“J”

Wastewater Feasibility Study

Gandona Winery P17-00068-MOD & P17-00069-VAR
Planning Commission Hearing Date 3 October 2018

WINERY WASTEWATER FEASIBILITY REPORT

GANDONA WINERY
1533 SAGE CANYON ROAD
ST. HELENA, CALIFORNIA 94574

APN 032-010-079

PROPERTY OWNER:

Manuel Pires
1535 Sage Canyon Road
St. Helena, CA 94558

Project# 4116034.0
February 10, 2017
Revised: July 28, 2017

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APPENDICES

INTRODUCTION

The Owner is applying to the County of Napa for a modification to a Use Permit for an existing winery. This modification is to add a building for office and barrel storage, and increase marketing activities. The existing permit allows a production of 20,000 gallons per year. The property is a 114.72 ± acre parcel located at 1535 Sage Canyon Road, St. Helena (APN 032-010-079). Access to the property is an existing driveway connection to Sage Canyon Road.

The parcel is located south of Lake Hennessy. Access to the winery is from Sage Canyon Road, opposite the Lake Hennessy boat launch. An existing private driveway extends approximately 1 mile from Sage Canyon Road to the project site. Two wells exist on the parcel and are available for domestic and wine production purposes. All wells are located well beyond the required 100 foot septic system setback. The proposed winery facility will add two offices, a meeting space, an employee break-room and bathroom and a dry-goods storage area. Appendix 1 contains a Site Location Map showing the parcel boundary, topography, and other features. Appendix 2 contains a reduced set of Civil Use Permit plans for the proposed expansion.

This report will evaluate the existing wastewater disposal facilities and necessary modifications for the proposed expansion.

EXISTING PROCESS AND DOMESTIC WASTEWATER SYSTEM

The existing winery wastewater system was designed in 2009 by Riechers Spence & Associates, and installed under permit E09-00209. Domestic wastewater flows to a 1,200 gallon septic tank, then to a combined Orenco pre-treatment system. Process wastewater flows to a 2,000 gallon septic tank, then to a second 2,000 gallon tank for pre-aeration, before entering the combined pre-treatment system. Pre-treatment consists of two Orenco AX-100 pods and a 2,000 gallon recirculation tank. Pre-treated effluent is stored in a 2,000 gallon dosing tank with duplex pumps, and is dispersed in a two-zone, 432 LF pressure distribution system. A 100% reserve area exists on site. This system is designed to accommodate a peak domestic wastewater flow of 333 GPD, and a peak process wastewater flow of 667 GPD (274 GPD average). Appendix 3 contains copies of the existing wastewater disposal system plans and design report.

Two of the pressure distribution lines on the north side of the proposed building will be relocated further north to maintain required 10 foot setback from the proposed stormdrain. The system will maintain all of its treatment capacity and this shift will not impact the adequacy of the system to treat and dispose of wastewater from the proposed winery expansion.

DOMESTIC WASTEWATER CHARACTERISTICS

The proposed domestic wastewater flows for the Winery Use Permit Modification are shown in Table 2 below. The number of visitors and employees is based on information provided by the owner. The projected flow is based on Napa County Environmental Management guidelines. The following is a summary of the estimated flows from the proposed winery.

Table 2

Use	Source	Number	Projected Flow (gpd)	Total Flow No Event Day (gpd)	Total Flow Event Day (gpd)
WINERY	Full-time employees	4	15	60	60
	Part-time employees	1	15	15	15
	Harvest employees	1	15	15	15
	Visitors	12	3	36	36
	Private Event w/ meals (offsite catered)	25	10	0	250
Winery Subtotals				**126**	**376**
Process Wastewater				667	273
Grand Total			**Total Peak Flow**	**793**	**649**

The number of visitors is based on a maximum expected daily visitor count. Any combination of events where the expected total guest count exceeds 37 persons in a single day will require the use of portable sanitation facilities.

Peak wine production operations will not occur on event days, but some production may still take place, so the average daily production level was used to calculate wastewater production for event days.

CONCLUSION

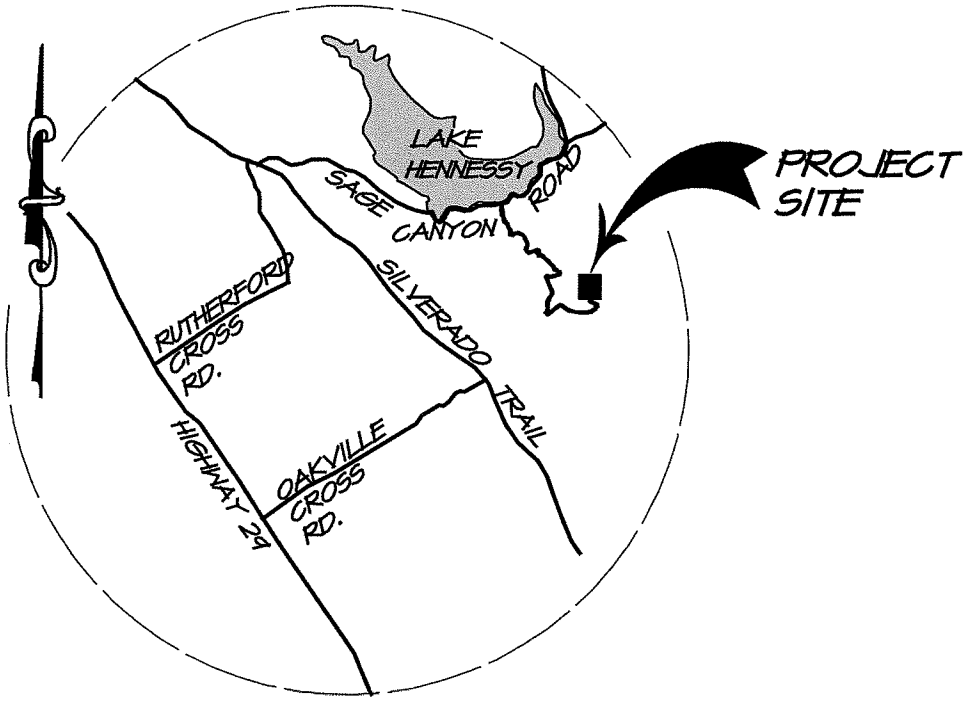
The winery will be able to dispose of all sanitary and process wastewater on-site. This report demonstrates that the existing process and domestic wastewater system can adequately treat and dispose of wastewater from the proposed winery expansion. The existing system meets the design standards of Napa County, Environmental Management Department, ASTS Design guidelines and the system manufactures requirements.

Appendix 1

Vicinity Map & USGS Site Map

GANDONA WINERY
VICINITY MAP

NAPA COUNTY CALIFORNIA



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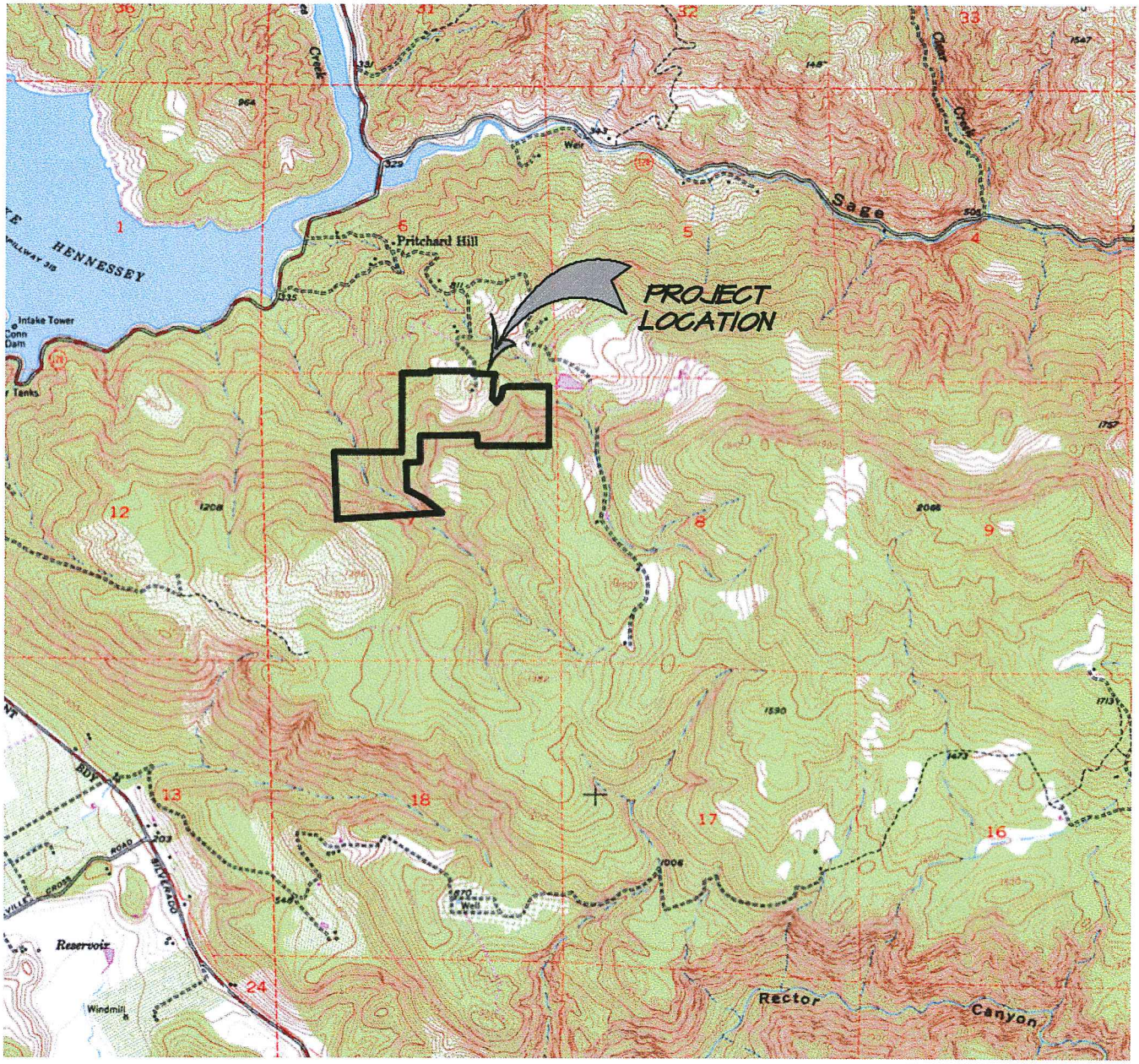
GANDONA WINERY
USGS MAP



SCALE: 1" = 3000'

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Appendix 2

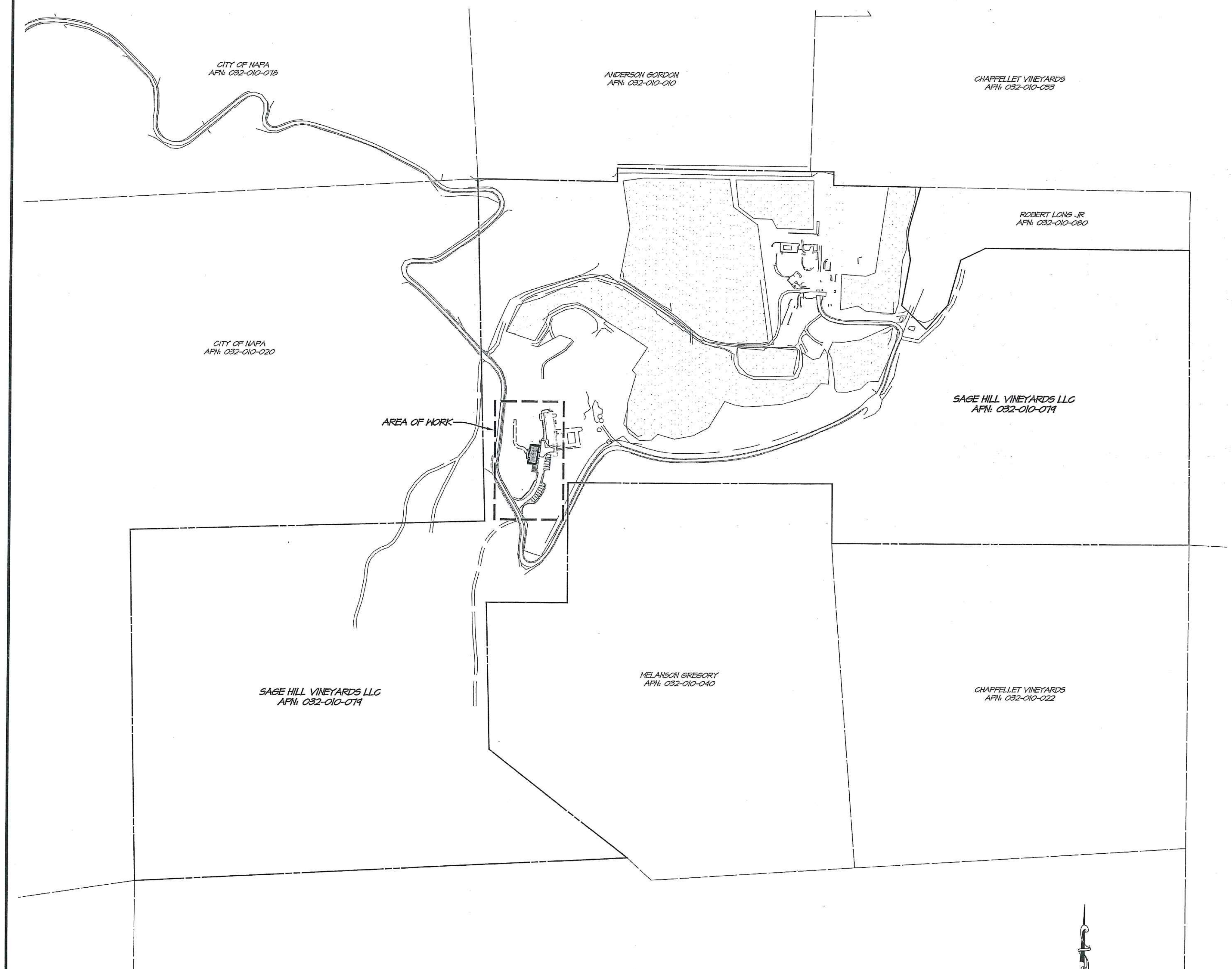
Reduced Use Permit Plan Set

Appendix 3

Pressure Distribution Wastewater Disposal System Plans and Process & Sanitary Wastewater Septic System Design Report

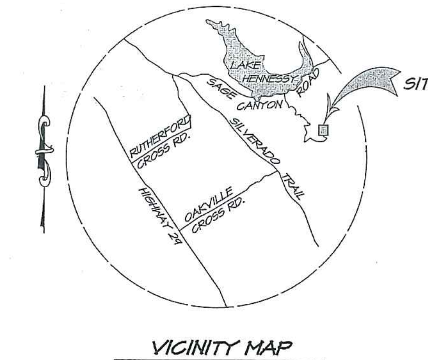
GANDONA WINERY

USE PERMIT MODIFICATION



SITE PLAN
SCALE: 1" = 200'

GRAPHIC SCALE
200 0 200 400
(IN FEET)
1 inch = 200 FT



VICINITY MAP
NO SCALE

SYMBOL LEGEND

EXISTING

☼	LIGHT
⌖	HOSE BIB
•G	GAS RISER
GV ⋈	GAS VALVE
EV	ELECTRIC VAULT
○ TREE	TREE (AS NOTED)
● SSCO	SEWER CLEANOUT
△	SURVEY CONTROL STATION
□ICV	IRRIGATION CONTROL VALVE
— — —	FLOWLINE
— — —	EDGE OF GRAVEL
—— NEW TOPO ——	LIMITS OF NEW 2016 TOPO
—— OLD TOPO ——	LIMITS OF OLD 2015 TOPO

PROPOSED

SD	STORM DRAIN LINE
—— DW ——	DOMESTIC WATER LINE
—— FW ——	FIRE WATER LINE
Y Y	SLOPE AS SHOWN
WDH	WET DRAFT HYDRANT
WV	WATER VALVE
DI	DRAIN INLET
AD	AREA DRAIN
X TREE	EX TREE TO BE REMOVED
→ →	SWALE FLOW LINE
— — — —	PROPERTY LINE

ABBREVIATIONS

AC	ASPHALT CONCRETE
BFG	BOTTOM FINISH GRADE
C	COMPACT STALL
℄	CENTERLINE
CONF	CONFORM
CY	CUBIC YARD
DI	DRAIN INLET
DW	DOMESTIC WATER
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
EX / (E)	EXISTING
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FW	FIRE WATER
GAL	GALLON
GB	GRADE BREAK
HP	HIGH POINT
INV	INVERT
LF	LINEAL FEET/FOOT
LP	LOW POINT
MH	MANHOLE
OC	ON CENTER
PL	PROPERTY LINE
(P)	PROPOSED
R	RADIUS
S	SLOPE (FEET/FOOT)
S.A.D.	SEE ARCHITECTS DRAWINGS
S/B	SETBACK
SD	STORM DRAIN
SDCO	STORM DRAIN CLEANOUT
SF	SQUARE FEET
S.M.D.	SEE MECHANICAL DRAWINGS
SSMH	SANITARY SEWER MANHOLE
STA	STATION
TFG	TOP FINISH GRADE
TW	TOP OF WALL
TYP	TYPICAL
WV	WATER VALVE
WW	WASTE WATER

PROJECT INFORMATION

APPLICANT:	MANUEL PIRES 1535 SAGE CANYON ROAD ST. HELENA, CA
SITE ADDRESS:	1533 SAGE CANYON ROAD ST. HELENA, CA
CIVIL ENGINEER:	RSA+ 1515 FOURTH STREET NAPA, CA 94559 (707) 252-3301
APN:	032-010-079
PARCEL AREA:	114.72 ACRE
EXISTING USE:	WINERY
PROPOSED USE:	WINERY
ZONING:	AW

TOPOGRAPHY NOTES

THIS MAP DOES NOT REPRESENT A PROPERTY LINE SURVEY.

THIS MAP IS BASED ON A FIELD SURVEY OF 10/01/2015 AND 10/06/2016.

THE VERTICAL DATUM OF THIS MAP IS BASED ON EXISTING SURVEY COORDINATES BY TERRA FIRMA SURVEYS.

BASIS OF BEARING

ASSUMED VERTICAL DATUM TWO FOOT CONTOUR INTERVAL BASIS OF BEARINGS PER 17 RS 90 N.C.R.

BENCHMARK

SET MAG NAIL #6850 IN SEAM OF CONCRETE CRUSH PAD, 4.1' FROM FACE OF STONE WALL, 6.6' FROM SOUTH EDGE OF DROP INLET. ELEVATION = 939.01

SHEET INDEX

NO.	DATE	REVISIONS	BY	APPD

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GANDONA WINERY
COVER SHEET
NAPA COUNTY CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER BRUCE WILLIAM FENTON No. 77859 Exp. 6-30-19 CIVIL ENGINEER STATE OF CALIFORNIA

DATE	JULY 28, 2017
DRAWN	JFW
DESIGNED	MSS
CHECKED	BWF
JOB NO.	4116034.0
SHEET NO.	UP1 1 OF 4 SHEETS

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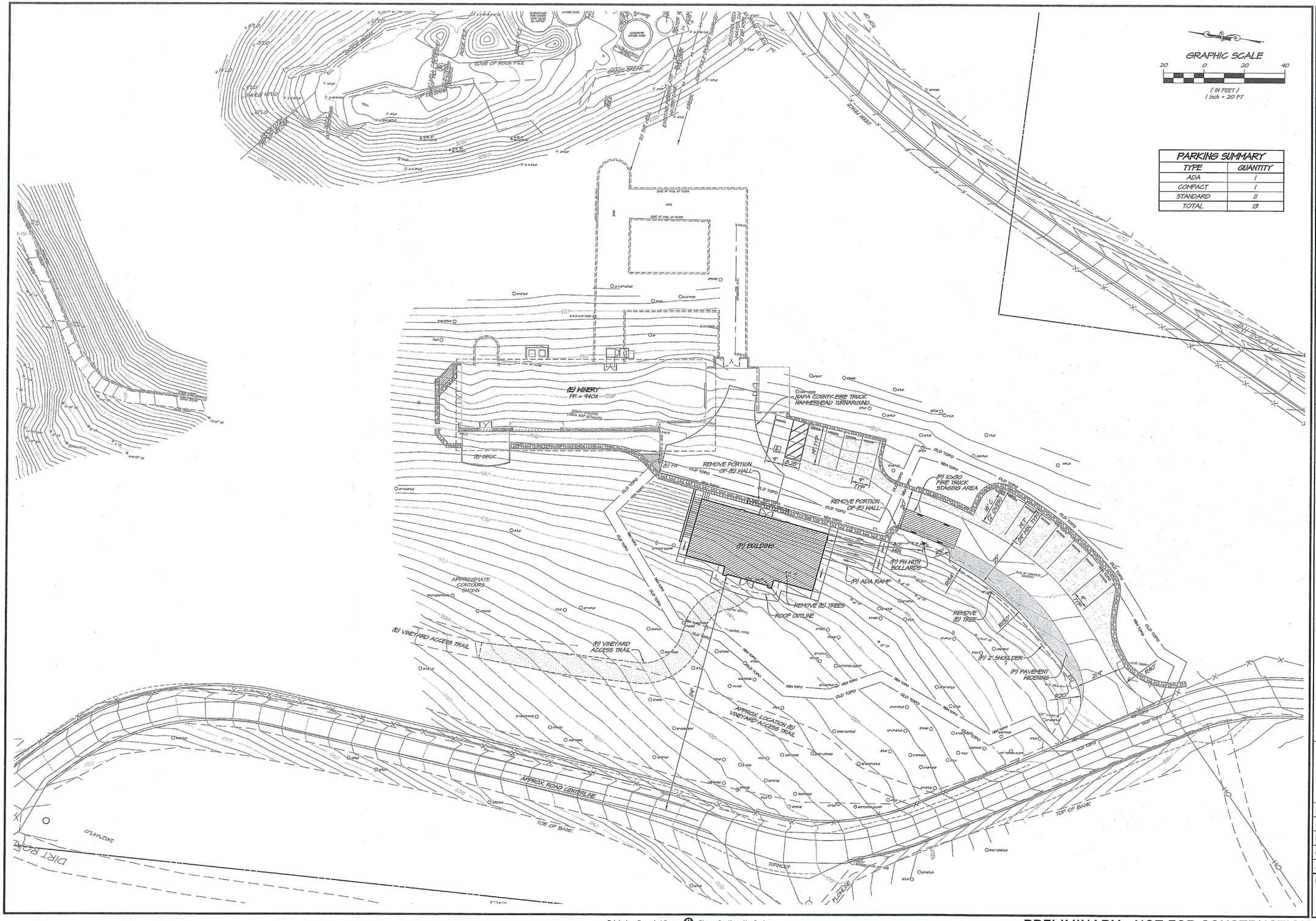

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GANDONA WINERY
LAYOUT PLAN
NAPA COUNTY
CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
WILLIAM F. HEINZ
No. 77859
Ex. 6-30-19
CIVIL ENGINEER
STATE OF CALIFORNIA

