B

Type

X

Plans

GRD12-0083

Permit Number

14701

Street Number

Bodega Hwy

Street Name

TW1

Community Code

026-120-006

APN

COUNTY OF SONOMA - PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-1103

Please Print Your Name:	Date Applied:

INFORMATION WITHIN HEAVY LINE TO BE COMPLETED BY APPLICANT

SITE LOCATION INFORMATION - PRINT CLEARLY

Site Address: 14701 Bodega Hwy	City: Sebastopol/Freestone	ZIP:	
Cross-Street: Freestone Vly Ford Rd	APN: 026-120-006	Project Phone #: 707.824.9730	Project Fax #: 707 824 9707
Directions:	Email address:	Unit #	Lot #
Describe Project: Grading for new winery Pad	Living Area N/a Garage Decks	Contract Price:	

OWNER NAME AND ADDRESS			APPLICANT NAME AND ADDRESS		
Name: Steve Kistler			Name: Steve Martin		
Mailing Address: 1470 Bodega Hwy			Mailing Address: 130 S Main St. #130		
City: Freestone	State: CA	ZIP:	City: Sebastopol	State: CA	ZIP: 95472
Day Ph: ( )	Fax: ( )		Day Ph: 707 824.9730	Fax: (824-9707	

CONTRACTOR INFORMATION			OTHER PERSONS (ARCHITECT, ENGINEER, ETC.)		
Company Name:			Name: See applicant		
Address: TBD			Address:		
City:	State:	ZIP:	City:	State:	ZIP:
Day Ph: ( )	Fax: ( )		Day Ph: ( )	Fax: ( )	
			License No:	Exp. Date:	

WORKER'S COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

☐ I have and will maintain a certificate of consent to self-insure for worker's compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

☐ I have and will maintain worker's compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My worker's compensation insurance carrier and policy number are:

Carrier _____

Policy No. _____

(This section need not be completed if the permit is for one hundred dollars ($100) or less).

X I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the worker's compensation laws of California, and agree that if I should become subject to the worker's compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Exp. Date: 7-1-11 Applicant: _____

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractor's License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500).):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044 Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.).

X ☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.).

X ☐ I am exempt under Sec. _____, B & P.C. for this reason 49390

By my signature below I acknowledge that, except for my personal residence in which I must have resided for at least one year prior to completion of the improvements covered by this permit, I cannot legally sell a structure that I have built as an owner-builder if it has not been constructed in its entirety by licensed contractors. I understand that a copy of the applicable law, Section 7044 of the Business and Professions Code, is available upon request when this application is submitted or at the following website: http://www.leginfo.ca.gov/calaw.html.

7-1-11 _____

Date Signature of Property Owner or Authorized Agent

LICENSED CONTRACTOR'S DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

Lic. Class _____ Lic. No. _____

Exp. Date _____ Contractor _____

ASBESTOS DECLARATION

Written asbestos notification pursuant to Part 61 of Title 40 of the Code of Federal Regulations is required when asbestos exists in buildings, or portions thereof, undergoing demolition. I hereby declare that demolition authorized by this permit is from construction that (☐ does) (☐ does not) contain asbestos, or that ☐ no demolition is authorized by this permit.

I certify that I have read this application and affirm under penalty of perjury that the above information is correct. I agree to comply with all local Ordinances and State laws relating to building construction. I hereby authorize representatives of the County of Sonoma to enter upon the above-mentioned property for inspection purposes. If, after making the Certificate of Exemption for the Worker's Compensation provision of the Labor Code I should become subject to such provisions, I will forthwith comply. In the event I do not comply with the Workman's Compensation law, this permit shall be deemed revoked.

_____

PERMITTEE SIGNATURE

135 S Main #130 Sebastopol CA

ADDRESS CITY ZIP

☐ Contractor ☐ Owner X Other Licensed Professional

THIS PERMIT SHALL EXPIRE IN THREE(3) YEARS FROM DATE FEES ARE PAID UNLESS OTHERWISE NOTED BY CODE ENFORCEMENT

FOR DEPARTMENT USE

Zoning RRD/A/B6/100 BR/VOH Acres 250.6ac.

Existing Use/Structures Std. Sheepgrazing, Vineyard

Proposed Use/Structures Grading for winery pad

Zoning Min. Yard Requirements: Front _____ Rear _____ Left _____ Right _____ Bldg. Ht. _____

NOTE: Fire Safe Standards require all parcels greater than 1 Acre to have a min. 30' setback unless mitigated. ☐ Mitigation Required ☐ Address subject to change

Approval for Permit Issuance:

By: _____

Date: _____

Approval for Occupancy:

By: Tracy Jensen

Date: 7/1/2011

Conditions: SR = Scenic Hwy Corridor only No Scenic Landscape Unit

Sewer Connection: ☐ Available ☐ Fees Paid

Approved by: _____ Date: _____

Road Encroachment: ☐ Fees Paid

Approved by: N/R Date: _____

Septic System Permit/Clearance # _____

Approved by: Tan R. Date: 12/12/12 RO

Flood Zone: ☐ Yes ☒ No 100 Year Flood Elevation: _____

Site Review _____

Drainage Review:

Approved by: _____ Date: 10/7/13

Fire:

Approved by: Steve M. Date: 8/20/13 RO

Code Enforcement Violation ☐ Yes ☒ No Violation # _____

This permit is limited to _____ days.

Work Authorized: FINISH GRADING FOR WINERY SITE IMPROVEMENTS & ACCESS DRIVE TO OFFICES.

☑ Plans Approved ☐ No Plans Subject to Field Inspection

☐ Post FIRM ☐ Alquist Priolo Report Available ☐ Pre FIRM ☐ Geotechnical report Available

Plancheck Cleared By	Date:	Type of Construction	Occupancy	No. of Stories	No. of Bedrooms
[illegible]	10/7/13				

Permit Cleared for Issuance By	Date:	Auto. Fire Sprinklers Req'd	No of Units	Certificate of Occupancy
Regina	10/9/13			

Machine Space for Permit Fee

PAYMENT REC'D

$ _____

OCT 09 2013

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT COUNTY OF SONOMA

Distribution: White - Permit Center Canary - Assessor Cardstock - Inspector

cmuller s:\handouts\cast\CIS-007.cdr Revised: 01/29/2009

JOB ADDRESS: 14701 Bodega Hwy TBE

PERMIT NUMBER: GRD 12-0083

INSPECTION AREA: 30

ENGINEERING DIVISION - PERMIT INSPECTION RECORD

Sonoma County Permit And Resource Management Department *INSPECTOR COPY*

2550 Ventura Avenue ❖ Santa Rosa, CA 95403 ❖ Telephone (707) 565-1900

OWNER **KISTLER STEPHEN W**

PERMIT# **GRD12-0083** AREA **07**

JOB ADDRESS **14701 BODEGA HWY TWI**

DATE ISSUED **Permit to Expire: 10/06/2016**

CONTRACTOR **MARTIN STEVEN M**

CONSTRUCTION INSPECTION CONTACT PERSON

DESCRIPTION OF WORK **FINISHED GRADING WORK FOR WINERY (PLANCHECK**

AUTOMATED INSPECTION REQUEST SYSTEM
❖ 565-3551 ❖

Our automated inspection request system (for use with a touch tone phone) allows you to schedule next day inspections by calling between the hours of 6:00 a.m. to midnight. You must have your permit number, job address number and the inspection code listed below.

THIS JOB CARD MUST BE AVAILABLE AT TIME OF INSPECTION

The current status of this permit is available on our website:
http://www.SonomaCountyPermits.org

RB 1 _____ RB 2 _____ NPDES _____

Scantron CODE	INSPECTION TYPE	
	SITE GRADING & SITE IMPROVEMENTS	**GRD**
200	SITE GRADING, PRE-CONSTRUCTION *(5 DAY NOTICE)*	
201	START WORK *(5 DAY NOTICE)*	
202	RESUME GRADING ACTIVITY *(2 DAY NOTICE)*	
203	SITE GRADING, ROUGH	
204	SUB DRAIN	
205	SUB GRADE *(2 DAY NOTICE)*	
206	SITE IMPROVEMENTS, PRE-PAVING	
207	CONCRETE FLATWORK	
208	PAD CERTIFICATION	
209	PRE-PAVING *(2 DAY NOTICE)*	
210	PAVING *(2 DAY NOTICE)*	
211	STRIPING & SIGNAGE *(5 DAY NOTICE)*	
212	LIGHTING & SIGNALS *(5 DAY NOTICE)*	
213	KEYING & BENCHING	
214	SLOPE STABILITY / RETAINING WALL	
215	SOIL REPORT CERTIFICATION	
216	SPECIAL INSPECTION	
218	PRE-FINAL *(5 DAY NOTICE)*	
219	SITE GRADING, FINAL *(2 DAY NOTICE)*	
220	SUBDIVISION WARRANTY	
	WATER SYSTEMS	**WAT**
450	WATER FIELD WORK COMPLIANCE	
451	WATER PIPE INSTALLATION	
452	WATER ENCROACHMENT REQUIREMENTS	
453	WATER WELL DRAWDOWN & YIELD	
454	WATER SYSTEM HYDROSTATIC TEST	
459	WATER SYSTEM FINAL	
	ENCROACHMENT	**ENC**
240	START WORK *(5 DAY NOTICE)*	
241	ENCROACHMENT TRENCHING	
242	ENCROACHMENT PIPE / BEDDING	
243	ENCROACHMENT BACKFILL / COMPACTION	
244	ENCROACHMENT PRE-PAVING	
245	ENCROACHMENT PAVING	
249	ENCROACHMENT FINAL	
250	PUBLIC IMPROVEMENTS WARRANTY	
	DRAINAGE	**DRN**
640	TRENCH (DRAINAGE PIPE)	
641	DRAINAGE PIPE	
642	PIPE BACKFILL / COMPACTION	
643	PIPE STRUCTURES	
644	INLET / OUTLET EROSION PROTECTION	
645	SWALE(S)	
649	DRAINAGE FINAL *(2 DAY NOTICE)*	

