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Wastewater Feasibility Study

Maldonado Winery Expansion P17-00101
Planning Commission Hearing Date 19, September, 2018

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

SEPTIC FEASIBILITY REPORT

FOR THE

MALDONADO WINERY
USE PERMIT MODIFICATION

PROJECT LOCATED AT

3070 OLD LAWLEY TOLL ROAD
CALISTOGA, CA 94559

COUNTY: NAPA
APN: 017-140-039

INITIAL SUBMITTAL: MAY 11, 2017

PREPARED FOR REVIEW BY:

NAPA COUNTY PLANNING, BUILDING AND ENVIRONMENTAL SERVICES
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I. INTRODUCTION

Maldonado Winery is applying to the County of Napa for a Use Permit Modification to increase wine production capacity and employee numbers. This report has been prepared to evaluate the feasibility of treating and disposing the increased wastewater flows for both domestic and process wastewater.

Maldonado Winery is currently approved for the following uses that contribute to wastewater flows on-site:

- *Production Capacity:* 15,000 Gallons Wine / Year
- *Employees:* 1 full-time
- *Daily Visitors:* 4/day

Maldonado Winery wishes to revise their marketing plan to increase their production capacity and number of staff as follows:

- *Production Capacity:* 30,000 Gallons Wine / Year
- *Employees:* 3 full-time/part-time
- *Daily Visitors:* 4/day (same)

Wastewater is currently treated and dispersed through a pressure distribution system. Delta Consulting and Engineering performed the engineering design for the existing wastewater treatment system, which treats both domestic and process wastewater. The system was completed in approximately June 2010. The following sections describe the existing system, design flows, and options for upgrades necessary to accommodate additional wastewater generated by increased wine production and employees.

II. EXISTING WASTEWATER FLOWS AND TREATMENT SYSTEMS

A. Wastewater Generation

Domestic Wastewater

The domestic wastewater (DW) generated at the Maldonado Winery is dependent on the daily number of employees and visitors present at the winery. The existing marketing plan, presented in the introduction of this report, determines the maximum number of guests the winery is permitted to serve in one day, as well as the maximum number of permanent and temporary employees that the winery needs to functionally operate. In terms of wastewater generation, this gives the maximum number of people that will be contributing to the daily peak wastewater flow rate. Based on the existing marketing plan and Napa County Regulations[1], the peak daily DW flow is:

Employees:	1 x 15 gallons/day = 15
Tasting Visitors:	4 x 3 gallons/day = 12
Daily Peak Flow:	27 gallons/day

[1] Napa County Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems, Appendix 1, Table 4, 2006.

Process Wastewater

The process wastewater (PW) generated at the Maldonado Winery varies throughout the winemaking year. A typical winemaking year begins with harvest preparation and harvest. These events occur during the months of August, September, and October. The harvest season typically generates both the largest volume and maximum strength of process wastewater. The Napa County Method is used to estimate the peak wastewater flow that could occur in one day during harvest. This method uses two base assumptions: the amount of process wastewater generated annually is only distributed during harvest period, and a multiplication factor of 1.5 is used for process waste generation. The results of their assumptions are shown below:

Napa County Method
(1.5 x 15,000 gallons wine) / 30 days crush = 750 gallons / day

B. Existing Wastewater Treatment System

Delta Consulting and Engineering designed a pressure distribution wastewater system for the winery in August 2009 to treat both domestic and process wastewater. Wastewater flows via gravity from plumbing features in the winery caves, crush pad, and bathroom to the primary septic tank to filter out solids and sediment. Process wastewater from the crush pad flows to a manual diversion valve, designed by others, prior to being routed to the primary septic tank.

After primary settling in the 3,000 gallon septic tank, effluent flows via gravity to a 2,500 gallon dosing tank. Effluent is pumped from the dosing tank to the pressure distribution (PD) field. The PD field was converted from an existing conventional leach field and consists of 630 linear feet (LF) of trench. Although only 583 LF of trench was required, 630 feet was used based on the existing conventional system layout and to balance each zone of the PD system. Each trench is 24-inches wide, constructed with a 12-inch tall gravel section over 36-inches of undisturbed sandy clay loam soil, and backfilled with 12-inches of native soil.

The size of the PD field is based on the total peak wastewater flow of 777 gallons/day and an approved site evaluation, dated July 1, 2004, which determined the application rate to be 0.8 gallons/sqft/day. Construction plans and calculations for the existing system are attached in Appendix A. The flow chart below details the existing DW treatment system.

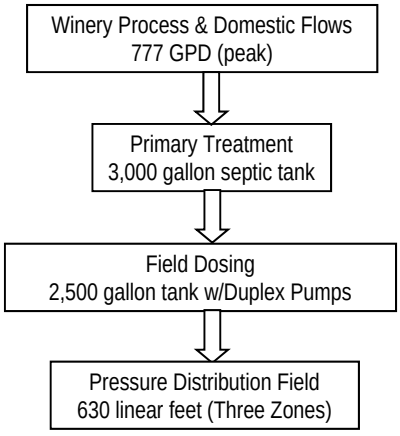

Figure 1: Existing Wastewater Treatment System Schematic

III. TREATMENT OPTIONS FOR INCREASED WASTEWATER FLOW

A. Wastewater Generation

Domestic Wastewater

The increase in domestic wastewater (DW) generated at Maldonado Winery is dependent on the proposed daily number of employees and visitors present at the winery. Based on the proposed marketing plan and Napa County Regulations[2], the total peak daily DW flow is:

Employees: 3 x 15 gallons/day = 45
Tasting Visitors: 4 x 3 gallons/day = 12

Daily Peak Flow: 57 gallons/day

Process Wastewater

The increase in process wastewater (PW) generated at Maldonado Winery is dependent on the proposed annual wine production quantity. The total peak daily flow using the Napa County Method is estimated below:

Napa County Method
(1.5 x 30,000 gallons wine) / 45 days crush = 1,000 gallons / day

B. Option #1: Add Pre-Treatment, Continue Use of Existing PD System

This option proposes to retrofit the existing PD system to accommodate the increase in wastewater from the winery. The majority of the retrofit will include the addition of treatment equipment to reduce wastewater strength and increase the application rate of the soil in the dispersal area. The treatment equipment will primarily reduce the Five Day Biochemical Oxygen Demand (BOD5) and Total Suspended Solids (TSS) in the wastewater. The sections below discuss the proposed treatment system required to increase the application rate and modifications to the PD field necessary to meet increased demand.

1. Primary Treatment

Primary Settling Tanks
The existing septic tank will be removed or repurposed and separate primary settling tanks will be provided for DW and PW. Each tank will be sized to provide approximately three days of hydraulic retention time for its respective waste stream. The tanks will be underground, fiberglass or concrete, and fitted with an effluent filter to retain solids larger than 1/16th of an inch within the tank.

Nutrient Addition and pH Balance
Process wastewater, the dominant component in the waste stream, is typically nitrogen deficient and acidic, two properties that make it difficult for bacteria to thrive and consume the organic material present in wastewater. To optimize the treatment process, nutrients and

[2] Napa County Regulations for Design, Construction, and Installation of Alternative Sewage Treatment Systems, Appendix 1, Table 4, 2006.

chemicals must be added to the wastewater. Ideally, chemicals required to improve the treatment process will be added to the effluent during the aeration process. For this treatment system, the addition of chemicals will be accomplished by pumping a slurry mix into the aeration tank. The slurry will be mixed within the tank until the optimal pH and nitrogen levels are reached. Monitors will be installed within the tank to automate the addition and mixing of the slurry and wastewater. The nutrient and pH adjustment chemicals at the winery will be monitored and administered by a contracted maintenance consultant. Equipment will be stored on an above ground pad area adjacent to the underground wastewater treatment tanks.

Aeration

The aeration stage is a critical part of the treatment process. It supplies oxygen to the wastewater and supports the bacteria population that consumes organic matter. The aeration tank must be sized to provide adequate hydraulic retention time for biological activity to take place. The amount of oxygen supplied must be determined by the BOD5 reduction expected in this stage of treatment.

Aeration will occur in an underground tank sized to provide approximately one to two days hydraulic retention time at the peak daily flow rate. The BOD5 influent concentration is expected to be 5,000 mg/L at peak loading conditions. The BOD5 reduction and subsequent oxygen supply will be determined at the construction document phase.

Aeration can be achieved by pumps and mixing nozzles within the tank or above ground blowers that force air into the underground aeration tank. The air delivery system will be determined at the construction document phase.

It is assumed that there will be no reduction of TSS in the aeration tank. Wastewater from the aeration tank will either flow via gravity or be pumped to the next stage of the treatment system.

Secondary Settling

Secondary settling is an important part of a treatment system that involves aeration. The aeration tank keeps solids suspended in solution because of air bubbles that are forced through the wastewater. Additionally, the rapid growth of bacteria forms colonies that flocculate and contribute to the TSS concentration. Providing a still environment for the solids and flocculants to settle out of solution is critical to maintaining low TSS concentrations and preventing solids buildup in pumps and filters. The secondary settling basin will be an underground storage tank sized to provide one to two days of hydraulic retention time and is expected to further reduce the TSS by through gravitational settling and filter screening.

Wastewater from the secondary settling tank will flow via gravity to the next stage of the treatment system.

2. Secondary Treatment

Orenco Advantex Filter & Recirculation Tank

To further reduce wastewater strength, an additional stage of biological treatment will be added to system after the secondary settling tank. The Advantex textile filter, manufactured by Orenco, is a fixed media filter designed to reduce BOD5 and TSS in the effluent.

Properly sized Orenco Advantex units can reduce up to 90% of the BOD5 and TSS present in wastewater. To maximize the treatment process and prevent fouling in the filter, Orenco recommends that a peak daily load of 0.08 pounds of BOD5 per square foot of filter area per day (lbs/sqft/day) should not be exceeded. In order to calculate the expected load to the filter, the daily flow rate and influent wastewater concentration must be estimated. For this report, it will be assumed that the aeration and secondary settling system will reduce the BOD5 in the wastewater to 400 mg/L. The conversion to pounds of BOD5 is estimated using the equation described below:

BOD5 (lbs/day) = Flow (Gallons) x BOD5 (mg/L) x (Conversion Constant $8.34x10^{-6}$ lbs/gal)
BOD5 (lbs/day) = (1,057 Gallons) x (400 mg/L) x ($8.34x10^{-6}$ lbs/gal)
BOD5 (lbs/day) = 3.52 lbs/day

To determine the amount of filter area required for adequate treatment, the expected daily BOD5 loading must be divided by the peak loading rate recommended by Orenco.

Minimum Filter Area (sqft) = (3.52 BOD5 lbs/day) / (0.08 lbs/sqft/day)
Minimum Filter Area (sqft) = 44.0 sqft

For this system, one AX-100 filter is recommended to provide redundancy and additional treatment area should issues arise with the aeration system. Each AX-100 unit provides 100 sqft of filter area. Due to the excess filter area, it is assumed that the system will provide a 90% reduction in BOD5 and TSS under normal operating conditions. A summary of the estimated wastewater strength characteristics after this stage of treatment are shown below:

BOD5 = 40 mg/L
TSS = 20 mg/L

The AX-100 unit requires an additional tank and pump system to circulate wastewater through the filter. Per manufacturer specifications, the re-circulation tank must be sized to store at least 80% of the peak daily flow. For this project, a minimum tank size of 1,000 gallons is recommended for the re-circulation tank. Treated wastewater will be transferred via gravity to a dosing tank for final storage and dispersal to the pressure distribution system.

2,500 Gallon Dosing Tank
The existing dosing tank is adequately sized for the increased flow rate and will be reused if possible or replaced. The float settings within the tank will be adjusted to account for the larger daily flow.

3. Treated Effluent Dispersal System

Pressure Distribution Field
Installing the treatment system described above allows for a pre-treatment credit that will increase the soil application rate to 1.0 gallon/sqft/day. With the increased application rate, 634 linear feet of PD trench is required to disperse the proposed peak flow rate of 1,057 gallons per day. This option proposes to add two linear feet of trench to each zone of the existing 630 linear foot PD field. This will increase the trench length of each zone to 212 linear feet, and the overall trench length to 636 linear feet. Calculations detailing the required trench length are provided in Appendix B.

The reserve area for this system will separate PW and DW. The PW will use the treatment system described above and disperse to land with a new surface drip irrigation system. The surface drip irrigation system is described in Section C below. The DW will be treated by a septic tank only and use the existing reserve area shown on the site map in Appendix B.

C. Option #2: Connect DW to Existing, Treat PW for Surface Drip Dispersal

The second option for wastewater treatment at the winery is to treat and disperse PW and DW separately. The DW would flow from source to a new septic tank, the existing dosing tank, and continue to use the existing PD system. Only one zone of the existing PD system would be used, with the other two held for the reserve area. Calculations are provided in Appendix C to demonstrate the capacity of one PD zone to accommodate the increased DW flow rate.

PW would be treated separately according to the primary and secondary treatment systems described in Option #1. Treated PW will be stored in an above ground tank prior to dispersal through a new surface drip irrigation system described below.

1. PW Surface Drip Dispersal System

Lift Station

A lift station tank or chamber within one of the treatment tanks will likely be required to pump treated PW effluent to an above ground wet weather/irrigation storage tank. The new pumping and control system will be determined at the construction document phase.

10,000 Gallon Above Ground Storage Tank

During the rainy season, water to be used for surface drip dispersal must be stored for 48 hours before, during, and 48 hours after storm events. Fortunately, the daily wastewater generated during the rainy season is much lower than what is generated during harvest. Typically, the average non-harvest flow rate is used to determine the amount of irrigation storage required. The water balance calculations provided in Appendix C determined the minimum storage required is 10,000 gallons based on anticipated number of rainy days and average non-harvest monthly flow rates. Potential locations for the tank are also provided in Appendix C. An above ground irrigation pump located adjacent to the tank will be used to dose the surface drip dispersal system.

Surface Drip Dispersal Field

The surface drip dispersal system is sized based on site specific conditions including soil type, vegetation, evapotranspiration, and precipitation. This project proposes to disperse treated PW in the existing vineyards on the Maldonado Winery parcel. A water balance calculation detailing the site conditions and proposed flow rates has been prepared to determine the required vineyard area and can be seen in Appendix C. Additionally, a soils report prepared using the Natural Resources Conservation Service (NRCS) online Web Soil Survey (www.websoilsurvey.sc.eov.usda.gov) is included in Appendix D. The proposed surface drip dispersal system will be installed on the vine rows across the entire existing vineyard area (approximately ½ acre). The direct, on ground effective infiltration area is approximately 8,500 square feet.

IV. CONCLUSION

Maldonado Winery is proposing an annual wine production of 30,000 gallons, three employees, and a maximum of four daily visitors. The existing pressure distribution wastewater system was designed to accommodate 777 gallons per day of combined process and domestic wastewater. Because additional leach lines were added during construction, the existing system can be retrofitted to accommodate the increased combined flow of 1,057 gallons per day. The reserve area involves separated the PW and DW wastewater streams, dispersing treated PW effluent as surface drip irrigation in the vineyards, and utilizing the existing reserve area for the DW.

As a secondary option, the Maldonado Winery would like to consider the use of treated process wastewater for vineyard irrigation. Several additional pieces of equipment would be required for this system and can be seen in the site map in Appendix C. If this option is pursued, the domestic wastewater from the winery will be connected to the existing PD septic system.

With the treatment options outlined in this report Maldonado Winery is capable of treating and dispersing the additional wastewater generated by the proposed increases to their marketing plan.

IX. APPENDIX

A. Existing System: Calculations & Plans (11”x17”)
B. Treatment Option #1: Calculations & Site Plan
C. Treatment Option #2: Calculations & Site Plan
D. NRCS Site Soil Report

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APPENDIX A:
EXISTING SYSTEM: CALCULATIONS & PLANS (11”x17”)

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Project: Maldonado Winery
3082 Lawley Old Toll Road
Calistoga, CA 94559
APN: 017-140-039

Project Description:
The following design is for a pressure distribution septic system to accommodate the wastewater flows from a winery with a production capacity of 15,000 gallons per year. The effluent from the winery consists of approximately 750 gallons of process waste and 27 gallons domestic waste. The combined effluent is treated with the system consisting of a 3,000 gallon septic tank, gravity flow to a 1,500 gallon dosing tank, and field dispersal to a pressure distributed distribution field.

This design is based on the retrofitting of an approved standard septic system. Upon layout of the standard distribution field, it was discovered that the field encroached into the 100' creek setback. These calculations are for the conversion from a standard system to a pressure distribution system. In the "Distribution Lateral Design' area, the three (3) zones are made up of the existing laterals to be used for the pressure distribution field.