DATE	JULY 28, 2017
DRAWN	JPH
DESIGNED	MSS
CHECKED	BHF
JOB NO.	4116.034.0

SHEET NO.
UP2
2 OF 4 SHEETS

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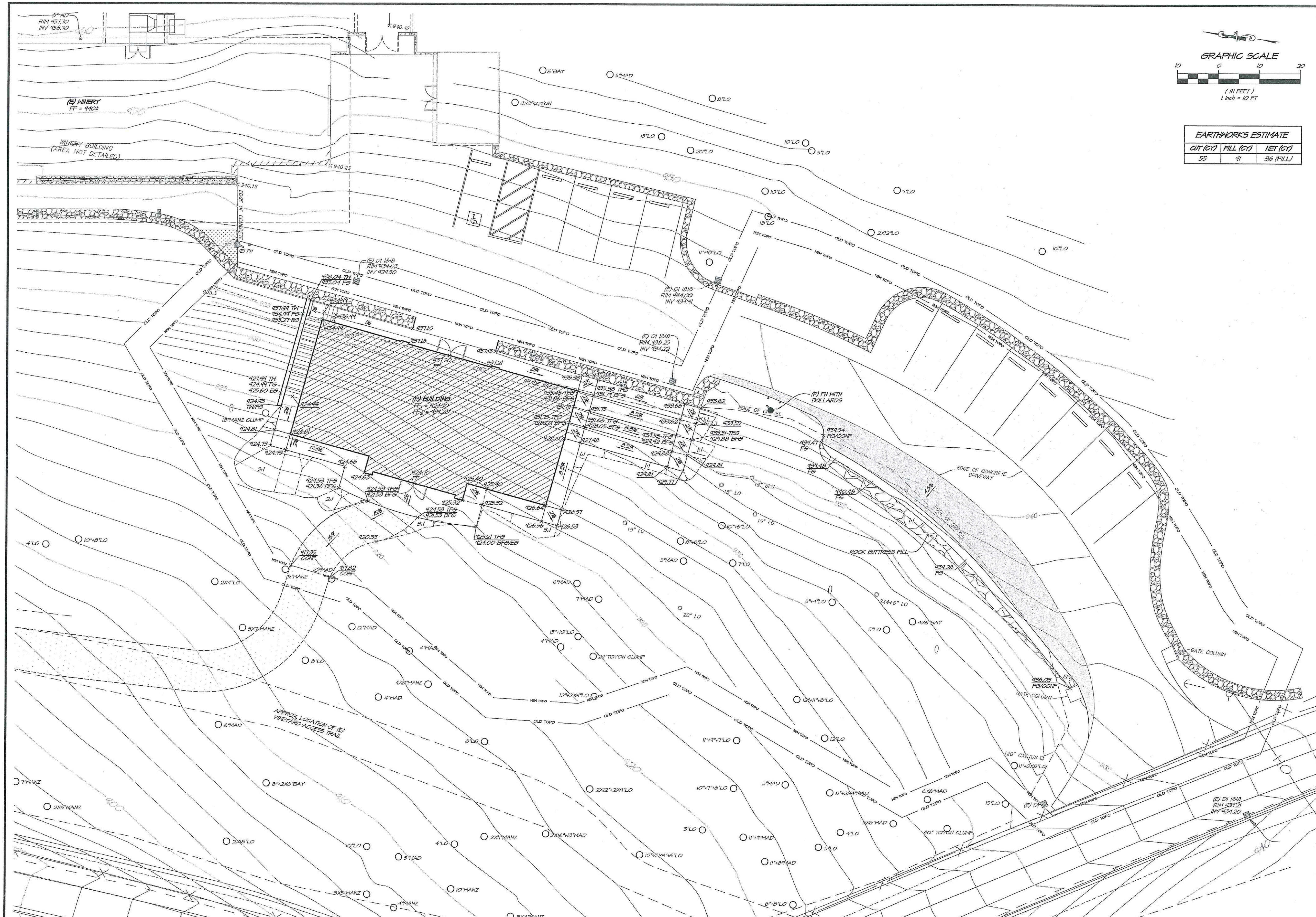

EARTHWORKS ESTIMATE

CUT (CY)	FILL (CY)	NET (CY)
55	91	36 (FILL)

NO.	DATE	REVISIONS	BY	APPD

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GANDONA WINERY
GRADING PLAN
NAPA COUNTY CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER BRUCE WILLIAM FENTON No. 77869 Exp. 6-30-19 CIVIL ENGINEER STATE OF CALIFORNIA

DATE	JULY 28, 2017
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UP3
3 OF 4 SHEETS

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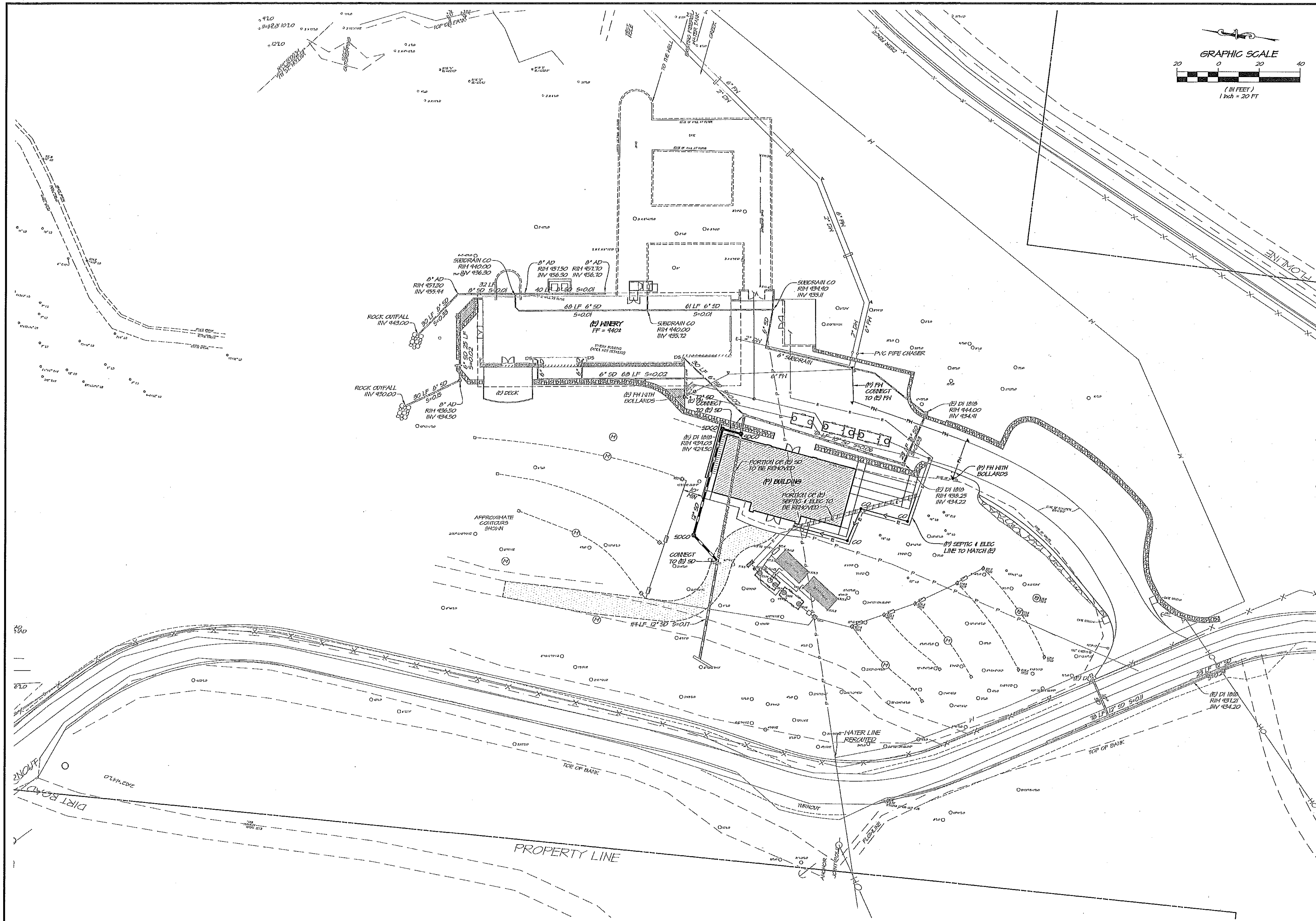

GANDONA WINERY
UTILITY PLAN

NAPA COUNTY CALIFORNIA

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REGISTERED PROFESSIONAL ENGINEER BRUCE WILLIAM FENTON No. 77659 Exp. 6-30-19 CIVIL ENGINEER STATE OF CALIFORNIA

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JOB NO.	4116034.0

SHEET NO.

UP4

4 OF 4 SHEETS

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SAGE HILL WINERY, LLC

PRESSURE DISTRIBUTION WASTE WATER DISPOSAL SYSTEM

NAPA COUNTY CALIFORNIA

SEPTIC AND SUMP TANK NOTES

1. GENERAL
   A. ALL SEPTIC TANKS SHALL BE ACCEPTED BY IAPMO AS MEETING STANDARD PS-1.
   B. ALL SEPTIC TANKS SHALL BE OF TWO COMPARTMENT CONSTRUCTION. THE FIRST SHALL BE TWICE THE CAPACITY OF THE SECOND AND SEPARATED BY A BAFFLE.
   C. TANKS MUST HAVE A STRENGTH CAPABLE OF WITHSTANDING ANTICIPATED LOADS.

2. MATERIALS
   A. THE ENGINEER ASSUMES A CONCRETE SEPTIC AND SUMP TANK IN THESE CALCULATIONS, IF THE CONTRACTOR DESIRES TO USE A TANK MATERIAL OTHER THAN CONCRETE, THEN THE CONTRACTOR MUST SUPPLY TO THE ENGINEER THE SPECIFICATIONS FOR ANCHORING AND BALLASTING.
   B. METAL OR WOODEN TANKS ARE PROHIBITED.
   C. IF SEPTIC OR SUMP TANKS ARE MADE FROM HIGH DENSITY POLYETHYLENE (HDPE) OR FIBERGLASS, THEN TANKS MUST BE ANCHORED TO PREVENT HEAVING OR BUOYANT FORCES.
   D. IF SEPTIC OR SUMP TANKS ARE MADE FROM HDPE OF FIBERGLASS, THEN PROPER SIDEWALL PROTECTION MUST BE INSTALLED TO PREVENT SIDEWALL FAILURE. SUFFICIENT PROTECTION MUST BE INSTALLED TO PREVENT VEHICLES FROM CROSSING OVER THE TOP OF THE HDPE OR FIBERGLAS TANKS.
   E. ALL SEPTIC AND PUMP TANKS SHALL BE WATER TIGHT. CONCRETE TANKS SHALL BE A MONOLITHIC 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. PLACEMENT
   A. SEPTIC AND PUMP TANKS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATION.
   B. THE TANK SHALL BE INSTALLED ON A SOLID LEVEL BED.
   C. SOIL AROUND THE TANK MUST BE COMPACTED; SAND MUST BE JETTED.

4. ACCESS RISERS
   A. ACCESS TO EACH SEPTIC TANK COMPARTMENT MUST BE PROVIDED BY A MANHOLE AT LEAST TWENTY INCHES IN DIAMETER AND HAVING A DURABLE HANDLE TO FACILITATE REMOVAL TO ALLOW ACCESS FOR INSPECTION AND MAINTENANCE OF THE TANK AND OF SUFFICIENT SIZE FOR REMOVAL OF THE MANHOLE COVER.
   B. A RISER MUST EXTEND FORM EACH MANHOLE COVER TO OR ABOVE THE SURFACE OF THE GROUND. THE RISER MUST BE OF A SIZE LARGER THAN THE MANHOLE COVER, BE BOTH GAS AND WATERTIGHT, AND BE CONSTRUCTED OF DURABLE MATERIAL AND SHALL BE CAPABLE OF WITHSTANDING ANTICIPATED LOADS FROM SOIL BACKFILL.
   C. CONCRETE RISERS SHALL BE SEALED WITH XYPEX OR APPROVED EQUAL.
   D. ALL RISERS SHALL BE FITTED WITH AIRTIGHT DURABLE LIDS THAT HAVE A LOCKING MECHANISM TO PREVENT UNWANTED ENTRY AND PREVENT INSECT/RODENT ACCESS.

5. SEPTIC TANK CONNECTIONS
   A. ALL CONNECTIONS FROM BUILDINGS TO SEPTIC TANKS SHALL BE MADE IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE CALIFORNIA PLUMBING CODE.
   B. GRAVITY LINES FOR SEWAGE DISPOSAL SYSTEMS MUST BE FOUR INCHES IN DIAMETER.
   C. FOR ALL GRAVITY LINES, INSTALL CLEANOUTS ON ALL ELLS AND EVERY 100 FEET ON STRAIGHT RUNS.
   D. ALL SOLID PIPE JOINTS AND CONNECTIONS MUST BE GLUED, CEMENTED, OR MADE WITH AN ELASTOMERIC SEAL SO AS TO BE WATERTIGHT.
   E. WHERE ENTERING THE TANK, A MINIMUM OF 4 INCH DIAMETER PVC SCHEDULE 40 STUB SHALL BE CAST IN PLACE OR SEALED WITH THOROPLUG OR OTHER WATERPROOF MATERIAL.
   F. BRASS TYPE FITTINGS, VALVES, AND PIPING ARE PROHIBITED IN SEPTIC AND SUMP TANKS.

6. EFFLUENT FILTERS ARE TO BE USED IN ALL SEPTIC TANKS AND SHALL HAVE A FILTRATION OF NO GREATER THAN 1/8", OR AS SPECIFIED ON THE PLANS.

7. ELECTRICAL CONNECTIONS
   A. ALL ELECTRICAL CONDUITS AND FITTINGS ENTERING THE SUMP SHALL BE GAS TIGHT AND WATER TIGHT PVC. METALLIC GAS TIGHT FITTINGS ARE NOT ALLOWED.
   B. ALL WIRES SHALL BE INDIVIDUALLY SEALED AT THE JUNCTION BOX OR ALARM/CONTROL PANEL AS APPROPRIATE. GROUT OR ASPHALT EMULSION IS NOT AN ACCEPTABLE SEALANT.
   C. THE PUMP POWER LEAD AND THE FLOAT SWITCH CONTROL WIRES SHALL NOT BE RUN IN A COMMON CONDUIT.
   D. 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.
   E. CONTROL FLOATS SHALL BE ATTACHED TO PVC POLE WITH APPROVED CONNECTORS OR PLASTIC TIE STRAPS..

STAGES TO BE INSPECTED BY THE DESIGNER

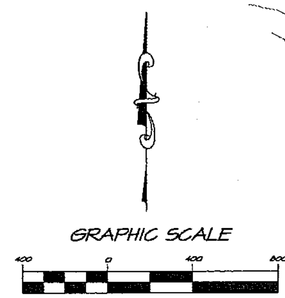
CONTRACTOR IS REQUIRED TO HAVE ENGINEER AND NAPA COUNTY ENVIRONMENTAL MANAGEMENT DEPARTMENT INSPECT THE CONSTRUCTION AT THE FOLLOWING STAGES. FAILURE TO REQUEST THESE INSPECTIONS WILL RESULT IN THE CONTRACTOR HAVING TO UN-EARTH AND RE-DO THE WORK. THE CONTRACTOR SHALL GIVE 48-HOUR ADVANCE NOTICE TO THE ENGINEER FOR ANY OF THESE INSPECTIONS:

1. CHECK LAYOUT OF ALL TANKS BEFORE EXCAVATION.
2. CHECK LAYOUT OF ALL PRESSURE AND DISPERSAL LINES BEFORE TRENCHING FOR LEVEL AND SPACING.
3. WATERTIGHT TEST OF ALL TANKS BEFORE BACKFILL.
4. HYDRAULIC TEST OF PRESSURE AND DISPERSAL LINES IN TRENCH BEFORE COVER WITH GRAVEL OR CHAMBER.
5. FINAL INSPECTION AND STARTUP AFTER PERMANENT POWER HOOK-UP.

SEWAGE TREATMENT SYSTEM CONSTRUCTION NOTES

GENERAL:

1. A STAMPED COPY OF THE PLANS FOR THE APPROVED SEWAGE DISPOSAL SYSTEM MUST BE KEPT AVAILABLE AT THE JOB SITE DURING SYSTEM INSTALLATION AND UNTIL THE SYSTEM PASSES FINAL INSPECTION.
2. THE SYSTEM LAYOUT SHALL CONFORM TO THIS PLAN. IF THE FIELD CONDITIONS DO NOT ALLOW FOR THIS CONDITION, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY IN ORDER TO MAKE 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. EQUIPMENT SUSCEPTIBLE TO FREEZING MUST BE ADEQUATELY PROTECTED TO PREVENT FREEZING.
5. COMPLETE PROPER DRAINAGE WORK AND EROSION CONTROL MEASURES BEFORE FINAL INSPECTION.



GRAPHIC SCALE

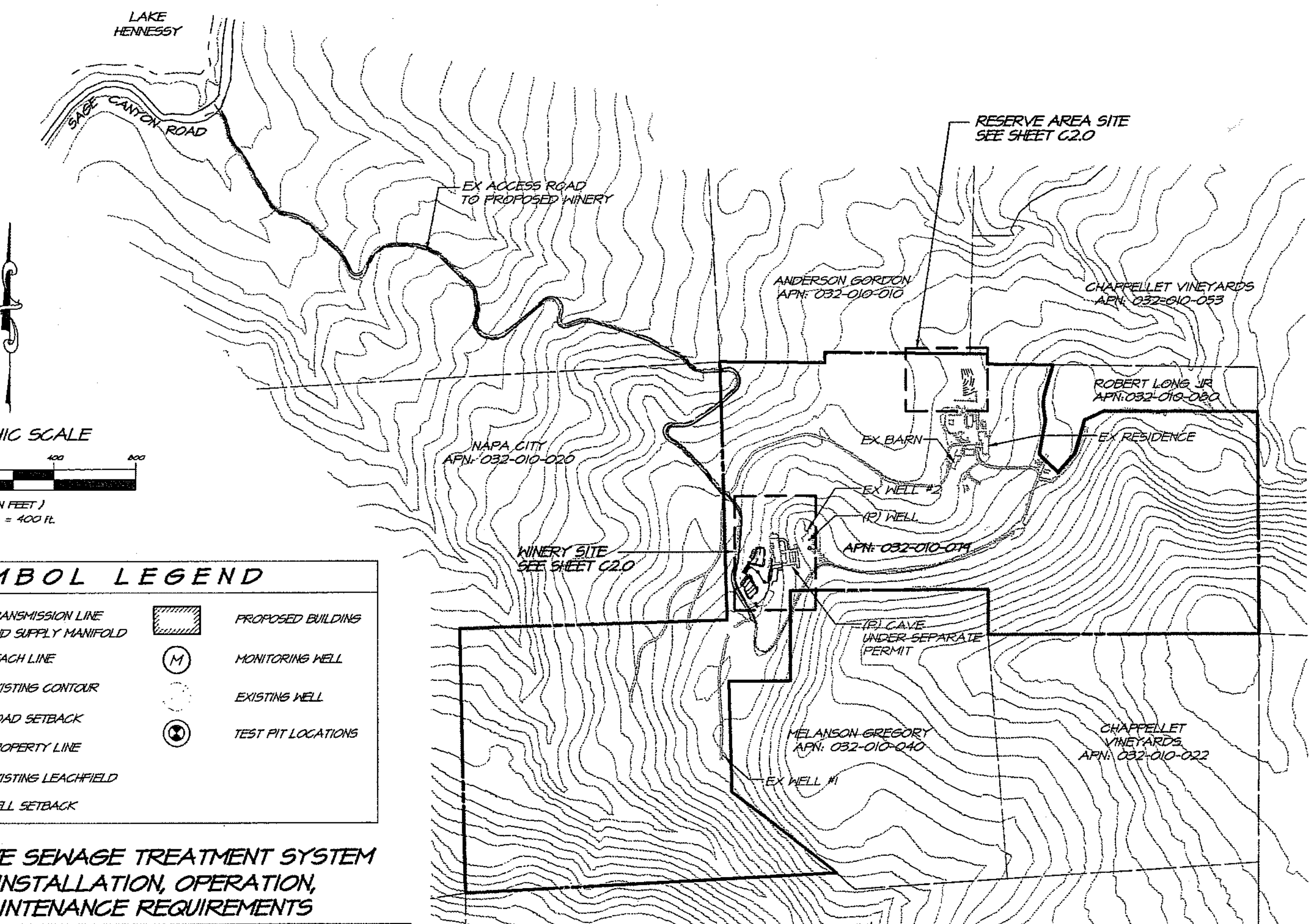
(IN FEET)
1 inch = 400 ft.

SYMBOL LEGEND

———	TRANSMISSION LINE AND SUPPLY MANIFOLD	[hatched box]	PROPOSED BUILDINGS
- - - -	LEACH LINE	(M)	MONITORING WELL
········	EXISTING CONTOUR	○	EXISTING WELL
———	ROAD SETBACK	⊗	TEST PIT LOCATIONS
—— - - ——	PROPERTY LINE		
········	EXISTING LEACHFIELD		
— — — —	WELL SETBACK		

ALTERNATIVE SEWAGE TREATMENT SYSTEM (ASTS) INSTALLATION, OPERATION, AND MAINTENANCE REQUIREMENTS

1. ALL ALTERNATIVE SEWAGE TREATMENT SYSTEMS (ASTS) ARE REQUIRED TO MAINTAIN AN ANNUAL OPERATING PERMIT ISSUED BY THE NAPA COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.
2. THE ASTS SHALL BE OPERATED AND MAINTAINED IN CONFORMANCE WITH THE CONDITIONS PRESCRIBED IN THE ANNUAL OPERATING PERMIT. ALL REQUIRED OPERATING, MAINTENANCE, AND MONITORING OF THE ASTS IS THE RESPONSIBILITY OF THE PERMIT HOLDER. CONTACT THE DEPARTMENT OF ENVIRONMENTAL MANAGEMENT FOR INFORMATION ON CONDITIONS OF THIS PERMIT.
3. PRIOR TO ISSUANCE OF THE ASTS INSTALLATION PERMIT, THE OWNER OF THE PROPERTY SHALL APPLY FOR THE ANNUAL OPERATING PERMIT BY SUBMITTING TO THE NAPA COUNTY ENVIRONMENTAL MANAGEMENT DEPARTMENT A SIGNED AND NOTARIZED "SUPPLEMENTAL APPLICATION TO CONSTRUCT AND OPERATE AN ASTS", AND A "MASTER FILE RECORD". FORMS ARE AVAILABLE FROM THE DEPARTMENT.
4. ALL INSTALLERS OF AN ASTS MUST HAVE AN ACTIVE CALIFORNIA CLASS A GENERAL ENGINEERING CONTRACTOR, CLASS C-42 SANITATION SYSTEM CONTRACTOR, OR CLASS C-36 PLUMBING CONTRACTOR LICENSE.
5. PRIOR TO ISSUANCE OF THE ASTS OPERATING PERMIT, ALL INSPECTIONS SHALL BE COMPLETED (SEE SEPARATE INSPECTION SCHEDULE) AND THE OWNER OF THE PROPERTY SHALL SUBMIT A COPY OF THE SIGNED SERVICE PROVIDER MAINTENANCE CONTRACT.
6. THE ASTS IS REQUIRED TO UNDERGO ONGOING INSPECTION AND MONITORING BY AN APPROVED SERVICE PROVIDER REGISTERED WITH THE DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AT A FREQUENCY OF ONCE DURING EVERY SIX (6) MONTH PERIOD. EACH SIX MONTH PERIOD IS DENOTED AS "WINTER SEASON" (NOVEMBER 1ST TO APRIL 30TH) AND "SUMMER SEASON" (MAY 1ST TO OCTOBER 31ST). THE TWO INSPECTIONS SHALL BE PERFORMED A MINIMUM OF NINETY (90) DAYS APART.
7. CONTACT THE ENVIRONMENTAL MANAGEMENT DEPARTMENT FOR CURRENT INSPECTION REQUIREMENTS. THE INSPECTION, AT A MINIMUM, SHOULD EVALUATE THE FOLLOWING ITEMS AS APPLICABLE TO THIS ASTS.
   A. CONDITION AND OPERATION OF SEPTIC AND PUMP TANKS INCLUDING CHECKING SLUDGE, GREASE, AND SCUM LEVELS AND CONDITION OF ALL EFFLUENT FILTERS.
   B. CONDITION AND OPERATION OF ANY PRE-TREATMENT SYSTEM.
   C. CONDITION AND OPERATION OF PURGE VALVES, BALANCING VALVES, DISTRIBUTION VALVES, AND ALL OTHER CONTROL VALVES.
   D. CONDITION OF THE DISPERSAL FIELD GROUND COVER.
   E. CONDITION, MOVEMENT, AND STABILITY OF ANY FILL IN THE DISPERSAL FIELD AREA.
   F. CONDITION OF EROSION CONTROL MEASURES.
   G. FLOW METER AND/OR PUMP COUNTER MEASUREMENTS AND COMPARISON TO DESIGN CAPACITY.
   H. FULL OPERATIONAL PERFORMANCE TEST OF ALL INSTALLED COMPONENTS (PUMPS, CONTROL PANELS, VALVES, ETC.)