Scantron CODE	INSPECTION TYPE	
	STORM WATER	
650	SUSMP INSPECTION	
651	S/W PRE-CONSTRUCTION	
652	S/W BMPS VERIFICATION	
654	S/W SITE INVESTIGATION	
655	S/W PRE-RAIN SEASON INSPECTION	
656	S/W ENFORCEMENT ACTION COMPLIANCE	
657	S/W POST-RAIN SEASON INSPECTION	
659	STORM WATER FINAL *(2 DAY NOTICE)*	
	SEWER SYSTEMS	**SEW**
430	START WORK *(5 DAY NOTICE)*	
431	RESUME SEWER SYSTEM ACTIVITY	
432	SEWER TRENCH	
433	SEWER PIPE / BEDDING	
434	SEWER BACKFILL / COMPACTION	
435	SEWER TESTING	
438	SEWER MANHOLE	
439	SEPTIC TANK DESTRUCT W/SEWER CONNECTION	
440	GREASE INTERCEPTOR	
441	PUMP SYSTEM	
442	SEWER PRE-PAVING	
443	SEWER PAVING	
449	SEWER FINAL *(2 DAY NOTICE)*	
699	PERMIT FINAL *(5 DAY NOTICE)*	

1/21/14

1/21/14

1/21/14

ENGINEERING DIVISION - PERMIT INSPECTION RECORD

Sonoma County Permit And Resource Management Department
2550 Ventura Avenue ❖ Santa Rosa, CA 95403 ❖ Telephone (707) 565-1900

INSPECTION NOTES for PERMIT # ____________

INSP #	DATE	INITIALS	REMARKS

SMA
130 South Main Street, Suite 201
Sebastopol, CA 95472
707-824-9730
707-824-9707 (fax)

606 Alamo Pintada Road #3-221
Solvang, CA 93463
805-541-9730

January 21, 2014

Sonoma County Permit & Resource
Management Department
2550 Ventura Avenue
Santa Rosa, CA 95403

Attention: John Rainwater

Re: Kistler Vineyards
Road Improvements & Rough
Grading
GRD12-0083
Project No. 2009006

Dear Mr. Rainwater

The purpose of this letter is to inform you that the construction of the site grading and drainage improvements at the new Kistler Vineyards Winery located at 14701 Bodega Highway in Sonoma County is complete. Site visits were made regularly throughout construction by this office and a "final" site visit was made on January 21, 2014. Final construction of improvements was found to be in substantial conformance to the construction drawings and specifications by Steve Martin Associates dated June 30, 2011 and re-issued for plan check on July 30, 2013. Furthermore, the improvements constructed are in conformance to the UBC, California Building Code and Sonoma County PRMD building codes.

If you need any additional information or have questions or comments, please call.

Sincerely,

Steven Martin, P.E.

cc: Steve Kistler

Brunsing Associates, Inc.

January 21, 2014

11627.08

Kistler Vineyards
C/o: Steve Martin
Steve Martin Associates
130 S. Main Street, Suite 201
Sebastopol, CA 95472

Final Report
Geotechnical Engineering Services during Construction
Kistler Vineyards Pozzi Ranch Winery
14701 Bodega Highway
Sebastopol, California

Introduction

This letter summaries the results of geotechnical engineering services performed by Brunsing Associates, Inc. (BAI), during construction for a phase of the Kistler Vineyards Pozzi Ranch Winery at 14701 Bodega Highway, Sebastopol, California. This phase of the project includes fermentation/bottling/barrel building (FBB), mechanical building, an 8,000 gallon domestic water tank, a 50,000 gallon fire protection water tank and a paved driveway to these facilities. BAI previously prepared the following report and letters:

- Geotechnical Investigation, dated August 16, 2011
- Plan Review Conclusions, dated August 16, 2011
- Geotechnical Plan Review, dated September 14, 2011
- Progress Report, dated December 23, 2011
- Geotechnical Plan Review, dated February 6, 2012
- Progress Report, dated April 6, 2012
- Geotechnical Recommendations for Cut Pad, dated April 26, 2012
- Progress Report, Observations During Foundation Construction, dated June 12, 2012
- Progress Report, Geotechnical Engineering Services during Construction, dated July 25, 2013

The four progress reports identified above are attached. BAI's services described in this report were performed between September 2011 and May 2013. The project plans prepared by Nielsen-Schuh Architects, Jankovsky Engineering Services, and Steve Martin Associates, provided the guidelines for the work.

Services Performed

During construction BAI intermittently observed the work including:

- Keyway excavation for the embankment west of the FBB building.
- Placement of the keyway subdrain and cleanouts prior to placement of compacted fill.
- Excavation and installation of the deep perimeter subdrain around the FBB building.

- Over excavation of the FBB building pad. Where necessary, weak materials were removed and replaced with compacted fill.
- Foundation excavations for the winery building, water tanks, and retaining walls. The foundation excavations conformed to the project plans and our recommendations and penetrated into supporting material.
- Placement of the subdrain behind the retaining walls.

BAI also performed field density/relative compaction tests within the fill material. Samples of on-site and import material were compacted in our laboratory in accordance with the ASTM D1557 test procedure to estimate the optimum moisture content and maximum dry density. The laboratory compaction test data are presented on Plates 1 through 3.

Field density tests were performed at representative locations within the fill material, as the soils were being moisture conditioned and compacted. Each field density was compared to the maximum dry density to determine the percent of relative compaction achieved. The field density test results and the corresponding relative compaction values are summarized on Plates 4 through 7.

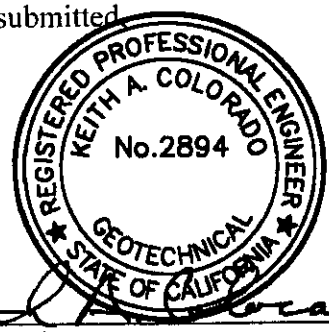
Conclusions

Based upon the results of our intermittent on-site observations and field and laboratory testing, we conclude that the geotechnical related aspects of the work completed have been performed in substantial accordance with the project guidelines.

Limitations

These observations and field and laboratory testing for the winery were performed in substantial accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, either expressed or implied, is provided as to the conclusions and professional advice presented in this report. Our conclusions are based upon reasonable geotechnical engineering interpretation of available data.

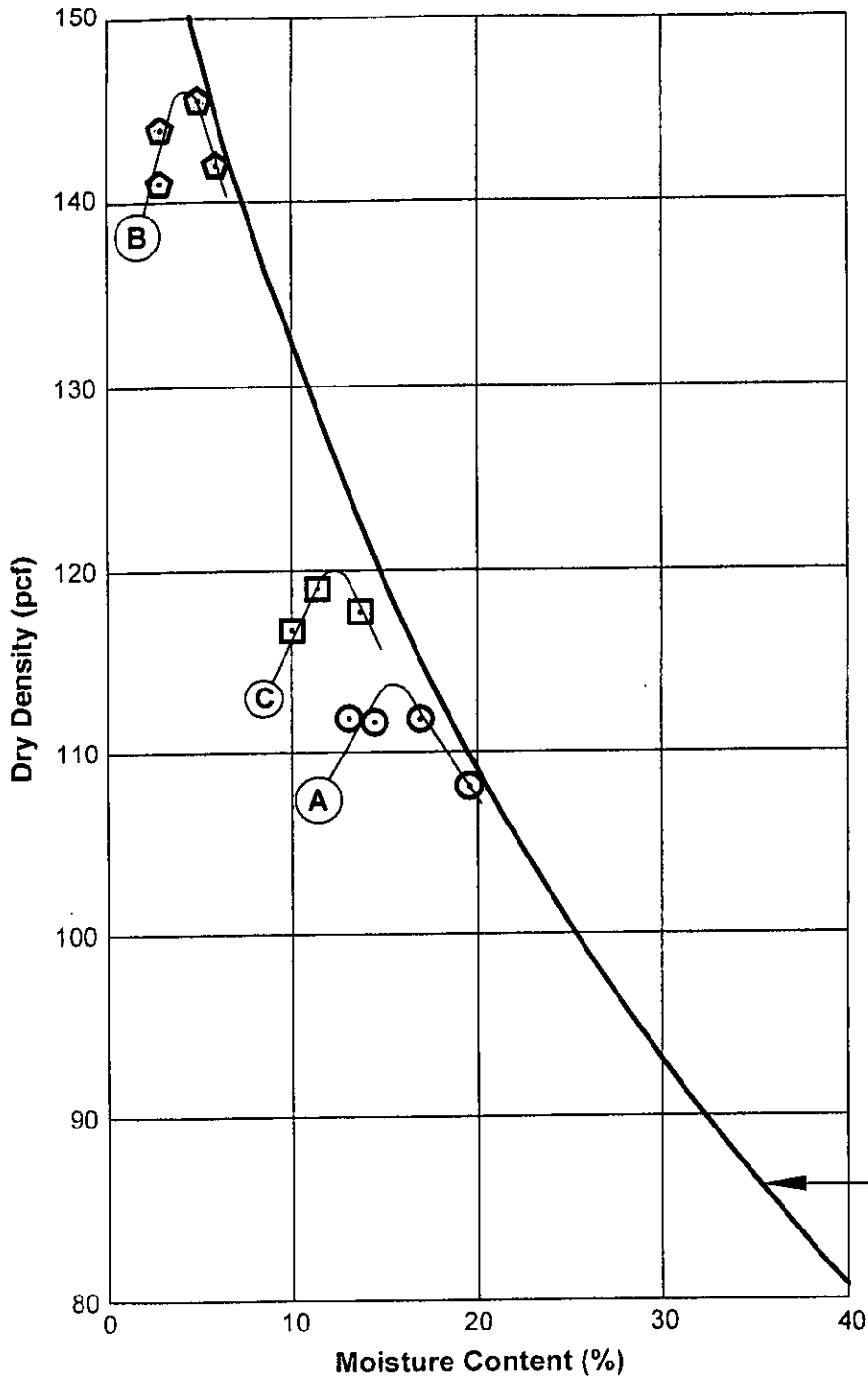
Respectfully submitted,



Keith A. Colorado
Geotechnical Engineer - 2894

J. Erich Rauber
Geotechnical Engineer - 2887

KAC/JER/kac
Three copies submitted
Attachments:
Plates 1 - 3: Compaction Test Data
Plates 4 - 7: Summary of Field Density Tests
Cc: Steve Kistler, 4707 Vine Hill Road, Sebastopol, CA 95472