Site Evaluation Conclusions

Performed By:	Delta Consulting		Soil Type:	(SCL) Sandy Clay Loam
Site Evaluation Date:	5/27/2004		Structure-Grade:	(S) Strong
Primary Acceptable Core Hole #s:	1 & 2		Structure-Shape:	(SB) Subangular Blocky
Reserve Core Hole #s:				
Pretreatment Credit?	Not Required			
		Use STE--->	Application Rate Used:	0.8 gal/ft^2/day

Trench Design

Acceptable Soil to:	48	in				
Undistrubed Soil Below Trench Bottom:	36	in	Allowable Undisturbed Soil OK			
Remaining Soil for Trench:	12	in				
Depth of Trench:	12	in	Trench Depth OK			
Gravel over Pipe Crown	2	in				
Distribution Lateral Crown from Trench Bottom:	10	in				
Soil Cover over Gravel to Trench Top:	0	in				
Soil Cover above Existing Ground	12	in				
Available Sidewall Area:	1.67	ft^2/ft	Sidewall OK			
Average Slope-Distribution Field:	0-5%					
Trench Spacing:	5	ft				

Notes: Distribution field shall be covered w/ 12 in. of suitable soil (no clay)

Design Waste Flows

Residential Domestic Flows (Daily)

	# Bedrooms	gal/bdrm	Total GPD
Main House	0	120	0
Guest House	0	120	0

Winery Domestic Flows (Daily)

	#	gal/person	Total GPD
Employees	1	15	15
Guests/Visitors	4	3	12

Winery Process Flows (Peak Daily)

GPY of Wine	Days Crush	Total GPD
15,000	30	750

Total Design Flows= 777 gallons per day

Note: 20% reduction in flow: Water saving devices must be incorporated into dwelling

Distribution Field Sizing

Trench Sidewall Required	971	ft^2	
Total Length of Distribution Pipe	583	ft	
Number of Distribution Laterals	9		
Length of Each Lateral	70	ft	This value is the average per zone
Number of Dosing Zones	3		
Laterals per Zone	3		

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Distribution Lateral Design

Orifice Size:	1/8	in
Orifice Spacing:	24	in ← **REVISED 8-5-09**
Orifice Area:	8.522E-05	ft^2
Required Squirt Height:	5	ft
Orifice Flow:	0.42	gpm/orifice
Hazen-Williams Roughness Coef:	150	

Typical Dosing Zone	Lateral Length (ft)	Orifice Offset (ft)	# Orifices	Lateral Flow (gpm)	
ZONE 1					
Lateral 1	90	2	45	19	
Lateral 6	60	2	30	13	
Lateral 7	60	2	30	13	
Dosing Zone Totals	210	ft	Zone Flow=	44	gpm
ZONE 2					
Lateral 2	90	2	45	19	
Lateral 4	60	2	30	13	
Lateral 8	60	2	30	13	
Dosing Zone Totals	210	ft	Zone Flow=	44	gpm
ZONE 3					
Lateral 3	80	2	40	17	
Lateral 5	70	2	35	15	
Lateral 9	60	2	30	13	
Dosing Zone Totals	210	ft	Zone Flow=	44	gpm
Total Distribution Field Length	630	ft	Lateral Length OK		

Septic Tank Design

Winery

Model\Tank Dimensions:	Inv In (in)	Inv Out (in)	Overall Width (in)	Overall Length (in)	Overall Depth (in)	Tank Top to Inv In (in)
Jenson JS-3000 (Res)	67	64	69	202	77	10

Water Surface Area:	82.2	ft^2
Volume/ft depth:	82.2	ft^3
Gallons/tank depth:	614.7	gallons/ft
Hydraulic retention time:	4.3	days
County Formula for Septic Tank (gal):	1708	Use 3,000 gallon tank

Septic Tank Elevations

FG:	464.00	ft			
MH Rim:	464.25	ft	Tank Soil Cover	2.00	Depth OK
Top of Tank:	462.00	ft			
Tank Pad Elevation:	455.58	ft			
Tank floor or Tank Invert:	455.92	ft	Assumes 4" thick tank bottom		
Invert In:	461.17	ft			
Invert out:	460.92	ft			

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Dosing Tank Design

Model\Tank Dimensions:	Inv In (in)	Inv Out (in)	Overall Width (in)	Overall Length (in)	Overall Depth (in)	Tank Top to Inv In (in)
Jenson JS-2500 (Res)	58	55	69	202	68	10

Water Surface Area:	82.2	ft^2
Volume/ft depth:	82.2	ft^3
Gallons/tank depth:	614.7	gallons/ft

Dosing Tank Elevations

FG:	463.00	ft			
MH Rim:	463.25	ft	Soil Cover=	2.00	Depth OK
Top of tank	461.00	ft			
Tank Pad Elevation:	455.33	ft			
Tank floor:	455.66	ft	Assumes 4" thick tank bottom		
Invert In:	460.17	ft			

Dosing Pump Specifications

		Zone Dosing Req. (gpm)	Pump Specifications MLL (in)	Pump Specifications Height (in)	Operating Point Required Flow (gpm)	Operating Point Required Head (ft)
Dosing Pump	Orenco PF500712	44	25	23.7	60	57
Dosing Pump Discharge Diameter	2					

Float Elevations in Dosing Tank (Timed Dosing)

Bottom Float: Low Level Alarm/Redundant Off	458.00	ft	0.25	feet (3 inches) above Pump MLL	
Second Float: Timer On (begins pump timer cycle)	458.25	ft	0.25	feet above LLA/RO	
Start Timer Cycle (Pump Off)	57	min--->	300	gallons - Normal Operation Range	
Pump On (Cycles Second)	3	min--->	180	gallon dose	
Surge Volume:	300	gallons above second float			
Third Float: Timer Over-ride	458.73	ft			
Timer Over-ride: Pump OFF	24	min			
Timer Over-ride: Pump ON	6	min--->	360	gallon dose	
Top Float: Alarm	458.90	ft	ok		
Storage above Alarm Float	777	gallons			
Simplex pump Top Float: High Water Alarm*	458.90	ft	777	gallons below SS Invert In	
Duplex pump Top Float: High Water Alarm*	459.35		500	gallons below SS Invert In	
	Simplex pumping OK				
	Float settings Ok				

Field Float Settings		
Top (High Level Alarm):	38.9	inches from pump tank floor
Third Float (Timer Over-ride / Lag Pump On)	36.9	inches from pump tank floor
Second Float (Timer On/Off)	31.0	inches from pump tank floor
Bottom Float (Low Level Alarm/Redundant Off)	28.0	inches from pump tank floor
Standing Water Depth:	2.33	ft
Volume below Float Off:	1434	gallons
Gross Operating Range:	403	gallons

Alarm Float to Timer On Float

*If alarm condition is reached, terminate all sources of waste flow to the system immediately & inspect.

Pressure Main / Lateral Size & Volume

Highest Distribution Lateral (assumed):	459.00	ft
Including Squirt Height:	464.00	ft
Lift Head Loss:	8	ft

Hazen-Williams Coefficients

Pressure Main	137
Lateral	137

	Pipe Type	Diameter (in)	Length (ft)	Gallons/Ft	Volume (gal)	Velocity (ft/s)
Pressure Main	PVC, CPVC	2.00	521	0.170	88.5	4.49
Distribution Lateral	PVC, CPVC	1.50	70	0.103	7.2	7.98

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System Head Losses

Transmission Mains	Pipe Type	Diameter (in)	Length (ft)	Gallons/Ft	Volume (gal)	Velocity (ft/s)
Pump to Hydrotec	PVC, CPVC	2	11	0.170	1.9	4.49
Hydrotec to Manifold	PVC, CPVC	2	550	0.170	93.4	4.49
None	None	-	-	-	-	-
None	None	-	-	-	-	-

Component Head Losses

Transmission Mains

	Reynolds Number	Flow Type	Roughness, ε	Friction Factor, f	Head Loss (ft) Darcy Wiesbach	Hazen-Williams
Pump to Hydrotec	61,902	Turbulent Flow	0	0.0198	0.41	0.48
Hydrotec to Manifold	61,902	Turbulent Flow	0	0.0198	20.47	24.05
None	-	-	0	-	-	-
None	-	-	0	-	-	-
				Total Transmission Loss	20.88	24.53
				Use:	22.70	ft

Friction Factor, f (curve fit): 0.0199

Reynolds Number assumes water at 60°F

Assumes smooth pipe walls; If Roughness changes from 0, input Roughness coefficient

Fittings and Equipment

Item	Number of Fittings	K Value	Head Loss (ft)/fitting	Total Loss/Fitting (ft)	
Gate 1/4 closed	1	0.26	0.08	0.08	
Regular 90°, threaded	4	1.5	0.47	1.88	
Regular 45°, threaded	2	0.4	0.13	0.25	
None		-	-	-	
None		-	-	-	
None		-	-	-	
None		-	-	-	
Orenco FM150 (1.5")	1			5.28	Flow OK
Orenco 2" Discharge Assembly HV200BC	1			3.9	Size matches Pump discharge
Orenco Hydrotec V6400A	1			11.9	Flow OK
Use: Orenco Hydrotec V6403A			Total Fitting Losses (ft)	23.3	ft

Total System Head Losses

Component	Head Loss (ft)	
Transmission Main	22.70	ft
Fittings	23.30	ft
Lift Head Loss	3.34	ft
Total Head Loss	49.34	ft
15% F.S.	56.74	ft
Use	57	ft

Design Notes & Pump Specifications

Dosing Pump
(2) Orenco P500712 effluent pump, single phase, 0.75 hp, 230 volts
Pump provides 65 feet of dynamic head at 44 GPM.
Orenco Biotube Pump Vault Model: PVU 68-24-25-L (68" height, 24" filter cartridge, 25" high inlet holes)
Orenco Hydrote Automatic Distributing Valve Model: V4603
Orenco control panel MVP-DAX-2-IR-PT-RO-PRL-DS-RA-TS-PL-SA for system pumps on one panel
Contact Eric Moody at Pace Supply, Santa Rosa (707) 547-4447 for ordering and model number confirmation

[1]PT=Programable Timer, RO=Redundant Off, RA=Remote Alarm, CT=Counter, PRL=Pump Run Light, PL=Power Light, SA=Surge Arrestor

Distribution System
Type: Pressure Distribution
Zones: 3
Laterals per Zone: 3
Length of Individual Laterals: 70 feet average
Length: 210 feet / Zone
Total Length all Zones: 630 feet

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PRESSURE DISTRIBUTION SEWAGE DISPOSAL SYSTEM FOR:

MALDONADO WINERY

3082 LAWLEY OLD TOLL ROAD
CALISTOGA, CALIFORNIA

DESIGN SUMMARY

DESIGN NOTES

1. THIS SET OF PLANS IS FOR THE DESIGN OF A PRESSURE DISTRIBUTION SYSTEM TO SERVE A PROPOSED WINERY WITH A COMBINED PROCESS WASTE AND DOMESTIC WASTE FLOW OF 777 GALLONS PER DAY. THE SYSTEM FOR THE PROCESS (750GPD) AND DOMESTIC (27GPD) EFFLUENT CONSISTS OF A 3,000 GALLON SEPTIC TANK, A 2,500 GALLON DOSING TANK, AND FINAL DISPOSAL TO PRESSURE DISTRIBUTION FIELD WITH CHAMBERS.
2. THIS DESIGN IS BASED ON TWO SITE EVALUATIONS, BOTH PERFORMED BY MONTELLI CONSTRUCTION, ST. HELENA, CA AND OBSERVED BY NAPA COUNTY ENVIRONMENTAL MANAGEMENT. THE RESERVE FIELD DESIGN IS BASED ON THE FIRST SITE EVALUATION PERFORMED ON 9/8/2000. THE PRIMARY FIELD DESIGN IS BASED ON THE SECOND SITE EVALUATION PERFORMED ON 7/1/2004.
3. THE OWNER MUST SECURE AN ANNUAL OPERATING PERMIT FROM THE NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT FOR THE SYSTEM. ALL REQUIRED SYSTEM MONITORING AND REPORTING SHALL BE COMPLIED WITH AS REQUIRED BY SAID DEPARTMENT.
4. WATER SUPPLY IS PROVIDED BY AN ON-SITE WELL THAT IS GREATER THAN 100 FEET FROM THE SEPTIC TANKS AND DISTRIBUTION FIELD. NO KNOWN WATER LINES EXIST WITHIN 10 FT OF THE SEPTIC TANKS OR DISPOSAL FIELD. IF ANY WATERLINES ARE FOUND DURING CONSTRUCTION, CONTRACTOR IS TO REMOVE AND/OR RELOCATE AS REQUIRED.
5. A REVIEW OF THE ADJOINING PARCEL'S FILES AT THE NAPA COUNTY ENVIRONMENTAL MANAGEMENT DEPARTMENT YIELDED NO WELLS LOCATED WITHIN 100 FEET OF THE PROPOSED DISTRIBUTION OR RESERVE FIELDS. A VISUAL SITE INSPECTION YIELDED THE SAME RESULT.

GENERAL NOTES

1. CONTRACTOR SHALL BE APPROPRIATELY LICENSED WITH THE STATE OF CALIFORNIA TO PERFORM THE WORK OUTLINED IN THESE PLANS.
2. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL SECURE ANY CONSTRUCTION PERMITS FROM THE GOVERNING AGENCIES AS NECESSARY AND PAY ALL FEES INCLUDING INSPECTION FEES.
3. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNERS AND THE ENGINEER HARMLESS FROM ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THE PROJECT; EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNERS OR THE ENGINEER.
4. SHOULD ANY CONTRACTOR OR SUBCONTRACTOR FIND ANY DEFICIENCIES, ERRORS, CONFLICTS OR OMISSIONS IN THESE PLANS AND SPECIFICATIONS OR SHOULD HE BE IN DOUBT AS TO THEIR MEANING OR INTENT, HE SHALL NOTIFY THE ENGINEER FOR A WRITTEN CLARIFICATION, ADDENDUM, ETC. SHOULD HE FAIL TO DO SO BEFORE SUBMITTING A PROPOSAL, HE CANNOT CLAIM ADDITIONAL COMPENSATION FROM WORK REQUIRED TO COMPLETE THE PROJECT.
5. WRITTEN DIMENSIONS ALWAYS TAKE PRECEDENCE OVER SCALED DIMENSIONS. IF THERE IS A CONFLICT, NOTIFY THE ENGINEER AND OBTAIN A CLARIFICATION. NO DEVIATIONS OR SUBSTITUTIONS SHALL BE ALLOWED WITHOUT OBTAINING WRITTEN APPROVAL FROM THE ENGINEER.
6. ALL WORKMANSHIP AND MATERIALS FOR IMPROVEMENTS SHALL CONFORM TO THE STANDARD SPECIFICATIONS OF THE COUNTY OF NAPA, LATEST EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS AND STANDARD PLANS. THE ONSITE IMPROVEMENTS SHALL BE INSPECTED BY THE PUBLIC WORKS INSPECTOR.
7. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR BEING FAMILIAR WITH THE PROVISIONS AND REQUIREMENTS IN THE COUNTY OF NAPA STANDARD SPECIFICATIONS. CONTRACTOR SHALL HAVE A COPY AVAILABLE AT THE JOB SITE AT ALL TIMES.
8. CONTRACTOR SHALL REQUEST INSPECTIONS A MINIMUM OF ONE WORKING DAY IN ADVANCE BY CALLING THE COUNTY OF NAPA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AT (707) 253-4471.
9. ALL MATERIAL SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR UNLESS OTHERWISE NOTED.
12. FADED BACKGROUND REPRESENTS EXISTING TOPOGRAPHIC FEATURES.

SEPTIC & PUMP TANKS AND RISERS

SEPTIC TANKS

1. ALL SEPTIC TANKS MUST BE ACCEPTED BY IAPMO AS MEETING STANDARD PS-1 AND MEET THE FOLLOWING SPECIFICATIONS:
   1.1 ALL SEPTIC TANKS SHALL BE WATER TIGHT AND SHALL BE COATED ON THE INTERIOR WITH A WATERPROOF BITUMINOUS COMPOUND COMPLYING WITH ASTM D 41-78 PER THE MANUFACTURERS SPECIFICATIONS.
   1.2. METAL OR WOODEN TANKS ARE PROHIBITED.
   1.3. ALL SEPTIC TANKS SHALL BE OF TWO COMPARTMENT CONSTRUCTION. THE FIRST SHALL BE TWICE THE CAPACITY OF THE SECOND AND SEPARATED BY A BAFFLE.
2. ALL BELOW GROUND TANKS SHALL BE PROPERLY ANCHORED TO PROTECT IT FROM BOUYANT FORCES.
3. ALL TANK ELEVATIONS SHALL BE DETERMINED IN THE FIELD TO PROVIDE A MINIMUM 2% SLOPE FROM THE CONNECTION POINTS. ALL ELEVATIONS SHOWN ON DETAILS ARE SUBJECT TO FIELD CONDITIONS.

PUMP TANK SPECIFICATIONS

1. SUMP TANK SHALL PROVIDE A 780 GALLON STORAGE CAPACITY BETWEEN THE HIGH WATER ALARM AND THE OUTLET (SIMPLEX PUMP).
2. CONCRETE SUMP TANKS SHALL BE A MONLITHIC CASTING OR JOINTS SEALED SEALED WITH THOROPLUG OR OTHER APPROVED SEALANTS. CONCRETE SUMPS SHALL BE PROTECTED WITH "XYPEX", "THOROSEAL" OR "ULTRA-BLOC" ON THE INSIDE. ASPHALT EMULSION OR TAR SHALL NOT BE USED AS JOINT SEALANTS.
3. ALL SUMPS SHALL HAVE A 24" MINIMUM RISER THAT EXTENDS TO AT LEAST SIX INCHES ABOVE FINISHED GRADE. RISERS SHALL BE SEALED WATERTIGHT TO THE SUMP CHAMBER WITH "RAMNEK" OR OTHER APPROVED MATERIAL. WOOD RISERS ARE NOT ALLOWED.
4. ALL PIPES AND/OR ELECTRICAL CONDUITS ENTERING THE SUMP SHALL BE GAS AND WATER TIGHT. GROUT OR ASPHALT EMULSION IS NOT AN ACCEPTABLE SEALANT.
5. IF A STANDARD SEPTIC TANK IS UTILIZED FOR THE PUMP TANK, CONTRACTOR SHALL CHISEL A MINIMUM 10" Ø HOLE AT THE BASE OF THE BAFFLE WALL TO ALLOW FREE FLOW OF EFFLUENT BETWEEN COMPARTMENTS

TANK PLACEMENT

1. TANKS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATION.
2. THE TANK SHALL BE INSTALLED ON UNDISTURBED SOIL A MINIMUM OF 18" BELOW ORIGINAL GRADE ON A SOLID BED AND TO BE INSTALLED LEVEL.
3. SOIL BEARING CAPACITY SHALL BE A MINIMUM OF 1000 PCF.
4. SOIL AROUND THE TANK MUST BE COMPACTED; SAND MUST BE JETTED.
5. FILL TANK WITH WATER AFTER IT HAS BEEN SET IN PLACE AND THE SIDES BACKFILLED.
6. TANKS MUST HAVE A STRENGTH CAPABLE OF WITHSTANDING ANTICIPATED LOADS.

ACCESS RISERS

1. A RISER SHALL EXTEND FROM EACH MANHOLE COVER TO A HEIGHT OF SIX INCHES ABOVE THE GROUND TO ALLOW ACCESS FOR INSPECTION AND MAINTENANCE OF THE TANK.
2. THE RISER SHALL BE A MINIMUM OF 36"Ø TO ALLOW SUFFICIENT ROOM FOR INSTALLATION OF PUMPS AND FUTURE MAINTENANCE AND BE OF SUFFICIENT SIZE FOR REMOVAL OF THE TANK MANHOLE COVER.
3. RISERS SHALL BE WATERTIGHT CONCRETE, PVC OR FIBERGLASS, AND SHALL BE CAPABLE OF WITHSTANDING LOADS FROM SOIL BACKFILL.
4. RISERS SHALL BE FITTED WITH AIRTIGHT DURABLE LIDS THAT HAVE A LOCKING MECHANISM TO PREVENT UNWANTED ENTRY AND PREVENT INSECT/RODENT ACCESS.
5. GROMMET(S) SHALL BE USED FOR ALL PIPE/CONDUIT PENETRATIONS.