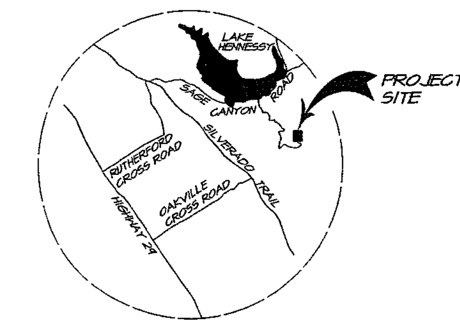
SITE PLAN

ABBREVIATIONS

AD	AREA DRAIN	GPM	GALLONS PER MINUTE
AC	ASPHALT CONCRETE	HP	HIGH POINT
AB	AGGREGATE BASE	INV	INVERT
APN	ASSESSORS PARCEL NUMBER	IP	IRON PIPE
BC	BEGIN CURVE	JP	JOINT POLE
BM	BENCHMARK	LF	LINEAL FEET/FOOT
BO	BLOWOFF	MAX	MAXIMUM
BS	BOTTOM SLOPE	MH	MANHOLE
BW	BOTTOM OF WALL	MIN	MINIMUM
CB	CATCH BASIN	O.C.	ON CENTER
℄	CENTERLINE	PIV	POST INDICATOR VALVE
CO	CLEANOUT	ℙ	PROPERTY LINE
CU	CUBIC	QTY	QUANTITY
CV	CHECK VALVE	PVC	POLYVINYL CHLORIDE
DCV	DOUBLE CHECK VALVE	RCP	REINFORCED CONCRETE PIPE
DI	DROP INLET	RD	ROAD
DIA	DIAMETER	RECIRC	RECIRCULATION
DW	DOMESTIC WATER	RW	RECLAIMED WATER
EC	END OF CURVE	S	SLOPE (FEET/FOOT)
ECP	EROSION CONTROL PLAN	SCH	SCHEDULE
EMER	EMERGENCY	SD	STORM DRAIN
EX(E)	EXISTING	SS	SANITARY SEWER
FC	FACE OF CURB	SPECS	SPECIFICATIONS
FDC	FIRE DEPT. CONNECTION	STA	STATION
FF	FINISHED FLOOR	SQ	SQUARE
FG	FINISH GRADE	TC	TOP OF CURB
FH	FIRE HYDRANT	TP	TEST PIT
FM	FORCE MAIN	TW	TOP OF WALL
FT	FEET	TYP	TYPICAL
F	FIRE SERVICE	V	VOLT
FL	FLOW LINE	W/	WITH
GAL	GALLON	WM	WATER METER
GB	GRADE BREAK	WV	WATER VALVE

CALL USA
BEFORE EXCAVATING

48 HOURS IN ADVANCE
1 (800) 227-2600



LOCATION MAP
NO SCALE

PROJECT INFORMATION

OWNER:	MANUEL PIRES
OWNER ADDRESS:	1535 SAGE CANYON ROAD ST. HELENA, NAPA COUNTY CALIFORNIA
CIVIL ENGINEER:	RIECHERS SPENCE & ASSOC. 1541 THIRD STREET NAPA, CALIF. 94559
SITE ADDRESS:	1535 SAGE CANYON ROAD ST. HELENA, NAPA COUNTY CALIFORNIA
PARCEL NO:	032-010-079
PARCEL AREA:	114.7 ACRE
EXISTING USE:	WINERY
PROPOSED USE:	WINERY
EXISTING ZONING:	AW
PROPOSED ZONING:	AW
GENERAL PLAN DESIGNATION:	AW
USE PERMIT No.:	P07-00348 AND P08-00880
CAVE PERMIT No.:	W08-01277, B09-00072
SEPTIC PERMIT No.:	E09-00039 (THIS PLAN SET)

SURVEY

THE TOPOGRAPHIC SURVEY SHOWN DOES NOT REPRESENT A PROPERTY LINE SURVEY. PROPERY LINES SHOWN HEREON ARE BASED ON RECORD DATA, AND MAY NOT REPRESENT THE TRUE POSITIONS OF THE LINES. BOUNDARY IS BASED ON A FIELD SURVEY OF MAY 22 AND 23, 2006.

SURVEYED BY:
TERRA FIRMA SURVEYS, INC.
P.O. BOX 533
ST. HELENA, CA 94574
TEL: (707) 963-7565

BASIS OF BEARING

ASSUMED VERTICAL DATUM TWO FOOT CONTOUR INTERVAL BASIS OF BEARINGS PER 17 RS 90 N.C.R.

BENCHMARK

THE SECOND STORY FINISHED FLOOR OF THE MAIN RESIDENCE HALF A FOOT INSIDE THE FRONT DOOR.
ELEVATION = 906.76'

SHEET INDEX

REGISTERED PROFESSIONAL ENGINEER
CARL ANTHONY BUTTS
No. 70562
Exp. 3-31-11
CIVIL ENGINEER
STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF:

CARL A. BUTTS RCE 70562 EXP 3-31-11

NO.	DATE	REVISIONS	BY	APP'D

RIECHERS SPENCE ASSOCIATES
CONSULTING CIVIL ENGINEERS
1541 Third Street
Napa, California 94559
v 707.252.3301
f 707.252.4966

SAGE HILL WINERY, LLC
COVER SHEET
NAPA COUNTY CALIFORNIA

DATE	MAY 13, 2009
DRAWN	ECB
DESIGNED	MRF
CHECKED	CAB
JOB NO.	4106024.0
SHEET NO.	C1.0 OF 4 SHEETS

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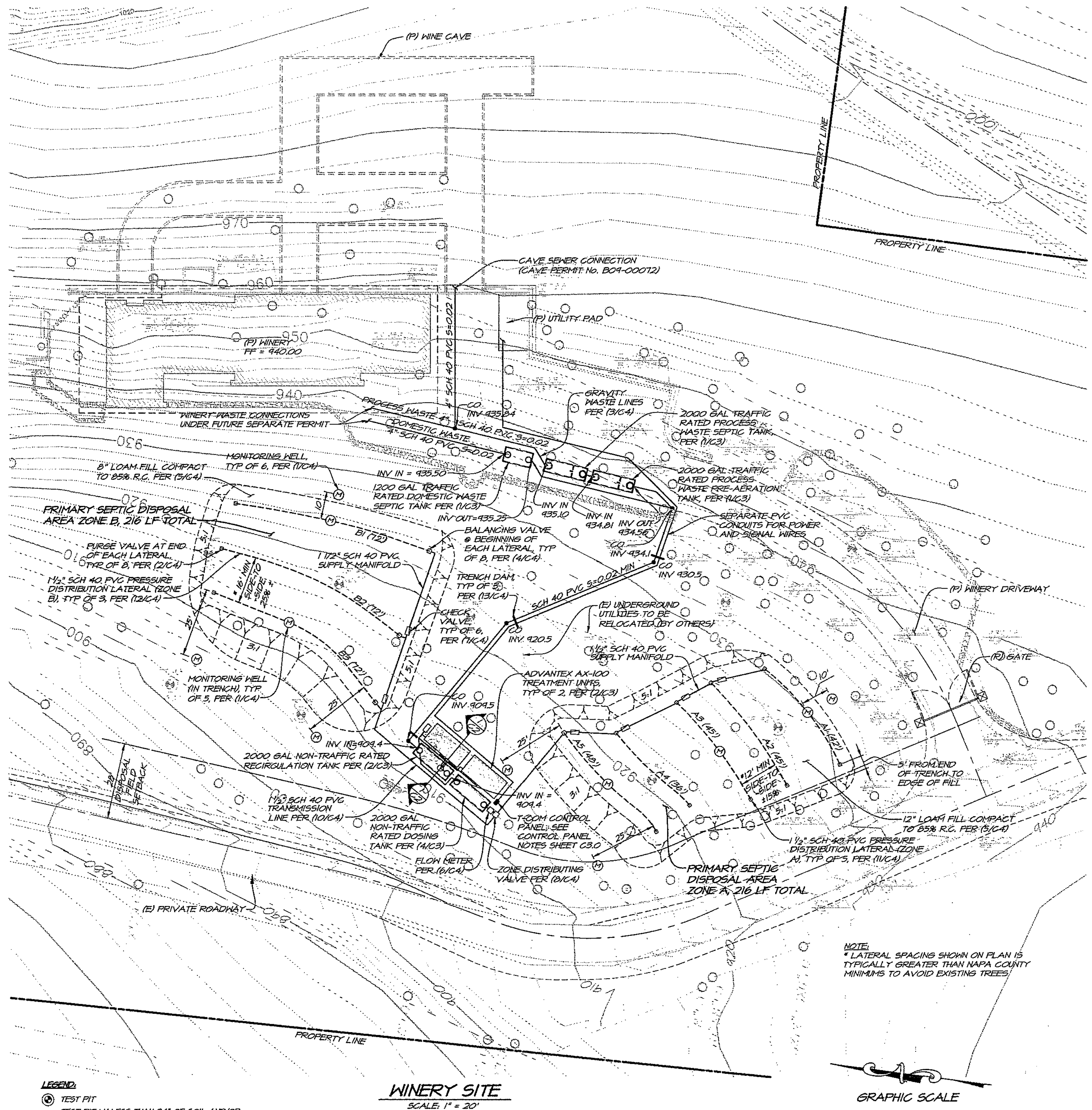
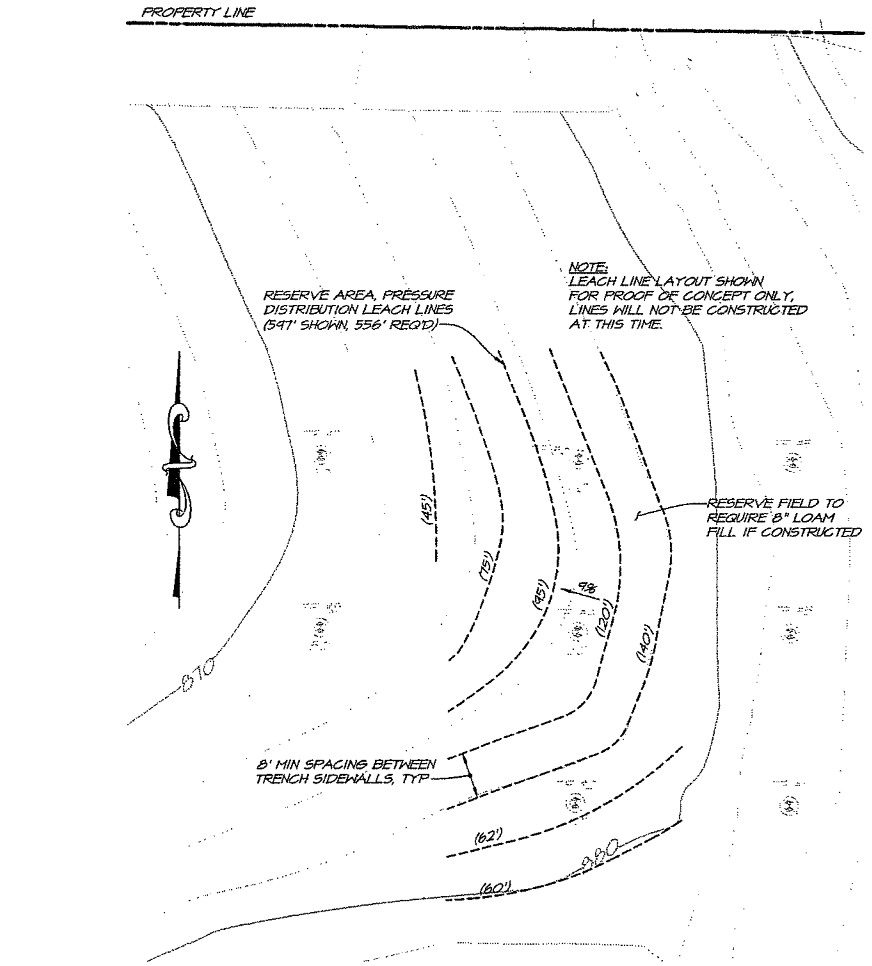


NOTE:
* LATERAL SPACING SHOWN ON PLAN IS TYPICALLY GREATER THAN NAPA COUNTY MINIMUMS TO AVOID EXISTING TREES.

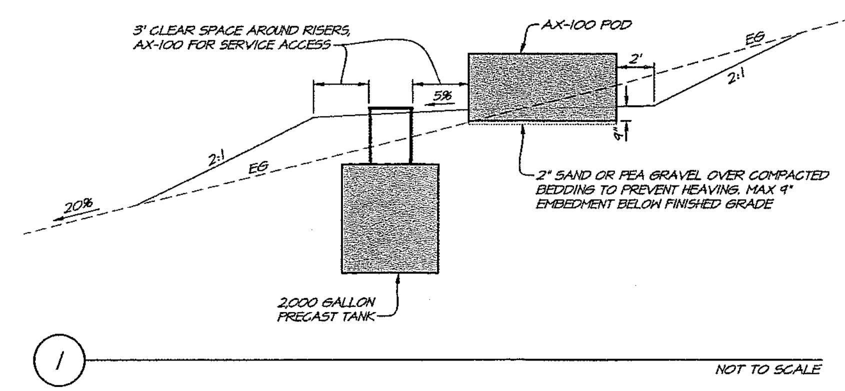
LEGEND:
- TEST PIT
- TEST PIT W/ LESS THAN 24" OF SOIL AND/OR TOO STEEP TO ADD FILL SOIL
- LEACH FIELD MONITORING WELL
- EXISTING TREES

WINERY SITE
SCALE: 1" = 20'

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.



RESERVE AREA SITE
SCALE: 1" = 20'



1 NOT TO SCALE

Registered Professional Engineer Carl Anthony Butts No. 70562 Exp. 3-31-11 Civil Engineer State of California

PREPARED UNDER THE DIRECTION OF:

CARL A. BUTTS RCE 70562 EXP 3-31-11

NO.	DATE	REVISIONS	BY	APPD

RIECHERS SPENCE ASSOCIATES — CONSULTING CIVIL ENGINEERS
1541 Third Street, Napa, California 94559
T 707.252.3301 F 707.252.4966

SAGE HILL WINERY, LLC
SEPTIC SITE PLAN
NAPA COUNTY CALIFORNIA

DATE	MAY 18, 2009
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DESIGNED	MRF
CHECKED	CAB
JOB NO.	4106024.0
SHEET NO.	C2.0
	OF 4 SHEETS

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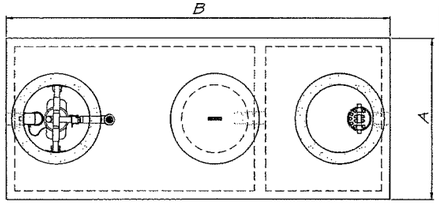
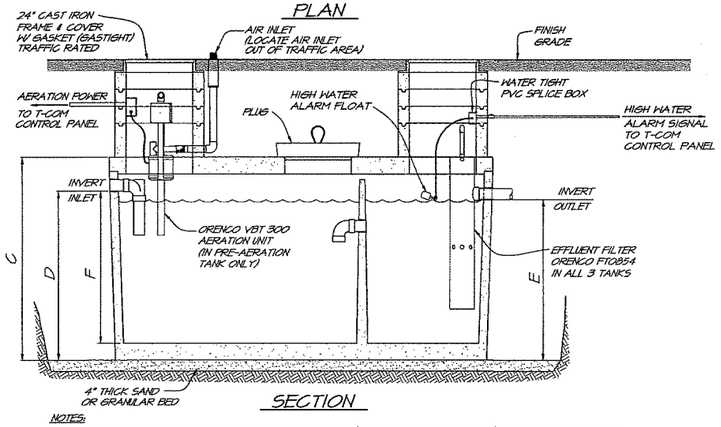
SEPTIC TANK DIMENSIONS										
MODEL NUMBER	LIQUID CAPACITY GALLONS	DIMENSION						MINIMUM EXCAVATION WIDTH	MINIMUM EXCAVATION LENGTH	DEPTH OF BURY
		A	B	C	D	E	F			
JP1200EE-5T	1200	6'-0"	8'-6"	6'-6"	5'-0"	4'-9"		7'-0"	9'-6"	1' TO 6'
JP2000EE-5T	2000	4'-11"	15'-11"	6'-0"	5'-0"	4'-9"		5'-11"	16'-11"	1' TO 6'



PLAN

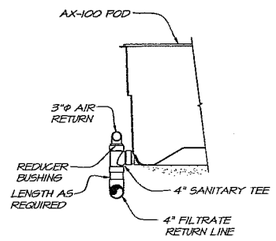


SECTION

NOTES:
1. DESIGN LOAD: H-20 TRAFFIC WITH DRY SOIL CONDITIONS (WATER LEVEL BELOW TANK) AND 1'-6" EARTH COVER.
2. SUITABLE SUB-BASE BEDDED WITH GRANULAR MATERIAL SHALL BE PREPARED TO HANDLE ANTICIPATED LOAD.
3. CONTACT JENSEN PRODUCTS FOR ADITIONAL INFORMATION. http://www.jensenprecast.com
4. SEE TABLE FOR SEPTIC TANK DIMENSIONS.

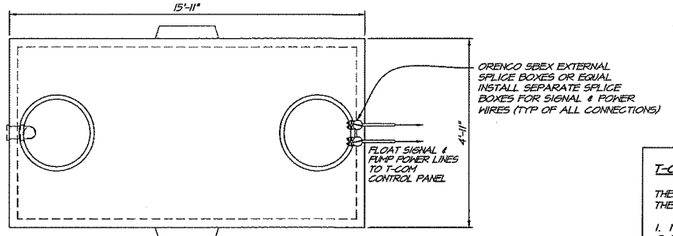
1/C3 JENSEN COMMERCIAL SEPTIC TANK, PRE-AERATION TANK

NOT TO SCALE

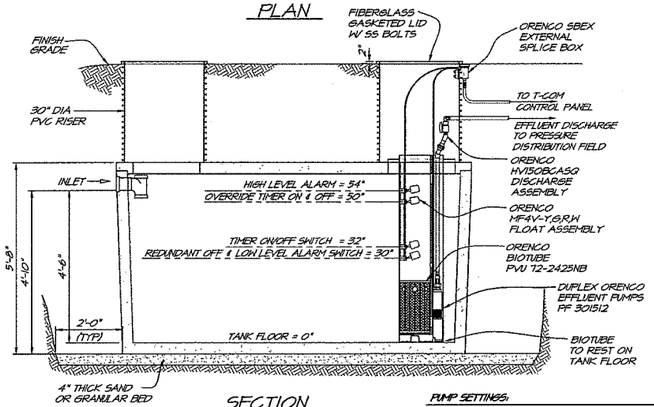


6/C3 FILTRATE RETURN OUTLET DETAIL

NOT TO SCALE



PLAN



SECTION

NOTES:
1. LIQUID CAPACITY: 2,000 GALLONS
2. DESIGN LOAD: NON TRAFFIC - 3 FEET OF EARTH COVER MAX. AT 500 PSF.
3. FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT JENSEN PRECAST http://www.jensenprecast.com

PUMP SETTINGS:

DAILY FLOW:	1000 GPD		
DOSES PER DAY:	10		
GALLONS PER DOSE:	100 GALLONS		
DOSING FLOW RATE:	30 GPM		
TIMER:	ON = 3 MIN 18 SEC	OFF =	140 MIN 42 SEC
OVERRIDE:	ON = 3 MIN 18 SEC	OFF =	68 MIN 42 SEC

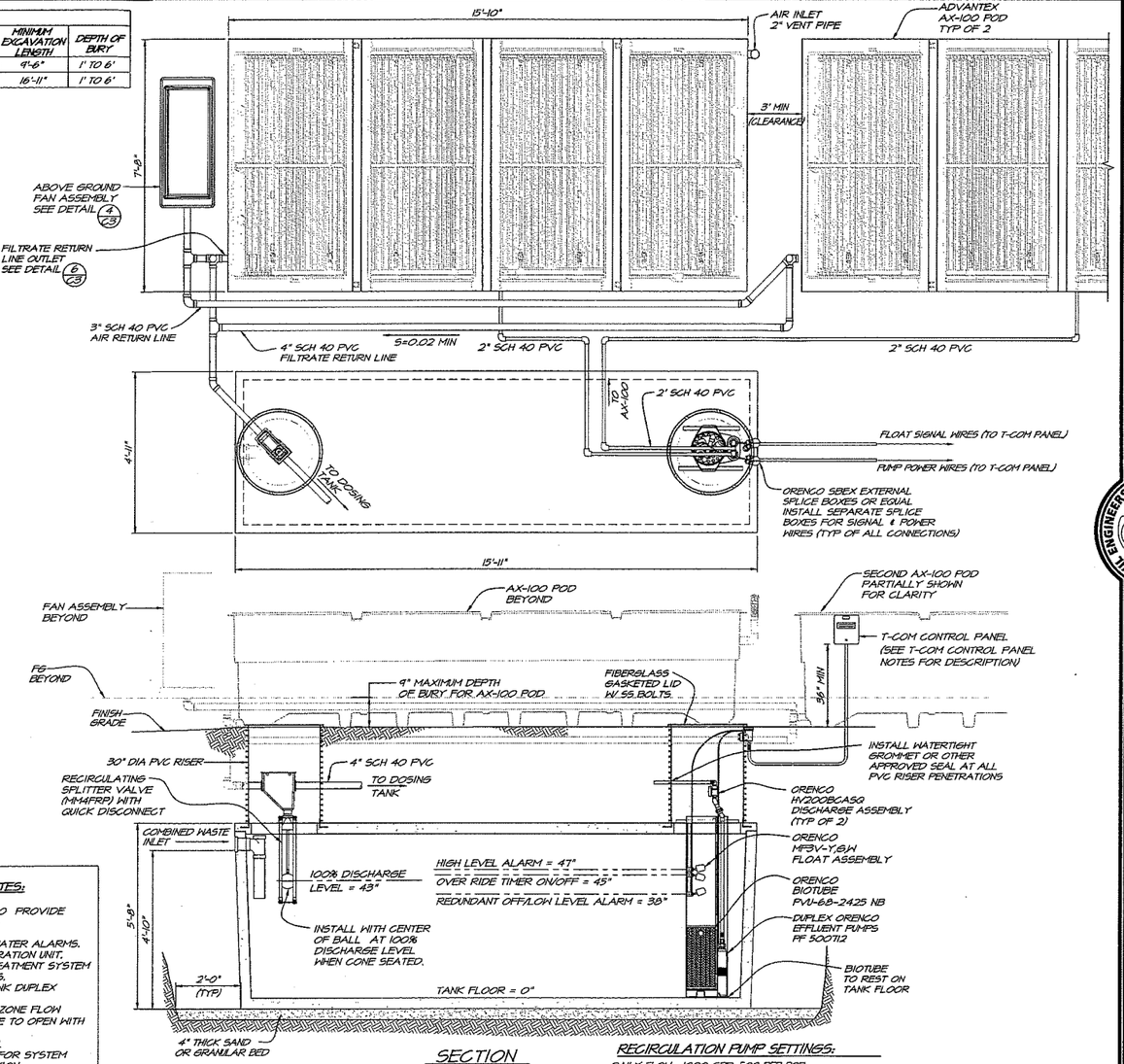
3/C3 JENSEN PRECAST HS-2000 DOSING TANK

NOT TO SCALE

T-COM CONTROL PANEL NOTES:

THE T-COM CONTROL PANEL IS TO PROVIDE THE FOLLOWING FUNCTIONALITY:

1. MONITOR SEPTIC TANK HIGH WATER ALARMS.
2. TIMED AERATION OF VBT AERATION UNIT.
3. TIMED DOSING OF AX-100 TREATMENT SYSTEM DUPLEX RECIRCULATION PUMPS.
4. TIMED DOSING OF DOSING TANK DUPLEX DISCHARGE PUMPS.
5. AUTOMATIC CONTROL OF THE ZONE FLOW CONTROL VALVES (ONE VALVE TO OPEN WITH EACH PUMPING CYCLE).
6. REMOTE ALARM NOTIFICATION.
7. REMOTE TELEMETRY ACCESS FOR SYSTEM CONTROL AND DATA ACQUISITION.