TEST METHOD
ASTM D1557-09

Laboratory
Compaction
Point

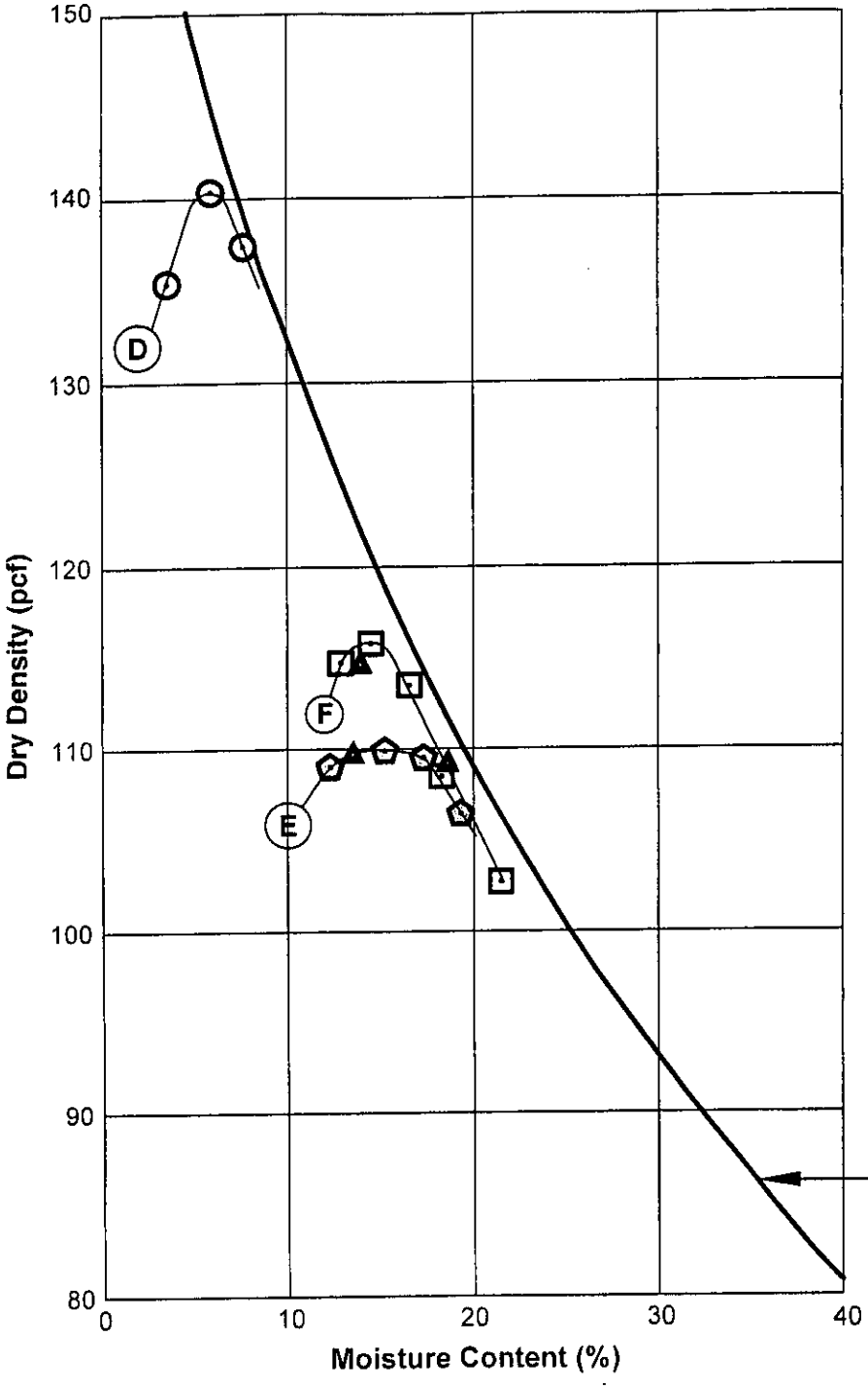
Symbol	Sample Source	Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)
A ⊙	On-Site Excavation	YELLOW BROWN SILTY SAND (SM)	15.5	114
B ⬠	On-Site Excavation	GRAY SILTY SANDY GRAVEL (GM)	4.3	146
C ⊡	On-Site Excavation	YELLOW BROWN SILTY SAND (SM)	12.3	120

Brunsing Associates, Inc.
5468 Skylane Blvd., Suite 201
Santa Rosa, California 95403
Tel: (707) 838-3027

Job No.: 11627.08
Appr.: KAC
Date: 01/21/14

COMPACTION TEST DATA
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE
1



TEST METHOD
ASTM D1557-09

Laboratory
Compaction
Point

Compaction
Check
Point

Reference Line -- 100% Saturation
for 2.70 Specific Gravity

Symbol	Sample Source	Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)
(D) ⊙	Imported from Canyon Rock Company, Inc.	DARK GRAY SILTY SANDY GRAVEL (GM)	5.8	140
(E) ⬠	On-Site Excavation	YELLOW-BROWN SILTY SAND (SM)	15.2	110
(F) ⊡	On-Site Excavation	REDDISH YELLOW CLAYEY SAND (SC)	14.4	116

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5468 Skylane Blvd., Suite 201
Santa Rosa, California 95403
Tel: (707) 838-3027

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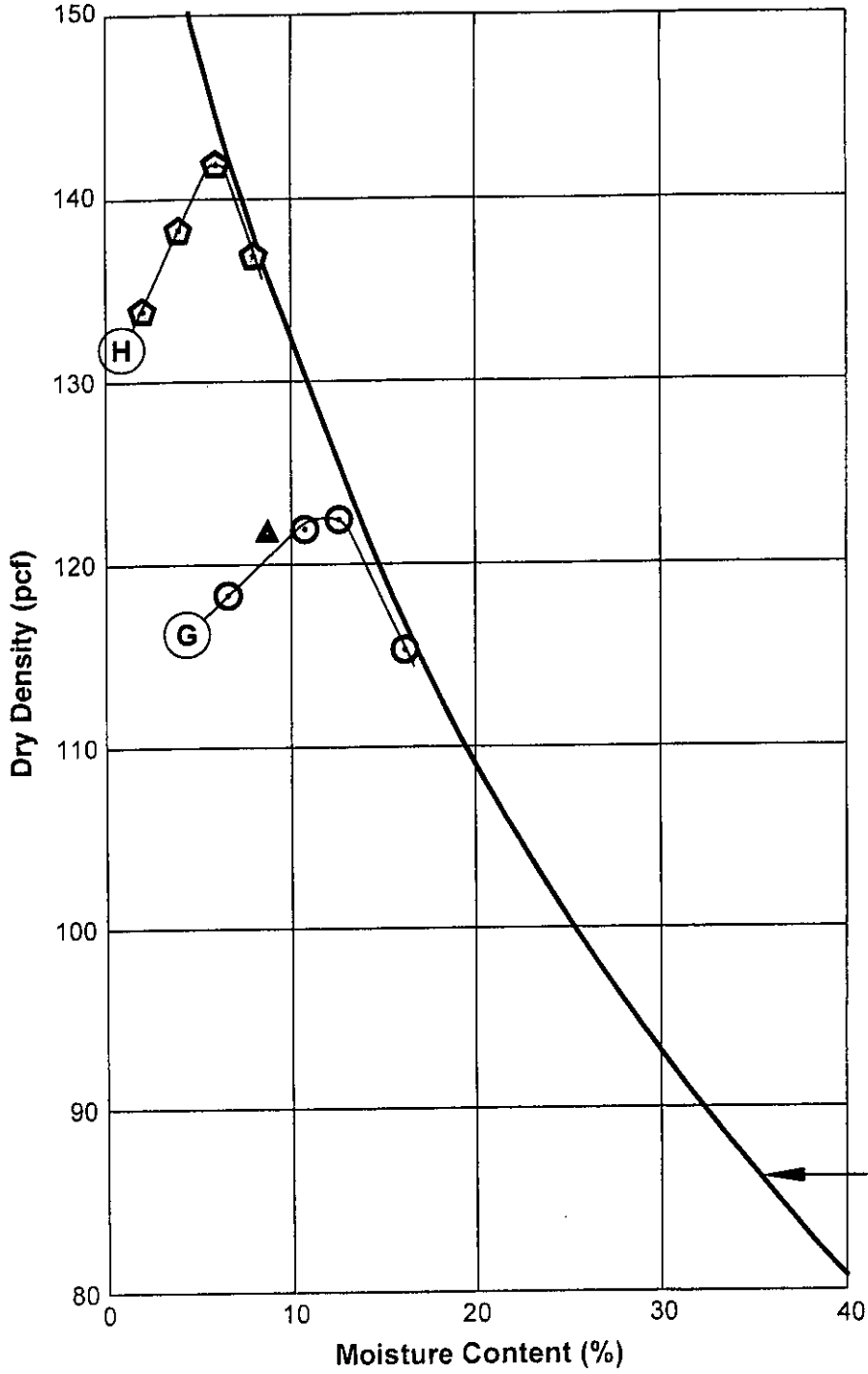
Date: 01/21/14

COMPACTION TEST DATA

KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE
2



TEST METHOD
ASTM D1557-09

Laboratory
Compaction
Point

Compaction
Check
Point

Reference Line -- 100% Saturation
for 2.70 Specific Gravity

Symbol	Sample Source	Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)
G ⊙	On-Site Excavation	YELLOW BROWN SILTY GRAVELLY SAND (SM)	12.0	123
H ⬠	Imported from Canyon Rock	BLUE-GRAY SANDY SILTY GRAVEL (GM) Class 2 - Aggregate Base	6.0	142

Brunsing Associates, Inc.
5468 Skylane Blvd., Suite 201
Santa Rosa, California 95403
Tel: (707) 838-3027