ACCESS RISERS: NON-TRAFFIC AREAS
1. BOND ALL RISERS TO TANK ADAPTER WITH RECOMMENDED ADHESIVE TO CREATE A WATERTIGHT SEAL TYPICAL.
2. USE FIBERGLASS GASKETED LID(S) WITH STAINLESS STEEL BOLTS IN NON-TRAFFIC AREA.

ACCESS RISERS: TRAFFIC AREAS
1. USE TRAFFIC RATED RISERS AND MANHOLE COVERS IN TRAFFIC AREAS AND ADEQUATELY SEAL TO CREATE A WATER TIGHT CONNECTION TO THE TANK AND RISER SECTIONS.

SEPTIC TANK CONNECTIONS

1. ALL CONNECTIONS FROM BUILDINGS TO SEPTIC TANKS SHALL BE MADE IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE UNIFORM PLUMBING CODE.
2. EFFLUENT FILTERS, WHICH ARE TO BE USED IN ALL SPETIC TANKS, SHALL BE EQUIVALENT TO ZABEL A100, OR THE ORENCO 4" BIOTUBE EFFLUENT FILTER.

PRESSURE DISTRIBUTION SYSTEM CONSTRUCTION

NOTES:

1. THE TRENCH BOTTOMS MUST BE INSTALLED LEVEL WITHIN A TOLERANCE OF 0.25 FEET (3 INCHES) VERTICALLY PER 100 FEET HORIZONTALLY.
2. IF THE LAYOUT OF THE FIELD STAKES DOES NOT ALLOW FOR THE ABOVE CONDITION, THE ENGINEER SHALL BE NOTIFIED IN ORDER TO FACILITATE A DESIGN ADJUSTMENT.
3. THE CONTRACTOR SHALL OBTAIN CERTIFICATIONS FROM THE SUPPLIER FOR THE MATERIALS STATING THAT THEY MEET THE SPECIFIED CRITERIA ON THE PLANS.
4. THE PRESSURIZED TRANSMISSION LINE SHALL BE PLACED A MINIMUM OF 24 INCHES BELOW THE GROUND SURFACE.
5. PERFORM HYDRAULIC TEST AFTER THE DISTRIBUTION SYSTEM HAS BEEN COMPLETED.
6. INSTALL MONITORING WELLS AND DETAILS AS SHOWN ON THE PLAN.
7. COMPLETE PROPER DRAINAGE WORK AND EROSION CONTROL MEASURES BEFORE FINAL INSPECTION.

CONSTRUCTION NOTES:

1. THE TRENCHES SHALL BE EXPLICITLY PARALLEL TO THE NATURAL EXISTING CONTOUR OF THE GROUND ALONG ITS LENGTH. THE TRENCHES MUST BE INSTALLED WITHIN A TOLERANCE OF 0.25 FEET (3 INCHES) VERTICALLY PER 100 FEET HORIZONTALLY.
2. IF THE LAYOUT OF THE FIELD STAKES DOES NOT ALLOW FOR THE ABOVE CONDITION, THE ENGINEER SHALL BE NOTIFIED IN ORDER TO FACILITATE A DESIGN ADJUSTMENT.
3. THE CONTRACTOR SHALL OBTAIN CERTIFICATIONS FROM THE SUPPLIER FOR THE MATERIALS STATING THAT THEY MEET THE SPECIFIED CRITERIA ON THE PLANS.
4. THE PRESSURIZED TRANSMISSION LINE FROM THE SUMP TO THE DISTRIBUTION FIELD SHALL BE PLACED A MINIMUM OF 24 INCHES BELOW THE GROUND SURFACE.
5. CONTRACTOR SHALL FOLLOW THE FOLLOWING PREPARATION OF DISTRIBUTION FIELD SOIL SURFACE:
   5.1 MOW EXCESSIVE VEGETATION. REMOVE TREES, CUT AND GRIND STUMPS TO A DEPTH OF 6 INCHES.
   5.2 IF A SOIL CAP IS REQUIRED (SEE TRENCH SECTION), RIP THE NATIVE GROUND PARALLEL TO THE CONTOURS OF THE GROUND WITHIN THE LIMITS OF THE DRAIN FIELD IN ORDER TO PROVIDE A SUITABLE INTERFACE WITH THE FILL SOIL TO BE PLACED. RIP IN ONE DIRECTION, RIPPERS SET TEN INCHES APART AND RIP ONLY THREE INCHES DEEP. PROHIBIT ALL TRAFFIC ON ANY RIPPED SURFACES UNTIL THE FILL MATERIAL HAS BEEN PLACED.
   5.3 CONDITION SOIL COVER FILL MATERIAL WITH SUFFICIENT MOISTURE TO PERMIT WHEEL ROLLING TO 85% COMPACTION.
   5.4 PERFORM HYDRAULIC TEST AFTER THE DISTRIBUTION SYSTEM HAS BEEN COMPLETED.
   5.5 INSTALL MONITORING WELLS AND DETAILS AS SHOWN ON THE PLAN.
   5.6 COMPLETE PROPER DRAINAGE WORK AND EROSION CONTROL MEASURES BEFORE FINAL INSPECTION.
6. THE AREA OF THE DISPOSAL FIELD SHALL BE PROTECTED FROM COMPACTION DUE TO EQUIPMENT STORAGE, TRAFFIC, OR OTHER POTENTIALLY DAMAGING ACTIVITIES, PRIOR TO AND DURING CONSTRUCTION. FAILURE TO COMPLY WITH THIS REQUIREMENT MAY RESULT IN THE SYSTEM HAVING TO BE RELOCATED, WHICH WILL REQUIRE ADDTIONAL ENGINEERING AND SOIL TESTING.
7. A MINIMUM OF 6 MONITORING WELLS SHALL BE PLACED WITHIN AND AROUND THE DISTRIBUTION SYSTEM TO A DEPTH OF 24" BELOW THE PROPOSED TRENCH BOTTOM AT THE FOLLOWING LOCATIONS:
   A. ONE OR MORE SHALL BE INSTALLED BETWEEN TRENCHES IN THE MIDDLE OF THE LEACH FIELD.
   B. ONE OR MORE SHALL BE INSTALLED 10 FEET DOWNSLOPE OF THE LOWEST TRENCH LINE.
   C. TWO SHALL BE INSTALLED 25 FEET DOWNSLOPE OF THE LOWEST TRENCH LINE.
   D. ONE OR MORE SHALL BE INSTALLED 10 FEET UPSLOPE OF THE HIGHEST TRENCH LINE.
   E. ALL SHALL BE PROTECTED AND ENCASED WITHIN A PLASTIC OR CONCRETE BOX TO PROVIDE ACCESS.
   F. FOR MONITORING WELL DETAIL, SEE DETAIL 3, SHEET SS3

PUMP, ALARM AND ELECTRICAL

SUMP TANK SPECIFICATIONS

1. SUMP TANK SHALL PROVIDE A MINIMUM OF 600 GALLONS STORAGE BETWEEN THE HIGH WATER ALARM AND THE INLET (DUPLEX PUMPS).
2. CONCRETE SUMP TANKS SHALL BE A MONLITHIC CASTING OR JOINTS SEALED SEALED WITH THOROPLUG OR OTHER APPROVED SEALANTS. CONCRETE SUMPS SHALL BE PROTECTED WITH "XYPEX", "THOROSEAL" OR "ULTRA-BLOC" ON THE INSIDE. ASPHALT EMULSION OR TAR SHALL NOT BE USED AS JOINT SEALANTS.
3. ALL SUMPS SHALL HAVE A 24" MINIMUM RISER THAT EXTENDS TO AT LEAST SIX INCHES ABOVE FINISHED GRADE. RISERS SHALL BE SEALED WATERTIGHT TO THE SUMP CHAMBER WITH "RAMNEK" OR OTHER APPROVED MATERIAL. WOOD RISERS ARE NOT ALLOWED.
4. ALL PIPES AND/OR ELECTRICAL CONDUITS ENTERING THE SUMP SHALL BE GAS AND WATER TIGHT. GROUT OR ASPHALT EMULSION IS NOT AN ACCEPTABLE SEALANT.

PUMP CONTROL SPECIFICATIONS

1. FLOAT CONTROLS FOR THE PUMP AND AUDIO/VISUAL ALARM SHALL BE MOUNTED TO A SCHEDULE 40 PVC POLE MOUNTED INSIDE THE PUMP CHAMBER THAT CAN BE REMOVED FOR MAINTENANCE.
2. CONTROL FLOATS SHALL BE ATTACHED TO PVC POLE WITH PLASTIC TIE STRAPS.
3. THE PUMP SHALL BE MOUNTED ON A 4" CONCRETE BLOCK ON THE SUMP TANK FLOOR.
4. A "WIDE ANGLE" MECURY/MECHANICAL FLOAT SWITCH SHALL BE USED TO ACTIVATE THE PUMP. NARROW ANGLE FLOAT SWITCHES ARE NOT ACCEPTABLE. THE ALARM/CONTROL BOX SHALL BE EQUIPPED WITH A MOTOR CONTACTOR FOR THE PUMP AND A MOMENTARY CONTACT "PUMP TEST" SWITCH TO MANUALLY RUN THE PUMP, BYPASSING THE CONTROL PANEL AUTOMATIC MODE.
5. THE ALARM/CONTROL BOX SHALL BE EQUIPPED WITH THE FOLLOWING:
   A. A LOUD AUDIO ALARM AND NECESSARY FLOAT TO INDICATE A HIGH WATER CONDITION.
   B. 7/8" DIAMETER (MINIMUM) RED LIGHT SHALL BE MOUNTED ON THE FACE OF THE PANEL & SHALL GLOW AS LONG AS THE HIGH WATER CONDITION EXISTS.
   C. MOMENTARY "ALARM TEST/ ALARM SILENCE" SWITCH TO TEST THE ALARM LIGHT & HORN AND TO SILENCE THE AUDIO ALARM HORN DURING A HIGH WATER CONDITION.
6. THE ALARM/CONTROL PANEL SHALL BE EQUIPPED INTERNALLY WITH SEPARATE CIRCUIT PROTECTION FOR THE CONTROL AND PUMP CIRCUITRY.
7. A NON-RESETTABLE DOSE COUNTER SHALL BE INSTALLED IN THE CONTROL BOX. CONTROL BOXES THAT MUST BE OPENED TO VIEW THE DOSE COUNTER SHALL BE EQUIPPED WITH A CLEAR PLASTIC OR PYREX SAFETY SHIELD INSIDE THE CONTROL BOX. THE CONTROL BOX SHALL HAVE A LABEL PLACED ON IT STATING "CAUTION-ELECTRICAL HAZARD".
8. ALARM / CONTROL PANEL ENCLOSURE SHALL BE NEMA TYPE 4. IF MOUNTED GREATER THAN 25 FEET FROM THE BUILDING, A REMOTE ALARM WITH AN ADDITIONAL LIGHT AND HORN SHALL BE PROVIDED.
9. ENCLOSURE FOR THE REMOTE AND AUDIO / VISUAL ALARM SHALL BE NEMA TYPE 4 (OUTDOORS) OR NEMA TYPE 1 (INDOORS).
10. EMERGENCY DISCONNECT FOR THE ALARM / CONTROL PANEL IS PROVIDED FOR BY THE INTERNAL FUSED DISCONNECT AND PUMP CIRCUIT BREAKER.

ELECTRICAL SPECIFICATIONS

1. A DISCONNECTING MEANS SHALL BE LOCATED IN SIGHT FROM THE PUMP LOCATION.
2. ELECTRICAL SERVICE TO THE ALARM / CONTROL PANEL SHALL BE EQUIPPED WITH A BREAKER OR FUSE AT THE POWER SOURCE WHICH IS LARGER THAN THE CIRUIT BREAKER FOR THE PUMP IN THE ALARM / CONTROL PANEL.
3. NO ELECTRICAL JUNCTION BOX SHALL BE PLACED BELOW GROUND LEVEL OR WITHIN THE SUMP.
4. ALL WIRES GOING INTO THE SUMP SHALL BE INDIVIDUALLY SEALED WITH PVC GAS TIGHT FITTINGS IN EITHER THE JUNCTION BOX OR ALARM/CONTROL PANEL AS APPROPRIATE. METALLIC GAS TIGHT FITTINGS ARE NOT ALLOWED.
5. ALL ELECTRICAL MATERIALS SHALL BEAR THE UL LABEL WHERE APPLICABLE.
6. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST REGULATIONS OF THE NATIONAL ELECTRIC CODE, CALIFORNIA OSHA, UNIFORM BUILDING CODE, CALIFORNIA BUILDING CODE, UNIFORM ELECTRIC CODE.
7. ALL WIRING FROM THE CONTROL / ALARM PANEL TO THE PUMP STATION SHALL BE ENCLOSED WITHIN CONDUIT.

PUMP SPECIFICATIONS

1. PUMP PROTECTION SHALL BE PROVIDED BY A THERMAL MAGNETIC CIRCUIT BREAKER FOR OVERLOAD AND SHORT CIRCUIT PROTECTION.
2. SINGLE PHASE PUMPS SHALL HAVE MOTOR WINDINGS WITH INTERNAL THERMAL OVERLOAD PROTECTION. THREE PHASE PUMPS SHALL HAVE AN ADJUSTABLE THERMAL OVERLOAD PROTECTION IN THE ALARM/CONTROL BOX.
3. THE PUMP POWER LEAD AND THE FLOAT SWITCH CONTROL WIRES SHALL NOT OCCUPY A COMMON CONDUIT.

PIPING OF SEWAGE EFFLUENT

1. WHERE ENTERING THE SUMP, A MINIMUM OF 3" DIAMETER PVC SHEDULE 40 STUB SHALL BE CAST IN PLACE OR SEALED WITH THOROPLUG OR OTHER WATERPROOF MATERIAL.
2. 2" PVC SCHEDULE 40 SHALL BE USED FOR THE PRESSURE LINE FROM PUMP TO LATERALS.
3. BRASS TYPE FITTINGS, VALVES, AND PIPING ARE PROHIBITED IN SUMP TANKS.

SURVEY NOTES

1. THE BOUNDARY ON THESE DRAWINGS DOES NOT REPRESENT A PROPERTY LINE SURVEY. PROPERTY LINES SHOWN HEREON ARE BASED ON RECORD DATA, AND MAY NOT REPRESENT THE TRUE POSITIONS OF THE LINES.
2. THE TOPOGRAPHY IS BASED ON AN UNDATED SURVEY BY H & H ENGINEERS, MIDDLETOWN, CA COMBINED WITH NAPA COUNTY GIS DATA UPDATED 3/30/2004.
3. THE TOPOGRAPHY IS ON AN ASSUMED DATUM.
4. DELTA CONSULTING & ENGINEERING ASSUMES NO LIABILITY, REAL OR ALLEGED, REGARDING THE ACCURACY OF THE TOPOGRAPHIC INFORMATION SHOWN ON THESE PLANS.

INSPECTION NOTES & SCHEDULE

ALL CONSTRUCTION MATERIALS AND PROCEDURES SHALL SATISFY THE REQUIREMENTS OF THE NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT. THE CONTRACTOR SHALL COORDINATE INSPECTIONS DIRECTLY WITH SAID DEPARTMENT. CONTRACTOR IS REQUIRED TO HAVE ENGINEER AND ENVIRONMENTAL HEALTH DEPARTMENT PERSONNEL INSPECT THE CONSTRUCTION AT THE FOLLOWING STAGES:

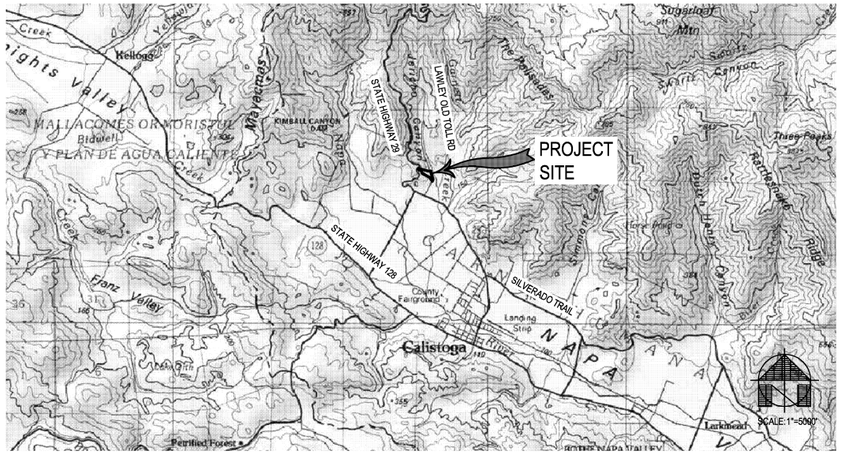
PRE-CONSTRUCTION MEETING
1. INITIAL SYSTEM LAYOUT AND SITE PREPARATION PRIOR TO TRENCHING WITH COUNTY REPRESENTATIVE, DELTA, CONTRACTOR, AND OWNER
2. CHECK TRENCH BOTTOM FOR LEVEL PRIOR TO PLACEMENT OF CHAMBERS
3. SEPTIC TANK AND PUMP TANK INSTALLATION & WATER TIGHT TEST CONDUCTED BY DELTA
4. HYDRAULIC (SQUIRT_TEST) IN CHAMBER PRIOR TO COVER CONDUCTED BY COUNTY AND DELTA
5. FINAL INSPECTION INCLUDING INSPECTION OF SUB-DRAINS, EROSION CONTROL MEASURES, AND/OR SURFACE WATER DIVERSION.

FAILURE TO REQUEST THESE INSPECTIONS WILL RESULT IN THE CONTRACTOR HAVING TO EXCAVATE THE SYSTEM FOR INSPECTION. THE CONTRACTOR SHALL GIVE 48-HOUR NOTICE TO THE ENGINEER FOR ANY OF THESE INSPECTIONS.

THE ENGINEER MUST ISSUE AN INSPECTION REPORT TO THE COUNTY PRIOR TO ACCEPTANCE OF THE SYSTEM BY THE COUNTY.