SECTION

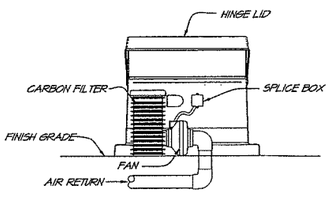
NOTES:
1. LIQUID CAPACITY: 2,000 GALLONS.
2. DESIGN LOAD: NON TRAFFIC - 3 FEET OF EARTH COVER MAX. AT 500 PSF.
3. FOR COMPLETE DESIGN AND PRODUCT INFORMATION CONTACT JENSEN PRECAST http://www.jensenprecast.com

RECIRCULATION PUMP SETTINGS:

DAILY FLOW:	1000 GPD, 500 PER POD		
RECIRCULATION RATIO:	12:1		
TOTAL DAILY DOSING:	6500 GPD PER POD		
DOSES PER DAY:	12 PER POD		
DOSING FLOW RATE:	31.4 GPM		
TIMER:	ON = 2 MIN 53 SEC	OFF =	17 MIN 7 SEC
OVERRIDE:	ON = 2 MIN 53 SEC	OFF =	7 MIN 7 SEC

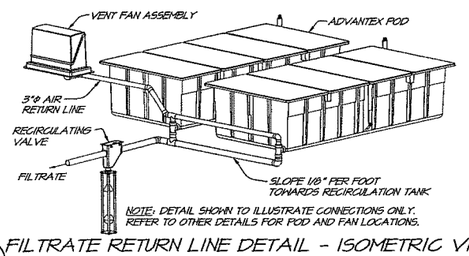
2/C3 JENSEN PRECAST HS-2000 RECIRCULATION TANK W/ ADVANTEX AX-100 PODS

NOT TO SCALE



4/C3 ABOVE GROUND FAN ASSEMBLY

NOT TO SCALE



NOTE: DETAIL SHOWN TO ILLUSTRATE CONNECTIONS ONLY. REFER TO OTHER DETAILS FOR POD AND FAN LOCATIONS.

5/C3 FILTRATE RETURN LINE DETAIL - ISOMETRIC VIEW

NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
CARL ANTHONY BITTS
No. 70562
Exp. 3-31-11
CIVIL ENGINEER
STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF:

CARL A. BITTS RCE 70562 EXP 3-31-11

NO.	DATE	REVISIONS	BY	APPD

RIECHERS SPENCE ASSOCIATES
CIVIL ENGINEERS CONSULTING
1541 Third Street
Napa, California 94559
T 707.252.3301
F 707.252.4956

SAGE HILL WINERY, LLC
DETAILS
NAPA COUNTY CALIFORNIA

DATE	MAY 13, 2009	
DRAWN	ECB	
DESIGNED	MRF	
CHECKED	CAB	
JOB NO.	41060240	
SHEET NO.	C3.0 OF 4 SHEETS	

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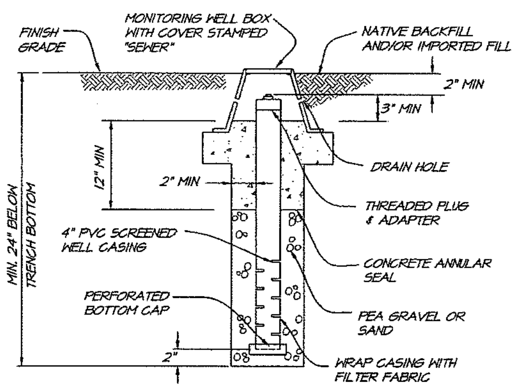
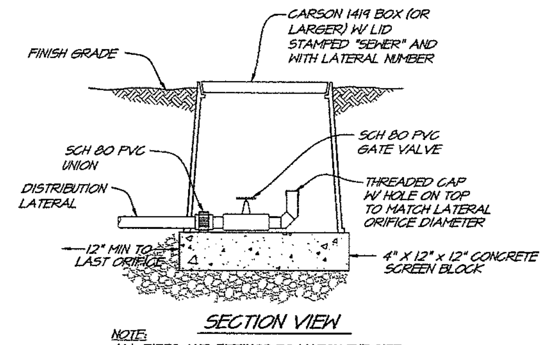
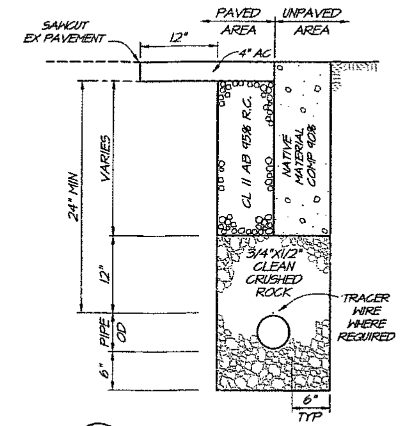


1/C4 MONITORING WELL DETAIL
NOT TO SCALE

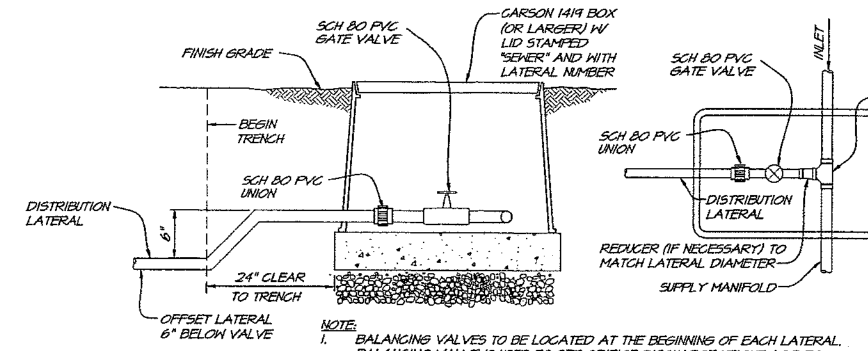


NOTE:
ALL PIPES AND FITTINGS TO MATCH THE SIZE OF DISTRIBUTION LATERAL

2/C4 PD PURGE VALVE DETAIL
NO SCALE

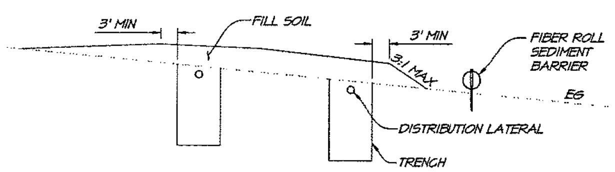


3/C4 SANITARY SEWER
REV SS0000-05 NO SCALE

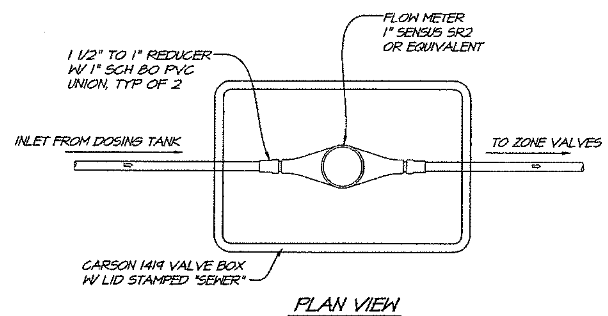


NOTE:
1. BALANCING VALVES TO BE LOCATED AT THE BEGINNING OF EACH LATERAL. BALANCING VALVE IS USED TO SET ORIFICE DISCHARGE HEIGHT AT 5 FT.
2. ALL PIPES AND FITTINGS TO MATCH THE SIZE OF THE MANIFOLD OR DISTRIBUTION LATERAL AS APPROPRIATE.

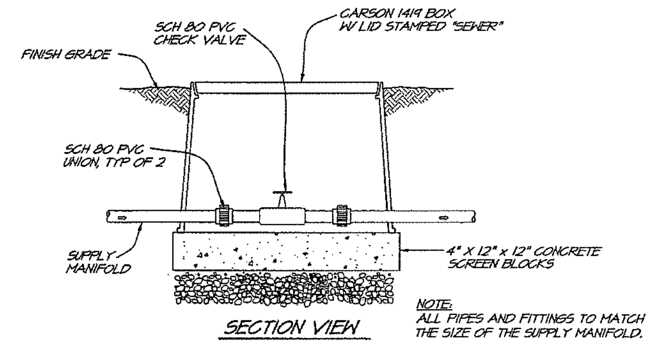
4/C4 PD BALANCING VALVE DETAIL
NO SCALE



GENERALIZED TRENCH COVER GRADING DETAIL (TYPICAL)
5/C4 REV WW0000-11 NO SCALE

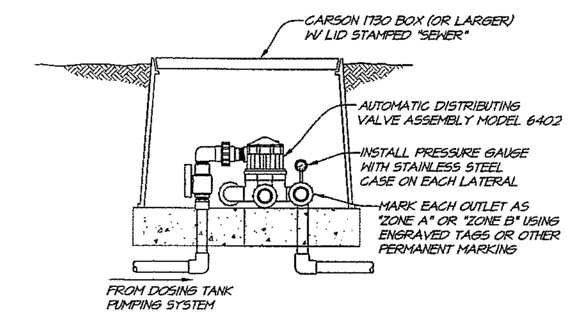


6/C4 FLOW METER DETAIL
NOT TO SCALE

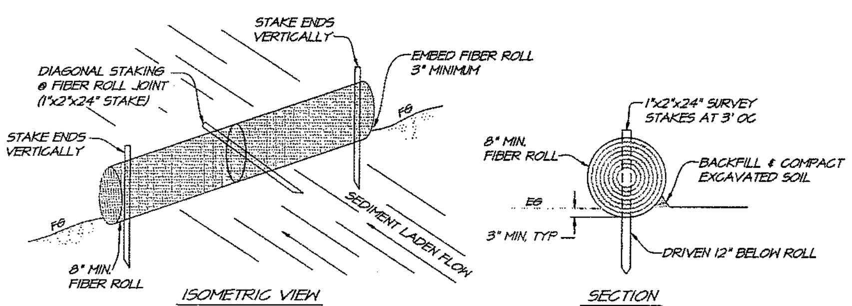


NOTE:
ALL PIPES AND FITTINGS TO MATCH THE SIZE OF THE SUPPLY MANIFOLD.

7/C4 CHECK VALVE DETAIL
NO SCALE

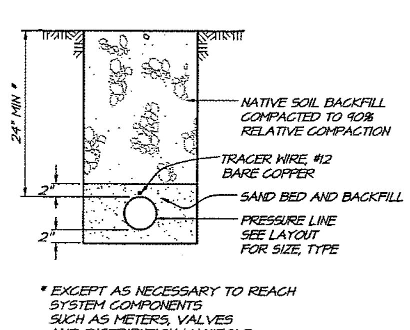


8/C4 DISTRIBUTING VALVE DETAIL
NOT TO SCALE



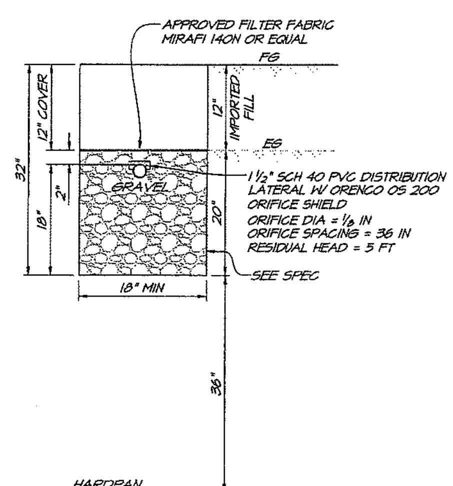
NOTE:
PLACE FIBER ROLLS INTO THE KEY TRENCH AND STAKE ON BOTH SIDES OF THE ROLL WITHIN 6 FEET OF EACH END AND THEN 4 FEET WITH 1" x 2" STAKES OR AS SUGGESTED BY MANUFACTURER.

9/C4 FIBER ROLL SEDIMENT BARRIER
NO SCALE



* EXCEPT AS NECESSARY TO REACH SYSTEM COMPONENTS SUCH AS METERS, VALVES AND DISTRIBUTION MANIFOLD

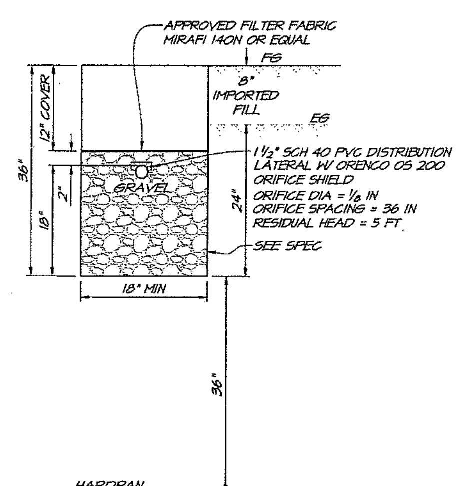
10/C4 PRESSURIZED TRANSMISSION LINE DETAIL
NO SCALE



NOTES FOR PD MATERIALS

GRAVEL SHALL BE 3/8"-2" DOUBLE WASHED RIVER ROCK, CRUSHED DRAIN ROCK, LAVA ROCK, OR PEA GRAVEL. THE FINES IN THE WASHED GRAVEL SHALL NOT EXCEED 1% BY WEIGHT. BACKFILL SHALL BE NATIVE TOPSOIL OR IF IMPORTED SHOULD BE USDA CLASSIFIED AS LOAM, SANDY CLAY LOAM, OR SANDY LOAM

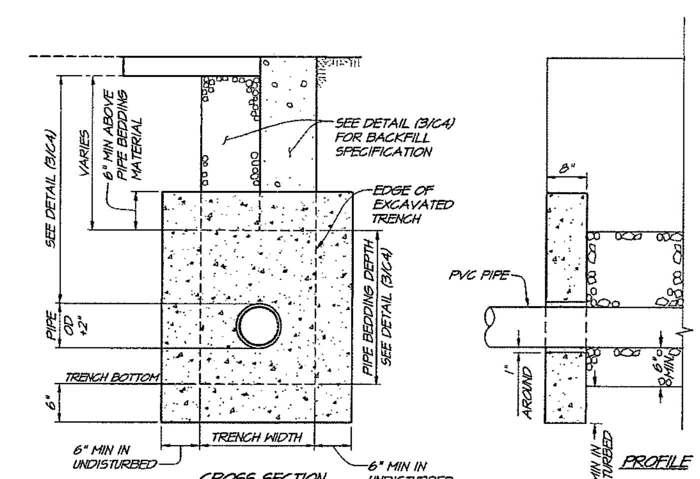
11/C4 PD TRENCH SECTION ZONE A
REV WW0000-17 NO SCALE



NOTES FOR PD MATERIALS

GRAVEL SHALL BE 3/8"-2" DOUBLE WASHED RIVER ROCK, CRUSHED DRAIN ROCK, LAVA ROCK, OR PEA GRAVEL. THE FINES IN THE WASHED GRAVEL SHALL NOT EXCEED 1% BY WEIGHT. BACKFILL SHALL BE NATIVE TOPSOIL OR IF IMPORTED SHOULD BE USDA CLASSIFIED AS LOAM, SANDY CLAY LOAM, OR SANDY LOAM

12/C4 PD TRENCH SECTION ZONE B
REV WW0000-17 NO SCALE



NOTES:
1. CONCRETE TRENCH DAM TO HAVE 8" MIN. THICKNESS.
2. CONSTRUCT TRENCH DAM AT 100' INTERVALS OVER LENGTH OF NATURAL COVER TRENCHES OR AS SHOWN ON PLAN.

13/C4 CONCRETE TRENCH DAM DETAIL
NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER — CARL ANTHONY BUTTS — No. 70562 — Exp. 3-31-11 — CIVIL ENGINEER — STATE OF CALIFORNIA

PREPARED UNDER THE DIRECTION OF:

CARL A. BUTTS RCE 70562 EXP 3-31-11

NO.	DATE	REVISIONS	BY	APP'D

RIECHERS SPENCE ASSOCIATES
CONSULTING CIVIL ENGINEERS
1541 Third Street
Napa, California 94559
v 707.252.3301
f 707.252.4966

SAGE HILL WINERY, LLC
DETAILS
NAPA COUNTY CALIFORNIA

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DATE	MAY 13, 2009
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DESIGNED	MRF
CHECKED	CAB
JOB NO.	4106024.0

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C4.0
OF 4 SHEETS

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SAGE HILL WINERY

Napa County, CA

PROCESS AND SANITARY WASTEWATER SEPTIC SYSTEM DESIGN REPORT

Project# 4106024.0
May 13, 2009

Prepared by

Riechers Spence & Associates
1541 Third Street
Napa, CA 94559

(707) 252-3301 v www.rsacivil.com (707) 252-4966 f

Introduction and Project Description

The owner of parcel APN 032-010-079 is proposing to build a 20,000 gallon per year winery (8,300 cases). This report accompanies a set of wastewater system construction plans and describes the design of the proposed wastewater system for the winery. The proposed system will combine and treat all sanitary waste and winery process waste followed by subsurface disposal in a pressure distribution system.

Site Description

The 115+/- acre parcel is located south of Lake Hennessey. The winery entrance is located along Sage Canyon Road near the Lake Hennessey boat docks. A private road continues about 1 mile from Sage Canyon Road to the subject property. Although there are some relatively flat areas on the property, much of the site is sloped above 20%. Two water wells exist on the parcel and are available for domestic and wine production purposes. A third well is proposed. All wells are located well beyond the required 100 foot septic system setback. The winery facility will consist of wine production areas, a wine cave, offices, and a tasting and sales area. Appendix A contains a Site Location Map showing the parcel boundary, topography, and other features. These features are also shown on the construction plans accompanying this report.

Site Evaluations

Riechers Spence & Associates, in conjunction with Napa County, conducted three septic site evaluations on the subject parcel. All three site evaluations were conducted by Riechers Spence and Associates and inspected by Darrell Choate of Napa County Environmental Management. Appendix B contains a test pit location map and test pit logs for each of the three site evaluations.

Site Evaluation 1 – March 21, 2007:
Six of ten test pits were acceptable with depths up to 60 inches. Soil was classified as Clay Loam.

Site Evaluation 2 – November 7, 2007:
Seven of eight test pits were acceptable with depths up to 48 inches. Soil was classified as Loam and Clay Loam.

Site Evaluation 3 – January 16, 2008:
Seven of twelve test pits were acceptable with depths up to 60 inches. Soil was classified as Loam and Sandy Clay Loam.

A representative soil sample was collected during each site evaluation and a soil texture analysis by Bouyoucos Hydrometer Method was performed on each sample by RGH Consultants Inc. These test results are also included in Appendix B.

Process and Sanitary Wastewater Characteristics

Wastewater will leave the winery in two separate streams for sanitary and winery process wastewater. Flow volume and constituent strength estimates for the design are provided for each type of waste.

Process Wastewater Flow Volume

Based on a winery producing 20,000 gallons per year of wine, peak daily process wastewater flow is estimated as follows using current Napa County guidelines.

$$Peak\ Day\ Flow = \frac{Annual\ production\ (gallons)\ x 1.5}{45\ Day\ Harvest\ Period}$$

$$Peak\ Day\ Flow = \frac{20{,}000\ gallons\ x 1.5}{45\ Day\ Harvest\ Period} = 667\ gpd$$

Sanitary Wastewater Flow Volume

The projected peak daily sanitary waste flow has been estimated from the projected peak number of visitors and employees as originally described in the Septic Feasibility Report submitted as part of the Use Permit application. This data is summarized in Table 2. Rates for each type of occupancy are taken from Table 4 of the Napa County Alternative Treatment System Design Guidelines. From Table 2 the total projected sanitary flow is 333 gallons per day. The Use Permit allowed for a commercial kitchen to be installed in the winery for preparing food for

special promotional events, however due to space limitations the kitchen has been deleted from the final plans. Without a kitchen the total flow volume will presumably be reduced from that predicted in the feasibility report, however to be conservative we are still designing to the original flow estimate.

Table 2: Projected Sanitary Wastewater Flow

Type of Occupancy	Number	Rate	Total Flow
Full-time employees	1	15 gpd / person	15 gpd
Part-time employees	1	15 gpd / person	15 gpd
Part-time harvest employees	4	15 gpd / person	60 gpd
Tasting room visitors	6	3 gpd / person	18 gpd
Promotional event visitors	15	15 gpd / person	225 gpd
Peak Daily Sanitary Wastewater Flow			333 gpd

Combined Waste Flow Volume

During the primary treatment phase each flow will be treated separately, however they will be combined for secondary treatment and disposal. The total combined flow from process and sanitary waste sources is 1000 gpd.

Wastewater Strength

Process wastewater strength varies over a wide range depending on the day-to-day winery activities, with reported values of biochemical oxygen demand (BOD) ranging from 300-12,000 being typical[1]. Based on previous experience with similar wineries, for design purposes we have assumed average process wastewater strength as shown in Table 3.

[1] Waiver of Waste Discharge Requirements for Small Food Processors, Including Wineries, Within the Central Valley Region, Central Valley RWQCB Resolution R5-2003-0106.

Table 3. Average Waste Strength

	Estimated Waste Strength	
Constituent	Process Waste	Sanitary Waste
BOD[2] (20° C, 5-day)	6000 mg/L	300 mg/l
TSS[3]	2500 mg/L	330 mg/l

No kitchen is proposed for this facility therefore sanitary wastewater strength is assumed to be comparable to typical residential waste strengths. The USEPA reports typical sanitary waste strength as shown in Table 3[4]. To be conservative this design does not consider any dilution and reduction in BOD or TSS due to combining the stronger process waste with the weaker sanitary waste, and the process waste strengths given in Table 3 were used for the design.

Proposed Wastewater System Design

The sanitary and process waste streams will first undergo primary treatment in septic tanks before being combined to undergo secondary treatment in an Orenco Systems Advantex pretreatment system. Final disposal will be to a subsurface pressure dispersal (PD) system. The treatment goal is to produce final treated effluent within Napa County discharge limits for discharge of septic tank effluent to a PD system, which are 150 mg/l BOD_5 and 150 mg/l TSS.

Primary Treatment

Primary treatment will be accomplished with standard septic tanks. Separate process waste and sanitary waste lines will drain by gravity to separate septic tanks for each waste stream. The septic tanks will be located in the paved parking lot below the winery.

Per Napa County Code, the sanitary waste septic tank is sized for three days hydraulic retention time (HRT). Based on a sanitary flow of 333 gpd, this equates to a tank volume of 999 gallons. The design provides a 1200 gallon septic tank, which is the minimum tank size allowed under

[2] BOD = 5-day, 20° Celsius, Biochemical Oxygen Demand
[3] TSS = Total Suspended Solids
[4] Onsite Wastewater Treatment Systems Manual, U.S. Environmental Protection Agency, 2002. BOD 155 – 286 mg/l, TSS 155 – 330 mg/l.

Napa County Code. Earlier winery designs included a kitchen however this has been removed from the plans and therefore a grease interceptor will not be installed at this time. If a kitchen is installed in the future a grease interceptor will be required.

The process waste septic tank is similarly sized, resulting in a 2000 gallon septic tank for 667 gpd of process waste flow. Orenco Systems recommends that winery process waste systems incorporating their Advantex treatment system be provided with a second primary treatment tank to provide addition detention time and that this second tank also be equipped with an aeration unit to "pre-aerate" the wastewater before it enters the recirculation tank. This design incorporates a 2000 gallon pre-aeration tank after the initial septic tank.

All septic tanks will be equipped with effluent filters and high water alarms will be installed on each tank to guard against flooding caused by a clogged effluent filter. The high water alarms will be tied to a centralized Orenco T-Com control panel that will control and monitor the entire wastewater system. This panel will be equipped with a telemetry system which will provide remote notification of alarms to the designated service provider.