Job No.: 11627.08
Appr.: KAC
Date: 01/21/14

COMPACTION TEST DATA
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE
3

Test (1)	Location (2) South	Location (2) West	Date	Elevation (Feet) (3)	Moisture Content (%)	Dry Density (pcf)	Max. Dry Density (pcf) (4)	Relative Compaction (%) (5)	Remarks
1	508	220	9/19/2011	415.0	22.0	97	114	86	Minimum 90% RC required, (6) see Test # 5
2	325	328	9/19/2011	410.0	18.8	104	114	91	Minimum 90% RC required
3	189	364	9/19/2011	405.0	18.6	96	120	80	Minimum 90% RC required, (6) see Test # 7
4	50	290	9/20/2011	411.0	23.3	96	114	85	Minimum 90% RC required, (6) see Test # 11 and 13
5	504	220	9/20/2011	415.0	25.3	98	114	87	Minimum 90% RC required, (6) see Test # 8
6	333	327	9/20/2011	410.0	19.8	106	114	93	Minimum 90% RC required
7	192	361	9/20/2011	405.0	20.2	97	120	81	Minimum 90% RC required, (6) see Test # 10
8	525	213	9/22/2011	415.8	19.3	105	114	92	Minimum 90% RC required
9	456	243	9/22/2011	412.4	19.0	103	114	91	Minimum 90% RC required
10	197	361	9/22/2011	405.9	13.8	115	120	96	Minimum 90% RC required
11	56	325	9/22/2011	406.0	21.4	103	114	91	Minimum 90% RC required
12	525	206	9/22/2011	418.5	18.5	103	114	90	Minimum 90% RC required
13	326	320	9/22/2011	412.8	18.9	103	114	91	Minimum 90% RC required
14	58	313	9/22/2011	409.2	20.6	103	114	91	Minimum 90% RC required
15	415	270	9/26/2011	116.0	21.1	103	114	91	Minimum 90% RC required
16	287	297	9/26/2011	113.1	21.2	103	114	90	Minimum 90% RC required
17	450	240	9/27/2011	419.5	21.6	103	114	91	Minimum 90% RC required
18	325	301	9/27/2011	416.6	20.7	105	114	93	Minimum 90% RC required
19	214	318	9/27/2011	415.4	19.9	108	114	95	Minimum 90% RC required
20	117	329	9/27/2011	412.6	20.2	104	114	92	Minimum 90% RC required
21	452	258	9/28/2011	417.4	20.0	103	114	91	Minimum 90% RC required
22	277	302	9/28/2011	414.6	20.3	103	114	91	Minimum 90% RC required
23	444	248	9/29/2011	420.9	17.8	103	114	91	Minimum 90% RC required
24	304	263	9/29/2011	419.0	20.5	105	114	93	Minimum 90% RC required
25	104	289	9/29/2011	417.7	19.7	103	114	90	Minimum 90% RC required
26	193	304	10/3/2011	418.0	6.7	137	146	94	Minimum 90% RC required
27	395	265	10/19/2011	417.5	8.7	134	146	92	Minimum 90% RC required
28	181	304	10/19/2011	415.8	10.2	133	146	91	Minimum 90% RC required
29	395	262	10/19/2011	419.8	10.0	134	146	92	Minimum 90% RC required
30	180	300	10/19/2011	418.5	10.3	134	146	92	Minimum 90% RC required
31	64	268	5/8/2012	420.4	20.4	104	114	92	Minimum 90% RC required
32	57	262	5/8/2012	420.4	20.3	105	114	93	Minimum 90% RC required
33	284	160	5/9/2012	421.0	171.0	104	116	90	Minimum 90% RC required
34	194	178	5/9/2012	421.0	21.5	100	110	90	Minimum 90% RC required
35	188	111	5/9/2012	421.0	20.1	100	110	91	Minimum 90% RC required

NOTES:

(1) Suffix S-Subgrade, B-Baserock, SS-Sanitary Sewer, FP

(2) Origin of coordinates: Survey point with elevataion 452.93 at top left hand side of Sheet C3 prepared by Steve Martin Assoicates, dated 10.02.12

(3) Elevation determined using hand levels, and stakes in the field.

(4) Maximum dry densities determined in our laboratory in accordance with ASTM D 1557-09 compaction procedure.

(5) Relative compaction (RC) refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil.

(6) Material was recompacted or removed, replaced, and recompacted.

Brunsing Associates, Inc.
5468 Skylane Blvd, Ste 201
Santa Rosa, CA 95403
(707) 528-6108

Job No.: 11627.08
Appr.: KAC
Date: 01/21/14

SUMMARY OF FIELD DENSITY TESTS
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE 4

Test (1)	Location (2) South	Location (2) West	Date	Elevation (Feet) (3)	Moisture Content (%)	Dry Density (pcf)	Max. Dry Density (pcf) (4)	Relative Compaction (%) (5)	Remarks
36	246	173	5/9/2012	421.9	17.1	102	116	88	Minimum 90% RC required, (6)
37	224	101	5/9/2012	421.8	20.6	101	116	87	Minimum 90% RC required, (6)
38	306	151	5/10/2012	421.8	20.8	97	110	88	Minimum 90% RC required, (6)
39	208	177	5/10/2012	421.9	20.8	101	116	87	Minimum 90% RC required, (6)
40	207	105	5/10/2012	421.7	21.2	102	116	88	Minimum 90% RC required, (6)
41	283	91	5/10/2012	421.9	20.9	97	110	88	Minimum 90% RC required, (6)
42	254	98	5/11/2012	421.5	17.1	113	123	92	Minimum 90% RC required
43	194	112	5/11/2012	421.5	21.4	106	123	86	Minimum 90% RC required, (6) see Test 50
44	268	158	5/11/2012	421.5	17.5	112	123	91	Minimum 90% RC required
45	268	125	5/11/2012	421.6	17.4	113	123	92	Minimum 90% RC required
46	348	147	5/11/2012	421.5	16.4	113	123	91	Minimum 90% RC required
47	305	84	5/11/2012	422.0	17.1	112	123	91	Minimum 90% RC required
48	213	133	5/11/2012	422.0	18.0	111	123	90	Minimum 90% RC required
49	222	158	5/11/2012	421.8	15.2	116	123	94	Minimum 90% RC required
50	195	117	5/14/2012	241.5	16.1	114	123	93	Minimum 90% RC required
51S	273	91	5/14/2012	243.0	15.8	114	123	93	Minimum 90% RC required
52S	191	147	5/14/2012	243.0	15.0	116	123	94	Minimum 90% RC required
53S	310	124	5/14/2012	243.0	16.9	113	123	92	Minimum 90% RC required
54S	63	262	5/14/2012	241.5	5.1	134	140	96	Minimum 95% RC required
55S	329	141	5/15/2012	423.0	15.9	113	123	92	Minimum 90% RC required
56S	171	184	5/15/2012	423.0	15.9	112	123	91	Minimum 90% RC required
57S	69	267	5/18/2012	421.5	6.2	133	140	95	Minimum 90% RC required
58	302	290	5/18/2012	421.0	15.5	114	123	92	Minimum 90% RC required
59S	272	210	5/21/2012	419.5	14.6	109	114	95	Minimum 95% RC required
60S	103	276	5/21/2012	420.0	12.3	121	123	98	Minimum 95% RC required
61S	233	303	5/21/2012	419.2	12.9	123	123	100	Minimum 95% RC required
62S	429	251	5/21/2012	421.1	8.9	119	123	97	Minimum 95% RC required
63S	37	252	5/23/2012	418.0	13.3	112	120	93	Minimum 90% RC required
64	113	54	10/17/2012	425.8	22.6	99	110	90	Minimum 90% RC required
65	266	67	10/17/2012	426.5	22.0	102	110	93	Minimum 90% RC required
66	170	87	10/17/2012	426.8	21.3	102	110	93	Minimum 90% RC required
67	314	50	10/17/2012	426.8	22.7	101	110	92	Minimum 90% RC required
68	261	64	10/17/2012	428.1	23.6	99	110	90	Minimum 90% RC required
69	142	85	10/17/2012	427.6	24.1	99	110	90	Minimum 90% RC required
70	350	74	10/17/2012	424.3	23.2	99	110	90	Minimum 90% RC required

NOTES:

(1) Suffix S-Subgrade, B-Baserock, SS-Sanitary Sewer, FP

(2) Origin of coordinates: Survey point with elevataion 452.93 at top left hand side of Sheet C3 prepared by Steve Martin Assoicates, dated 10.02.12

(3) Elevation determined using hand levels, and stakes in the field.

(4) Maximum dry densities determined in our laboratory in accordance with ASTM D 1557-09 compaction procedure.

(5) Relative compaction (RC) refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil.

(6) Material was recompacted or removed, replaced, and recompacted.

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Job No.: 11627.08
Appr.: KAC
Date: 01/21/14

SUMMARY OF FIELD DENSITY TESTS
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE 5

Test (1)	Location (2) South	Location (2) West	Date	Elevation (Feet) (3)	Moisture Content (%)	Dry Density (pcf)	Max. Dry Density (pcf) (4)	Relative Compaction (%) (5)	Remarks
71	329	52	10/17/2012	428.3	23.5	98	110	89	Minimum 90% RC required, (6) see Test 73
72	209	77	10/17/2012	429.3	23.7	101	110	92	Minimum 90% RC required
73	325	51	10/17/2012	428.3	23.4	100	110	91	Minimum 90% RC required
74	236	68	10/18/2012	430.4	23.8	99	110	90	Minimum 90% RC required
75SS	288	250	10/18/2012	417.5	15.7	99	110	90	Minimum 90% RC required
76SS	176	295	10/18/2012	417.7	12.7	100	110	91	Minimum 90% RC required
77SS	175	281	10/18/2012	419.4	11.5	114	120	95	Minimum 90% RC required
78FP	163	288	10/18/2012	419.4	8.7	123	123	100	Minimum 90% RC required
79PW	154	288	10/18/2012	419.2	8.8	117	123	95	Minimum 90% RC required
80P	134	288	10/18/2012	419.5	8.4	117	123	95	Minimum 90% RC required
81E	92	291	10/18/2012	419.5	8.9	102	110	93	Minimum 90% RC required
82	214	75	10/18/2012	432.0	23.0	99	110	90	Minimum 90% RC required
83	184	79	10/18/2012	432.0	21.6	100	110	91	Minimum 90% RC required
84	293	53	10/18/2012	431.3	21.4	100	110	91	Minimum 90% RC required
85	157	84	10/18/2012	433.0	21.4	99	110	90	Minimum 90% RC required
86	365	109	10/19/2012	423.3	17.1	99	110	90	Minimum 90% RC required
87	136	119	10/19/2012	415.3	23.5	99	110	90	Minimum 90% RC required
88	149	88	10/19/2012	434.5	22.4	99	110	90	Minimum 90% RC required
89	282	51	10/19/2012	434.3	24.1	99	110	90	Minimum 90% RC required
90	323	162	10/19/2012	422.0	15.3	106	116	92	Minimum 90% RC required
91	352	162	10/19/2012	423.6	12.9	106	116	91	Minimum 90% RC required
92	366	135	10/19/2012	423.9	19.9	101	110	92	Minimum 90% RC required
93	191	72	10/19/2012	435.1	23.3	102	110	92	Minimum 90% RC required
94	259	55	10/19/2012	436.3	23.4	101	110	92	Minimum 90% RC required
95	176	75	10/20/2012	439.3	25.1	96	110	87	Minimum 90% RC required, (6) see Test 97
96	281	44	10/20/2012	437.2	18.4	106	116	91	Minimum 90% RC required
97	178	77	10/20/2012	439.2	24.1	99	110	90	Minimum 90% RC required
98	331	38	10/20/2012	438.2	21.1	105	116	90	Minimum 90% RC required
99	206	66	10/20/2012	436.9	23.1	99	110	90	Minimum 90% RC required
100	134	82	10/20/2012	442.3	24.1	99	110	90	Minimum 90% RC required
101	249	59	10/20/2012	440.3	19.1	107	116	92	Minimum 90% RC required
102	353	168	10/20/2012	427.4	12.4	113	116	97	Minimum 90% RC required
103	361	91	10/20/2012	427.5	13.8	110	116	95	Minimum 90% RC required
104	361	125	10/27/2012	428.3	24.1	99	110	90	Minimum 90% RC required
105	247	46	10/27/2012	444.3	24.2	99	110	90	Minimum 90% RC required

NOTES:

(1) Suffix S-Subgrade, B-Baserock, SS-Sanitary Sewer, FP

(2) Origin of coordinates: Survey point with elevataion 452.93 at top left hand side of Sheet C3 prepared by Steve Martin Assoicates, dated 10.02.12

(3) Elevation determined using hand levels, and stakes in the field.