ABBREVIATIONS

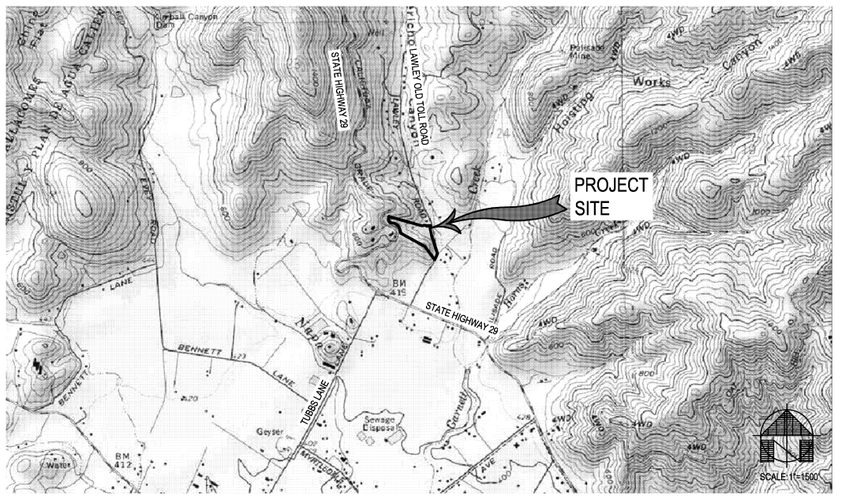
AB	AGGREGATE BASE	EC	END OF CURVE	LP	LOW POINT	RWL	RAIN WATER LEADER
AC	ASPHALT CONCRETE	(E)	EAST	MH	MANHOLE	RCP	REINFORCED CONCRETE PIPE
AD	AREA DRAIN	<E>	EXISTING	MON	MONUMENT	(S)	SOUTH
ARV	AIR RELEASE VALVE	ECR	END CURB RETURN	(N)	NORTH	S	SLOPE (FEET/FOOT)
BC	BEGIN CURVE	EG	EXISTING GROUND	<N>	NEW	SD	STORM DRAIN
BFE	BASE FLOOD ELEVATION PER FIRM	EP	EDGE OF PAVEMENT	NDS	NATIONAL DIVERSIFIED SALES	SLV	SLEEVE
BM	BENCHMARK	EVC	END VERTICAL CURVE	OC	ON CENTER	SL	SEWER LATERAL
BO	BLOWOFF	F/C	FACE OF CURB	OG	ORIGINAL GROUND	SRCP	SANTA ROSA CAST PRODUCT
BCR	BEGIN CURB RETURN	FDC	FIRE DEPT. CONNECTION	OH	OVERHEAD	SS	SANITARY SEWER
BVC	BEGIN VERTICAL CURVE	FG	FINISH GRADE	OHL	OVERHEAD LINE	SSCO	SANITARY SEWER CLEAN OUT
BSW	BACK OF SIDEWALK	FH	FIRE HYDRANT	PCC	PORTLAND CONCRETE CEMENT	SSFH	SANITARY SEWER FLUSH HOLE
CB	CATCH BASIN	FIRM	FLOOD INSURANCE RATE MAP	PD	PRESSURE DISTRIBUTION	SSMH	SANITARY SEWER MANHOLE
C&G	CURB AND GUTTER	FL	FLOW LINE	PG&E	PACIFIC GAS AND ELECTRIC	STA	STATION
CMU	CONCRETE MASONRY UNIT	FM	FORCE MAIN	PI	POINT OF INTERSECTION	STD	STANDARD
CP	CONCRETE PIPE	GB	GRADE BREAK	PIV	POST INDICATOR VALVE	SW	SIDEWALK
℄	CENTERLINE	HP	HIGH POINT	P℄	PROPERTY LINE	TC	TOP OF CURB
CO	CLEANOUT	IE	INVERT ELEVATION	PRC	POINT OF REVERSE CURVE	TW	TOP OF WALL
CV	CHECK VALVE	INST	INSTALL	PSI	POUNDS PER SQUARE INCH	TYP	TYPICAL
CW	COLD WATER	INV	INVERT	PUE	PUBLIC UTILITY EASEMENT	VC	VERTICAL CURVE
CWS	100 YEAR WATER SURFACE	IP	IRON PIPE	PVC	POLYVINYL CHLORIDE	VCP	VITRIFIED CLAY PIPE
DCV	DOUBLE CHECK VALVE	IRR	IRRIGATION	PVI	POINT OF VERTICAL INTERSECTION	VG	VALLEY GUTTER
DIP	DUCTILE IRON PIPE	JP	JOINT POLE	PW	PROCESS WASTE	(W)	WEST
DS	DOWNSPOUT	LF	LINEAL FEET/FOOT	R	RADIUS	WHARF	WHARF/DRAFT HYDRANT
DW	DRIVEWAY DOMESTIC WASTE	LH	LAMP HOLE	RC	RELATIVE COMPACTION	WM	WATER METER
DWG	DRAWING	LT	LEFT	RT	RIGHT	WS	WATER SERVICE
				ROW	RIGHT OF WAY	WV	WATER VALVE



VICINITY MAP

AREA SHOWN FROM USGS 15 MIN SERIES

SCALE = 1" = 5000'



AREA MAP

AREA SHOWN FROM USGS 7.5 MIN SERIES

SCALE = 1" = 1500'

PROJECT INFORMATION

OWNER/SUBDIVIDER:	MALDONADO WINERY HUGO MALDONADO 3082 LAWLEY OLD TOLL ROAD CALISTOGA, CA 94515 (707) 963-1217
SITE ADDRESS:	3082 LAWLEY OLD TOLL ROAD CALISTOGA, CA
ASSESSOR PARCEL #	017-140-014 (PREVIOUS APN PER NCEM) NEW WINERY APN 017–140-039 DISPOSAL FIELD APN 017-140-038
CIVIL ENGINEER:	DELTA CONSULTING & ENGINEERING, INC. 1104 ADAMS STREET, SUITE 203 ST. HELENA, CA 94574 ANDREW SIMPSON, P.E. (707) 963-8456

SHEET INDEX

EVERY PERSON PLANNING TO DIG
CALL USA AT 1-800-227-2600

FOR MORE INFORMATION,
SEE WWW.USANORTH.ORG

REGISTERED PROFESSIONAL ENGINEER
ANDREW A. SIMPSON
No. 62537
Exp. 12–31–09
CIVIL ENGINEER
STATE OF CALIFORNIA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707/963-8456 • 707/963-8528 FAX

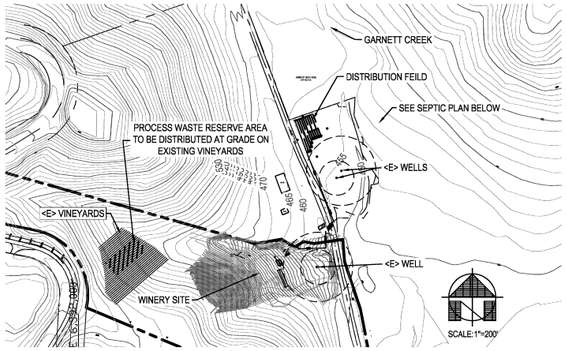
SEWAGE DISPOSAL DESIGN

COVER SHEET

PROJECT & LOCATION:
MALDONADO WINERY
3082 LAWLEY OLD TOLL ROAD
CALISTOGA CA
APN 017-140-014

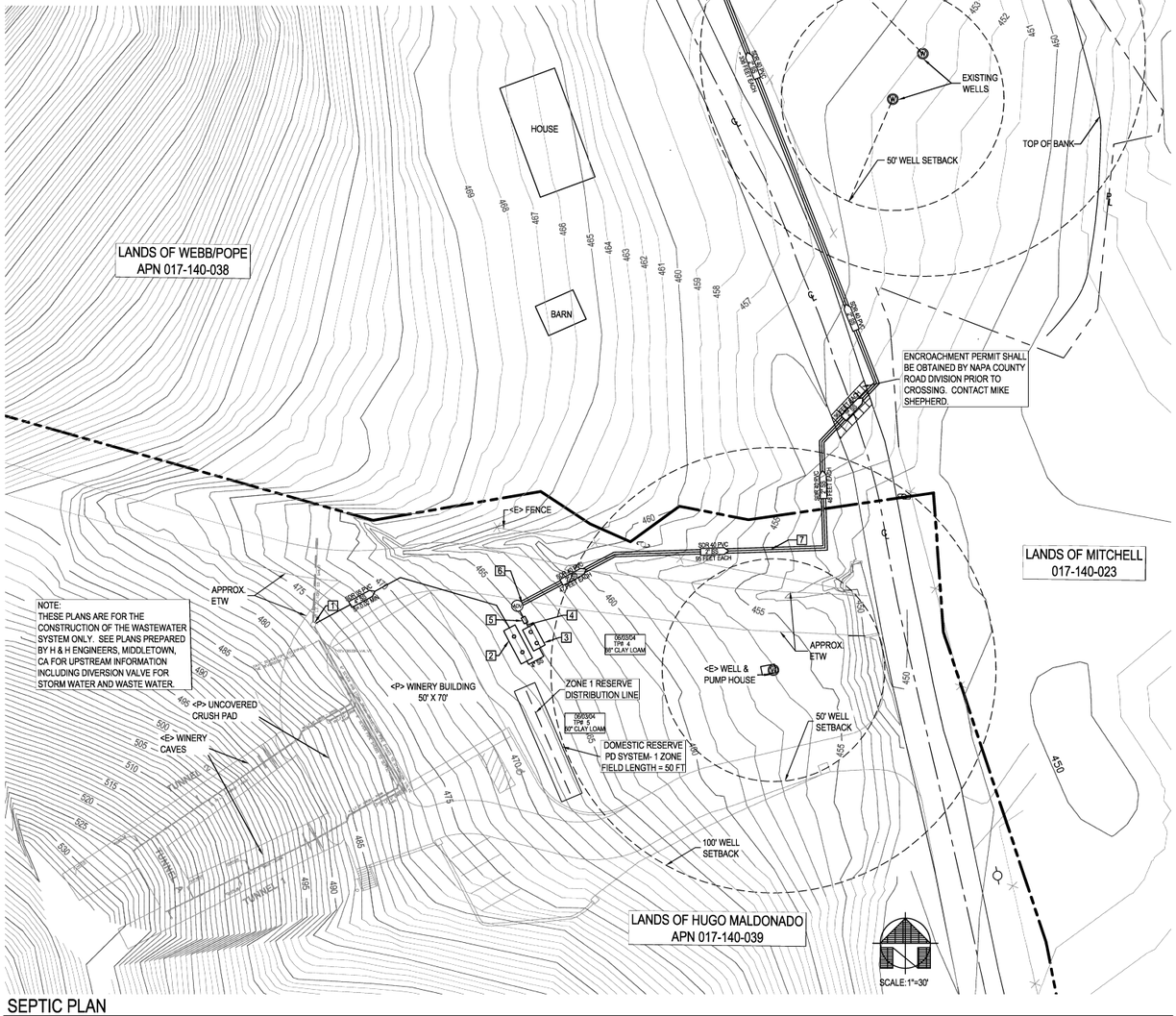
DATE: 07/06/2009
SCALE: AS NOTED
PROJECT: D121
FILE: SS1

SS1 OF 3



PROCESS WASTE RESERVE AREA -SURFACE DRIP

SCALE = 1" = 200'



SEPTIC PLAN

SCALE = 1" = 30'

DISTRIBUTION FIELD DATA

TRENCH	ZONE	LENGTH
1	1	90
2	2	90
3	3	80
4	2	70
5	3	60
6	1	60
7	1	60
8	2	60
9	3	60

ZONE	TRENCH	LENGTH
1	1, 6, 7	210
2	2, 4, 8	210
3	3, 5, 9	210

SEPTIC DETAIL CALLOUTS

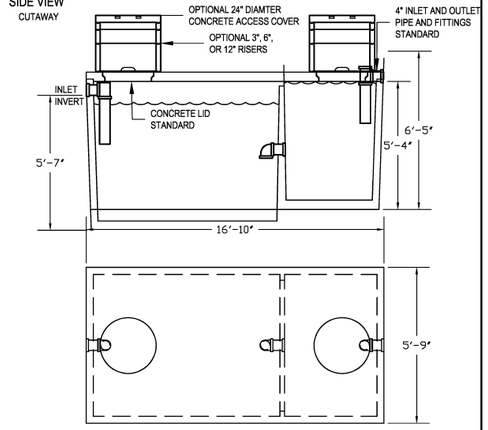
SEPTIC DETAIL CALLOUTS

1. DIVERSION VALVE. SEE SHEET C7 OF THE IMPROVEMENT PLANS BY H & H ENGINEERS. CONNECT 4" SDR 35 TO DIVERSION VALVE FOR SEPTIC.
2. 3,000 GALLON RESIDENTIAL SEPTIC TANK SEE DESIGN DETAILS FOR TANK DIMENSIONS (DETAIL 1, SHEET SS2)
3. 2,500 GALLON RESIDENTIAL DOSING TANK SEE DESIGN DETAILS FOR TANK ELEVATIONS (DETAIL 2, SHEET SS2)
4. EXPANSION FITTINGS TO CONNECT 1.5" HYDROTEC OUTLET TO EACH 2" FORCE MAIN
5. 2" SDR 40 PVC FROM PUMP DISCHARGE ASSEMBLY TO FLOW METER. REDUCE TO 1.5" TO CONNECT TO FLOW METER INLET
6. ORENCO 1.5" FLOW METER MODEL FM150 (SUPPLY SIDE) IN CHRISTY CONCRETE VALVE BOX OF APPROPRIATE SIZE TO ALLOW FOR MAINTENANCE.
7. PRESSURE MAINS TO DISPERSAL FIELD - 3 FORCE MAINS OF 2" SCH 40 PVC
8. PRESSURE DISTRIBUTION TRENCH SECTION WITH CHAMBERS (DETAIL 8, SHEET SS3)

PD SYSTEM SYMBOL LEGEND

10-3-06 TP# 1 XYSOIL TYPE	SITE EVALUATION TEST PIT
AVV	AUTOMATIC DISTRIBUTING VALVE DETAIL 3, SHEET SS3
FMW	FIELD MONITORING WELL DETAIL 4, SHEET SS3
TMW	TRENCH MONITORING WELL DETAIL 5, SHEET SS3
BV	BALACING VALVE DETAIL 6, SHEET SS3
PV	PURGE VALVE DETAIL 7, SHEET SS3.0

SIDE VIEW
CUTAWAY



TOP VIEW

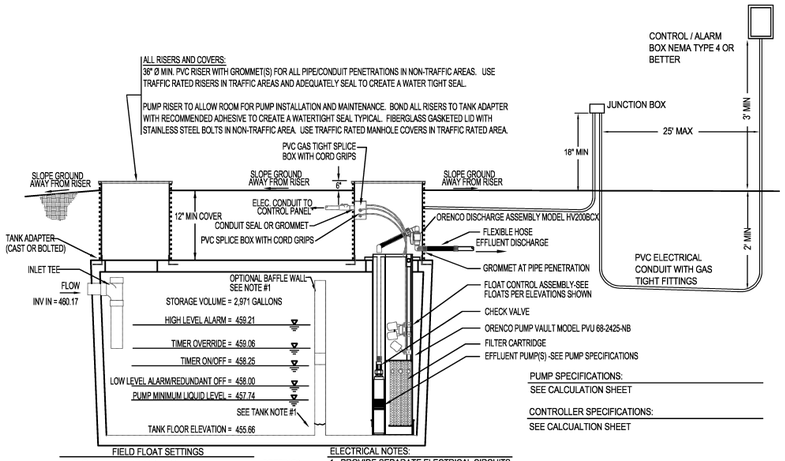
NOTES:

LIQUID CAPACITY: 3,000 GALLONS
BOX DESIGN LOAD: NON-TRAFFIC
UP TO 3 FEET OF SOIL COVER, MAXIMUM 500 PSF.
FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT JENSEN PRECAST.

1 3,000 GALLON RESIDENTIAL SEPTIC TANK

MODEL JS3000 ACCEPTED BY UPC

7/13/05 JS3000_B.dwg
© 2004 Jensen Precast



PUMP SPECIFICATIONS:
SEE CALCULATION SHEET

CONTROLLER SPECIFICATIONS:
SEE CALCUALTION SHEET

FIELD FLOAT SETTINGS

FLOAT	DESCRIPTION	SETTING*
TOP	HIGH LEVEL ALARM	38.9
THIRD	TIMER OVER-RIDE	36.9
SECOND	TIMER ON/OFF	31.0
BOTTOM	LLA / RO	28.0

*INCHES UP AS MEASURED FROM TANK BOTTOM

ELECTRICAL NOTES:
1. PROVIDE SEPARATE ELECTRICAL CIRCUITS FOR PUMP AND ALARM.
2. NO BELOW GROUND ELECTRICAL JUNCTIONS.
3. THE AUDIBLE AND VISIBLE ALARM SHALL HAVE A REMOTE ALARM AT THE WINERY.
4. SEE ELECTRICAL NOTES, SHEET 1.

DOSING PUMP TIMER SETTINGS:
TIMER ON (NORMAL CONDITION):
3 MINUTES PUMP ON, 57 MINUTES PUMP OFF
TIMER OVERRIDE (HIGH FLOW CONDITION):
6 MINUTES PUMP ON, 24 MINUTES PUMP OFF

TANK NOTES:
1. IF A STANDARD SEPTIC TANK IS UTILIZED FOR THE PUMP TANK, CONTRACTOR SHALL CHISEL A MINIMUM 10" Ø HOLE AT THE BASE OF THE BAFFLE WALL TO ALLOW FREE FLOW OF EFFLUENT BETWEEN COMPARTMENTS.
2. TANK SHALL BE PROPERLY ANCHORED TO PROTECT IT FROM BOUYANT FORCES.
3. ALL PUMP TANK ELEVATIONS SHALL BE DETERMINED IN THE FIELD TO PROVIDE A MINIMUM 2% PIPE SLOPE FROM THE CONNECTION POINTS TO THE TANK.
4. THIS DIAGRAM IS BASED ON THE TANK FLOOR AT ELEVATION 0 UNLESS NOTED OTHERWISE.
5. SEE SYSTEM PLAN FOR TANK SIZE.

2 TIMED DOSING / PUMP TANK DETAIL

JENSEN 2,500 SERIES TANK

NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER ANDREW A. SIMPSON No. 62537 Exp. 12-31-09 CIVIL ENGINEER STATE OF CALIFORNIA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707.963.4456 • 707.963.5528 FAX

SEWAGE DISPOSAL SYSTEM LAYOUT AND DETAILS

PROJECT & LOCATION:
MALDONADO WINERY
3082 LAWLEY TOLL ROAD
CALISTOGA CA 94559
017-140-011

DATE: 07/08/09
SCALE: AS NOTED
PROJECT: D121
FILE: SS2

SS2 OF 3

DISTRIBUTION FIELD COVER PLANTING

PLANTS CAN HELP YOUR DISPOSAL FIELD TO FUNCTION AT ITS BEST BY REMOVING MOISTURE AND NUTRIENTS FROM THE SOIL. PLANT COVER IS ALSO IMPORTANT TO REDUCE SOIL EROSION. AT A MINIMUM THE DISPOSAL FIELD SHOULD BE PLANTED WITH A DENSE COVER OF GRASS TO PROVIDE THESES IMPORTANT BENEFITS.