Septic tanks can be expected to provide over 50% reduction in BOD and TSS. Average removal efficiencies of 64% of BOD and 91% TSS are reported for septic tanks equipped with effluent filters[5]. This design assumes a 50% reduction in BOD and a 75% reduction in TSS will occur in the septic tanks, giving septic tank effluent of about 3000 mg/l BOD_5 and 600 mg/l TSS.

Secondary Treatment

Effluent from the septic tanks will flow to the treatment system, consisting of two (2) Orenco Advantex AX-100 treatment pods and a 2000 gallon pre-cast concrete recirculation tank. Wastewater flows into the recirculation tank where it is then pumped to the AX-100 treatment pods (dosing alternates between the two pods with each pump cycle). Treated effluent drains from the AX-100 pods to a recirculation splitter valve that, depending on the water level in the

[5] Bounds, T.R., 1997, "Design and Performance of Septic Tanks", Site Characterization and Design of Onsite Septic Systems ASTM STP1324-EB, M.S. Bedinger, J.S. Fleming, A.I. Johnson, Eds., American Society for Testing and Materials, Philadelphia, 1997.

recirculation tank, either returns the effluent to the recirculation tank for further treatment or routes it to a dosing tank for final dispersal to the PD system.

To achieve the desired treatment, wastewater in the processing tank will be recirculated several times each day through the AX-100 treatment pods. The system is designed with a recirculation ratio of 12:1, meaning that, on average, wastewater will pass through the treatment pods 12 times before being discharged to the PD dispersal field dosing tank.

To achieve the treatment goal of 150 mg/l BOD_5 and 150 mg/l TSS from septic tank effluent strength of about 3000 mg/l BOD_5 and 600 mg/l TSS, Orenco recommends a maximum hydraulic loading of no more 5 gpd/ft^2 to the AX-100 treatment pods. For a flow of 1000 gpd this equates to a need for about 200 ft^2 of treatment area. Each pod has 100 ft^2 of treatment area, therefore 2 pods are required.

The recirculation tank has been sized based on recommendations from Orenco Systems. The tank will be equipped with duplex pumps for recirculation to the AX-100 pods. With duplex pumps there is no minimum storage required above the high water alarm, however this design still provides about ½ day's flow in storage. Control of the recirculation pumps will be provided by the same Orenco T-Com telemetry control panel monitoring the septic tank high water alarms. Control float settings and pump timer calculations for the Advantex system are included in Appendix C

For optimal treatment the pH of the wastewater entering the Advantex system should be between 6.0 and 9.0. Winery process waste pH will generally range between 4 and 6. Although this is below the optimal level, we anticipate this will be partly neutralized by the sanitary waste and influent pH will be acceptable for treatment. If necessary, a pH control system can be added to the recirculation tank at a later date.

Dosing Tank and Pressure Distribution System

Treated effluent from the AX-100 pods will flow to a 2000 gallon precast concrete holding tank for final dosing to a pressure distribution dispersal field. For consistent dosing the holding tank has been sized to allow a working volume sufficient to avoid activating the pump override cycle under typical daily flow surges. The tank also allows for nearly one day of emergency storage above the high water alarm, and for redundancy is also equipped with duplex alternating dosing pumps. The dosing pumps will be controlled by the same T-Com telemetry panel controlling the Advantex treatment system. A flow meter will be installed to measure the volume of flow discharged to the PD system. Calculations for dosing pump sizing, control float settings, and pump timer settings are included as part of the PD calculations in Appendix D.

The primary PD dispersal field will be located on the slope below the proposed winery facility, at the location of site evaluation number three. A reserve area has been designated at the location of site evaluation number one. These areas are shown on sheets C1 and C2 of the construction plans. These areas were chosen because they had deeper soils (up to 60") than were found at the location of site evaluation number two (up to 48"). Even though the area of site evaluation number two had shallower soil, it is still a feasible reserve disposal field location; however using this area would require the waste to undergo additional treatment beyond that proposed in this design.

The primary PD field is sized for the full day's flow of 1000 gallons. The field is to be divided into two equal zones, "A" and "B". The dispersal trench design consists of 12" of cover soil over a 20" deep rock filled dispersal zone. The 20" deep dispersal zone has 2" of rock cover over the PD dispersal lateral and 18" of rock below the top of the dispersal lateral, which gives a total usable sidewall depth of 18" per side, or 3 square feet per lineal foot of trench. When discharging "septic tank effluent", 36" of acceptable soil is required below the trench bottom. This gives a total required soil depth of 68" (12" + 20" + 36"). As seen in the site evaluation data, the soil is only 60" deep in the septic field area (see pits # 2, 3, 7, 8), therefore import fill will be placed to make up the balance.

The hydraulic loading rate to the dispersal trench sidewall is based on the soil in the horizon containing the trench sidewall. In dispersal zone "B" 8" of import fill will be used as part of the 12" cover soil layer. This places the top of the dispersal zone sidewall 4" below existing grade and the bottom of the 20" deep trench 24" below the existing grade. The hydraulic loading rate for zone "B" is therefore based on the top 24" of existing soil. Referring to table 10 of Napa County Alternative Sewage Treatment System Design Guidelines, the hydraulic loading rate for "septic tank effluent" discharged to the loam soil in this horizon is 0.8 gallons per day per square foot. A detail of the trench section is shown on Sheet 4 of the construction plans included with this report.

In Zone "A" the conditions are slightly different. In this zone, and specifically at pit #2, the upper soil horizon is only 20" deep. In order to keep the sidewall entirely in this upper soil horizon, the full 12" thickness of the cover soil layer will be import fill. This raises the bottom of the dispersal trench to 20" below existing grade and allows the same 0.8 gpd/SF application rate as used in Zone "B".

Using this application rate gives a total leach line length of 417 feet (full calculations are included in Appendix D).

$$Leach\ Line\ Length = \frac{1000\ gpd}{0.8\ gpd/SF\ x\ 3\ SF/LF} = 417\ linear\ feet$$

The reserve area leach line length is calculated in a similar manner. The Clay Loam soil found during site evaluation number one has a hydraulic loading rate of 0.6 gpd/ft^2, which results in a reserve leach line length of 556 feet. Although the reserve area will not be constructed at this time, a leach line layout is shown on the plans for proof of concept.

As mentioned above, the total leach line length in the primary dispersal area will be divided into two equal zones "A" and "B". Distribution between the two zones will be accomplished using

an Orenco Automatic Distributing Valve which will automatically alternate dosing to each zone with each successive pump run cycle.

Each zone will be composed of several distribution laterals. Each lateral will have 1/8" orifices drilled at 36" on center down the length of the lateral. Balancing valves located at the beginning of each lateral will allow the flow to each lateral to be adjusted to achieve even distribution over the entire field. This is accomplished by adjusting each balancing valve to equalize the residual head ("squirt height") at the end of each lateral to the design head of 5 feet. Purge valves will be located at the end of each lateral to allow for line flushing. Check valves will be installed below each lateral to prevent dispersal laterals at higher elevations from draining to the lower lines.

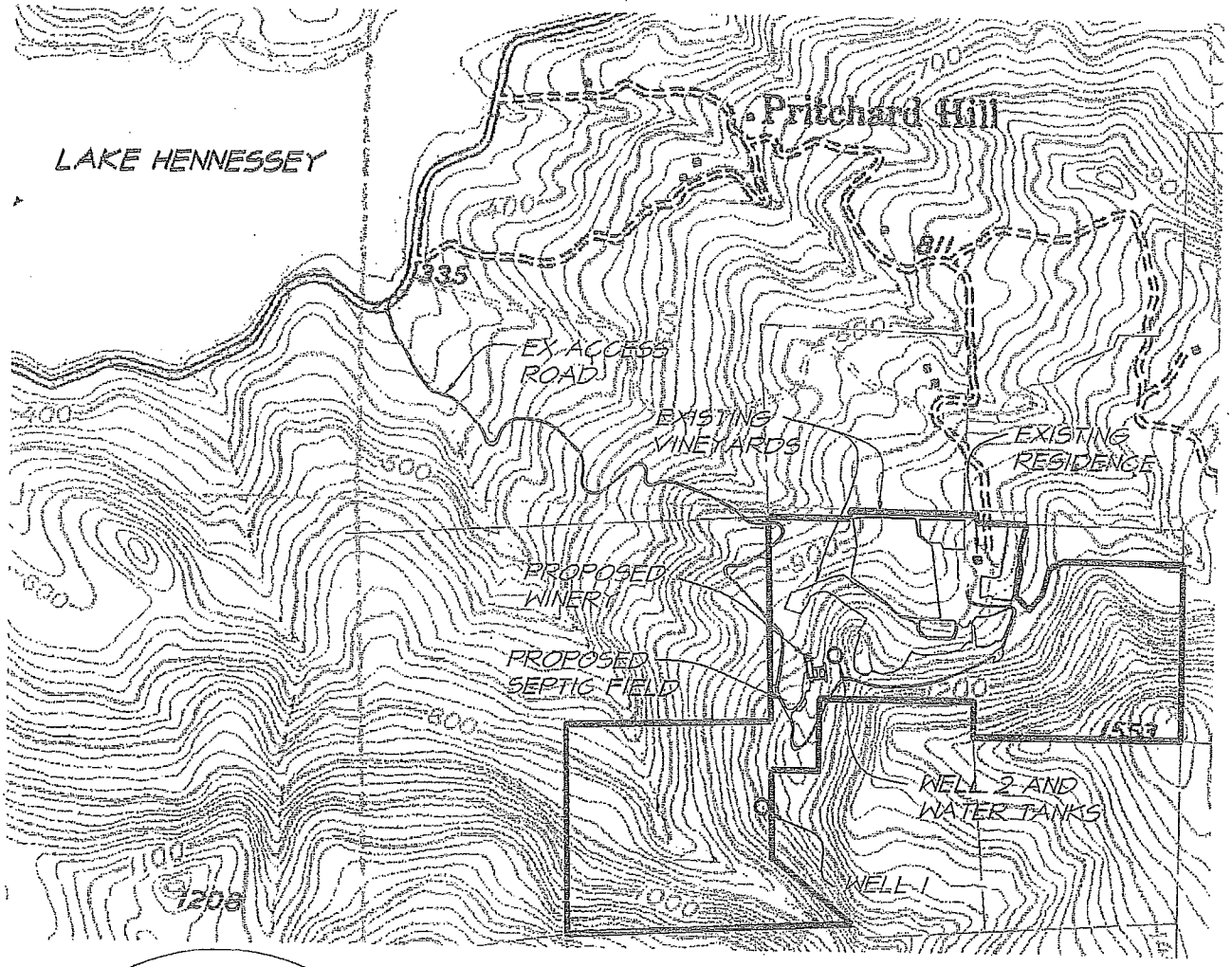
Monitoring wells will be installed up-slope and down-slope from the field as shown on the plans. In addition, every other dispersal lateral will have a monitoring well installed in the trench gravel section.

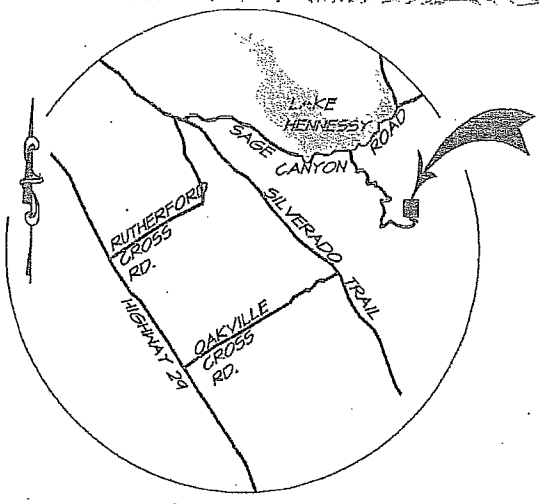
Conclusions

Based on the information contained in this report, we conclude that that the estimated volume of sanitary and process wastewater generated by the winery can be successfully treated by the proposed Orenco Advantex treatment system to meet the applicable Napa County discharge limits for final discharge to the proposed subsurface pressure distribution system.

Appendix A

SAGE HILL WINERY, LLC
USGS - VICINITY MAP
NAPA COUNTY, CALIFORNIA
1" = 1000'





LOCATION MAP
NO SCALE

APN: 032-010-079

ALL LOCATION INFORMATION IS APPROX.

LAT. 38.478° N, LONG. 122.342° W

USGS YOUNTVILLE QUADRANGLE

CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE & ASSOCIATES
PLANNERS & SURVEYORS

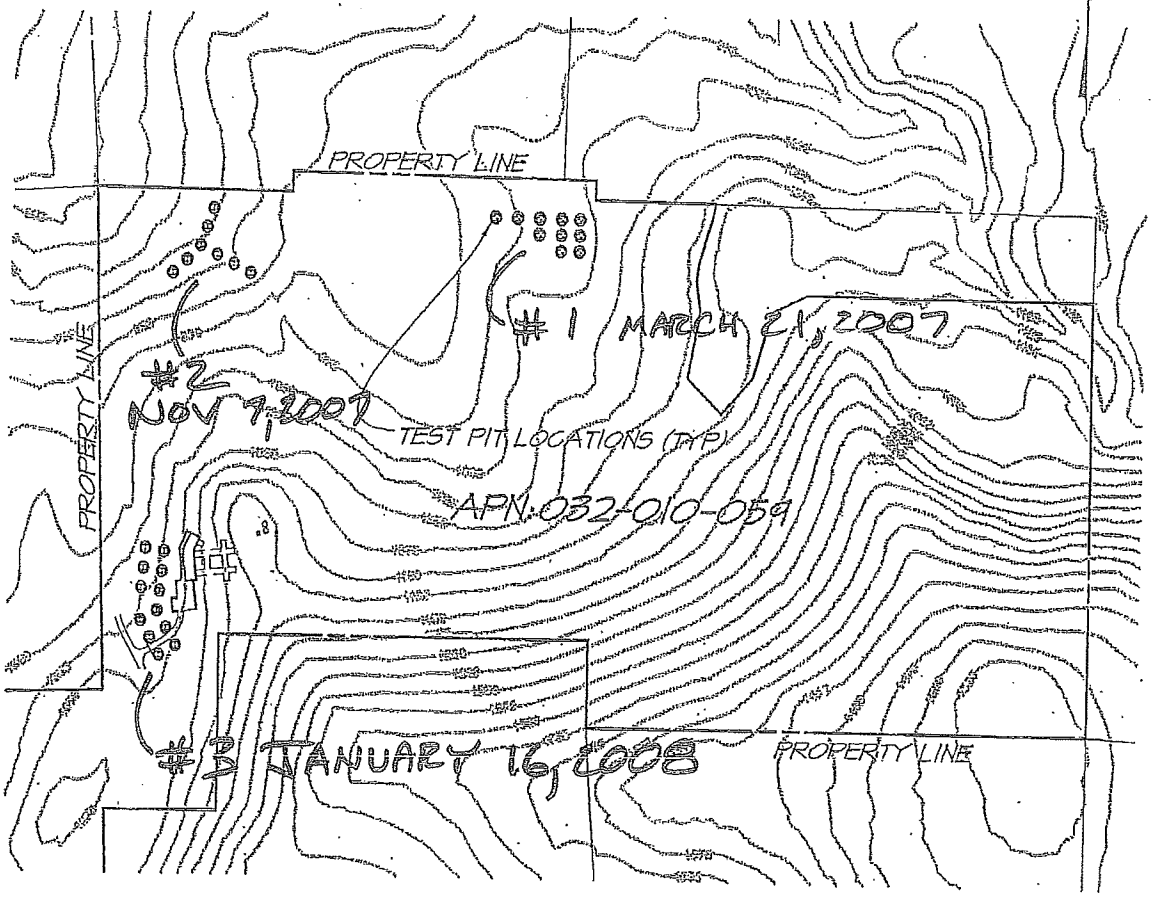
1541 Third Street
Napa, California 94559

v 707.252.3301
f 707.252.4966

NOV. 20, 2008 USGS 4106024.0 1

Appendix B

SAGE HILL WINERY, LLC
SITE EVALUATION LOCATIONS
NAPA COUNTY, CALIFORNIA
1" = 400'



CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE
ASSOCIATES
PLANNERS & SURVEYORS

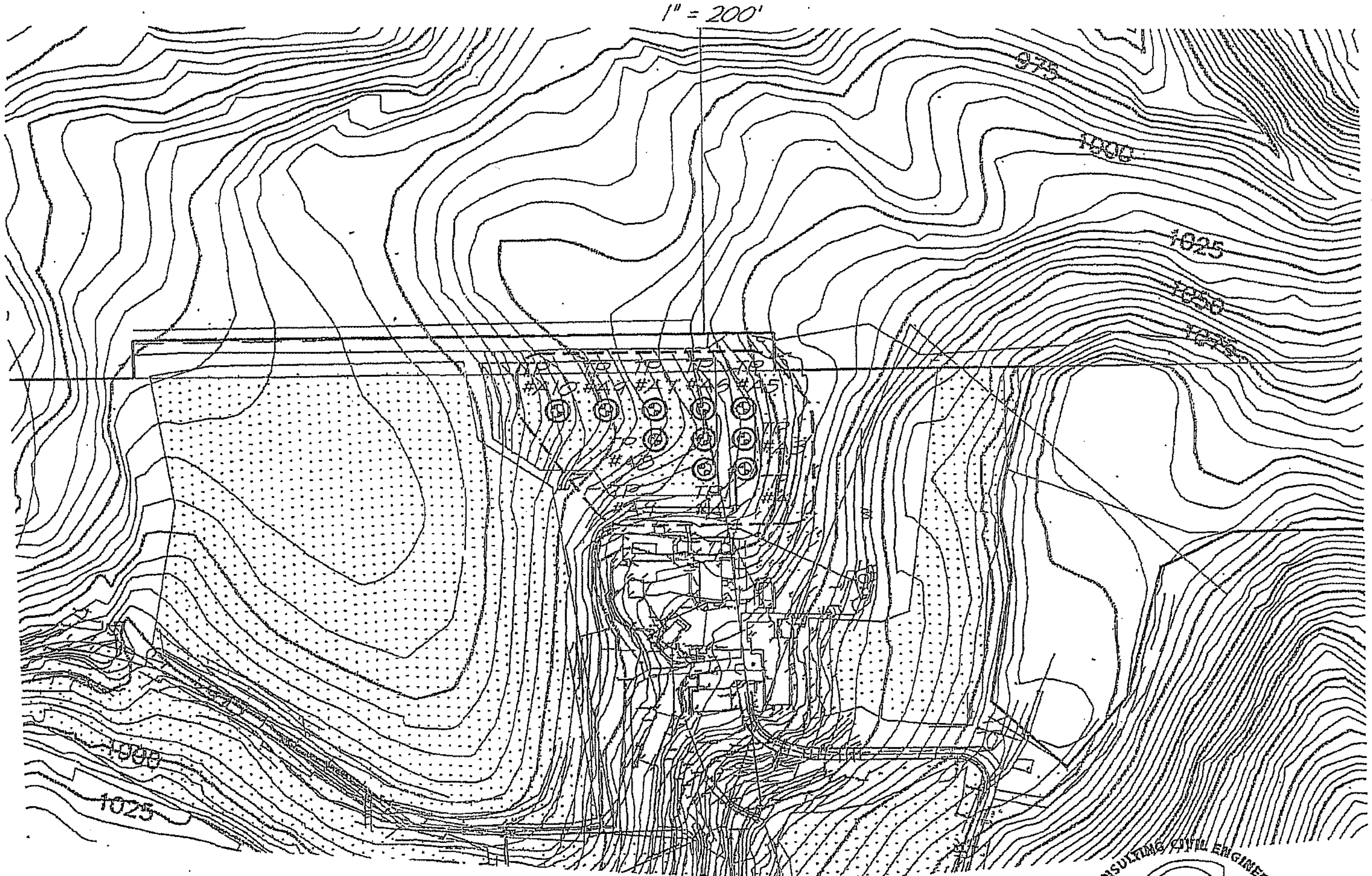
1541 Third Street
Napa, California 94559

v 707.252.3301
f 707.252.4966

JAN 31, 2008 USGS 4106024.0 3

MANUEL PIR_S WINERY
PIT MAP
NAPA COUNTY CALIFORNIA

1" = 200'



SITE EVALUATION DATE: MARCH 21, 2007
APN: 032-010-079
ADDRESS: 1535 SAGE CANYON ROAD
SAINT HELENA, CA
ENV. HEALTH INSPECTOR: DARRELL CHOATE

RIECHERS SPENCE ASSOCIATES
CONSULTING CIVIL ENGINEERS
PLANNERS & SURVEYORS
1541 Third Street
Napa, California 94559
v 707.252.3301
f 707.252.4966

MARCH 21, 2007 btestpit.dwg 4106024.0 3

SITE EVALUATION # 1

4106024.0

Site Evaluation Results

Date: 3.21.07 Page 1 of 1

EHS: DC Permit #E07-00110 Site Evaluator: RSA

Site Address: 1535 SAGE CYN. RD. STH APN: 032-010-079

Test Pit #	Horizon Depth (inches)	Boundary	% Rock	Texture	Structure	Consistence: Side Wall	Consistence: Ped	Consistence: Wet	Pores	Roots	Mottling
X 1	0-27	A	0-15 □ 15-30 X 30-50 □ >50 □	FILL	CEM						
	27-60		0-15 □ 15-30 □ 30-50 □ >50 □	CL	SSB	S	FRB	S	CM	NO	NO
2	0-60		0-15 □ 15-30 □ 30-50 □ >50 □	CL	SSB	S	FRB	S	CM	MM	NO
X 3	0-12	A	0-15 □ 15-30 X 30-50 □ >50 □	FILL	CEM						
	12-60		0-15 □ 15-30 □ 30-50 □ >50 □	CL	SSB	S	FRB	S	CM	MM	NO
4	SAME AS # 2		0-15 □ 15-30 □ 30-50 □ >50 □								
X 5	SAME AS # 3		0-15 □ 15-30 □ 30-50 □ >50 □								
6	SAME AS # 2		0-15 □ 15-30 □ 30-50 □ >50 □								
7	SAME AS # 2		0-15 □ 15-30 □ 30-50 □ >50 □								
X 8	0-30		0-15 □ 15-30 □ 30-50 X >50 □	CL	SSB	S	FRB	S	MM	FM	NO
	30+		0-15 □ 15-30 □ 30-50 □ >50 X	ROCK							
9	SAME AS # 2		0-15 □ 15-30 □ 30-50 □ >50 □								
10	SAME AS # 2		0-15 □ 15-30 □ 30-50 □ >50 □								
			0-15 □ 15-30 □ 30-50 □ >50 □								

Boundary	Texture	Structure	Consistence: Side Wall	Consistence: Ped	Consistence: Wet	Pores	Roots	Mottling
A=Abrupt <1"	S=Sand	W=Weak	L=Loose	L=Loose;	NS=NonSticky	Quantity:	Quantity:	Quantity:
C=Clear 1"-2.5"	LS=Loamy Sand	M=Moderate	S=Soft;	VFRB=Very Friable	SS=Slightly Sticky	F=Few	F=Few	F=Few
G=Gradual 2.5"-5"	SL=Sandy Loam	S=Strong	SH=Slightly Hard	FRB=Friable	S=Sticky	C=Common	C=Common	C=Common
D=Diffuse >5"	SCL=Sandy Clay Loam	G=Granular	H=Hard	F=Firm	VS=Very Sticky	M=Many	M=Many	M=Many
	SC=Sandy Clay	Pl=Platy	VH=Very Hard	VF=Very Firm	NP=NonPlastic	Size:	Size:	Size:
	CL=Clay Loam	Pr=Prismatic	ExH=Extremely Hard	ExF=Extremely Firm	SP=Slightly Plastic	VF=Very Fine	VF=Very Fine	F=Fine
	L=Loam	C=Columnar			P=Plastic	F=Fine	F=Fine	M=Medium
	C=Clay	AB=Angular Blocky			VP=Very Plastic	M=Medium	M=Medium	C=Coarse
	SiC=Silty Clay	SB=Subangular Blocky				C=Coarse	C=Coarse	VC=Very Coarse
	SiCL=Silty Clay Loam	M=Massive					VC=Very Coarse	ExC=Extremely Coarse
	SiL=Silt Loam	C=Cemented						Contrast:
	Si=Silt							Ft=Faint
								D=Distinct
								P=Prominent

3/26/07 pg 1/3

R G H

CONSULTANTS, INC.