(4) Maximum dry densities determined in our laboratory in accordance with ASTM D 1557-09 compaction procedure.

(5) Relative compaction (RC) refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil.

(6) Material was recompacted or removed, replaced, and recompacted.

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Job No.: 11627.08
Appr.: KKC
Date: 01/21/14

SUMMARY OF FIELD DENSITY TESTS
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE 6

Test (1)	Location (2) South	Location (2) West	Date	Elevation (Feet) (3)	Moisture Content (%)	Dry Density (pcf)	Max. Dry Density (pcf) (4)	Relative Compaction (%) (5)	Remarks
106	138	157	10/27/2012	428.9	23.7	99	110	90	Minimum 90% RC required
107	354	96	10/29/2012	430.8	24.3	99	110	90	Minimum 90% RC required
108	143	183	10/29/2012	428.5	22.9	102	110	92	Minimum 90% RC required
109	216	186	10/30/2012	425.5	21.3	103	110	93	Minimum 90% RC required
110	188	193	10/30/2012	429.0	20.7	104	116	90	Minimum 90% RC required
111	188	249	10/30/2012	423.2	22.1	100	110	91	Minimum 90% RC required
112	300	45	2/28/2013	436.0	28.4	93	110	85	Minimum 90% RC required, (6) see Test 116
113	195	72	2/28/2013	436.0	28.3	92	110	84	Minimum 90% RC required, (6) seeTest 117 and 118
114	346	68	3/27/2013	424.0	17.5	112	116	96	Minimum 90% RC required
115	350	76	3/27/2013	424.0	17.2	109	116	94	Minimum 90% RC required
116	346	68	4/23/2013	438.5	20.2	106	114	93	Minimum 90% RC required
117	250	73	4/23/2013	438.9	21.6	104	114	91	Minimum 90% RC required
118	147	98	4/23/2013	439.1	20.4	104	114	91	Minimum 90% RC required
119	330	236	4/23/2013	424.0	21.9	100	110	91	Minimum 90% RC required
120	300	193	4/23/2013	426.2	21.5	101	110	92	Minimum 90% RC required
121	161	81	5/1/2013	440.2	17.2	103	114	90	Minimum 90% RC required
122	228	68	5/1/2013	439.6	17.5	103	114	90	Minimum 90% RC required
123	119	291	5/22/2013	419.5	4.0	132	142	93	Minimum 90% RC required
124	156	304	5/22/2013	419.5	5.0	130	143	91	Minimum 90% RC required
125	205	294	5/22/2013	419.5	7.0	133	143	93	Minimum 90% RC required
126	253	278	5/22/2013	419.5	5.0	136	143	95	Minimum 90% RC required
127	298	270	5/22/2013	419.0	5.0	134	143	94	Minimum 90% RC required
128	373	263	5/22/2013	420.5	5.0	133	143	93	Minimum 90% RC required
129	420	249	5/22/2013	421.5	4.0	135	143	95	Minimum 90% RC required
130	146	144	5/30/2013	442.0	13.0	106	116	92	Minimum 90% RC required
131	148	155	5/30/2013	442.0	13.0	107	116	93	Minimum 90% RC required

NOTES:

(1) Suffix S-Subgrade, B-Baserock, SS-Sanitary Sewer, FP

(2) Origin of coordinates: Survey point with elevataion 452.93 at top left hand side of Sheet C3 prepared by Steve Martin Assoicates, dated 10.02.12

(3) Elevation determined using hand levels, and stakes in the field.

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SUMMARY OF FIELD DENSITY TESTS
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE 7

Brunsing Associates, Inc.

December 23, 2011 11627.08

Kistler Vineyards
C/o: Richard Schuh
Nielson-Schuh Architects
1346 Legs Lane
Sonoma, CA 95476

Dear Mr. Schuh:

Progress Report
Geotechnical Engineering Services
Kistler Vineyards – Pozzi Ranch Winery
Sonoma County, California

Introduction

This report summarizes the results of our geotechnical engineering services in connection with the initial phase of construction for the subject project. Brunsing Associates, Inc. (BAI) previously performed a geotechnical investigation for the project the results of which were presented in a report dated August 16, 2011 (the GIR).

The project will include an office, fermentation/bottling/barrel building (FBB), mechanical building and 50,000 gallon water tank. Excavations for the FBB building will extend up to 25 feet below grade. It was decided to perform this work in the Fall when annual groundwater levels tend to be at their lowest and thus minimize groundwater impacts on construction.

We obtained groundwater level measurements from piezometers installed during our geotechnical investigation. Groundwater measurements from these piezometers are summarized on Table 1. Piezometer locations in relation to the planned FBB building are shown on Figure 1.

Excavation and Fill Embankment Construction

The excavation and grading work described in this report was performed by Rege Construction Inc., based on drawings prepared by Steve Martin Associates and dated September 13, 2011 (the drawings). The GIR provided the guidelines for the work performed. The first phase of construction was performed between September and October 2011. Our services consisted of intermittent observations of the grading operations, including excavation of keyways, subdrain installation, and moisture conditioning and compaction of on-site soils.

BAI's engineering geologist and geotechnical engineer intermittently observed the work, including keyway excavation, and fill placement and compaction of on-site soil for the embankment west of the FBB building. BAI observed the placement of the keyway subdrain and cleanouts prior to placement of compacted fill. On the basis of our observations, keyway excavation and subdrain placement was satisfactorily performed.

Samples of on-site soils were tested in our laboratory in accordance with the ASTM D1557 test procedure to estimate its optimum moisture content and maximum dry density. Laboratory compaction test data are presented on Plate 1. BAI performed field density tests (FDTs) to check that the required 90 percent relative compaction was achieved.[1] A summary of FDTs is presented on Plate 2.

Cutoff Drain Installation

The GIR recommended that groundwater levels beneath the FBB building be permanently lowered to mitigate the potential for liquefaction to occur[2]. Per the drawings, this will be accomplished via a cutoff drain.

The cutoff drain was installed between October 18 and 26, 2011. Shortly thereafter, flow measurements were obtained from the north and south drain outfalls (Figure 1). Flow measurements obtained to date are summarized on Table 2. To confirm its effectiveness, on November 9, 2011, BAI installed four piezometers at the approximate locations shown on Figure 1.

Water level measurements to date, along with the target water level elevation , 411 Mean Sea Level, beneath the FBB building, are presented on Table 3. As shown, water levels are approaching the target levels. It will be important to properly perform frequent water level measurements during the winter months to check on this progress. If water levels do not achieve the target levels, it may be necessary to install another 'leg' of the cutoff trench, one trending east-west from the twin cleanouts at the approximate center of the north-south cutoff drain to daylight (Figure 1). We understanding that Kistler Vineyard staff with assistance from Mr. Sam Turner of Gracie Construction will be performing water level measurements weekly and forwarding this information to BAI for review.

[1] Relative compaction refers to the in-place dry density of the soil expressed as a percentage of the maximum dry density of the same soil.

[2] Liquefaction results in a loss of shear strength and potential soil volume reduction in saturated sandy, silty, silty/clayey, and also coarse gravelly soils below the groundwater table from earthquake shaking. The occurrence of this phenomenon is dependent on many factors, including the intensity and duration of ground shaking, the soil age, density, particle size distribution, and position of the groundwater table.

If you have any questions, please contact us at (707) 838-3027

Sincerely yours,

Keith Colorado, P.E., G.E.
Senior Engineer

J. Erich Rauber, P.E., G.E.
Principal Engineer

KAC/JER/ces

Enclosures

cc: Dave Jankowski
Steve Kistler
Steve Martin
Sam Turner

Tables

Table 1. Piezometers During Geotechnical Investigation

Piezo No.	K-1		K-2		CPT-2	
TOC Elev	442.60		438.06		446.39	
Date	Depth (ft)	Elevation	Depth (ft)	Elevation	Depth (ft)	Elevation
5/12/2011	--	--	--	--	17.20	429.19
5/20/2011	--	--	--	--	17.55	428.84
6/16/2011	18.00	424.60	16.50	421.56	18.00	428.39
6/27/2011	18.20	424.40	16.60	421.46	19.10	427.29
7/10/2011	19.23	423.37	19.02	419.04	19.65	426.74
7/28/2011	19.95	422.65	19.55	418.51	20.36	426.03
9/1/2011	20.96	421.64	20.27	417.79	--	--