THE BEST CHOICES FOR PLANTING OVER DISPOSAL FIELDS INCLUDE SHALLOW-ROOTED HERBACEOUS PLANTS, SUCH AS FLOWERING PERENNIALS AND ANNUALS, TURFGRASS AND MANY GROUND COVERS THAT ARE NOT EXCESSIVELY WATER LOVING.

TREES AND SHRUBS ARE MUCH RISKIER CHOICES FOR PLANTING ON DISPOSAL FIELDS. THE WOODY ROOTS OF THESE PLANTS ARE MORE LIKELY TO CLOG AND DAMAGE DRAIN LINES AND CAUSE COSTLY REPAIRS. BE ESPECIALLY CAREFUL OF WATER LOVING TREES LIKE WILLOWS, POPLARS AND REDWOODS. SOME SMALLER AND LESS-AGGRESSIVE WOODY SPECIES MAY BE SUITABLE FOR PLANTING OVER THE DISPOSAL FIELD. SOME POSSIBILITIES INCLUDE FIBROUS ROOTED SHRUBS SUCH AS BOXWOOD OR HOLLY OR SMALL TREES SUCH AS DOGWOODS. BE SURE NOT TO PLANT SMALL TREES AND SHRUBS DIRECTLY OVER A LEACH LINE.

IRRIGATION IS ONE OF THE MOST IMPORTANT THINGS TO CONSIDER WHEN LANDSCAPING YOUR DISPOSAL FIELD. DO NOT INSTALL SUBSURFACE DRIP OR SPRINKLERS ON THE DISPOSAL FIELD. WATER ANY VEGETATION MINIMALLY BY HAND OR WITH A SURFACE DRIP SYSTEM. DO NOT SATURATE THE GROUND OVER THE SEPTIC DISPOSAL FIELD UNDER ANY CIRCUMSTANCE.

THE FOLLOWING PLANT LIST HAS BEEN PROVIDED FOR GUIDANCE ONLY. PLEASE CONSULT WITH A LANDSCAPER OR LOCAL NURSERY FOR DROUGHT TOLERANT PLANTS WITH NON-INVASIVE ROOT SYSTEMS. A MIX OF PLANTS WITH HIGH WINTER EVAPOTRANSPIRATION (ET) RATES SHOULD BE PLANTED TO ASSIST THE FIELD IN REMOVING EXCESSIVE WATER DUE TO RAINFALL FROM THE DISTRIBUTION FIELD.

HERBACEOUS PLANTS			
ACHILLEA SPECIES	YARROW	Y, W, R	1'2"
ARCTOTHECA CALENDULA	CAPE WEED	Y	6"
ARTEMISIA SCHMIDTIANA	SILVER MOUND	X	2'
CENTAUREA CYANUS	BACHELOR'S BUTTON	B, P, R, W	1'-2'
COSMOS BIPINNATUS	COSMOS: DAZZLER	R	3'-6'
COSMOS BIPINNATUS	COSMOS: RADIANCE	Y	3'-6'
COSMOS SULPHUREUS	YELLOW COSMOS	Y	3'-4'
DIPLACUS SPECIES	MONKEY FLOWER	MANY	1'-2'
DIETES IRIDIOIDES	FORTNIGHT LILY	W	4'
ERIGERON KARVINSKIANUS	FLEABANE	W, P	1'-2'
ESCHSCHOLTZIA CALIFORNICA	CALIFORNIA POPPY	O, R	1'-2'
FESTUCA OVINA GLAUCA	BLUE FESCUE	X	1'2"
HEMEROCALLIS SPECIES	DAYLILLIES	MANY	1'-6'
LANTANA MONTEVIDENSIS	TRAILING LANTANA	R	1'-2'
LOBULARIA MARITIMA	SWEET ALYSSUM	W	6"-12"
MYOSOTIS SYLVATICA	FORGET-ME-NOT	B	6"-12"
OENOTHERA SPECIES	MEXICAN EVENING PRIMROSE	R, W, Y	1'-2'
SANTOLINA SPECIES	SANTOLINA	Y, W	1'-3'
STACHYS BYZANTINA	LAMB'S EARS	PUR	2"
TROPAEOLUM MAJUS	NASTURTIUM O	R, Y, W	12"
VERBENA SPECIES	VERBENA	VARIES	1'-3'
ZAUSCHNERIA CALIFORNICA	CALIFORNIA FUCHSIA	R	1'-2'
BULBS			
AMARYLLIS BELLADONNA	NAKED LADY	P	3'
CROCOSMIA CROCOSMIFLORA	MONTBRETIA	R	2'
IRIS SPECIES	IRIS	MANY	1'-2'
NARCISSUS SPECIES	DAFFODIL	Y, W	1'-2'
TULIP SPECIES	TULIP	MANY	1'-2'
SUCCULENTS AND HERBS			
MANY VARIETIES TO CHOOSE FROM; VERY DROUGHT TOLERANT			
WOODY GROUND COVERS			
ARCTOSTAPHYLOS UVA-URSI	GROUND COVER MANZANITA	W	1'-2'
BACCHARIS PILULARIS	COYOTE BUSH	W	1'-2'
CEANOTHUS SPECIES	VARIOUS PROSTRATE FORMS	B	1'-2'
COTONEASTER SPECIES	VARIOUS PROSTRATE FORMS	R	6"-12"
JUNIPERUS SPECIES	VARIOUS PROSTRATE FORMS	X	1'-2'
ROSMARINUS OFFICINALIS PROSTRATE	ROSEMARY	B	1'-2'

Color Key: B = BLUE; O = ORANGE; P = PINK; Pur = PURPLE; W = WHITE; Y = YELLOW; X = NON-FLOWERING

NAPA COUNTY ALTERNATE SEWAGE MONITORING PROGRAM

SYSTEM CAPACITY: 777 GALLONS PER DAY

THIS SEWAGE SYSTEM IS SUBJECT TO INSPECTION AND MONITORING BY AN APPROVED SERVICE PROVIDER. AN APPROVED SERVICE PROVIDER MEANS A REGISTERED CIVIL ENGINEER, REGISTERED ENVIRONMENTAL HEALTH SPECIALIST, OR ANY PERSON WHO IS LICENSED AS A "CERTIFIED ON-SITE WASTEWATER SYSTEM INSPECTOR" BY PASSING AN APPROVED STATE OR FEDERAL CERTIFICATION TEST.

OPERATION & MAINTENANCE REQUIREMENTS

(1) ALL ASTS'S IN THE MONITORING PROGRAM ARE REQUIRED TO HAVE AN OPERATIONAL PERMIT.
(2) OPERATIONAL PERMITS ARE NOT TRANSFERABLE. A NEW OPERATING PERMIT SHALL BE OBTAINED AT THE TIME OF SALE, OR IN THE CASE OF COMMERCIAL PROPERTIES, UPON CHANGE OF OCCUPANTS (IF THE LANDLORD IS NOT THE PERMIT HOLDER).
(3) IF IN THE OPINION OF THE ADMINISTRATIVE AUTHORITY, THE ASTS IS CAUSING AN ADVERSE EFFECT UPON THE GROUND OR SURFACE WATERS, PUBLIC HEALTH, OR A SIGNIFICANT EFFECT ON THE ENVIRONMENT, ENFORCEMENT ACTION MAY BE INITIATED. THIS MAY INCLUDE BUT NOT BE LIMITED TO ORDERING THE PERMIT HOLDER ON MANDATORY PUMP STATUS OR ISSUANCE OF A NOTICE TO ABATE A PUBLIC NUISANCE THROUGH THE DISTRICT ATTORNEY'S OFFICE.
(4) THE COUNTY MAY RECOVER COSTS ASSOCIATED WITH THE ABATEMENT OF OPERATIONAL PERMIT VIOLATIONS.
(5) THE CURRENT OWNER OF THE PROPERTY HAS THE RESPONSIBILITY FOR INFORMING SUCCEEDING PROPERTY OWNERS OF THE RENEWABLE OPERATING PERMIT AND SELF-MONITORING REQUIREMENTS.

OWNER RESPONSIBILITIES

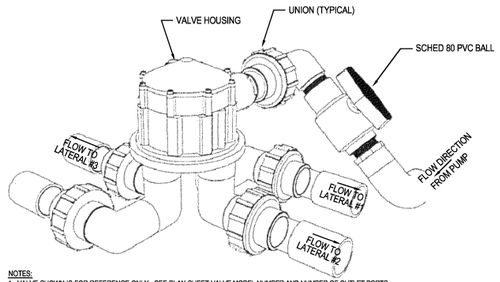
(1) OPERATIONAL PERMITS ARE NOT TRANSFERABLE. WITH THE SALE OF A PROPERTY, A NEW OPERATING PERMIT SHALL BE OBTAINED BY THE NEW OWNER/OPERATOR. CHANGE OF OWNERSHIP FOR RESIDENTIAL PROPERTIES SHALL MEAN WHEN A PROPERTY SERVED BY AN ASTS IS PURCHASED AND TITLE TO THE PROPERTY HAS CHANGED. FOR COMMERCIAL PROPERTIES, CHANGE OF OWNERSHIP SHALL MEAN THE EFFECTIVE DATE OF ANY LEASE OR OTHER AGREEMENT TO OPERATE THE BUSINESS FOR WHICH THE ASTS SERVES.
(2) WITHIN THIRTY (30) DAYS OF GAINING CONTROL OF THE PROPERTY OR BUSINESS (CLOSE OF ESCROW, LEASE/AGREEMENT EFFECTIVE DATE), A NEW OPERATING PERMIT MUST BE APPLIED FOR AND OBTAINED FROM THE DEPARTMENT BY THE NEW OWNER/OPERATOR. IN THE CASE WHERE THE BUSINESS OWNER IS NOT THE PROPERTY OWNER, THE OPERATING PERMIT MAY BE ISSUED TO THE PROPERTY OWNER OR THE OWNER OF THE BUSINESS.
(3) ALL REQUIRED OPERATING, MAINTENANCE, AND MONITORING OF THE ASTS IS THE RESPONSIBILITY OF THE PERMIT HOLDER. ALL REQUIRED FEES MUST BE PAID AT THE TIME OF APPLICATION.
(4) PRIOR TO FINAL ON THE PROJECT AND PRIOR TO ISSUANCE OF THE FIRST OPERATING PERMIT, THE OWNER SHALL PROVIDE A COPY OF A SIGNED CONTRACT WITH THE APPROVED SERVICE PROVIDER.
(5) THE SIGNED CONTRACT SHALL BE SUBMITTED TO THE DEPARTMENT WITH THE ORIGINAL APPLICATION FOR THE OPERATING PERMIT. SUBSEQUENT SELF-MONITORING REPORTS SHALL BE SUBMITTED AS DESCRIBED IN THE SERVICE PROVIDER MONITORING REQUIREMENTS DETAILED IN THIS SECTION AND AS PRESCRIBED ON THE OPERATIONAL PERMIT CONDITIONS. A COMPLETED MONITORING INSPECTION REPORT SHALL BE SUBMITTED TO THE DEPARTMENT WITH ANY APPLICATION FOR A CHANGE OF OWNERSHIP.

BASIC MAINTENANCE

(1) INSPECT THE SEPTIC TANKS AND SUMPS FOR SIGNS OF LEAKAGE AND GROUNDWATER INTRUSION ON TOP OF THE TANK, AT THE INLET AND OUTLET, AND ESPECIALLY AROUND THE RISERS.
(2) SEPTIC TANKS ARE TO BE PUMPED WHEN THE COMBINED SLUDGE AND SCUM LAYER IS GREATER THAN THIRTY FIVE (35) PERCENT OF THE LIQUID CAPACITY OF THE TANK. A LICENSED SEPTIC TANK PUMPER SHALL PUMP THE SEPTIC TANKS. SEE MANUFACTURER'S SPECIFICATIONS AND/OR ASTS CONSTRUCTION DRAWINGS FOR TANK CAPACITIES AND DIMENSIONS.
(3) MAINTAIN ALL SURFACE AND SUBSURFACE DRAINAGE AND IMPROVEMENTS IN ACCORDANCE WITH THE OPERATION AND MAINTENANCE MANUAL.
(4) ASSURE WASTEWATER QUALITY DISCHARGED TO THE SYSTEM IS CONSISTENT WITH THE DESIGN PARAMETERS. THE ADDITION OF ANY ATYPICAL WASTEWATER COMPONENT INTO THE SYSTEM IS PROHIBITED. CONTACT THE DEPARTMENT PRIOR TO DISPOSING OF ANY WASTEWATER CONSTITUENT INCONGRUOUS WITH THE DESIGNED WASTEWATER PARAMETERS.
(5) ASTS SHALL BE OPERATED AND MAINTAINED IN CONFORMANCE WITH THE CONDITIONS PRESCRIBED IN THE OPERATIONAL PERMIT.
(6) REPORT ANY MALFUNCTION OF THE ASTS TO THE DEPARTMENT.
(7) DO NOT ALLOW ANY DISTURBANCE OF THE SOIL COVER BY ANIMALS, VEHICLES, STRUCTURES, ETC.
(8) DO NOT HYDRAULICALLY OVERLOAD (EXCEED THE DESIGNED DAILY WASTEWATER FLOW) THE ASTS.
(9) DO NOT DISPOSE OF ANY HAZARDOUS MATERIAL INTO A SEPTIC TANK OR SYSTEM INCLUDING TOXIC SUBSTANCES, PESTICIDES, CHLORINE BLEACH, CLEANERS (OTHER THAN MINUTE CONCENTRATIONS CONTAINED IN MILD CLEANSERS AND CHEMICALS USED IN NORMAL HOUSEHOLD CLEANING), OR FLAMMABLE PRODUCTS.
(10) DO NOT PLANT VEGETATION INCOMPATIBLE WITH THE PROPER FUNCTION OF A SEWAGE TREATMENT SYSTEM IN AN AREA THAT MAY AFFECT THE DISPOSAL FIELD OR RESERVE AREA.
(11) DO NOT DISC, PLOW, RIP, OR ALLOW ANY OTHER DISTURBANCE OF THE SOIL IN A MANNER THAT COULD ADVERSELY IMPACT THE FUNCTION OF THE SEWAGE TREATMENT SYSTEM AND/OR RESERVE AREA.

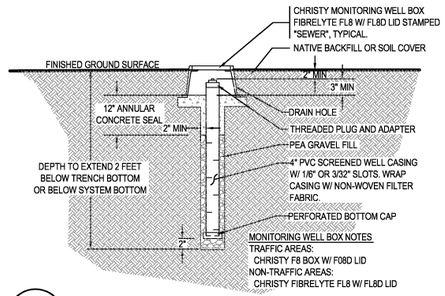
SERVICE PROVIDER MONITORING REQUIREMENTS

(1) SERVICE PROVIDER MONITORING REQUIREMENTS WILL VARY DEPENDING ON THE SPECIFIC TYPE OF ASTS, BUT IN GENERAL, MAY INCLUDE THE FOLLOWING:
  (I) RECORDING OF WASTEWATER FLOWS BASED ON WATER METER READINGS, PUMP EVENT COUNTERS, ELAPSED TIME METERS OR OTHER APPROVED METHODS.
  (II) INSPECTION AND RECORDING OF WATER LEVELS IN THE MONITORING WELLS IN THE DISPOSAL FIELD.
  (III) WATER QUALITY TESTING OF SELECTED WATER SAMPLES TAKEN FROM POINTS IN THE TREATMENT PROCESS, INCLUDING BUT NOT LIMITED TO; MONITORING WELLS, SURFACE STREAMS OR DRAINAGE WAYS, AND PRE-TREATMENT DEVICES. WATER QUALITY PARAMETERS TO BE ANALYZED MAY INCLUDE TOTAL AND FECAL COLIFORM, NITRATE, BIOCHEMICAL OXYGEN DEMAND (BOD), AND TOTAL SUSPENDED SOLIDS.
  (IV) INSPECTION AND OBSERVATION OF PUMP OPERATION AND OTHER MECHANICAL EQUIPMENT.
  (V) GENERAL INSPECTION OF TREATMENT AND DISPOSAL AREAS FOR EVIDENCE OF SEEPAGE, SURFACING EFFLUENT, EROSION OR OTHER INDICATORS OF MALFUNCTION.
(2) MONITORING INSPECTIONS SHALL BE PERFORMED AT A FREQUENCY OF ONCE DURING EVERY SIX (6) MONTH PERIOD. EACH SIX (6) MONTH PERIOD IS DENOTED AS "WINTER SEASON" AND "SUMMER SEASON". WINTER SEASON SHALL MEAN BETWEEN THE MONTHS OF NOVEMBER 1 ST AND APRIL 30TH. SUMMER SEASON SHALL MEAN BETWEEN THE MONTHS OF MAY 1ST AND OCTOBER 3 L T. THE TWO (2) SELF-MONITORING INSPECTIONS SHALL BE PERFORMED A MINIMUM OF NINETY (90) DAYS APART.
(3) MONITORING REPORTS SHALL BE SUBMITTED TO THE DEPARTMENT WITHIN 30 DAYS OF COMPLETION. ALL MONITORING REPORTS FOR THE PREVIOUS SUMMER AND WINTER SEASONS SHALL BE SUBMITTED NO LATER THAN DECEMBER 1ST OF EACH YEAR. ALL MONITORING DATA SHALL BE REPORTED IN THE FORMAT ESTABLISHED BY THE DEPARTMENT.
(4) IN SOME CASES, ADDITIONAL MONITORING REQUIREMENTS AND/OR AN INCREASE IN MONITORING FREQUENCY MAY BE REQUIRED AT THE DISCRETION OF THE DIRECTOR OF ENVIRONMENTAL MANAGEMENT.