Geotechnical
Geological
And Laboratory Services

April 26, 2007
File: 9187.1

Riechers Spence Associates
1541 Third Street
Napa, CA 94559

Subject: Laboratory Test Results
Soil Texture Analysis by
Bouyoucos Hydrometry Method
PIRES RESIDENCE

Dear Mr. Koldis:

This letter transmits the results of our laboratory testing performed for the subject project. Your personnel delivered the sample on April 20, 2007.

We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Sieve/Hydrometer	PIRES
+#10 Sieve	38.0 %
Sand	30.0 %
Clay	38.6 %
Silt	31.4 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

RGH GEOTECHNICAL

Tarance E. McCue
Laboratory Manager

406824.0

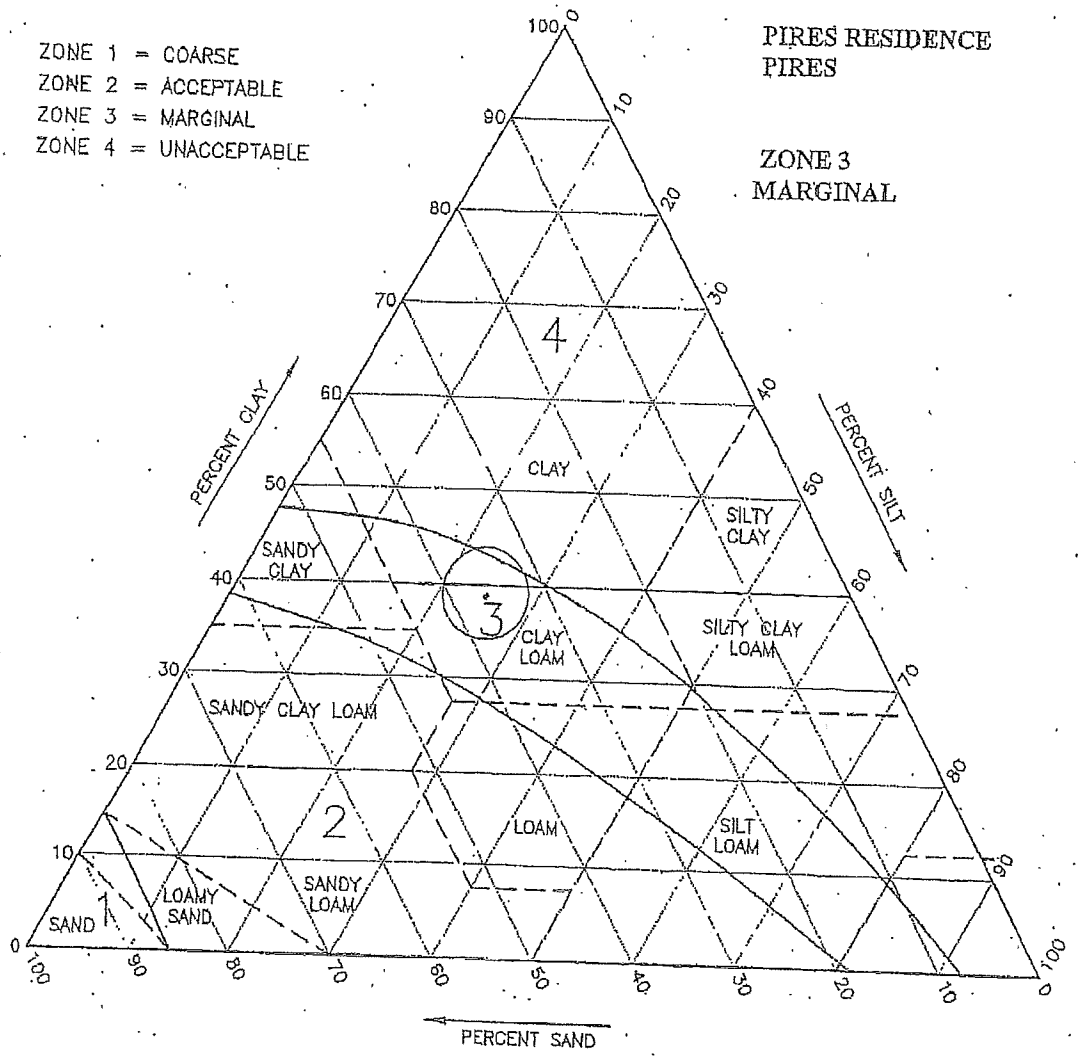
SOIL PERCOLATION SUITABILITY CHART

3/26/07 pg 2/3

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

PIRES RESIDENCE
PIRES

ZONE 3
MARGINAL



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not neccesary.

4060240

3/26/07 pg 3/3

RGH CONSULTANTS, INC.

Geotechnical
Geological
And Laboratory Services

Right

BOUYOCOUS HYDROMETER

CLIENT Riecher & Sprue LOCATION Pines Res/Alimbus Center JOB#

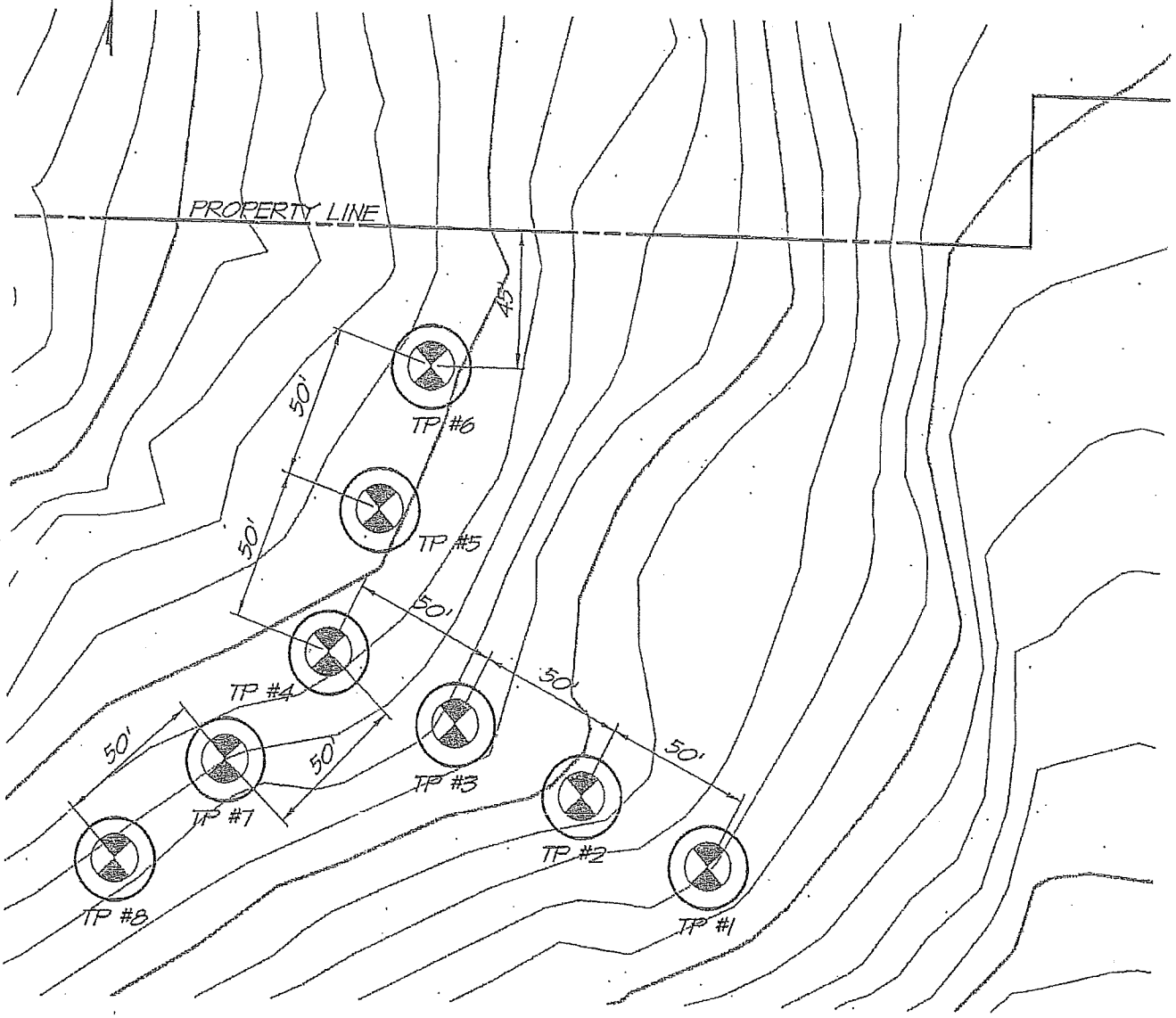
SAMPLE NUMBER	(3) Pines	(2) Wimbush	(1) Wimbush
DEPTH			
A. Oven dry wt. (grams)	50g	50g	50g
B. Starting Time (hr: min: sec:)	1523	1521	1519
C. Temp. @ 40 sec. (degrees F)	70.6	70.6	70.7
D. Hydro reading @ 40 sec. (gm/l)	41.0	27.0	26.5
E. Composite Corr. (gm/l)	-6.0	-6.0	-6.0
F. True Density @ 40 sec. (gm/l) D-E	35.0	21.0	20.5
G. Temp. @ 2 hrs. (degrees F)	72.0	72.0	72.1
H. Hydro reading @ 2 hrs. (gm/l)	25.0	13.0	14.0
I. Composite Corr. (gm/l)	-5.7	-5.7	-5.7
J. True Density @ 2 hrs. (gm/l) H-I	19.3	7.3	8.3
K. % Sand = 100 – [(F/A) x 100]	30.0	58.0	59.0
L. % Clay = [(J/A) x 100]	38.6	14.6	16.6
M. % Silt = 100-(K+L)	31.4	27.4	24.4
N. %-No. 10 =	38.0	0.2	8.5

Cup Number	ABP-2	ABP-18	ABP-4
Dry Before Wash + Tare	721.0	449.2	421.3
Dry After Wash + Tare	336.8	99.2	128.8
Dry Wt. Passing #10	384.2	350.0	292.5
Tare Weight	100.8	98.4	101.8
Dry Wt. Before Wash	619.2	350.6	319.5
% Passing #10	62.0	99.8	91.5
% #10	38.0	0.2	8.5

SITE EVALUATION #2

SAGE HILL VINEYARDS, LLC
TEST PIT MAP
NAPA COUNTY CALIFORNIA

1"=50'



SITE EVALUATION DATE: NOVEMBER 7, 2007
APN: 032-010-059
ADDRESS: 1535 SAGE CANYON ROAD
ST. HELENA, NAPA COUNTY
CALIFORNIA
ENV. HEALTH INSPECTOR: DARREL CHOATE

CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE & ASSOCIATES
1541 Third Street
Napa, Calif. 94559
v 707.252.3301
f 707.252.4966

PIRES

Napa County Department of Environmental Management

SITE EVALUATION REPORT

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #:	
APN:	032-010-079
(County Use Only) Reviewed by:	Date: 11

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner: MANUEL PIRES	☑ New Construction ☐ Addition ☐ Remodel ☐ Relocation ☐ Other:
Property Owner Mailing Address: 214 HOGS BACK ROAD	☐ Residential - # of Bedrooms: Design Flow: gpd
City: OXFORD State: CT Zip: 06478	☐ Commercial – Type: Sanitary Waste: gpd Process Waste: gpd
Site Address/Location: 1535 SAGE CANYON ROAD ST. HELENA, CA 94559	☐ Other: Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name: RIECHERS & SPENCE	Evaluator's Name: ROGER BRAY	Signature (Civil Engineer, R.E.H.S. Geologist, Soil Scientist)
Mailing Address: 1541 THIRD STREET		Telephone Number: (707) 252-3301
City: NAPA State: CA Zip: 94559		Date Evaluation Conducted: 11-7-07

Primary Area	Expansion Area
Acceptable Soil Depth: 42" in. Test pit #'s: 4, 5, 6	Acceptable Soil Depth: 28" in. Test pit #'s: 1, 2, 7, 8
Soil Application Rate (gal. /sq. ft. /day):	Soil Application Rate (gal. /sq. ft. /day):
System Type(s) Recommended:	System Type(s) Recommended:
Slope: %. Distance to nearest water source: ft.	Slope: %. Distance to nearest water source: ft.
Hydrometer test performed? No ☐ Yes ☑ (attach results)	Hydrometer test performed? No ☐ Yes ☑ (attach results)
Bulk Density test performed? No ☐ Yes ☐ (attach results)	Bulk Density test performed? No ☐ Yes ☐ (attach results)
Groundwater Monitoring Performed? No ☐ Yes ☐ (attach results)	Groundwater Monitoring Performed? No ☐ Yes ☐ (attach results)

Site constraints/Recommendations:

Test Pit # 1

632-010-059 (11-7-07)

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-28"	C	10	L	SAB	SH	VFRB	SS	CM	CM	—
28-43"		"	Rock"							

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-43"	C	20	L	SAB	SH	VFRB	SS	CM	CM	—
43-51"		"Rock"								

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-6"	C	40	L	SAB	SH	VFRB	SS	CM	CM	—
6"-36"	C	20	C	WM	VH	VF	VS	FF	FF	F/F
36-56"		"Rock"								

Attach additional sheets as needed

Test Pit # 4

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-42"	C	20	CL	MSB	SH	FRB	S	CM	CM	—
42-46"	C	20	C	WM	VH	VF	VS	FF	FF	—

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-16"	C	10	L	SAB	SH	VFRB	SS	CM	CM	—
16-45"	C	10	CL	MSB	SH	FRB	S	CM	CM	—
45-48"	C	10	C	WM	VH	VF	VS	FF	FF	—

Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48"	C	20	L	SAB	SH	VFRB	SS	CM	CM	—
48-50"			"Rocks"							

Attach additional sheets as needed

Test Pit # 7

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-22"	C	20	L	SAB	SH	VFRB	SS	CM	CM	—
22-43	C	20	CL	MSB	SH	FRB	S	CM	FF	—
43-50"	C	20	C	WM	VH	VF	VS	FF	FF	—

Test Pit # 8

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-43"	C	20	L	SAB	SH	VFRB	SS	CM	CM	—

Test Pit #

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			

Attach additional sheets as needed

11/15/07 pg 3/4

R G H

CONSULTANTS, INC.

Geotechnical
Geological
And Laboratory Services

November 15, 2007
File: 9187.19
Riechers Spence Job Number: 4106024.0

Riechers Spence Associates
1541 Third Street
Napa, CA 94559

Subject: **Laboratory Test Results**
Soil Texture Analysis by
Bouyoucos Hydrometry Method
Pirus Due Dillegence

Dear Mr. Bray:

This letter transmits the results of our laboratory testing performed for the subject project. Your personnel delivered the sample on November 13, 2007

We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size Density	Fines
+ #10 Sieve	26.6 %
Sand	38.2 %
Clay	26.2 %
Silt	35.6 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

RGH GEOTECHNICAL

Tarance E. McCue
Laboratory Manager

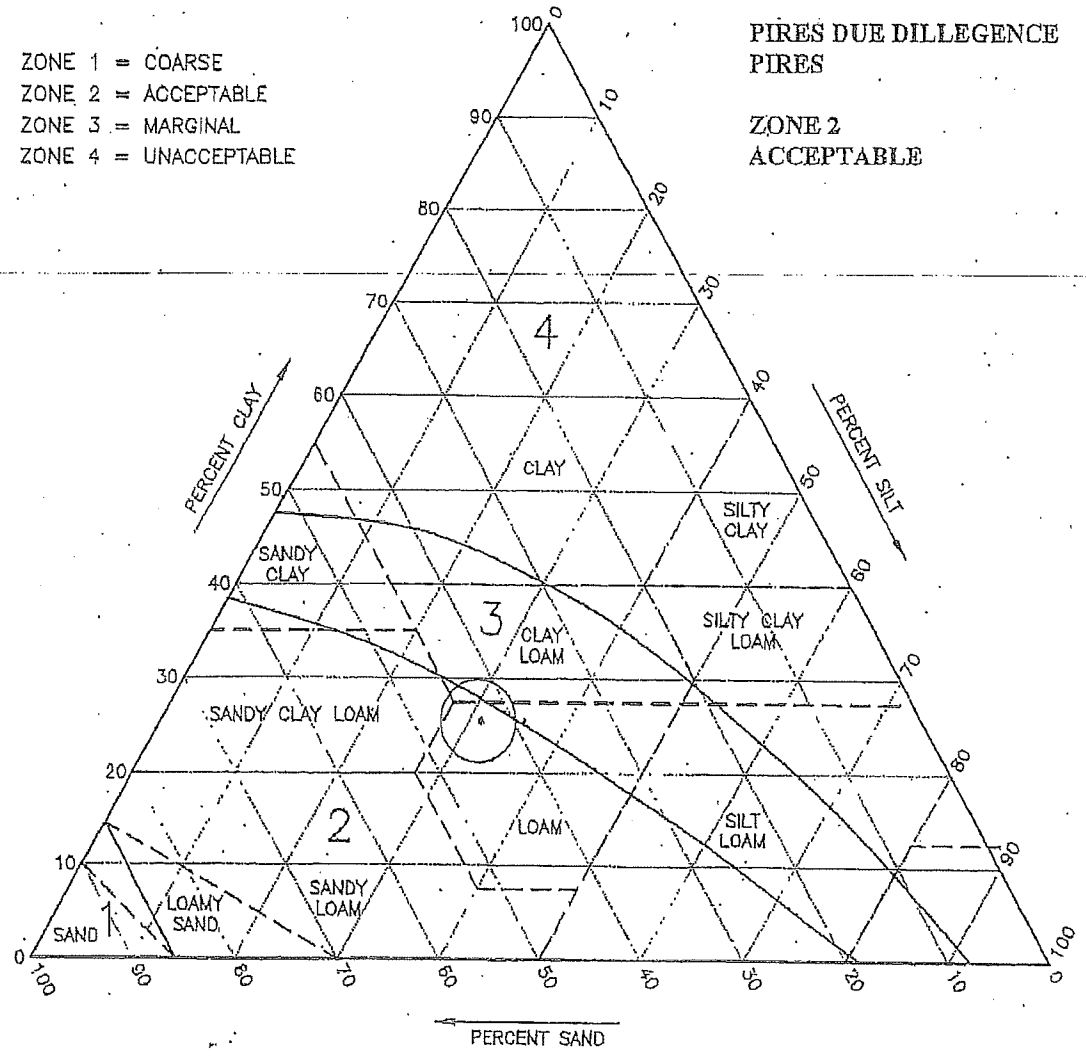
11/15/07 #2/4

SOIL PERCOLATION SUITABILITY CHART

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

PIRES DUE DILLEGENCE
PIRES

ZONE 2
ACCEPTABLE



Instructions:

1. Plot texture on triangle based on percent sand, silt, and clay as determined by hydrometer analysis.
2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
3. Adjust for compactness of soil by moving the plotted point in the clay direction an additional 15% for soils having a bulk-density greater than 1.7 gm/cc.

Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not necessary.

11/15/07 pg 4/4

RGH CONSULTANTS, INC.

Geotechnical
Geological
And Laboratory Services

Blue

BOUYOCOUS HYDROMETER

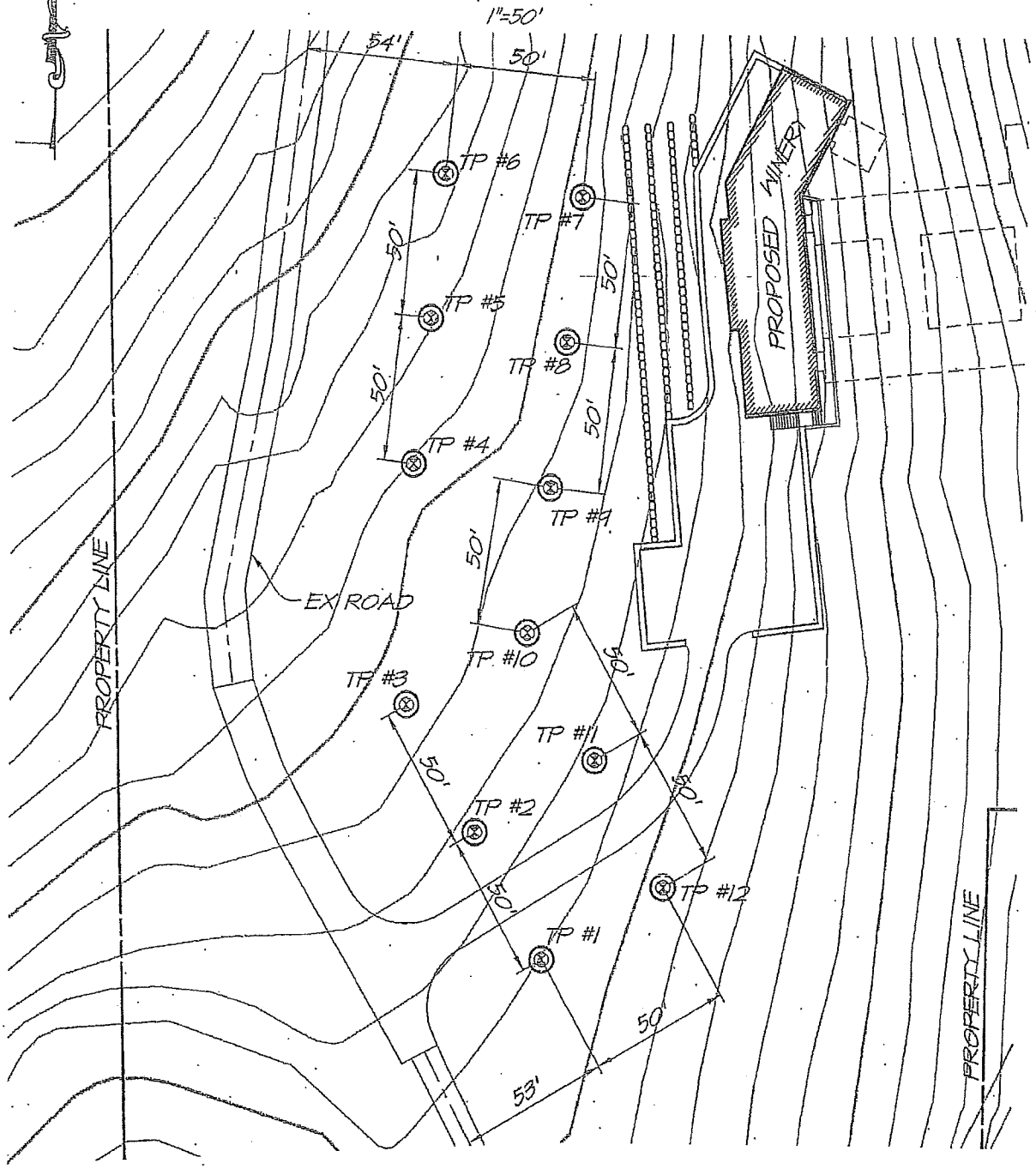
CLIENT Rockers Range (B) LOCATION Pirst Due Dilegence JOB# 9187.19 4101.0240

SAMPLE NUMBER	Pirus						
DEPTH							
A. Oven dry wt. (grams)	50g						
B. Starting Time (hr: min: sec:)	1407						
C. Temp. @ 40 sec. (degrees F)	70.2						
D. Hydro reading @ 40 sec. (gm/l)	37.0						
E. Composite Corr. (gm/l)	-6.1						
F. True Density @ 40 sec. (gm/l) D-E	30.9						
G. Temp. @ 2 hrs. (degrees F)	70.9						
H. Hydro reading @ 2 hrs. (gm/l)	19.0						
I. Composite Corr. (gm/l)	-5.9						
J. True Density @ 2 hrs. (gm/l) H-I	13.1						
K. % Sand = 100 – [(F/A) x 100]	38.2						
L. % Clay = [(J/A) x 100]	26.2						
M. % Silt = 100-(K+L)	35.6						
N. % No. 10 =	26.6						

Cup Number	A-41						
Dry Before Wash + Tare	248.7						
Dry After Wash + Tare	129.1						
Dry Wt. Passing #10	119.6						
Tare Weight	85.8						
Dry Wt. Before Wash	162.9						
% Passing #10	73.4						
% #10	26.6						

SITE EVALUATION #3

SAGE HILL VINEYARDS, LLC
TEST PIT MAP
NAPA COUNTY CALIFORNIA



SITE EVALUATION DATE: JANUARY 16, 2008
APN: 032-010-059
ADDRESS: 1535 SAGE CANYON ROAD
ST. HELENA, NAPA COUNTY
CALIFORNIA
ENV. HEALTH INSPECTOR: DARREL CHOATE

CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE ASSOCIATES
1541 Third Street
Napa, Calif. 94559
v 707.252.3301
f 707.252.4966

Napa County Department of Environmental Management

SITE EVALUATION REPORT

Please attach an 8.5" x 11" plot map showing the locations of all test pits triangulated from permanent landmarks or known property corners. The map must be drawn to scale and include a North arrow, surrounding geographic and topographic features, direction and % slope, distance to drainages, water bodies, potential areas for flooding, unstable landforms, existing or proposed roads, structures, utilities, domestic water supplies, wells, ponds, existing wastewater treatment systems and facilities.