Elevation is in feet above Mean Sea Level
TOC = Top of Casing

Table 2. Summary of Flow Rate Measurements from Cutoff Drain Outfalls

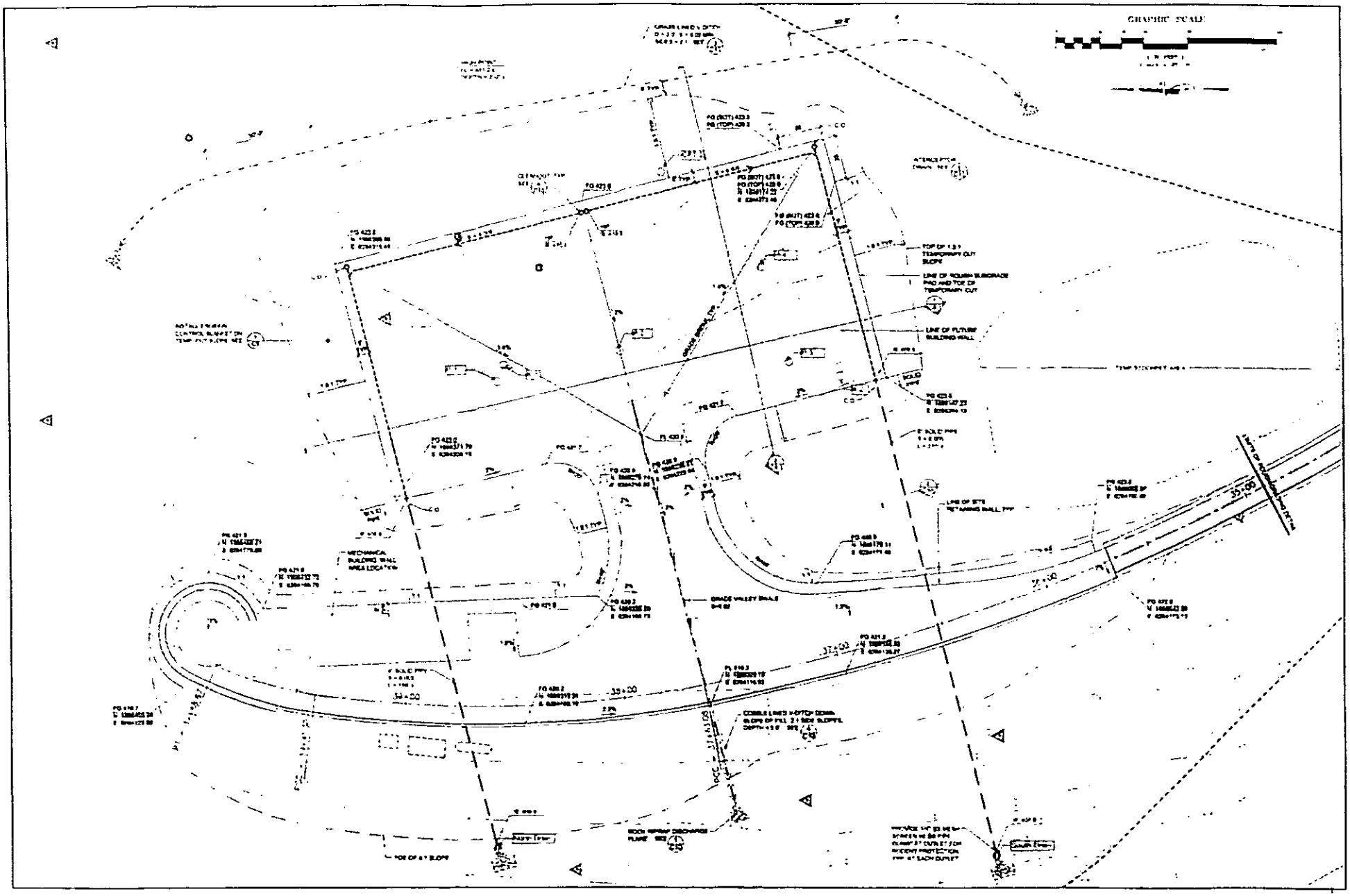
Date	Flow Rate (gal/min)	
	North Drain	South Drain
10/18/2007	3.3	--
10/25/2007	3.4	7.3
11/8/2007	2.0	4.0
11/13/2007	2.0	4.0
11/16/2007	1.5	2.5
11/30/2007	1.25	2.25
12/4/2007	1.25	2.5
12/7/2007	1.5	2.75
12/11/2007	1.5	2.75

Table 3. Piezometers During Construction Services

Piezo No.	P-1		P-2		P-3		P-4	
TOC Elev	424.35		424.35		424.35		424.35	
Date	Depth (ft)	Elev	Depth (ft)	Elev	Depth (ft)	Elev	Depth (ft)	Elev
11/14/2011			10.4	413.95				
12/15/2011	12.71	411.64	11.95	412.40	13.1	411.25	12.8	411.55

Elevation is in feet above Mean Sea Level
TOC = Top of Casing

Figures



REFERENCE:
Rough Road and Grading Plans.
prepared by Steve Martin Associates.
dated 9/13/11

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Tel: (707) 838-3027

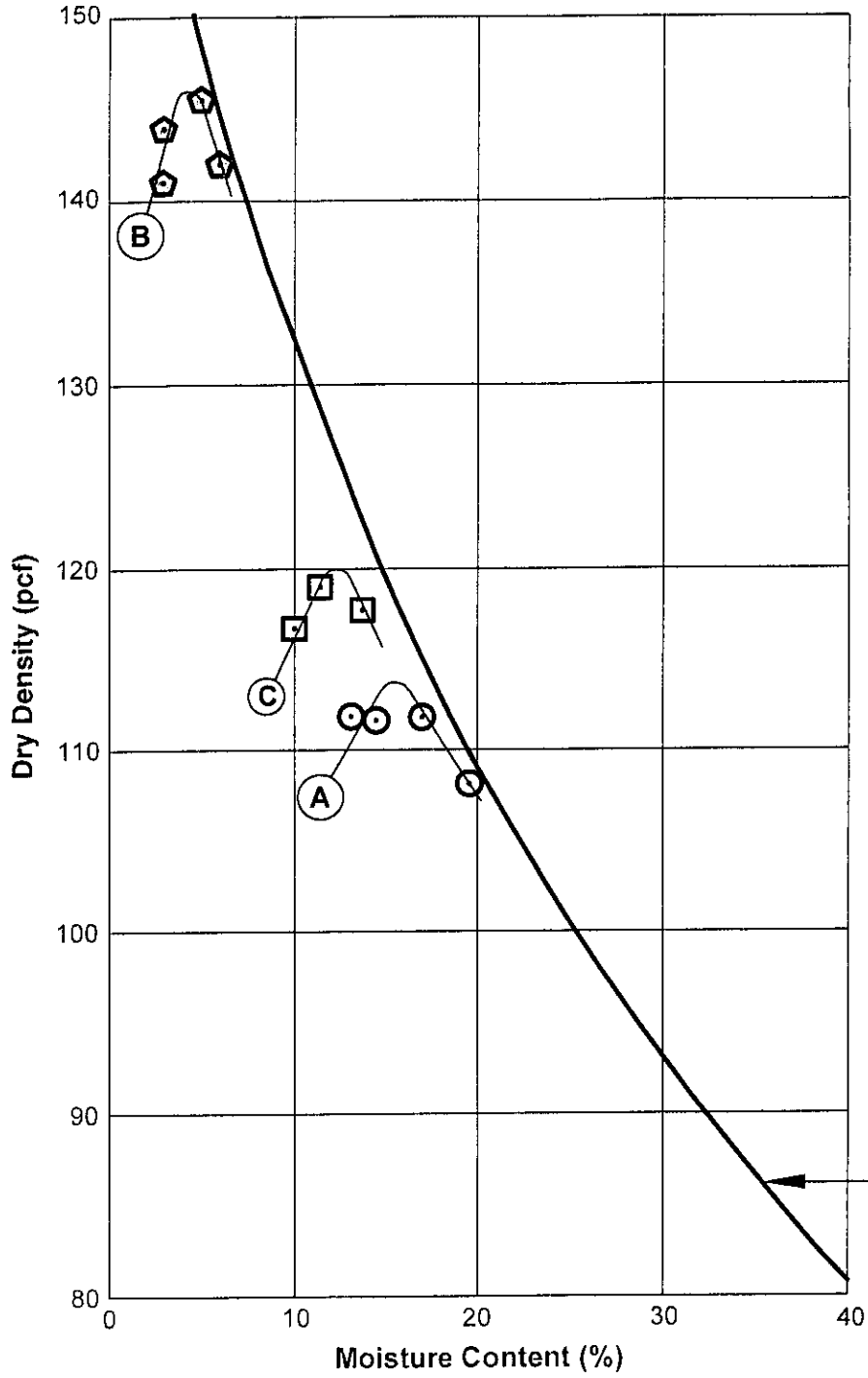
Job No.: 11627.08
Appr.:
Date: 12/23/11

PIEZOMETER & DRAIN LOCATIONS

KISTLER - POZZI RANCH
14701 Bodega Highway
Sebastopol, California

FIGURE 1

Plates



TEST METHOD
ASTM D1557-09

Laboratory
Compaction
Point

Symbol	Sample Source	Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)
A	On-Site Excavation	YELLOW BROWN SILTY SAND (SM)	15.5	114
B	On-Site Excavation	GRAY SILTY SANDY GRAVEL (GM)	4.3	146
C	On-Site Excavation	YELLOW BROWN SILTY SAND (SM)	12.3	120

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COMPACTION TEST DATA
KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLATE
1

Test	Location (1) Station	Left / Right	Date	Elevation (Feet) (2)	Moisture Content (%)	Dry Density (pcf)	Max. Dry Density (pcf) (3)	Relative Compaction (%) (4)	Remarks
1	35+31	5L	9/19/2011	415.0	22.0	97	114	86	Minimum 90% RC required, (5) see Test # 5
2	37+34	42L	9/19/2011	410.0	18.8	104	114	91	Minimum 90% RC required
3	38+66	62L	9/19/2011	405.0	18.6	96	120	80	Minimum 90% RC required, (5) see Test # 7
4	40+02	18L	9/20/2011	411.0	23.3	96	114	85	Minimum 90% RC required, (5) see Test # 11 and 13
5	35+34	2L	9/20/2011	415.0	25.3	98	114	87	Minimum 90% RC required, (5) see Test # 8
6	37+26	42L	9/20/2011	410.0	19.8	106	114	93	Minimum 90% RC required
7	38+63	60L	9/20/2011	405.0	20.2	97	120	81	Minimum 90% RC required, (5) see Test # 10
8	35+11	1L	9/22/2011	415.8	19.3	105	114	92	Minimum 90% RC required
9	35+89	9L	9/22/2011	412.4	19.0	103	114	91	Minimum 90% RC required
10	38+57	59L	9/22/2011	405.9	13.8	115	120	96	Minimum 90% RC required
11	39+82	45L	9/22/2011	406.0	21.4	103	114	91	Minimum 90% RC required
12	35+09	1L	9/22/2011	418.5	18.5	103	114	91	Minimum 90% RC required
13	37+30	34L	9/22/2011	412.8	18.9	103	114	91	Minimum 90% RC required
14	39+84	33L	9/22/2011	409.2	20.6	103	114	91	Minimum 90% RC required
15	36+35	12L	9/26/2011	116.0	21.1	103	114	91	Minimum 90% RC required
16	37+66	5L	9/26/2011	113.1	21.2	103	114	90	Minimum 90% RC required
17	35+93	3R	9/27/2011	419.5	21.6	103	114	91	Minimum 90% RC required
18	37+39	15L	9/27/2011	416.6	20.7	105	114	93	Minimum 90% RC required
19	38+43	18L	9/27/2011	415.4	19.9	108	114	95	Minimum 90% RC required
20	39+35	32R	9/27/2011	412.6	20.2	104	114	92	Minimum 90% RC required
21	35+99	15L	9/28/2011	417.4	20.0	103	114	91	Minimum 90% RC required
22	37+73	8L	9/28/2011	414.6	20.3	103	114	91	Minimum 90% RC required
23	36+00	0	9/29/2011	420.9	17.8	103	114	91	Minimum 90% RC required
24	37+42	32R	9/29/2011	419.0	20.5	105	114	93	Minimum 90% RC required
25	39+52	2R	9/29/2011	417.7	19.7	103	114	90	Minimum 90% RC required
26	38+58	2L	10/3/2011	418.0	6.7	137	146	94	Minimum 90% RC required
27	36+52	2L	10/19/2011	417.5	8.7	134	146	92	Minimum 90% RC required
28	38+75	3L	10/19/2011	415.8	10.2	133	146	91	Minimum 90% RC required
29	36+52	2R	10/19/2011	419.8	10.0	134	146	92	Minimum 90% RC required
30	38+75	2R	10/19/2011	418.5	10.3	134	146	92	Minimum 90% RC required

NOTES:

(1) Origin of coordinates: Stationing as shown on Road & Rough Grading Plan and right or left of center line by Steve Martin Associates, dated 09.13.11.