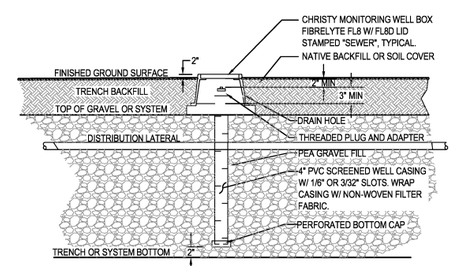


NOTES:
1. VALVE SHOWN IS FOR REFERENCE ONLY. SEE PLAN SHEET VALVE MODEL NUMBER AND NUMBER OF OUTLET PORTS.
2. THE ORENCO AUTOMATIC DISTRIBUTION VALVE SHALL BE PLACED WITHIN A MINIMUM 24" DIAMETER FIBERGLASS RISER EQUIPED WITH A LOCKING LID AND BE SUPPORTED FROM BELOW WITH A CONCRETE BLOCK. THE RISER HOUSING SHALL HAVE A MINIMUM OF 4" THICK CONCRETE BOTTOM TO PREVENT RODENT AND SOIL INTRUSION.
3. A PVC CONNECTOR IS NEEDED TO CONNECT THE 2" FORCE MAIN INTO THE HYDROTEC VALVE
4. THE DISTRIBUTION VALVE SHALL BE PLACED AS CLOSE TO THE PUMP AS POSSIBLE.
5. THE DISTRIBUTION VALVE SHALL BE PLACED AT THE HIGH POINT IN THE DISTRIBUTION SYSTEM.
6. THE TRANSPORT LINE BETWEEN THE PUMP AND THE VALVE SHOULD BE KEPT FULL IF POSSIBLE.
7. IF THE FINAL DISCHARGE POINT IS MORE THAN 2 FEET ABOVE THE VALVE AND THE SYSTEM DOES NOT DRAIN BACK INTO THE DOSING TANK, CHECK VALVES SHOULD BE INSTALLED ON THE LINES IMMEDIATELY FOLLOWING THE VALVE AND A PRESSURE RELEASE HOLE OR LINE SHOULD BE INSTALLED JUST PRIOR TO THE VALVE. THIS PRESSURE RELEASE HOLE OR LINE SHOULD REDIRECT THE EFFLUENT TO THE DOSING TANK.

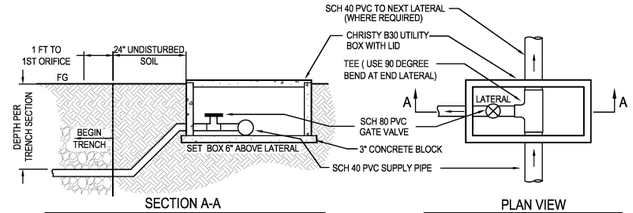
3 HYDROTEC VALVE BY ORENCO SYSTEMS DETAIL
aka: AUTOMATIC DISTRIBUTING VALVE
MODEL: V6403A
NO SCALE



4 FIELD MONITORING WELL DETAIL
SEE PLAN FOR MONITORING WELL LOCATIONS
NO SCALE



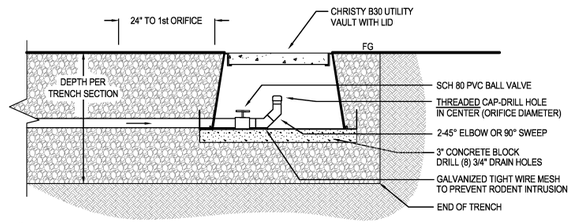
5 TRENCH MONITORING WELL DETAIL
SEE PLAN FOR MONITORING WELL LOCATIONS
LOCATE WELL ADJACENT TO DISTRIBUTION LATERAL
NO SCALE



SECTION A-A PLAN VIEW

NOTES:
1. BALANCING VALVES TO BE LOCATED AT THE BEGINNING OF EACH LATERAL.
2. BALANCING VALVE IS USED TO SET ORIFICE DISCHARGE HEIGHT.

6 PD BALANCING VALVE DETAIL
NO SCALE



7 PD PURGE VALVE DETAIL
NOTES:
1. PURGE VALVE TO BE LOCATED INSIDE OF THE TRENCH AS SHOWN.
2. PIPE AND FITTING DIAMETERS PER PLANS.
NO SCALE

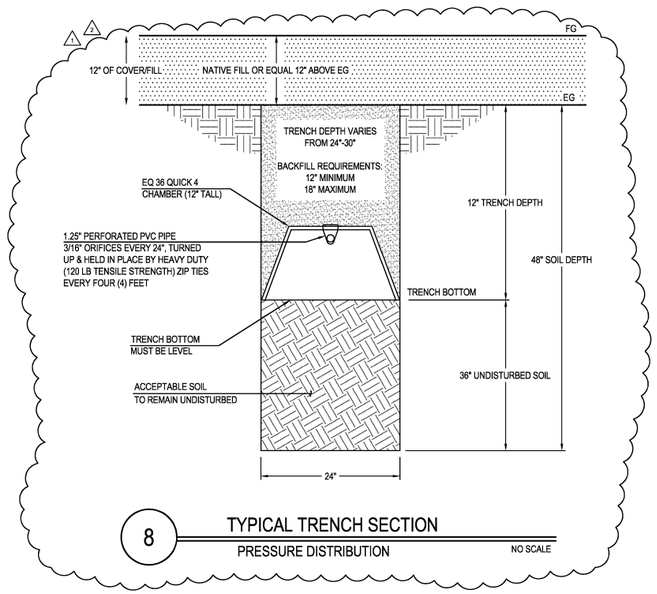
1 PD FIELD RETROFIT INTO EXISTING CHAMBERS

1. CONTRACTOR SHALL HAND EXCAVATE THE BEGINNING AND END OF EACH LATERAL WITH SUFFICIENT AREA TO AVOID SOIL BACKFILL INTO CHAMBER.
2. CONTRACTOR SHALL ASSEMBLE THE PROPER LENGTH OF EACH LATERAL ON THE GROUND, MARK EACH ORIFICE POSITION (SEE PLAN FOR ORIFICE SPACING AND DIAMETER), AND DRILL EACH ORIFICE. EACH ORIFICE MUST BE DRILLED IN LINE AND VERTICAL ALONG THE TOP OF THE LATERAL. ONCE THE ORIFICES ARE DRILLED, EACH ORIFICE (INSIDE AND OUTSIDE OF THE PIPE) SHALL BE 'DEBURRED' WITH A WIRE SUITABLE STRENGTH TO REMOVE THE PLASTIC BURRS.
3. ONCE ORIFICES ARE DRILLED AND DEBURRED FROM THE LATERAL, CAP THE LEAD END OF THE LATERAL WITH DUCT TAPE OR A PVC CAP AND INSERT THE LATERAL INTO THE END OF THE CORRESPONDING CHAMBER. ALLOW AN EXTRA 10' OF SOLID PVC PIPE TO EXTEND BEYOND BALANCING VALVE TO ALLOW FOR CONNECTION TO THE MANIFOLD. MAKE SURE THE ORIFICES ARE FACING UP (SKYWARD) IN THE CHAMBER.
4. CONTRACTOR TO EXCAVATE SECTION OF SOIL AT 4' INCREMENTS ALONG EACH LATERAL TO EXPOSE THE TOP OF THE CHAMBER AND LARGE ENOUGH TO PERFORM THE FOLLOWING STEPS. CONTRACTOR SHALL DRILL A HOLE IN THE TOP OF THE CHAMBER LARGE ENOUGH TO REACH AND LIFT THE PVC LATERAL. DRILL TWO ADDITIONAL SMALL HOLES APPROXIMATELY 1" APART OF A DIAMETER OF SUITABLE SIZE TO FIT THE 'ZIP TIE' THOUGH THE HOLE. THE SMALL HOLE SHALL BE DRILLED ALONG THE CROWN OF THE CHAMBER AND EACH HOLE SHALL BE DRILLED ON EACH SIDE OF THE CHAMBER CROWN LINE. CONTRACTOR SHALL GRAB PVC LATERAL PIPE THROUGH 4" HOLE, LIFT THE PIPE INTO POSITION IN THE TOP OF THE CHAMBER, AND, SECURE TO THE TOP OF THE CHAMBER WITH A HEAVY DUTY ZIP TIE (120 LB TENSILE STRENGTH). LEAVE APPROXIMATELY 2" OF SPACE BETWEEN TOP OF PIPE AND TOP OF CHAMBER AND MAKE CERTAIN THE ORIFICES ARE FACING UP IN THE CHAMBER. THIS ZIP TIE-ING SHALL BE REPEATED EVERY 4' FEET ALONG EACH LATERAL.
5. COVER EACH DRILLED "CHAMBER ACCESS HOLE" WITH DISCARDED SECTIONS OF CHAMBERS OR PLASTIC OF SUITABLE STRENGTH TO WITH STAND THE SOIL PRESSURE FROM BREACHING THE VOID AND ENTERING THE CHAMBER SPACE.
6. COVER EACH "CHAMBER ACCESS HOLE" WITH A PIECE OF FILTER FABRIC AND REPLACE SOIL OVER CHAMBER
7. INSTALL AUTOMATIC DISTRIBUTION VALVE AND MANIFOLD.
8. CONSTRUCT EACH ZONE BY CONNECTING THE APPROPRIATE LATERALS TO EACH ZONE PRESSURE MAIN, INSTALL THE BALANCING VALVE IN THE VALVE BOX, AND CONNECT TO EACH LATERAL (SEE DETAIL ON PLANS).
9. INSTALL THE PURGE VALVE AND VALVE BOX AT THE END OF EACH LATERAL (SEE DETAIL ON PLANS).

SPECIFIC CONSTRUCTION NOTES:

1. LATERALS # 4 AND #5 ARE DESIGNED AS 70' AND 60' RESPECTIVELY. THE ACTUAL 'AS CONSTRUCTED' TRENCHES ARE AT 75' AND 70' CURRENTLY, SO THESE CHAMBERS WILL NEED TO BE CUT TO MEET DESIGN LENGTH. FOR THESE LATERALS, HAND EXCAVATE SOIL AT THE PROPOSED PURGE VALVE LOCATION, CUT EXCESS CHAMBER AND SAVE FOR LATER USE.

2. CHAMBER #9 IS DESIGNED FOR 60' BUT IS CURRENTLY AT 50'. ADD 10' EXTENSION TO MEET DESIGN LENGTH. HAND EXCAVATE TRENCH FROM END OF EXISTING CHAMBER TO PROPOSED PURGE VALVE LOCATION. CONNECT ADDITIONAL 10' OF CHAMBER TO EXISTING TO PRODUCE A TOTAL OF 60'. SLIDE LATERALS INTO CHAMBERS, ENSURING THE DRILLED ORIFICES ARE FACING UP.



8 TYPICAL TRENCH SECTION
PRESSURE DISTRIBUTION
NO SCALE

REVISIONS

1	08/05/09	• ADD NARRATIVE: PD FIELD RETROFIT • EDIT PD CHAMBER IN TYPICAL TRENCH SECTION DETAIL
2	08/13/09	• REVISED DIMENSIONS FOR PD CHAMBER TRENCH SECTION

REGISTERED PROFESSIONAL ENGINEER
ANDREW A. SIMPSON
No. 62537
Exp. 12-31-09
CIVIL ENGINEER
STATE OF CALIFORNIA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707.963.4456 • 707.963.5528 FAX

SEWAGE DISPOSAL SYSTEM
DETAILS

PROJECT & LOCATION:
MALDONADO WINERY
3082 LAWLEY TOLL ROAD
CALISTOGA CA 94559
017-140-011

DATE: 07/08/09 (2)
SCALE: AS NOTED
PROJECT: D121
FILE: SS3

SS3 OF 3

REFER TO MECHANICAL, REFRIGERATION, ELECTRICAL AND SEPTIC PLANS FOR OTHER UTILITIES.

IG=469.00 (18")
IG=469.50 (8")
IG=469.50 (6")
IG=470.00 (6"-SUB)

DIVERSION VALVE TO SEPARATE STORM RUNOFF AND SEWER FLOW. VALVE TO DIVERT FLOW TO THE STORM DRAIN SYSTEM DURING THE RAINY SEASON. VALVE SHALL DIRECT THE FLOW TO THE SEPTIC TANK DURING THE OPERATION ON THE CRUSHING PAD.

36 L.F. 6" HDPE SD S=0.07

95 L.F. SOLID 6" SUB S=0.04 SDR 35 SUB

SEE SEPTIC PLANS BY DELTA ENGINEERING FOR SEWER HOOKUP

EX. 75 L.F. 8" HDPE

IG=472.96

CAVE SEWER PIPE TO CONNECT DIRECTLY TO THE SPETIC TANK

IG=468.00

67 L.F. 6" SEWER AND STORM DRAIN COLLECTION PIPE S=SUB TO DIVERSION VALVE

6" SEWER PIPE S=SUB TO SEPTIC TANK

POLYCAST® TRENCH DRAIN 600 SERIES W/ SLOTTED HARDNOSE CAST IRON GRATE 700 SERIES. S=0.006 SEE DETAIL SHEET C4 (TYP.)

EX. EDGE OF ACCESS ROAD

EX. 235 L.F. 18" CMP

EX. EDGE OF ACCESS ROAD

EX. JOINT TRENCH

IG=470.00

350 L.F. 1" WATER LINE (SEE SHEET C5 FOR ROUTE AND TANK LOCATION) (SEE SHEET C4 FOR TRENCH DETAIL)

1" WATER VALVE WITH TRAFFIC RATED VALVE BOX

HOSE BIB

48 L.F. 6" SDR35

15 L.F. 6" SDR35 S=0.08

S=0.03

TG=476.00
FL=475.53
IG=474.04

CONNECT PERFORATED SUBDRAIN TO 4" SOLID PIPE. CONTINUE AT SLOPE TO OUTLET. IG=473.70

102 L.F. 4" SOLID SDR35 - S=0.03

47 L.F. 6" SDR35 S=0.01

15 L.F. 6" SDR35 S=0.02

CLEANOUT W/ TRAFFIC RATED LID

IG=473.70

TG=476.36

TG=476.69

72 L.F. 4" SDR35 - S=0.01

TG=476.66

120 L.F. 4" PERFORATED SDR35 - S=0.01

TG=476.96

TG=477.08

FL=477.34

IG=474.90

IG=474.70

SEE SHEET C4 FOR SLAB STRUCTURAL DETAIL (TYP.)

TG=476.64

TG=476.90
IG=475.90

109 L.F. 4" PERFORATED SDR35 - S=0.01

91 L.F. 6" SDR35 - S=0.01

TG=476.71
IG=475.71

TG=476.36

TG=475.48
CLEANOUT RISER

TG=477.06
TG=476.06

IG=474.80

IG=468.73

EX. 118 L.F. 8" HDPE

EX. 28 L.F. 8" HDPE

IG=469.08

490

500

510

520

530

460

470

10+00

11+0

True North

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

Revision	Date	By
ISSUE	08/27/07	HRH
REV.1	02/25/08	HRH
REV.2	05/22/08	HRH
REV.3	07/08/09	HRH

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PROJECT DESCRIPTION:
MALDONADO WINERY
OLD LAWLEY TOLL ROAD
NAPA COUNTY
A.P.# 017-140-039

SHEET DESCRIPTION:
CAVE & CRUSH PAD
UTILITY PLAN

Date 07/08/09
Scale 1"=10'
Drawn H.R.H
Job 07-03A
File 07-03B

Sheet C7
Of 7 Sheets

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APPENDIX B:
TREATMENT OPTION #1: CALCULATIONS & SITE PLAN

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

Project: Maldonado Winery
3082 Lawley Old Toll Road
Calistoga, CA 94559
APN: 017-140-039

Project Description:
The following design proposes modifications to an existing pressure distribution septic system as part of a Wastewater Feasibility Study for a Use Permit Modification. The Use Permit Modification proposes to increase winery production capacity from 15,000 to 30,000 gallons per year and employment from one to three employees. The existing pressure distribution system did not use pre-treatment, had an application rate of 0.8 gal/ft2/day, and required 583 linear feet of trench. A total of 630 linear feet of trench is currently installed.

The modification does not propose any change to the trench cross section. It proposes to pre-treat the wastewater, increase the application rate, and install additional trench length as needed. The combined effluent is currently treated with a 3,000 gallon septic tank, gravity flow to a 2,500 gallon dosing tank, and field dispersal to the pressure distributed distribution field. Additional pre-treatment will be provided in the form of aeration and fixed media filtration with an Orenco Advantex system.