Permit #:

APN: 032-010-079

(County Use Only)
Reviewed by: Date:

PLEASE PRINT OR TYPE ALL INFORMATION

Property Owner: Manuel Pires

Property Owner Mailing Address: 214 Hogs Back Rd.

City: OXFORD State: CT. Zip: 06478

Site Address/Location: 1535 Sage Canyon Road St. Helena. CA 94559.

☑ New Construction ☐ Addition ☐ Remodel ☐ Relocation
☐ Other:

☐ Residential - # of Bedrooms: Design Flow: gpd

☐ Commercial – Type:
Sanitary Waste: gpd Process Waste: gpd

☐ Other:
Sanitary Waste: gpd Process Waste: gpd

Evaluation Conducted By:

Company Name: Riechers Spence & Associates Evaluator's Name: T. Rangel Gonzales

Signature (Civil Engineer, R.E.H.S., Geologist, Soil Scientist)

Mailing Address: 1541 Third St.

Telephone Number: (707) 252-3301

City: Napa State: CA Zip: 94559

Date Evaluation Conducted: 11/6/08

Primary Area

Acceptable Soil Depth: 60 in. Test pit #'s: 1,2,3,6,7,8

Soil Application Rate (gal. /sq. ft. /day): 0.5

System Type(s) Recommended: PD

Slope: 30 %. Distance to nearest water source: 250 ft.

Hydrometer test performed? No ☐ Yes ☒ (attach results)

Bulk Density test performed? No ☒ Yes ☐ (attach results)

Groundwater Monitoring Performed? No ☒ Yes ☐ (attach results)

Expansion Area

Acceptable Soil Depth: in. Test pit #'s:

Soil Application Rate (gal. /sq. ft. /day):

System Type(s) Recommended:

Slope: %. Distance to nearest water source: ft.

Hydrometer test performed? No ☐ Yes ☐ (attach results)

Bulk Density test performed? No ☐ Yes ☐ (attach results)

Groundwater Monitoring Performed? No ☐ Yes ☐ (attach results)

Site constraints/Recommendations:

Test Pit # 1

Sage Hill 1/16/08

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-24	C	5	L	SSB	L	VFRB	SS	MM	MM	/
24-56	C	40	SCL	MSB	S	FRB	S	CF	FF	/
56-68	C	40	C	MSB	SH	FRB	VS	FF	FF	/

Test Pit # 2

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-20	C	5	L	SSB	L	VFRB	NS	MM	MM	/
20-62	G	35	SCL	MSB	S	FRB	S	MF	FF	/

Test Pit # 3

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-36	G	10	L	SSB	L	VFRB	SS	MM	MM	/
36-60	G	30	SCL	MSB	S	FRB	VS	MF	FF	/

Attach additional sheets as needed

Test Pit # 4

SAGE HILL WINERY 1/16/08

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
—	Rock	—	—	—	—	—	—	—	—	—

Test Pit # 5

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-12	C	10	L	SSB	L	FRB	SS	MM	FF	—
12-60	Rock	—	—	—	—	—	—	—	—	—

Test Pit # 6

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-60	C	45	SL	SSB	L	VFRB	S	MF	FF	—

Attach additional sheets as needed

Test Pit # 7

SAGE HILL WINERY 1/16/08

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-48	C	10	L	SSB	L	VFRB	SS	MF	FF	—
48-60	C	40	SCL	MSB	S	FRB	S	FF	FF	—

Test Pit # 8

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-60	C	20	SCL	SSB	L	VFRB	S	MF	FF	—

Test Pit # 9

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-38	C	20	L	SSB	L	FRB	SS	MM	FF	—
38-42	—	ROCK								

Attach additional sheets as needed

Test Pit # 10

SAGE HILL WINERY 1/16/08

PLEASE PRINT OR TYPE ALL INFORMATION

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-14	C	5	L	SSB	L	VFRB	NS	MM	MM	—
14-68	— ROCK —									

Test Pit # 11

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-72	— ROCK —									

Test Pit # 12

Horizon Depth (Inches)	Boundary	%Rock	Texture	Structure	Consistence			Pores	Roots	Mottling
					Side Wall	Ped	Wet			
0-72	— ROCK —									

Attach additional sheets as needed

1/24/8 pg 1/6

RECEIVED
JAN 24 2008
By

R G H
CONSULTANTS, INC.

Geotechnical
Geological
And Laboratory Services

GEOTECHNICAL LABORATORY

FACSIMILE COVER SHEET

TO: RANGEL GONZALES

RE: SAGE HILL SITE

FAX#: 252-4966

FROM: TERRY McCUE

JOB NUMBER: 4106024

COMMENTS:

THANKS
TMC

TOTAL PAGES INCLUDING THIS COVER SHEET 6

HARD COPY TO BE SENT BY MAIL: ___NO YES

RGH 1305 NORTH DUTTON, SANTA ROSA, CALIFORNIA 95401
PHONE: 707-544-1072 FAX: 707-544-1082
E-mail tmccue@rghgeo.com

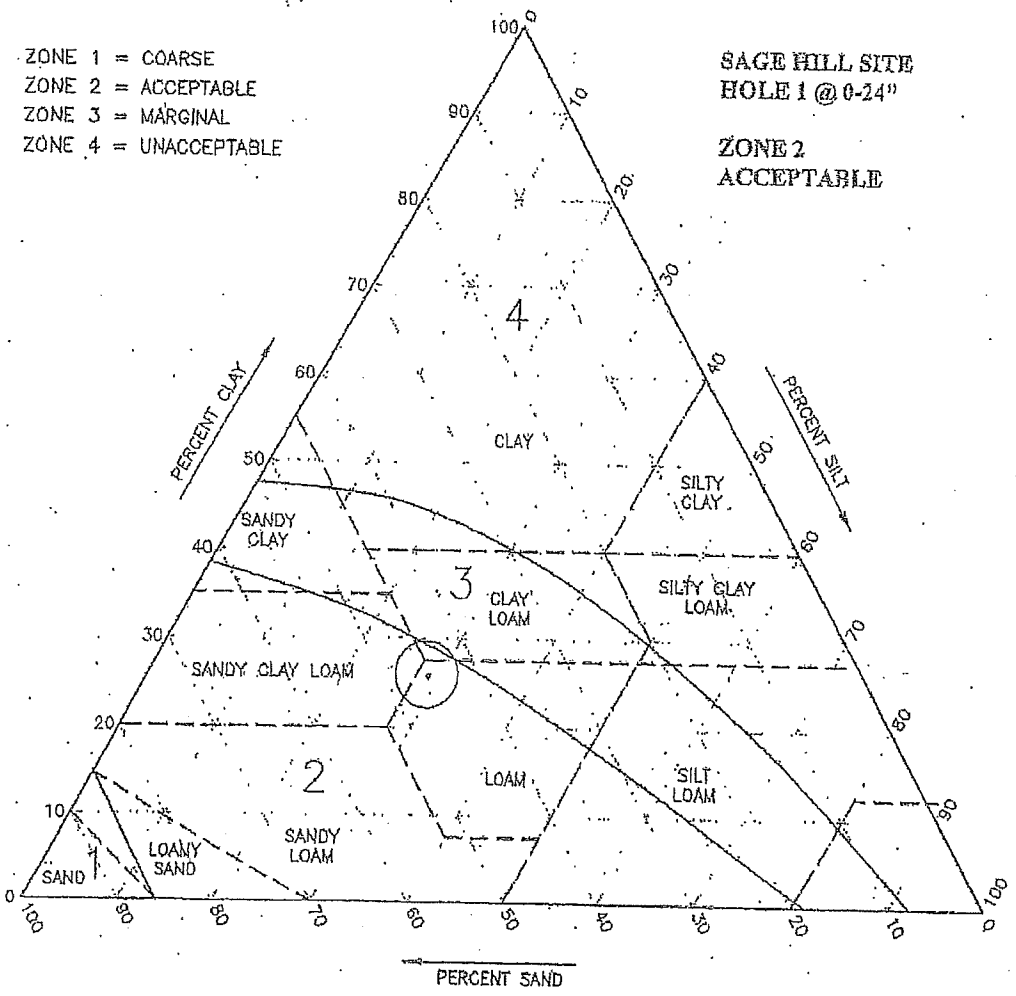
SOIL PERCOLATION SUITABILITY CHART

1/24/08
2/6

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

SAGE HILL SITE
HOLE 1 @ 0-24"

ZONE 2
ACCEPTABLE



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2. Adjust for coarse fragments by moving the plotted point in the sand direction an additional 2% for each 10% (by volume) of fragments greater than 2mm in diameter.
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Note:

For soils falling in sand, loamy sand or sandy loam classification bulk density analysis will generally not affect suitability and analysis not necessary.

1/24/08 3/6

R G H

CONSULTANTS, INC.

Geotechnical
Geological
And Laboratory Services

January 24, 2008
File: 9187.20
Riechers Spence Job Number:

Riechers Spence Associates
1541 Third Street
Napa, CA 94559

Subject: **Laboratory Test Results**
Soil Texture Analysis by
Bouyoucos Hydrometry Method
SAGE HILL SITE

Dear Mr. Bray:

This letter transmits the results of our laboratory testing performed for the subject project. Your personnel delivered the sample on January 18, 2007

We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Sieve/Density	HOLE 1 @ 1-2'
+ #10 Sieve	62.7 %
Sand	34.6 %
Clay	25.4 %
Silt	40.0 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

RGH GEOTECHNICAL

Tarance E. McCue

Tarance E. McCue
Laboratory Manager

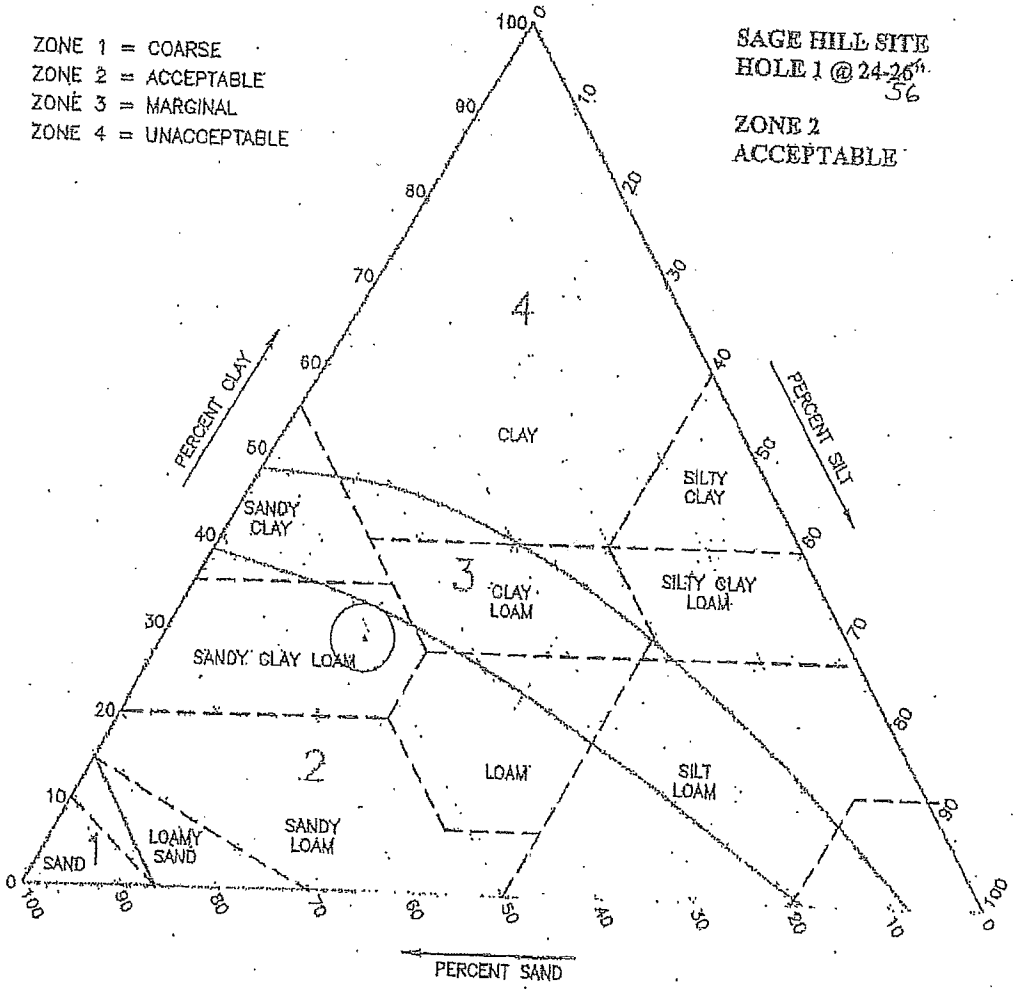
1/24/08
4/6

SOIL PERCOLATION SUITABILITY CHART

ZONE 1 = COARSE
ZONE 2 = ACCEPTABLE
ZONE 3 = MARGINAL
ZONE 4 = UNACCEPTABLE

SAGE HILL SITE
HOLE 1 @ 24-26"
56

ZONE 2
ACCEPTABLE



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1/24/08
5/6

R G H

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Geological
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We performed a Soil Texture Analysis by the Bouyoucos Hydrometery Method with the following results:

Size/Density	Holland (2-7-2)
+ #10 Sieve	41.3 %
Sand	44.0 %
Clay	27.4 %
Silt	28.6 %
Db g/cc	--

We trust this provides the information required at this time. Should you have further questions, please call.

Yours very truly,

RGH GEOTECHNICAL

Tarance E. McCue

Tarance E. McCue
Laboratory Manager

1/24/08 6/6

RGH CONSULTANTS, INC.

Geotechnical Geological And Laboratory Services

BOUYOCOUS HYDROMETER

CLIENT Rayshon Spence LOCATION Sage Hill JOB# 9187.20

SAMPLE NUMBER	Hole 1 @ Red	Hole 1 @ Red				
DEPTH	24-36"	0-24"				
A. Oven dry wt. (grams)	50g	50g				
B. Starting Time (hr: min: sec:)	1341	1339				
C. Temp. @ 40 sec. (degrees F)	64.4	63.8				
D. Hydro reading @ 40 sec. (gm/l)	35.5	40.0				
E. Composite Corr. (gm/l)	-7.3	-7.3				
F. True Density @ 40 sec. (gm/l) D-E	28.0	32.7				
G. Temp. @ 2 hrs. (degrees F)	64.0	63.8				
H. Hydro reading @ 2 hrs. (gm/l)	21.0	20.0				
I. Composite Corr. (gm/l)	-7.3	-7.3				
J. True Density @ 2 hrs. (gm/l) H-I	13.7	12.7				
K. % Sand = 100 – [(F/A) x 100]	44.0	34.6				
L. % Clay = [(J/A) x 100]	27.4	25.4				
M. % Silt = 100-(K+L)	28.6	40.0				
N. % No. 10 =	41.3	62.7				

Cup Number	A-31	A-11				
Dry Before Wash + Tare	296.2	329.1				
Dry After Wash + Tare	186.7	236.9				
Dry Wt. Passing #10	109.5	92.2				
Tare Weight	109.6	81.9				
Dry Wt. Before Wash	186.6	247.2				
% Passing #10	58.7	37.3				
% #10	41.3	62.7				

Appendix C

4106024.0 Sage Hill Winery
May 13, 2009

CONSULTING CIVIL ENGINEERS
RIECHERS SPENCE ASSOCIATES

Advantex AX-100 Treatment System Calculations

Sizing Calculation for AX-100

- Peak daily flow = 1,000 gpd
- Based on Orenco recommendations for winery process waste, the maximum allowable loading per square foot of AX-100 pod footprint area = 5.0 gpd / sf
- Minimum required treatment area = 1,000 gpd / 5.0 gpd / sf = 200 sf
- Each AX-100 pod has a footprint of 100 square feet.
- Number of AX-20 pods required = 200 sf / 100 sf = 2 pods
- Orenco specifies a PF500712 pump for the AX-100 system. One pump will be installed for each pod and the pods will be dosed simultaneously. A pump curve is attached for reference.

Timer Setting Calculation for the AX-100

- Peak daily flow = 1,000 gpd
- Recirculation Ratio = 12
- Total AX-100 flow through = (12 + 1) x 1000 = 13,000 gpd
- Total flow per pod = 13,000 / 2 = 6,500 gpd
- Number of cycles per day = 72 (3 doses per hour to prevent drying of the textile)
- Total flow per dose = 6,500 gallons / 72 doses = 90.3 gallons per dose
- Design pump flow rate = 31.4 gpm (from Orenco pump specs, attached)
- On time per dose = 90.3 gallons per dose / 31.4 gpm = 2.88 minutes (2 minute 53 seconds).
- Off time per dose = 17 minutes 7 seconds
- Override off time = 7 minutes 7 seconds (doubles number of doses per hour)

Recirculation Valve and Float Setting Calculations for AX-100 Recirculation Tank

Per Orenco recommendations, the recirculation tank will be 2000 gallons.

- **Tank Data:**

  Jensen HS-2000 non-traffic rated holding tank
  Capacity to Inlet = 2,000 gallons
  Inside Height to Invert = 54"
  Overall Inside Height = 60"
  Gallons per inch = 2,000 gallons / 54" = 37.0" gpi

  (Note: Reference datum for all float settings is the tank bottom, at 0")

- **100% Discharge Level / Float Ball Center = 43"**

  This design uses a model MM4FRP Recirculation Ball Valve. This valve is to be installed so the center of the float ball is at the desired 100% discharge water level, which is the water level when the cone, lifted by the float ball, becomes fully seated in the valve body and prevents flow from recirculating back to the tank, forcing all flow to discharge. (See diagram on attached product data sheet)

  Orenco recommends the 100% discharge level be set to allow a specific amount of emergency tank storage (typically 1 day's flow) or alternatively, in the absence of specific storage requirements it can be set at a level equal to about 80% of the tank volume to the inlet invert. This design incorporates duplex pumps therefore emergency storage is not a governing factor in the design and the 80% volume level is used for the design.

  54" (invert) x 80% = 43.2" (set at 43")

- **Override timer = 45"**

  This float is set 2" above the 100% discharge level. Orenco recommends this 2" clearance to allow surge capacity and reduce the frequency of pump override cycles, which will allow the system to provide more consistent treatment.

  43" (100% discharge) + 2" (Clearance) = 45"

- **High Level Alarm = 47"**

  This float is set 2" above the override timer float. This 2" clearance reduces the chance of nuisance high water alarms.

45" (override float) + 2" (Clearance) = 47"

Note: Per Napa County regulations, the 1-day storage capacity above the high water alarm is waived for the processing tank as long as the system features duplex (redundant) pumps. This design still provides the following storage above the high water alarm to the inside tank top:

60" (inside height) – 47" (high level) = 13"

13" (storage height) x 37.0 gpi = 481 gallons (about ½ day's flow)

- **Redundant off / low level alarm = 38"**
  This float is set far enough below the 100% discharge level to allow for normal tank drawdown during dosing cycles without causing nuisance low level alarms. Orenco recommends a minimum of about 5" clearance:

  43" (100% discharge) - 5" (Clearance) = 38"

  Note that this is also above the pump minimum liquid level of 22".