(2) Elevation determined using hand levels, and stakes in the field.

(3) Maximum dry densities determined in our laboratory in accordance with ASTM D 1557-09 compaction procedure.

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Job No.: 11627.08
Appr.: KAC
Date: 12/23/11

SUMMARY OF FIELD DENSITY TESTS

KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Highway
Sebastopol, California

PLAT 2

Brunsing Associates, Inc.

April 6, 2012 11627.08

Kistler Vineyards
C/o: Richard Schuh
Nielson-Schuh Architects
1346 Legs Lane
Sonoma, CA 95476

Dear Mr. Schuh:

Progress Report
Geotechnical Engineering Services during Construction
Kistler Vineyards – Pozzi Ranch Winery
Sonoma County, California

Introduction

This letter presents our conclusions and recommendations regarding the performance of the dewatering system for the planned fermentation/bottling/barrel building (FBB) in connection with the subject project. The project will include an office building, the FBB, a mechanical building and a 50,000 gallon water tank. Brunsing Associates, Inc. (BAI) previously performed a geotechnical investigation for the project the results of which were presented in a report dated August 16, 2011.

Background

The initial phase of construction included excavation for the FBB pad, construction of a fill embankment, and installation of a cutoff drain. The cutoff drain was installed to lower and maintain groundwater levels a sufficient distance below FBB foundations and thus minimize the potential of liquefaction-induced settlement and lateral spreading. Shortly after the installation, piezometers were installed to monitor the effectiveness of the cutoff drain. BAI provided oversight and testing for the initial phase of construction, and presented the results in a report dated December 23, 2011.

Rege Construction completed installation of the cutoff drain on October 26, 2011; BAI installed four piezometers on November 9, 2011. BAI initiated water level measurements in the piezometers. This effort was continued under the direction of Sam Turner of Gracie Construction. BAI reviewed the monitoring data, and performed occasional independent readings to confirm the results. Water level measurements are summarized in Figure 1. Locations of piezometers and subdrain outlets are presented on Figure 2.

Results and Observations

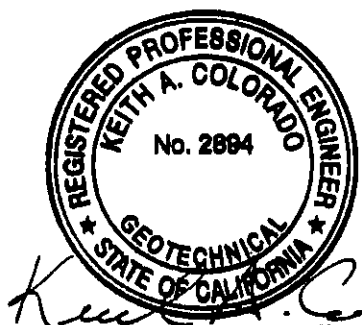
The goal of the cutoff drain was to achieve a permanent lowering of the groundwater table beneath the FBB to 411 feet mean sea level. If this goal could be achieved and maintained during an entire winter, then no additional measures to lower the groundwater would be necessary. To check the adequacy of the cutoff drain, we were hoping for an above average or at least average rainfall: we didn't get it. Annual precipitation in 2010 and 2011 was 50 inches and 40 inches, respectively. In 2012, only 25 inches of precipitation has accumulated thus far with much of it coming in March (11.80 inches). Precipitation data since the beginning of October 2011 is shown on Figure 1. On March 1st, groundwater elevations were essentially at the target elevation of 411. During March, despite over 11 inches of precipitation, water levels have risen only two inches.

Conclusions and Recommendations

Based on the monitoring results, we conclude the cutoff wall is preforming as intended. Thus, the need for additional/deeper cutoff drains is not necessary. We recommend that, if practicable, piezometers P-2 or/and P-4 be maintained and, along with flow rates from the cut off drain outfalls, be periodically monitored over the next several years. If groundwater rises to within 5 feet of the FBB finish slab surface, action should be taken. Such action should include checking that the cutoff drain piping is free of blockages. If water levels remain high, mitigation methods, such as horizontal drains should be considered.

If you have any questions, please contact us at (707) 838-3027.

Sincerely yours,



Keith Colorado, P.E., G.E.
Senior Engineer

J. Erich Rauber, P.E., G.E.
Principal Engineer

KAC/JER/ces
Enclosures

cc: Dave Jankowski, jesengineering@comcast.net
Steve Kistler, 4707 Vine Hill Road, Sebastopol, CA 95472
Steve Martin, steve@smassociates.net
Sam Turner, sam@gracieconstruction.com

Tables

Table 1. Summary of Flow Rate Measurements from Cutoff Drain Outfalls

Date	Flow Rate (gal/min)	
	North Drain	South Drain
10/19/11	3.3	--
10/26/11	3.4	7.3
11/9/11	2.0	4.0
11/14/11	2.0	4.0
12/1/11	1.3	2.3
12/5/11	1.3	2.5
12/8/11	1.5	2.8
12/12/11	1.5	2.8
12/15/11	1.3	2.5
12/22/2011	1.0	2.5
12/26/2011	1.0	3.0
12/29/2011	1.0	2.0
1/2/2012	0.8	2.0
1/9/2012	0.7	1.6
1/9/2012	0.75	2
1/16/2012	0.75	2
1/30/2012	0.75	1.75
2/20/2012	0.5	1.5
3/5/2012	0.75	1.5
3/14/2012	0.75	1.5
3/19/2012	0.75	1.5
3/27/2012	0.5	1.5
3/28/2012	0.54	1.42
3/31/2012	0.5	1.5
4/2/12	0.5	1.5
4/3/12	0.5	1.5

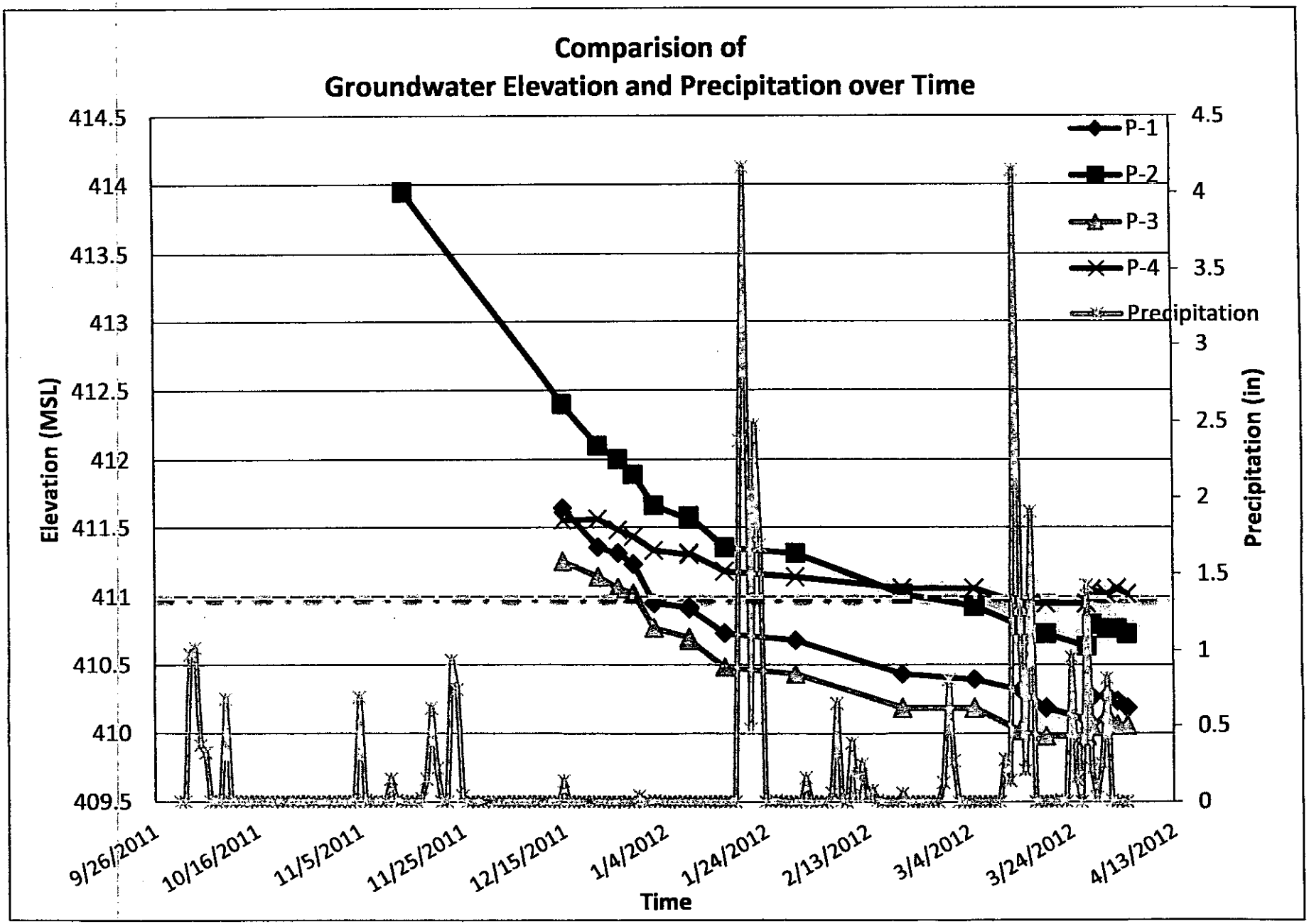
Table 2. Piezometers During Construction Services