Site Evaluation Conclusions

Performed By:	Delta Consulting		Soil Type:	(SCL) Sandy Clay Loam
Site Evaluation Date:	5/27/2004		Structure-Grade:	(S) Strong
Primary Acceptable Core Hole #s:	1 & 2		Structure-Shape:	(SB) Subangular Blocky
Reserve Core Hole #s:				
Pretreatment Credit?	Application Rate	Requires Pretreatment		
	Use PTE--->	Application Rate Used:	1	gal/ft^2/day

Trench Design

Acceptable Soil to:	48	in			
Undistrubed Soil Below Trench Bottom:	36	in	Allowable Undisturbed Soil OK		
Remaining Soil for Trench:	12	in			
Depth of Trench:	12	in	Trench Depth OK		
Gravel over Pipe Crown	2	in			
Distribution Lateral Crown from Trench Bottom:	10	in			
Soil Cover over Gravel to Trench Top:	0	in			
Soil Cover above Existing Ground	12	in			
Available Sidewall Area:	1.67	ft^2/ft	Sidewall OK		
Average Slope-Distribution Field:	0-5%				
Trench Spacing:	5	ft			

Notes: Distribution field shall be covered w/ 12 in. of suitable soil (no clay)

Design Waste Flows

Residential Domestic Flows (Daily)

	# Bedrooms	gal/bdrm	Total GPD
Main House	0	120	0
Guest House	0	120	0

Winery Domestic Flows (Daily)

	#	gal/person	Total GPD
Employees	3	15	45
Guests/Visitors	4	3	12

Winery Process Flows (Peak Daily)

GPY of Wine	Days Crush	Total GPD
30,000	45	1,000

Total Design Flows= 1,057 gallons per day

Note: 20% reduction in flow: Water saving devices must be incorporated into dwelling

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Project: Maldonado Winery
Issue Date: 05/11/17
Revision: 0

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Distribution Field Sizing

Trench Sidewall Required	1,057	ft^2
Total Length of Distribution Pipe	634	ft
Number of Distribution Laterals	9	
Length of Each Lateral	71	ft
Number of Dosing Zones	3	
Laterals per Zone	3	

This value is the average per zone

Distribution Lateral Design

Orifice Size:	1/8	in
Orifice Spacing:	24	in
Orifice Area:	8.522E-05	ft^2
Required Squirt Height:	5	ft
Orifice Flow:	0.42	gpm/orifice
Hazen-Williams Roughness Coef:	150	

Typical Dosing Zone	Lateral Length (ft)	Orifice Offset (ft)	# Orifices	Lateral Flow (gpm)	
ZONE 1					
Lateral 1	90	2	45	19	
Lateral 6	60	2	30	13	
Lateral 7	62	2	31	13	
Dosing Zone Totals	212 ft		Zone Flow=	44	gpm
ZONE 2					
Lateral 2	90	2	45	19	
Lateral 4	60	2	30	13	
Lateral 8	62	2	31	13	
Dosing Zone Totals	212 ft		Zone Flow=	44	gpm
ZONE 3					
Lateral 3	80	2	40	17	
Lateral 5	70	2	35	15	
Lateral 9	62	2	31	13	
Dosing Zone Totals	212 ft		Zone Flow=	44	gpm

Total Distribution Field Length: 636 ft — Lateral Length OK

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SEPTIC SYSTEM DETAIL CALLOUTS

1. RE-ROUTE EXISTING PROCESS WASTEWATER (PW) AND DOMESTIC WASTEWATER (DW) GRAVITY LINES TO NEW SEPTIC TANKS
2. NEW PW AND DW SEPTIC TANKS
3. UNDERGROUND COMBINED AERATION, SECONDARY SETTLING, AND RE-CIRCULATION TANK
4. PAD AREA FOR ABOVE GROUND NUTRIENT, pH, AND AERATION EQUIPMENT
5. ORENCO ADVANTEX AX-100 SECONDARY FILTRATION UNIT (ABOVE GROUND)
6. EXISTING 2,500 GALLON UNDERGROUND DOSING TANK TO BE REUSED
7. EXISTING FORCE MAIN LINES TO EXISTING PRESSURE DISTRIBUTION FIELD

EXISTING PRESSURE DISTRIBUTION FIELD
630-LINEAR FEET OF TRENCH TOTAL, THREE ZONES

ADD TWO LINEAR FEET TO EACH TRENCH AS SHOWN FOR A TOTAL 636-LINEAR FOOT TRENCH LENGTH

100' CREEK SETBACK

OLD LAWLEY TOLL ROAD

LANDS OF WEBB/POPE
APN 017-140-038

100.0' WELL SETBACK

HOUSE

BARN

LANDS OF WEBB/POPE
APN 017-140-038

PROPERTY LINE (APPROXIMATE)

EXISTING VINEYARD ACCESS ROAD
(APPROXIMATE LOCATION)

APPROX. ETW

EXISTING MANUAL DIVERSION VALVE
(APPROXIMATE LOCATION)

70.0' SETBACK FROM
HIGHWAY 29 CENTERLINE

PROCESS WASTEWATER (PW) RESERVE AREA
SURFACE DRIP IRRIGATION ON VINEYARDS
(EXISTING PW RESERVE AREA)

EXISTING UNCOVERED CRUSH PAD AREA

100.0' CAVE SETBACK

LANDS OF HUGO MALDONADO
APN 017-140-039

EXISTING CAVES

<FE> FENCE

APPROX. ETW

100.0' WELL SETBACK

LANDS OF MITCHELL
017-140-023

DOMESTIC WASTEWATER RESERVE AREA
ONE 50-FOOT PRESSURE DISTRIBUTION TRENCH
(EXISTING DW RESERVE AREA)

SCALE:1" = 60'
0 60
Scale in feet

WASTEWATER TREATMENT OPTION #1

MALDONADO WINERY USE PERMIT MODIFICATION WASTEWATER FEASIBILITY STUDY

NAPA COUNTY CA

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DATE:	05/11/17
SCALE:	AS SHOWN
JOB #:	PR-16.09
APN:	017-140-039

1 OF 1

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APPENDIX C:
TREATMENT OPTION #2: CALCULATIONS & SITE PLAN

Project: Maldonado Winery
Surface Drip Irrigation Water Balance
Issue Date: 05/11/17
Revision: 0

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Process Wastewater Treatment System: Surface Drip Irrigation Area Calculations

Overall System Operation

These calculations are intended to estimate the area required for the optional process wastewater surface drip irrigation system at Maldonado Winery.

Process Wastewater

Winery Production (WP) =	12,500	cases/year
	30,000	gallons (2.4 gallons/case)

*Estimated Peak Process Wastewater Flows: Napa County Method**

Number of Crush Days=	45	
Process Wastewater (Harvest Period) =	1,000	gpd
Estimated theoretical total PEAK PW generated during Harvest period=	45,000	gallons PW generated during harvest

**Napa County Enviromental Management Method*

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Historical Local Annual Average Precipitation, Evaporation Rates, and Temperatures

	Information Source	Location
Rainfall	Western Regional Climate Center	Calistoga, CA
Pan Evaporation	Western Regional Climate Center	Lake Berryessa, CA
Temperatures	California Department of Water Resources	Calistoga, CA

	Precipitation				Evaporation		Average Temperatures		
Month	Avg Rainfall (in)	10-Year Rainfall[a] (in)	Monthly Percentage	Calculated Rain Days	PAN Evaporation (in)	Lake Evaporation[b] (In)	High (°F)	Low (°F)	Month
Jan	7.88	11.03	20.8%	10	1.53	1.18	59	35.4	Jan
Feb	6.55	9.17	17.3%	10	2.15	1.66	62.9	38.2	Feb
Mar	5.10	7.14	13.5%	15	3.79	2.92	66.5	40	Mar
Apr	2.37	3.32	6.3%	30	5.82	4.48	71.5	41.6	Apr
May	1.00	1.40	2.6%	30	8.90	6.85	78.7	46.3	May
Jun	0.25	0.35	0.7%	30	11.00	8.47	86.5	50.4	Jun
Jul	0.05	0.07	0.1%	30	13.22	10.18	91.7	52.7	Jul
Aug	0.10	0.14	0.3%	30	12.06	9.29	91	52.5	Aug
Sep	0.38	0.53	1.0%	30	8.67	6.68	87.3	50.7	Sep
Oct	2.14	3.00	5.7%	30	5.72	4.40	79.5	45.9	Oct
Nov	4.60	6.44	12.2%	15	2.48	1.91	66	39.4	Nov
Dec	7.44	10.42	19.7%	10	1.66	1.28	59.2	35.2	Dec
	37.86	53.00	100.0%		77.00	59.29	91.7	35.2	<---Max/Min Temp (°F)
							Jul	Dec	<---Max/Min Month

Notes:
[a]10-Year Rainfall Is the Month Average Rainfall multiplied by 1.4
[b]PAN Evaporation Rates Adjusted By A Factor Of 0.77 To Determine Lake Evaporation

Standard daily pan evaporation is measured using the four-foot diameter Class A evaporation pan. The pan water level reading is adjusted when precipitation is measure to obtain the actual evaporation. Most Class A pans are installed above ground, allowing effects such as radiation on the side walls and heat exchnges with the pan material. These effects tend to increase the evaporation totals. The amounts can then be adjusted by multiplying the totals b 0.70 or 0.80 to more closely estimate the evaporation from naturally existing urfaces such as a shallow lake, wet soil or other moist natural surfaces.

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Project: Maldonado Winery
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Landscape and Plant Water Demand

Source and General Planting Information

Evapotranspiration Rate (ET_0) from[1]:	California Irrigation Management Information System
Station Location:	Oakville, CA, Station 77

Vineyard with Cover Crop:	Yes		
Landscape Planting Water Requirements	Moderate (M)	40 - 60% Etc	50%

General Water Demand

		Crop Coefficient, Kc				
Month	Reference Et_o[1] (in/mo)	Landscape Et_L (in/mo)	Vines (no cover crop)[2] (in/mo)	Vines w/ Cover Crop[3] (in/mo)	Vineyard Et_c[4] (in/mo)	Total Et Uptake (in/mo)
Jan	1.28	0.64	0.06	0.09	0.12	0.76
Feb	1.96	0.98	0.06	0.09	0.18	1.16
Mar	5.25	2.63	0.10	0.15	0.79	3.41
Apr	4.75	2.38	0.20	0.30	1.43	3.80
May	6.14	3.07	0.80	1.20	7.37	10.44
Jun	6.84	3.42	0.80	1.20	8.21	11.63
Jul	7.05	3.53	0.80	1.20	8.46	11.99
Aug	6.31	3.16	0.80	1.20	7.57	4.36
Sep	4.88	2.44	0.40	0.60	2.93	3.04
Oct	3.43	1.72	0.20	0.30	1.03	2.02
Nov	1.75	0.88	0.06	0.09	0.16	1.03
Dec	1.28	0.64	0.06	0.09	0.12	0.73
Total	50.92				38.34	54.35

[1] Reference ET_0 from California Irrigation Management Information System

[2] Crop Coefficients (Kc) for vineyards Table 5-2, Irrigation and Reclaimed Municipal Wastewater-A Guidance Manual, 84-1 wr, SWRCB

[3] 50% increase in vineyard uptake due to cover crop per reference note 2.

[4] Etc=Et*Kc (Column carries forward to Soil Water Balance)

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Project: Maldonado Winery
Surface Drip Irrigation Water Balance
Issue Date: 05/11/17
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Soil Properties

Site Evaluation Conclusions

Performed By:	None	Rate Limiting Soil Type:	(SL) Sandy Loam
Site Evaluation Date:	-	Structure-Grade:	(M) Moderate
Test Pits Evaluated:	-	Structure-Shape:	(SB) Subangular Blocky

Application Rate Determined from Field Analysis:	-	gal/ft^2/day
	-	min/in
	-	in/hr

U.S.D.A. Soil Survey

USDA, NRCS Report Name:	Custom Soil Resource Report for Maldonado Winery	
Report Date:	April 24, 2017	
Site Coordinates:	Latitude	Longitude
	38.6104	-122.5903
Site Soil Mapping Unit:	109	Boomer Gravelly Loam, 30% - 50% slopes

General Soil Information[1]:

Depth to Restrictive Layer:	>40"	
Typical Profile:	0-4"	Gravelly Loam
	4"-44"	Clay Loam, Gravelly Clay Loam, Weathered Bedrock

Physical Soil Properties[1]

Component Breakdown

Depth (in)	Sand (%)	Silt (%)	Clay (%)
0-4	40	38	18-23-27
4-44	35	34	27-31-35

Saturated Hydraulic Conductivity (micro m/s)

Depth (in)	Low	High	Average	Rating (µm/s)	Rating (in/hr)
0-4	4.00	14.00	9.0	4	0.6
4-44	1.40	4.00	2.7	3	0.4
	-	-	-		

Moist Bulk Density (g/cc)

Depth (in)	Low	High	Average
0-4	1.30	1.45	1.4
4-44	1.30	1.45	1.4
	-	-	-

Available Water Capacity (in/in)

Depth (in)	Low	High	Average
0-4	0.12	0.16	0.14
4-44	0.12	0.15	0.14
	-	-	-

Infiltration Rate for Design

	Reduction[2] (%)	in/hr	Available Percolation (in/mo)	Applied Percolation (in/mo)	gal/ft2/day
Site Evaluation Rate:	0.04	-	-	-	-
NRCS Rate:	0.04	0.4	306.1	12.2	0.25

Restrictive Infiltration Rate: 12.2 in/mo

[1]United Stated Department of Agriculture & Natural Resource Conservation Service, Web Soil Survey data for the subject location.

[2]0.04 to 0.10 adjustment factor to account for the resting period between applications, Crites & Tchobanoglous, page 670

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Project: Maldonado Winery
Surface Drip Irrigation Water Balance
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Surface Drip Irrigation Disposal

Land Application Irrigation Data: Drip System Layout

Dispersal Field Sizing		
Minimum Primary Drip Dispersal Area Required:	3931	ft^2
Primary Land Surface Area Required with 5 ft Drip Line Spacing:	9829	ft^2
200% Reserve Area Required:	19,658	ft^2

Provided Drip Line Information				
Ave. Row Length (ft)	Row Spacing (ft)	Emitter Spacing (ft)	# Rows	
140	5	4	35	(~4,900 ft of drip line required @4' emitter spacing)

Primary Drip Dispersal Area Provided:	8535	ft^2	(Total Emitters x Emitter Drip Area)
Primary Land Surface Area Provided:	24,500	ft^2	

Good, PrimaryDispersal Field Size Exceeds Minimum Size

Emmitter& Dispersal Flow Information

Total # Emmitters	Emitter Flowrate (gph)	Drip Radius (ft)	Drip Area (ft^2)	Field Flow Rate (gph)	Field Flow Rate (gpm)
1,208	1.0	1.5	7.07	1,208	20.13

Check Lateral Spacing:	Spacing Ok
Check Emmitter Spacing:	Spacing Ok

Irrigation Information Based on Drip System

Tank Storage Volume:	10,000	gallons
Distribution System?	Process Only	

	NON-GROWING SEASON [1]				GROWING SEASON [1]					NON-GROWING SEASON [1]		
	1-Jan	1-Feb	1-Mar	1-Apr	1-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	1-Nov	1-Dec
Estimated # Available Application Days[1]	10	10	15	30	30	30	30	30	30	30	15	10
Total WW Generated (gallons)	12,600	12,600	14,700	14,700	14,700	12,600	12,600	25,200	31,500	31,500	14,700	12,600
WW Applied/Cycle:	1,260	1,260	980	490	490	420	420	840	1,050	1,050	980	1,260
Irrigation Time per Cycle (hrs):	1.0	1.0	0.8	0.4	0.4	0.3	0.3	0.7	0.9	0.9	0.8	1.0
Irrigation Time per Cycle (min):	63	63	49	24	24	21	21	42	52	52	49	63
Volume per Emmitter per Cycle (gal):	1.04	1.04	0.81	0.41	0.41	0.35	0.35	0.70	0.87	0.87	0.81	1.04
Inches Applied per Month (in/mo):	2.37	2.37	2.76	2.76	2.76	2.37	2.37	4.74	5.92	5.92	2.76	2.37
Available Storage[2] (days):	24.4	22.2	21.3	20.4	21.3	23.8	24.4	12.3	9.5	9.8	20.4	24.4
Storage Met:	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok

Notes:

[1] Application days is a function of the particular month's percentage of annual rainfall.
Non-Growing Season assumes rain events which prohibit effluent application 2 days prior to, during, and 2 days after a rain event;
Growing season: assumes no or minimal rain events, all irrigation water to be applied to ground

[2] Available Storage assumes tank is empty at beginning of month. Tank(s) shall provide the number of days storage shown. If the sum of Available Application Days and Available Storage Days is greater than the number of days in the month, adequate storage is provided.

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Project: Maldonado Winery
Surface Drip Irrigation Water Balance
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DELTA CONSULTING & ENGINEERING
OF ST. HELENA

Soil Water Balance

Site Specific Water Balance								
Month	Vegetation ET_v[1], ET (in/mo)	Precipitation Rate[2], Pr (in/mo)	Net ET (ET_v-Pr) (in/mo)	Percolation Rate[3], P (in/mo)	Available Loading Rate[4] [L_w] (in/mo)	Applied Loading Rate[5] (in/mo)	Net[6] (in/mo)	Check
Jan	0.76	7.88	-	12.24	12.24	2.37	9.87	Good, Uptake Exceeds Inflow
Feb	1.16	6.55	-	12.24	12.24	2.37	9.87	Good, Uptake Exceeds Inflow
Mar	3.41	5.10	-	12.24	12.24	2.76	9.48	Good, Uptake Exceeds Inflow
Apr	3.80	2.37	1.43	12.24	13.67	2.76	10.91	Good, Uptake Exceeds Inflow
May	10.44	1.00	9.44	12.24	21.68	2.76	18.92	Good, Uptake Exceeds Inflow
Jun	11.63	0.25	11.38	12.24	23.62	2.37	21.25	Good, Uptake Exceeds Inflow
Jul	11.99	0.05	11.94	12.24	24.18	2.37	21.81	Good, Uptake Exceeds Inflow
Aug	4.36	0.10	4.26	12.24	16.50	4.74	11.76	Good, Uptake Exceeds Inflow
Sep	3.04	0.38	2.66	12.24	14.90	5.92	8.98	Good, Uptake Exceeds Inflow
Oct	2.02	2.14	-	12.24	12.24	5.92	6.32	Good, Uptake Exceeds Inflow
Nov	1.03	4.60	-	12.24	12.24	2.76	9.48	Good, Uptake Exceeds Inflow
Dec	0.73	7.44	-	12.24	12.24	2.37	9.87	Good, Uptake Exceeds Inflow
Totals (in/yr)--->	54.35	37.86	16.49	146.91	188.01	39.47	148.54	Ok

[1]From Crop Uptake table

[2]From Precip & Evap table

[3]From Soil Info table

[2]From Precip & Evap table

[4]Sum of Net ET and the soil Percolation Rate

[5] Treated WW applied per month converted to inches

[6]Net distribution to ground (positive=additional ww may be applied, negative=capacity is exceeded)

Hydraulic Loading Rate

$L_w = ET + P + \mathrm{Pr}$

where :

L_w = *wastewater hydraulic loading rate, in / mo*

ET = *evapotrans piration rate, in / mo*

Pr = *precipitat ion rate, in / mo*

P = *soil percolatio n rate, in / mo*

1104 Adams Street, Suite 203
St. Helena, California 94574
707-963-8456 + fax 963-8528

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

Project: Maldonado Winery
3082 Lawley Old Toll Road
Calistoga, CA 94559
APN: 017-140-039

Project Description:
The following design details the minimum required PD trench length to treat only Domestic Wastewater at Maldonado Winery per Option #2 of the Septic Feasibility Report. PW will be treated separately and dispersed via surface drip irrigation. A separate PW water balance calculation is included in this appedix (Appendix C).