Pump Selection for a Pressurized System

Project: AX100 -

Input Parameters

Orifice Size	5/32	inches
Residual Head at Last Orifice	10.5	feet
Orifice Spacing	2.0	feet
Number of Laterals per Cell	8	
Lateral Length	7.0	feet
Lateral Line Size	1.00	inches
Lateral Pipe Class/Schedule	40	
Distributing Valve Model	None	
Manifold Length	7.0	feet
Manifold Line Size	1.25	inches
Manifold Pipe Class/Schedule	40	
Lift to Manifold	5.0	feet
Transport Length	20.0	feet
Transport Line Size	2.00	inches
Transport Pipe Class/Schedule	40	
Discharge Assembly Size	2.00	inches
Flow Meter	None	inches
'Add-on' Friction Losses	40.0	feet

Calculations

Minimum Flow Rate per Orifice	0.98	gpm
Number of Orifices per Zone	32	
Total Actual Flow Rate	31.4	gpm
Number of Lines per Zone	8	
% Flow Differential 1st and Last Orifice	0.1	%
Lift to Manifold	5.0	feet
Residual Head at Last Orifice	10.5	feet
Head Loss in Laterals	0.0	feet
Head Loss Through Distributing Valve	0.0	feet
Head Loss in Manifold	0.2	feet
Head Loss in Transport Pipe	0.3	feet
Head Loss Through Discharge	2.0	feet
Head Loss Through Flow Meter	0.0	feet
'Add-on' Friction Losses	40.0	feet
Total Flow Rate	**31.4**	**gpm**
TDH	**58.1**	**feet**

Orenco Systems®
Incorporated

814 AIRWAY AVENUE

SUTHERLIN, OREGON

97479

TOLL FREE:

(800) 348-9843

TELEPHONE:

(541) 459-4449

FACSIMILE:

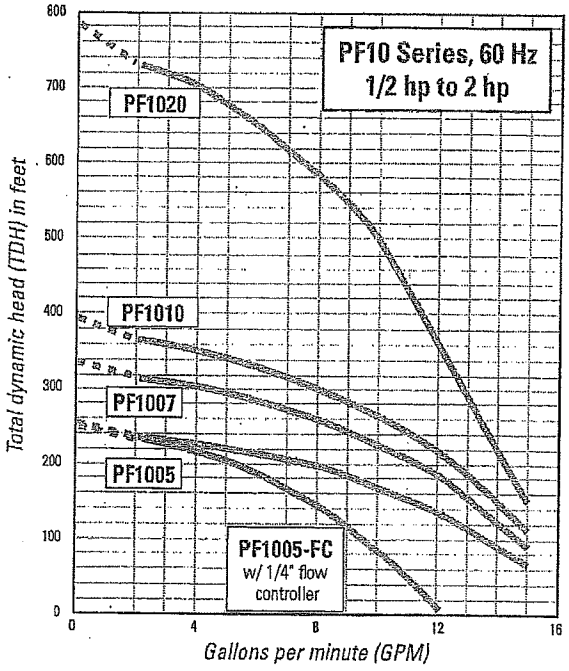
(541) 459-2884

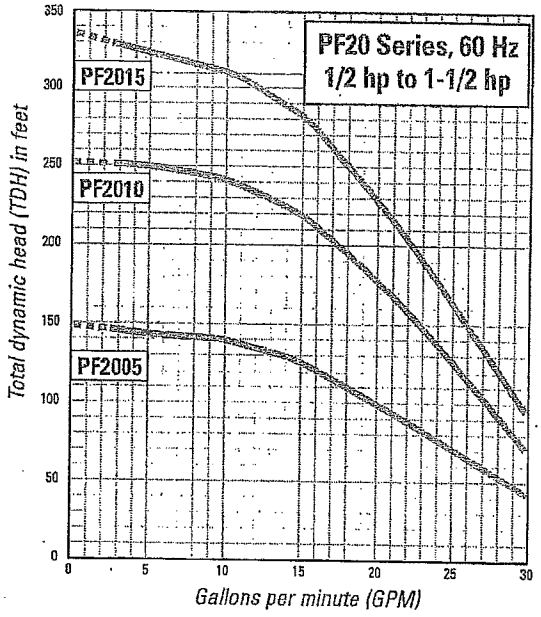
www.orenco.com

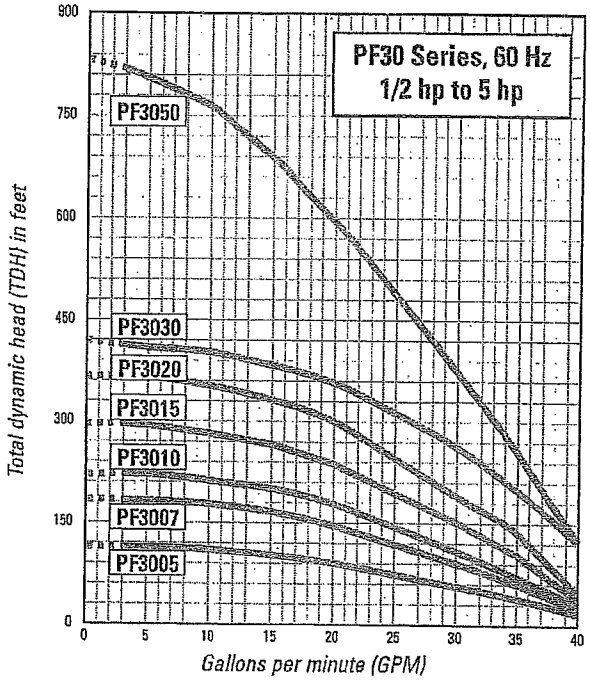
Using a Pump Curve

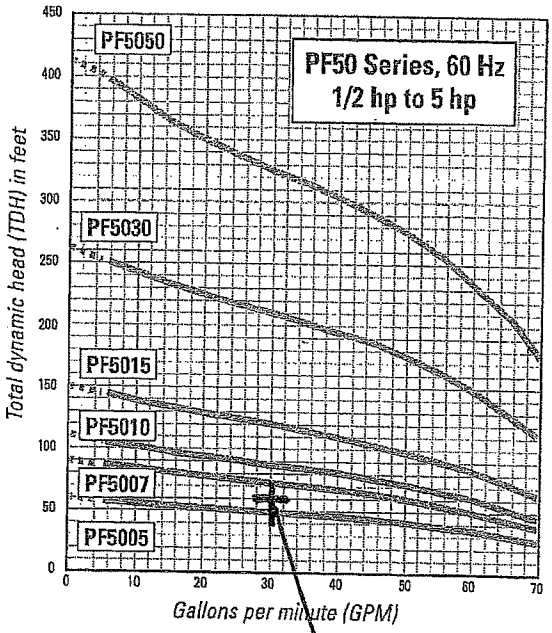
A *pump curve* helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head, or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their *nominal flow rate* — the value, measured in gpm (or L/sec), expressed by the first two numerals in an Orenco pump nomenclature. At low flow rates, TDH varies from pump to pump, so it is represented as a dashed line in the pump curves. For most accurate pump specification, use Orenco's PumpSelect™ software.

60 Hz Models









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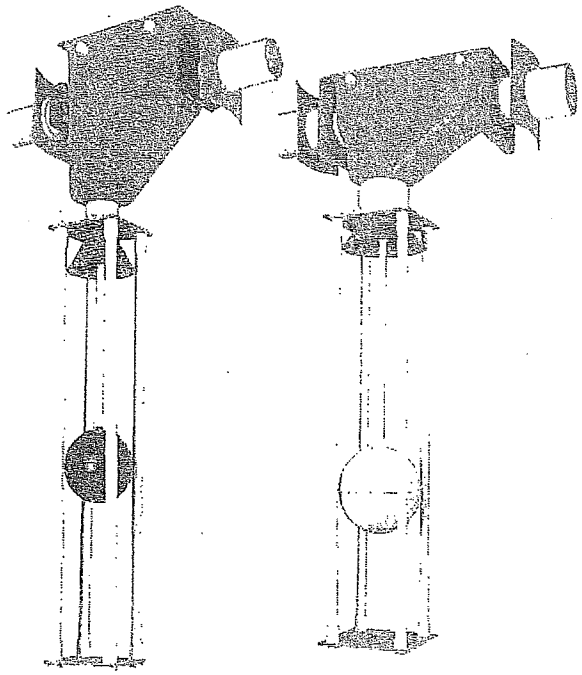
31.4 gpm @ 58.1 TDH

MM_-FRP Recirculating Ball Valve

Technical Data Sheet

Applications

The MM_-FRP Recirculating Ball Valve controls the circulation of effluent from the AdvanTex pod to the processing tank. When the liquid in the tank rises to a predetermined maximum bypass level, the valve closes, diverting effluent past the processing tank. When the liquid level is low, the valve remains open, allowing effluent to return to the processing tank for recirculation. As the liquid level approaches the maximum bypass level, effluent splits and flows both ways.



MM4-FRP (4-in. inlet and outlet)

MM6-FRP (6-in. inlet and outlet)

Features/Specifications

To specify this product, require the following:

- Capability of being adjusted in the field to maintain desired tank water level
- Corrosion-resistant construction
- Capacity for flows up to 125 gpm (MM4-FRP) or 225 gpm (MM6-FRP)
- Design that allows installation in a 30-in. PVC riser (MM6-FRP) or either a 24-in. or 30-in. riser (MM4-FRP)

Standard Models

MM4-FRP, MM6-FRP

Physical Specifications

Approximate Dimensions

	MM4-FRP	MM6-FRP
Total height	71 in. (1807 mm)	77.5 in. (1970 mm)
Float cage height	49 in. (1243 mm)	57 in. (1456 mm)
Distance between mounting brackets	17.375 in. (441 mm)	25.375 in. (644 mm)
Inlet and outlet	4 in. Sch. 40 PVC	6 in. Sch. 40 PVC

Materials of Construction

	MM4-FRP	MM6-FRP
Body and cone	Fiberglass-reinforced polyester	Fiberglass-reinforced polyester
Float	Polyethylene	ABS
Float cage	Fiberglass-reinforced polyester plates and PVC pipe	Fiberglass-reinforced polyester plates and PVC pipe
Float cage and bar	PVC	PVC
Quick-disconnect mounting brackets	ABS	PVC and fiberglass-reinforced polyester
Latches	No latches	Stainless steel

Orenco Systems® Incorporated

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NTD-MM-FRP-1
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Appendix D

Pressure Distribution System
Field Sizing Worksheet

Project Information	
RSA Project Number:	*4106024.0*
Job Description	*Sage Hill Winery*
Prepared By:	*Marc Foster*
Date:	*March 24, 2006*

A. System Design Flow		
A1	**Total wastewater flow for field design (333 SW + 667 PW)**	**1000 gpd**

B. Primary Dispersal Field Sizing Calculation (Gravel Trench)

Part 1, Trench Infiltration Area Calculation

Calculates the trench infiltration area per lineal foot based on the available soil depth to a limiting condition and the proposed trench dimensions. Infiltration area is defined as the total sidewall from the top of the lateral to the bottom of the gravel.

B1	Enter available native soil depth *(from site evaluation data)*	60.0 in
	Site evaluation date: 16-Jan-08	
	Pit numbers: 2, 3, 7, 8	
B2	Enter depth of fill to be imported *(12" maximum)*	12.0 in
B3	Enter depth of separation to limiting condition *(min. 24" for PTE or 36" for STE)*	36.0 in
B4	Enter depth of soil cover over gravel *(12" minimum, 18" maximum)*	12.0 in
B5	Enter depth of gravel cover over lateral *(2" minimum)*	2.0 in
B6	Total available sidewall depth *(= B1 + B2 - B3 - B4 - B5)*	22.0 in
B7	Usable sidewall depth *(18" maximum)*	18.0 in
B8	**Total available infiltration area per lineal foot of trench** *(both sides)*	**3.0 sf/lf**

Part 2, Total Lateral Length Calculation

Calculates the required lateral length from the total flow and the application rate for the given soil type.

B9	Depth of native soil from original grade to bottom of trench	20.0 in
B10	Enter sidewall soil type and structure *(use soil type within depth B9)*	SCL/SSB, L/SSB, SL/SSB
B11	Enter application rate per SF of sidewall *(From Napa Co. Guidelines Table 5)*	0.8 gpd/sf
B12	Application rate per lineal foot of trench *(= B8 x B11)*	2.4 gpd/lf
B13	**Total primary dispersal field lateral Length** *(= A1 / B12)*	**417 ft**

Part 3, Total Field Area Calculation

Calculates the approximate field footprint area based on the total lateral length and trench spacing. Note that this is just an estimate, and the final footprint may be larger or smaller depending on the actual distribution lateral layout.

B14	Enter trench width	18.0 in
B15	Enter maximum slope in primary dispersal field	30 %
B16	Enter maximum side-to-side trench spacing *(from Napa Co. Guidelines Table 8)*	16.0 ft
B17	**Approximate primary dispersal field footprint area** *(= B13 x (B14 + B16))*	**7292 sf**

Notes:

12" fill to be placed over pit 2, which only has 20" of native soil suitable for the 0.8 gpd/sf application rate. In all other pits the sidewall soil layer is deeper and only requires 8" of fill to maintain the same application rate. In those pits the application rate is based on soil within the top 24" of native soil.

Pressure Distribution System
Field Sizing Worksheet

C. *(Optional)* Reserve Dispersal Area Lateral Length Calculation (Gravel Trench)	
Part 1, Trench Infiltration Area Calculation *Calculates the trench infiltration area per lineal foot based on the available soil depth to a limiting condition and the proposed trench dimensions. Infiltration area is defined as the total sidewall from the top of the lateral to the bottom of the gravel.*	
C1 Enter available native soil depth *(from site evaluation data)*	60.0 in
Site evaluation date: 21-Mar-07	
Pit numbers: 2, 4, 6, 7	
C2 Enter depth of fill to be imported *(12" maximum)*	8.0 in
C3 Enter depth of separation to limiting condition *(minimum 24" PTE or 36" STE)*	36.0 in
C4 Enter depth of soil cover over gravel *(12" minimum, 18" maximum)*	12.0 in
C5 Enter depth of gravel cover over lateral *(2" minimum)*	2.0 in
C6 Total available sidewall depth *(= C1 + C2 - C3 - C4 - C5)*	18.0 in
C7 Usable sidewall depth *(18" maximum)*	18.0 in
C8 Total available infiltration area per lineal foot of trench *(both sides)*	**3.0 sf/lf**
Part 2, Total Lateral Length Calculation *Calculates the required lateral length from the total flow and the application rate for the given soil type.*	
C9 Depth of native soil from original grade to bottom of trench	24.0 in
C10 Enter sidewall soil type and structure *(use soil type within depth C9)*	CL/SSB
C11 Enter application rate per SF of sidewall *(From Napa Co. Guidelines Table 5)*	0.6 gpd/sf
C12 Application rate per lineal foot of trench *(= C8 x C11)*	1.8 gpd/lf
C13 Total reserve dispersal field lateral Length *(= A1 / C12)*	**556 ft**
Part 3, Total Field Area Calculation *Calculates the approximate field footprint area based on the required trench spacing. Note that this is just an estimate and that trench spacing may vary due to varying slopes. The field size may also vary depending on the distribution lateral layout required to avoid obstructions.*	
C14 Enter trench width	18.0 in
C15 Enter maximum slope in reserve dispersal field	10 %
C16 Enter maximum center-to-center trench spacing *(from Napa Co. Guidelines Table 8)*	8.0 ft
C17 Approximate reserve dispersal field footprint area *(= C13 x (C14 + C16))*	**5278 sf**

Pressure Distribution System
Pump Sizing Worksheet

Project Information	
RSA Project Number:	*4106024.0*
Job Description	*Sage Hill Winery*
Prepared By:	*Marc Foster*
Date:	*April 29, 2009*

A. Distribution Lateral Pipe Sizing

Calculates the lateral pipe size for a given orifice size and orifice spacing. Line size is selected to minimize head loss in the longest lateral to about 0.5 feet to ensure even flow between all orifices. Head loss is calculated using Hazen Williams and the flow at the beginning of the lateral. This result is reduced by a factor of 0.4 to compensate for the fact that the flow, and associated head loss, reduce with each successive orifice.

A1	Enter length of longest lateral	72.0 ft
A2	Enter lateral nominal diameter	1.50 in
A3	Actual lateral inside diameter *(from pipe manufacturer data for SCH 40 PVC)*	1.610 in
A4	Enter orifice spacing	36 in
A5	Number of orifices on longest lateral *(= A1 / A4)*	24.0 orifices
A6	Enter orifice diameter	0.125 in
A7	Enter desired residual head at last orifice ("squirt height")	5.0 ft
A8	Flow at last orifice for given residual head *(from orifice equation with C_d = 0.63)*	0.43 gpm
A9	Total flow at beginning of lateral *(= A5 x A8)*	10.4 gpm
A10	Head loss in longest lateral *(using Hazen-Williams, C=130, flow from A9, x 0.4 factor)*	0.275 ft
A11	**Final design lateral size**	**1.50 in**

B. Dosing Volume and Timer Settings

Calculates the dosing volume and pump timer settings so the dose volume is between the recommended minimum and maximum values.

Recommended minimum and maximum dose:		
B1	Total daily flow *(from field sizing worksheet)*	1000 gpd
B2	Total lateral length *(from field sizing worksheet)*	417 ft
B3	Enter number of zones	2
B4	Theoretical lateral length per zone *(= B2 / B3)*	209 ft
B5	**Minimum recommended dose volume** *(= 5 x lateral pipe volume in one zone)*	**110.5 gal**
B6	**Maximum recommended dose volume** *(= 20% of daily flow to one zone)*	**100.0 gal**
Actual design dose:		
B7	Total daily flow *(from field sizing worksheet)*	1000 gpd
B8	Enter desired number of doses per day	10 doses
B9	**Total volume per dose** *(= B7 / B8)* *100 gals is compromise between min / max*	**100.0 gal**
Pump timer settings:		
B10	Lateral length per zone *(from line B4)*	209 ft
B11	Orifice spacing *(from line A4)*	36 in
B12	Orifice flow rate *(from line A8)*	0.43 gpm
B13	Number of orifices per zone *(= B10 / B11)*	70 orifices
B14	Total dosing flow rate per zone *(= B12 x B13)*	30.3 gpm
B15	Total time to complete each full timer on/off cycle *(= 1440 minutes per day / B8)*	02:24:00 hh:mm:ss
B16	**Pump On Time per cycle** *(= B9 / B14)*	**00:03:18 hh:mm:ss**
B17	**Pump Off Time per cycle** *(= B15 - B16)*	**02:20:42 hh:mm:ss**

Pressure Distribution System
Pump Sizing Worksheet

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C. Head Loss & Pump Sizing				
Calculates the total dynamic head loss as the sum of static lift, supply line losses, losses from components such as flow meters, and the desired residual head.				
Static Lift				
C1	Enter height from pump to tank outlet			7.0 ft
C2	Enter elevation change from tank outlet to furthest PD lateral . (if downhill enter 0)			12.0 ft
C3	**Total static lift**			**19.0 ft**
Supply Line Friction Losses (Equivalent Length Method)				
C4	Enter supply line nominal diameter			1.50 in
C5	Actual supply line inside diameter *(from pipe manufacturer data)*			1.610 in
C6	Supply line cross-section area *(calculated)*			0.017 sq ft
C7	Dosing flow rate *(from line B14)*			30.3 gpm
C8	Flow velocity *(= C7 / C6)*			4.0 ft/sec
C9	Enter length of supply line from pump to end of farthest lateral			220 ft
C10	Enter equivalent lengths of fittings *(don't include components counted in next section)*			
	Fitting:	*Qty:*	*Eq. len. of each.:*	
	90 deg elbow	4	7.4	29.6 ft
	45 deg elbow	6	2.1	12.6 ft
	Balancing valve (gate)	1	1.2	1.2 ft
	Check valve	2	15	30.0 ft
C11	Total equivalent length of pipe and fittings *(= C9 + all fittings listed in C10)*			293 ft
C12	**Total supply line head losses** (using Hazen-Williams, C=130)			**20.3 ft**
Friction Losses For Other Specific Components				
C13	Pump discharge assy:	Orenco HV150BC		3.0 ft
C14	Flow meter	1.5" Sensus SR		7.0 ft
C15	Distribution valve	Orenco 6402		7.0 ft
C16				
C17				
C18				
C19	**Total head losses from specific components**			**17.0 ft**
Lateral Losses				
C20	Head loss in longest lateral *(from line A10)*			**0.3 ft**
C21	Desired residual head at last orifice ("squirt height") *(from line A7)*			**5.0 ft**
Total Dynamic Head				
C22	Total Dynamic Head *(= C3 + C12 + C19 + C20 + C21)*			61.6 ft
C23	Safety Factor			1.25
C22	**Total Dynamic Head**			**77.0 ft**

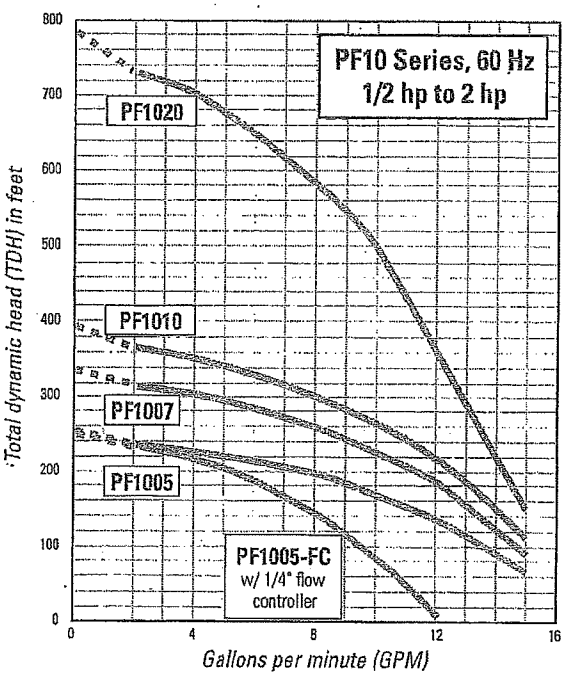
Pump Data (attach the pump performance curve)	
Manufacturer:	Orenco Systems
Model #:	PF301512
Hp:	1.5 Hp
Volts / # phases:	230 volt / 1 phase

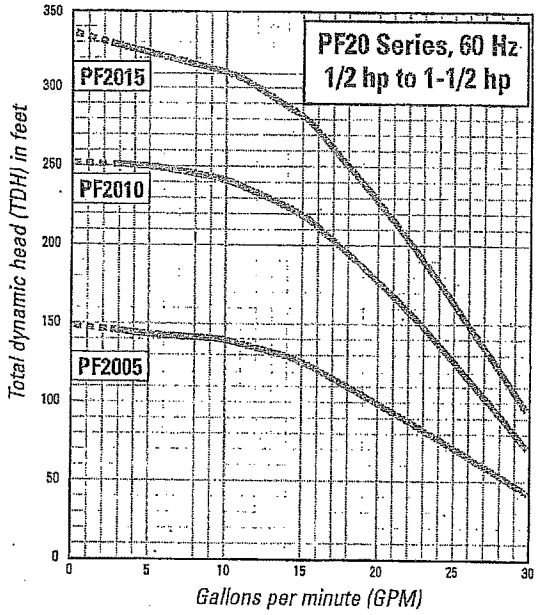
PF Series High-Head Effluent Pumps (continued)

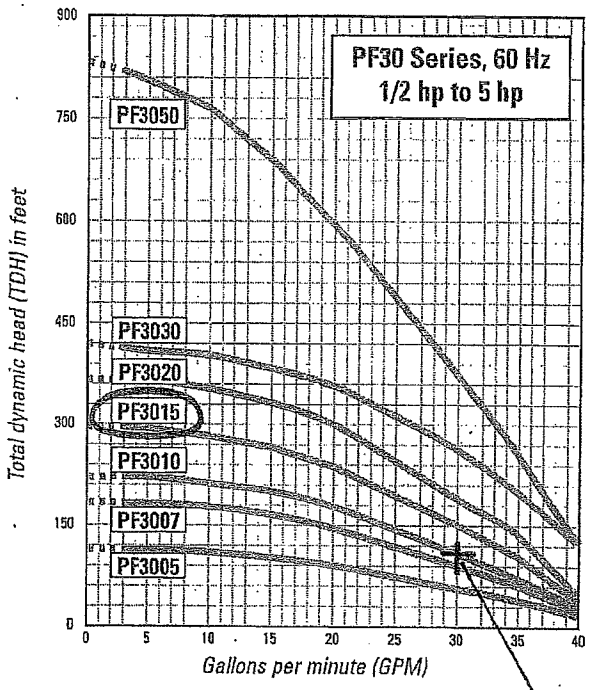
Using a Pump Curve

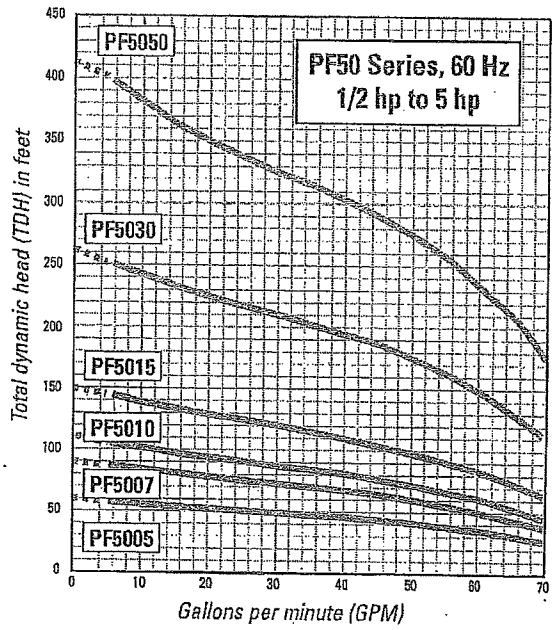
A *pump curve* helps you determine the best pump for your system. Pump curves show the relationship between flow (gpm or L/sec) and pressure (total dynamic head, or TDH), providing a graphical representation of a pump's optimal performance range. Pumps perform best at their *nominal flow rate* — the value, measured in gpm (or L/sec), expressed by the first two numerals in an Orenco pump nomenclature. At low flow rates, TDH varies from pump to pump, so it is represented as a dashed line in the pump curves. For most accurate pump specification, use Orenco's PumpSelect™ software.

60 Hz Models









77' TDH @ 30 GPM

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float should also be set far enough below the high water alarm float to prevent nuisance alarms (typically 2" – 4" clearance).

The working volume is estimated as the difference between the inflow and outflow during the hours in which most of the facility's water use will occur. For this project this period is assumed to be a typical 8 hour working day.

Inflow = 1000 gallons (peak day flow)

Outflow = 8/24 x 1000 gallons = 333 gallons (outflow over 8 hours)

Working volume = 1000 – 333 = 667 gallons

Working depth = 667 gallons / 37 gpi = 18"

Override = 32" (Timer On/Off) + 18" (Working depth) = 50"

- **High Level Alarm = 54"**

No minimum emergency storage is incorporated into this design for two reasons:

1. This design uses duplex pumps to allow continued operation if one pump fails.
2. In the event of a power failure, the upstream pumps will be inoperative and this tank will not receive any flow.

To warn of effluent backing up through the inlet, this float is set even with the tank inlet invert.

High level = 54" (Height to invert)

This level also provides adequate clearance above the override float to avoid nuisance alarms.