Site Evaluation Conclusions

Performed By:	Delta Consulting		Soil Type:	(SCL) Sandy Clay Loam
Site Evaluation Date:	5/27/2004		Structure-Grade:	(S) Strong
Primary Acceptable Core Hole #s:	1 & 2		Structure-Shape:	(SB) Subangular Blocky
Reserve Core Hole #s:				
Pretreatment Credit?	Not Required			
		Use STE--->	Application Rate Used:	0.8 gal/ft^2/day

Existing Trench Section

Acceptable Soil to:	48	in				
Undistrubed Soil Below Trench Bottom:	36	in	Allowable Undisturbed Soil OK			
Remaining Soil for Trench:	12	in				
Depth of Trench:	12	in	Trench Depth OK			
Gravel over Pipe Crown	2	in				
Distribution Lateral Crown from Trench Bottom:	10	in				
Soil Cover over Gravel to Trench Top:	0	in				
Soil Cover above Existing Ground	12	in				
Available Sidewall Area:	1.67	ft^2/ft	Sidewall OK			
Average Slope-Distribution Field:	0-5%					
Trench Spacing:	5	ft				

Notes: Distribution field shall be covered w/ 12 in. of suitable soil (no clay)

Design Waste Flows

Residential Domestic Flows (Daily)

	# Bedrooms	gal/bdrm	Total GPD
Main House	0	120	0
Guest House	0	120	0

Winery Domestic Flows (Daily)

	#	gal/person	Total GPD
Employees	3	15	45
Guests/Visitors	4	3	12

Winery Process Flows (Peak Daily)

GPY of Wine	Days Crush	Total GPD
0	30	0

Total Design Flows= 57 gallons per day

Note: 20% reduction in flow: Water saving devices must be incorporated into dwelling

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707-963-8456 + fax 963-8528

Project: Maldonado Winery
Issue Date: 05/11/17
Revision: 0

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

Distribution Field Sizing

Trench Sidewall Required	71	ft^2	
Total Length of Distribution Pipe	43	ft	Minimum Required for DW Only
Number of Distribution Laterals	9		Existing
Length of Each Lateral	70	ft	This value is the existing average per zone
Number of Dosing Zones	3		Existing
Laterals per Zone	3		Existing

Existing Distribution Lateral Layout

Orifice Size:	1/8	in
Orifice Spacing:	24	in
Orifice Area:	8.522E-05	ft^2
Required Squirt Height:	5	ft
Orifice Flow:	0.42	gpm/orifice
Hazen-Williams Roughness Coef:	150	

Typical Dosing Zone	Lateral Length (ft)	Orifice Offset (ft)	# Orifices	Lateral Flow (gpm)	
ZONE 1					
Lateral 1	90	2	45	19	
Lateral 6	60	2	30	13	
Lateral 7	60	2	30	13	
Dosing Zone Totals	210 ft		Zone Flow=	44	gpm
ZONE 2					
Lateral 2	90	2	45	19	
Lateral 4	60	2	30	13	
Lateral 8	60	2	30	13	
Dosing Zone Totals	210 ft		Zone Flow=	44	gpm
ZONE 3					
Lateral 3	80	2	40	17	
Lateral 5	70	2	35	15	
Lateral 9	60	2	30	13	
Dosing Zone Totals	210 ft		Zone Flow=	44	gpm

Total Distribution Field Length	630	ft	Lateral Length OK

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SEPTIC SYSTEM DETAIL CALLOUTS

1. RE-ROUTE EXISTING PROCESS WASTEWATER (PW) AND DOMESTIC WASTEWATER (DW) GRAVITY LINES TO NEW SEPTIC TANKS
2. NEW PW AND DW SEPTIC TANKS
3. UNDERGROUND COMBINED AERATION, SECONDARY SETTLING, RE-CIRCULATION, AND LIFT STATION TANK
4. PAD AREA FOR ABOVE GROUND NUTRIENT, pH, AND AERATION EQUIPMENT
5. ORENCO ADVANTEX AX-100 SECONDARY FILTRATION UNIT (ABOVE GROUND)
6. EXISTING 2,500 GALLON UNDERGROUND DOSING TANK TO BE REUSED FOR DW TO PD SYSTEM
7. EXISTING FORCE MAIN LINES TO EXISTING PRESSURE DISTRIBUTION FIELD
8. NEW FORCE MAIN LINE TO NEW ABOVE GROUND STORAGE TANK
9. 10,000 GALLON ABOVE GROUND STORAGE TANK (TWO POTENTIAL LOCATIONS SHOWN)

EXISTING PRESSURE DISTRIBUTION FIELD
630-LINEAR FEET OF TRENCH TOTAL, THREE ZONES
ADJUST TO USE ONE ZONE ONLY FOR DW PRIMARY WITH
TWO REMAINING ZONES HELD FOR DW RESERVE AREA

OLD LAWLEY TOLL ROAD

100' CREEK SETBACK

LANDS OF WEBB/POPE
APN 017-140-038

100.0' WELL SETBACK

HOUSE

BARN

LANDS OF WEBB/POPE
APN 017-140-038

PROPERTY LINE (APPROXIMATE)

EXISTING VINEYARD ACCESS ROAD
(APPROXIMATE LOCATION)

TREATED PROCESS WASTEWATER
SURFACE DRIP IRRIGATION ON VINEYARDS

70.0' SETBACK FROM
HIGHWAY 29 CENTERLINE

EXISTING MANUAL DIVERSION VALVE
(APPROXIMATE LOCATION)

EXISTING UNCOVERED CRUSH PAD AREA

100.0' CAVE SETBACK

LANDS OF HUGO MALDONADO
APN 017-140-039

EXISTING CAVES

LANDS OF MITCHELL
017-140-023

100.0' WELL SETBACK

DOMESTIC WASTEWATER RESERVE AREA (OPTIONAL)
ONE 50-FOOT PRESSURE DISTRIBUTION TRENCH
(EXISTING DW RESERVE AREA)

SCALE:1" = 60'
0 60
Scale in feet

WASTEWATER TREATMENT OPTION #2

MALDONADO WINERY USE PERMIT MODIFICATION
WASTEWATER FEASIBILITY STUDY

NAPA COUNTY CA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
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DATE:	05/11/17
SCALE:	AS SHOWN
JOB #:	PR-16.09
APN:	017-140-039

1 OF 1

APPENDIX D:
NRCS SITE SOILS REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Napa County, California

April 24, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

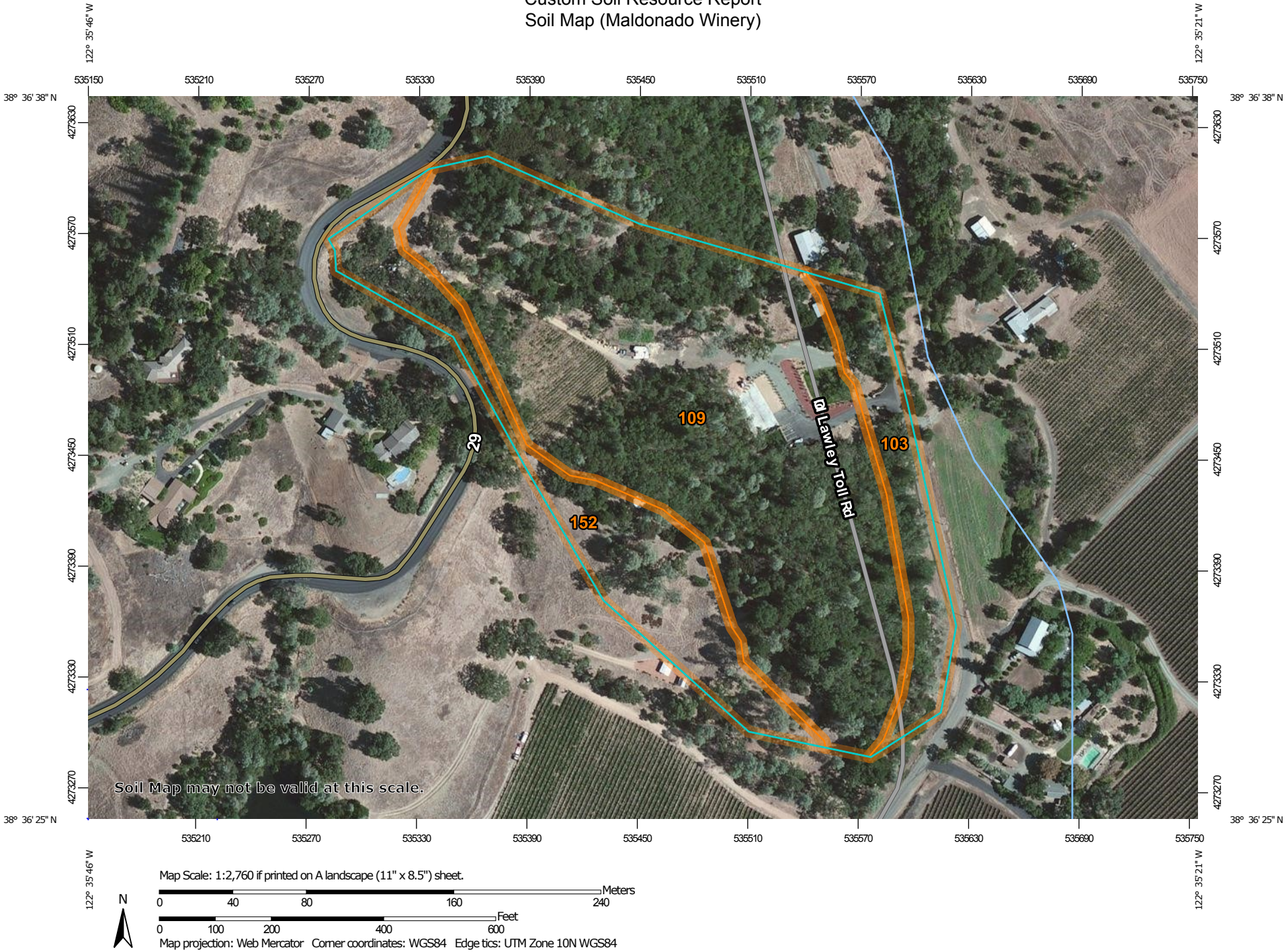
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Maldonado Winery)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Napa County, California
Survey Area Data: Version 9, Sep 21, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2011—Aug 15, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Maldonado Winery)

Napa County, California (CA055)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
103	Bale loam, 0 to 2 percent slopes	1.5	10.5%
109	Boomer gravelly loam, 30 to 50 percent slopes	10.4	70.9%
152	Hambright rock-Outcrop complex, 30 to 75 percent slopes	2.7	18.5%
Totals for Area of Interest		**14.7**	**100.0%**

Map Unit Descriptions (Maldonado Winery)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Napa County, California

103—Bale loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hdk3
Elevation: 20 to 400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 220 to 270 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Bale and similar soils: 85 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bale

Setting

Landform: Alluvial fans, flood plains
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from rhyolite and/or alluvium derived from igneous rock

Typical profile

H1 - 0 to 24 inches: loam
H2 - 24 to 60 inches: stratified gravelly sandy loam to loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clear lake

Percent of map unit: 3 percent

Landform: Alluvial fans
Hydric soil rating: Yes

109—Boomer gravelly loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hdk9
Elevation: 600 to 5,500 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 54 to 55 degrees F
Frost-free period: 210 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Boomer and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boomer

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 44 inches: clay loam, gravelly clay loam
H2 - 4 to 44 inches: weathered bedrock
H3 - 44 to 59 inches:

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C

Hydric soil rating: No

152—Hambright rock-Outcrop complex, 30 to 75 percent slopes

Map Unit Setting

National map unit symbol: hdlp
Elevation: 200 to 3,000 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 220 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Hambright and similar soils: 50 percent
Rock outcrop: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hambright

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from basic volcanic rock

Typical profile

H1 - 0 to 12 inches: very stony loam
H2 - 12 to 22 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): 7e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: VERY SHALLOW ROCKY (R015XD127CA)
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum weathered from igneous, metamorphic and sedimentary rock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: About 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Saturated Hydraulic Conductivity (Ksat), Standard Classes (Maldonado Winery)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits. The classes are:

Very low: 0.00 to 0.01

Low: 0.01 to 0.1

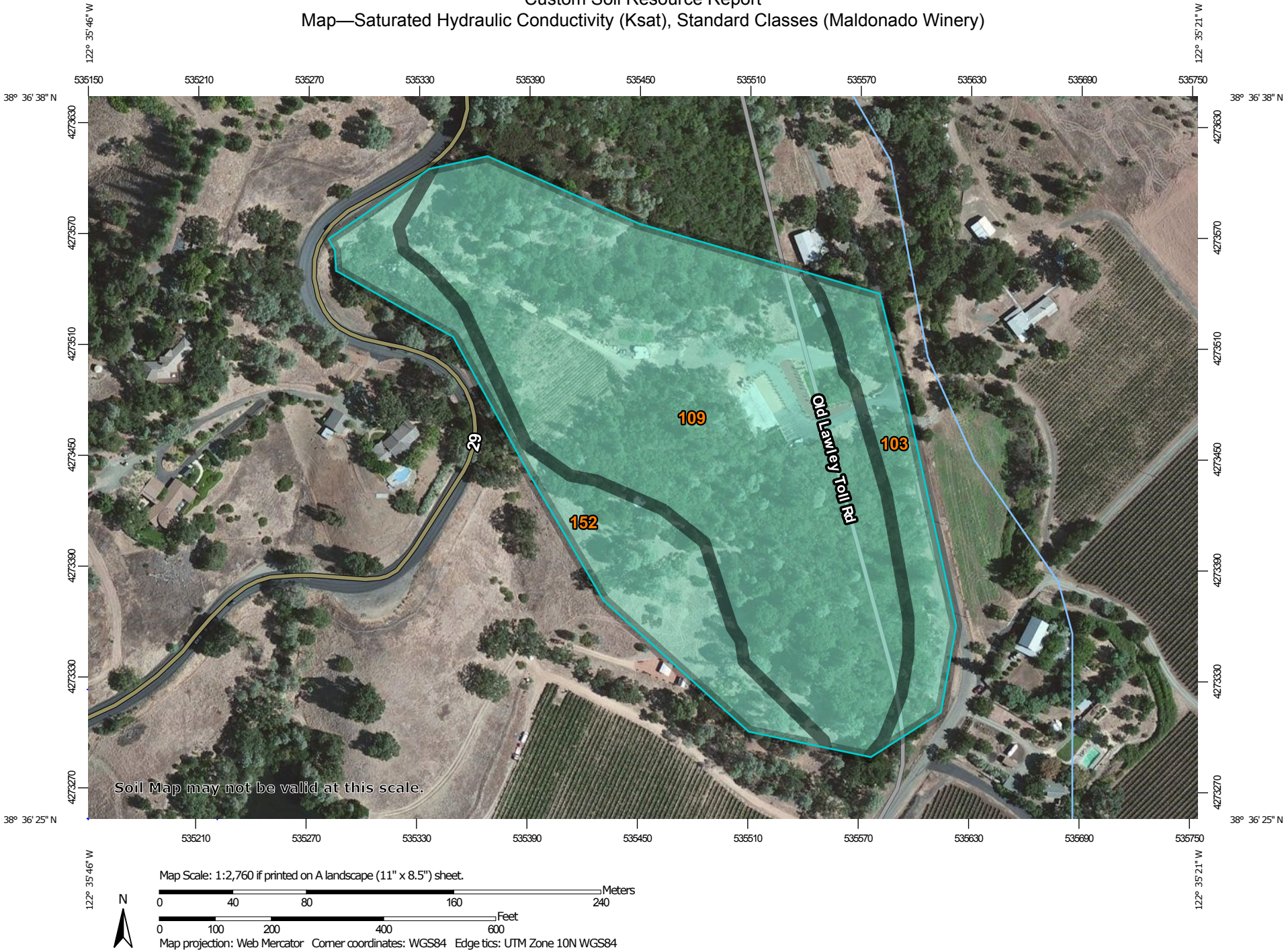
Moderately low: 0.1 to 1.0

Moderately high: 1 to 10

High: 10 to 100

Very high: 100 to 705

Map—Saturated Hydraulic Conductivity (Ksat), Standard Classes (Maldonado Winery)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Lines

- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Points

- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Napa County, California
Survey Area Data: Version 9, Sep 21, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 14, 2011—Aug 15, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Saturated Hydraulic Conductivity (Ksat), Standard Classes (Maldonado Winery)

Saturated Hydraulic Conductivity (Ksat), Standard Classes— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	**Map unit name**	**Rating (micrometers per second)**	**Acres in AOI**	**Percent of AOI**
103	Bale loam, 0 to 2 percent slopes	9.0000	1.5	10.5%
109	Boomer gravelly loam, 30 to 50 percent slopes	9.0000	10.4	70.9%
152	Hambright rock-Outcrop complex, 30 to 75 percent slopes	9.0000	2.7	18.5%
Totals for Area of Interest			**14.7**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat), Standard Classes (Maldonado Winery)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie. The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Slowest

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

For an attribute of a soil horizon, a depth qualification must be specified. In most cases it is probably most appropriate to specify a fixed depth range, either in centimeters or inches. The Bottom Depth must be greater than the Top Depth, and the Top Depth can be greater than zero. The choice of "inches" or "centimeters" only applies to the depth of soil to be evaluated. It has no influence on the units of measure the data are presented in.

When "Surface Layer" is specified as the depth qualifier, only the surface layer or horizon is considered when deriving a value for a component, but keep in mind that the thickness of the surface layer varies from component to component.

When "All Layers" is specified as the depth qualifier, all layers recorded for a component are considered when deriving the value for that component.

Whenever more than one layer or horizon is considered when deriving a value for a component, and the attribute being aggregated is a numeric attribute, a weighted average value is returned, where the weighting factor is the layer or horizon thickness.

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Physical Soil Properties (Maldonado Winery)

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Napa County, California														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
103—Bale loam, 0 to 2 percent slopes														
Bale	0-24	-41-	-37-	16-22- 27	1.40-1.45-1.50	4.00-9.00-14.00	0.13-0.15-0.16	0.0- 1.5- 2.9	1.0- 2.0-3.0	.24	.24	5	6	48
	24-60	-67-	-20-	10-13- 16	1.40-1.45-1.50	4.00-9.00-14.00	0.08-0.10-0.11	0.0- 1.5- 2.9	0.5- 0.8-1.0	.17	.24			
Clear lake	—	—	—	—	—	—	—	—	—					
109—Boomer gravelly loam, 30 to 50 percent slopes														
Boomer	0-4	-40-	-38-	18-23- 27	1.30-1.38-1.45	4.00-9.00-14.00	0.12-0.14-0.16	0.0- 1.5- 2.9	1.0- 2.0-3.0	.15	.28	4	7	38
	4-44	-35-	-34-	27-31- 35	1.30-1.38-1.45	1.40-2.70-4.00	0.12-0.14-0.15	3.0- 4.5- 5.9	0.5- 0.8-1.0	.32	.32			
	44-59	—	—	—	—	0.00-0.21-0.42	-0.00-0.00	—	—					
152—Hambright rock-Outcrop complex, 30 to 75 percent slopes														
Hambright	0-12	-39-	-37-	20-24- 27	1.40-1.45-1.50	4.00-9.00-14.00	0.08-0.09-0.10	1.2- 1.9- 2.7	2.0- 5.0-8.0	.10	.28	1	8	0
	12-22	—	—	—	—	0.07-70.00-141.00	-0.00-0.00	—	—					
Rock outcrop	0-10	—	—	—	—	0.00-0.00-0.00	—	—	—					

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