Piezo No.	P-1	P-2	P-3	P-4
TOC Elev	424.35	424.35	424.35	424.35
Date	Elevation	Elevation	Elevation	Elevation
11/14/2011		413.95		
12/15/2011	411.64	412.40	411.25	411.55
12/22/2011	411.35	412.10	411.14	411.56
12/26/2011	411.31	412.00	411.06	411.48
12/29/2011	411.23	411.89	411.02	411.43
1/2/2012	410.95	411.66	410.77	411.33
1/9/2012	410.92	411.56	410.70	411.30
1/9/2012	410.91	411.58	410.68	411.31
1/16/2012	410.73	411.35	410.48	411.18
1/30/2012	410.68	411.31	410.43	411.14
2/20/2012	410.43	411.02	410.18	411.06
3/5/2012	410.39	410.93	410.18	411.06
3/14/2012	410.31	410.79	410.02	410.95
3/19/2012	410.18	410.73	409.98	410.95
3/27/2012	410.10	410.64	409.98	410.95
3/28/2012	410.26	410.80	410.05	411.05
3/31/2012	410.27	410.77	410.14	411.02
4/2/12	410.23	410.77	410.06	411.06
4/4/12	410.18	410.73	410.06	411.02

Elevation is in feet above Mean Sea Level
TOC = Top of Casing

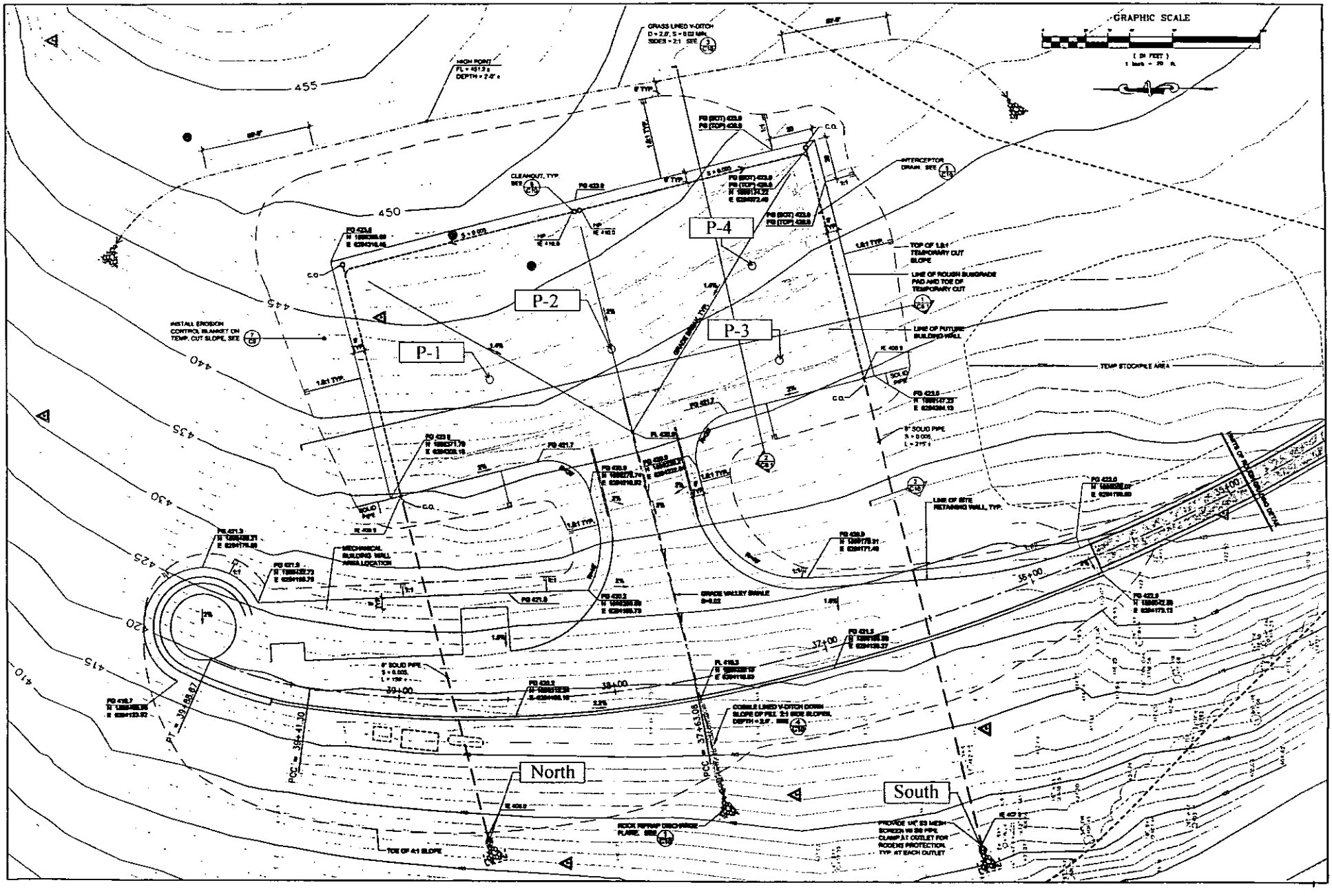
Figures

FIGURE 1



Brunsing Associates, Inc.

Kistler water monitoring Brunsing Edits.xlsx



REFERENCE:
Rough Road and Grading Plans,
prepared by Steve Martin Associates,
dated 9/13/11

Brunsing Associates, Inc.
5468 Skylane Blvd., Suite 201
Santa Rosa, California 95403
Tel: (707) 838-3027

Job No.: 11627.08
Appr.:
Date: 04/06/12

PIEZOMETER & DRAIN LOCATIONS
KISTLER - POZZI RANCH
14701 Bodega Highway
Sebastopol, California

FIGURE 2

Brunsing Associates, Inc.

June 12, 2012 11627.08

Kistler Vineyards
Mr. Richard Schuh
Nielsen – Schuh Architects
1346 Legs Lane
Sonoma, CA 95476

Dear Mr. Schuh:

Progress Report
Observations During Foundation Construction
Geotechnical Engineering Services
Kistler Vineyards – Pozzi Ranch Winery
Sonoma County, California

This progress report summarizes the geotechnical observation that Brunsing Associates, Inc. (BAI), has performed for the fermentation/bottling barrel building (FBB). The project site is located at 14701 Bodega Highway, Sonoma County, California.

On May 16 and 18, 2012, BAI observed the foundation excavations for the FBB. The foundation excavations penetrated into compacted and natural supporting material and conformed to the project plans and our recommendations.

Please contact us if you have questions at (707) 838-3027

Sincerely yours,

Keith A. Colorado
Geotechnical Engineer - 2894

cc: Sam Turner, Gracie Construction, Inc., sam@gracieconstruction.com

Brunsing Associates, Inc.

July 25, 2013 11627.08

Kistler Vineyards
C/o: Richard Schuh
Nielson-Schuh Architects
1346 Legs Lane
Sonoma, CA 95476

Dear Mr. Schuh:

Progress Report
Geotechnical Engineering Services during Construction
Kistler Vineyards – Pozzi Ranch Winery
Sonoma County, California

Introduction

This report summarizes the observation and testing services Brunsing Associates, Inc. (BAI), has performed during construction for the Kistler Vineyards – Pozzi Ranch Winery Building. The project site is located at 14701 Bodega Highway, Sonoma County, California. BAI previously prepared the following report and letters:

- Geotechnical Investigation, dated August 16, 2011
- Plan Review Conclusions, dated August 16, 2011
- Geotechnical Plan Review, dated September 14, 2011
- Progress Report, dated December 23, 2011
- Geotechnical Plan Review, dated February 6, 2012
- Progress Report, dated April 6, 2012
- Geotechnical Recommendations for Cut Pad, dated April 26, 2012
- Progress Report, Observations During Foundation Construction, dated June 12, 2012

Conclusions

Based upon the results of our intermittent on-site observations and field and laboratory testing, we conclude that the geotechnical related aspects of the work completed to date have been performed in substantial accordance with the intent of the project guidelines. The foundation excavations are suitable for support of the winery buildings.

These observations and field and laboratory testing for the project were performed in substantial accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, either expressed or implied, is provided as to the conclusions and professional advice presented in this report. Our conclusions are based upon reasonable geotechnical engineering interpretation of available data.

BAI is currently preparing a final report with detailed observations and summary of our laboratory and field test results.

If you have any questions, please contact us at (707) 838-3027.

Sincerely yours,

Keith Colorado, P.E., G.E.
Senior Engineer

KAC/kac

cc: Steve Kistler, 4707 Vine Hill Road, Sebastopol, CA 95472
Sam Turner, sam@gracieconstruction.com

SMA
130 South Main Street, Suite 201
Sebastopol, CA 95472
707-824-9730
707-824-9707 (fax)

606 Alamo Pintada Road #3-221
Solvang, CA 93463
805-541-9730

HYDROLOGY & HYDRAULIC

CALCULATIONS

For

KISTLER VINEYARDS WINERY

14701 Bodega Highway
Sonoma County, CA
APN 026-120-006

Sitework Improvements

Project No. 2009006

July 1, 2011
Revised April 5, 2013
Revised August 2, 2013
Revised September 25, 2013

By

SMA
130 South Main St. Suite 202
Sebastopol, CA
707-824-9730

Drainage Narrative

The project description consists of sitework improvements related to the construction of the new winery facility and entrance driveway. The access driveway to the site has recently been constructed under a separate grading permit. The winery building is partially buried and the grading design allows for the natural contouring to be replaced after building construction.

The uphill surface flow from the building will be intercepted in a grass line v-ditch and outlet to the surface on the north side and to a drop inlet on the south side. The building roof will discharge to two downspouts at the northwest and southwest corners of the roof. The downspouts discharge to a rock drain gallery that has a catch basin under the gravel. This drainage is then conveyed in a below ground storm drain system that outlets downstream beyond the toe of fill.

All drainage follows the original drainage overland direction and downstream points. Note that Subarea "D" and "E" run adjacent to the new vineyard since the vineyard has a separately installed storm drain system that picks up the watershed within the vineyard.

The storm water conveyance systems are design for 100 year storm event and the area has an annual precipitation of 40 inches per year. All v-ditches are to be grass lined utilizing North American Green 350 erosion control blanket over straw and seeding. This lining will prevent erosion of the soil and will filtrate sediment along the entire length. The grass lining described is an effective and permanent BMP. The rip-rap discharge flares will provide further filtration, if needed, slow the velocity down and spread the outlet flow. This, of course, will reduce potential downstream or down gradient erosion.

Pre & Post-Development Flow

As requested by Drainage Review, the Pre & Post-Development analysis for the 85th Percentile 24-hour storm has been completed. Per the recommendation of Alex Rosas of PRMD, the City of Santa Rosa Stormwater Calculator has been used in this analysis.

The surface of the pre-development condition at the site was pasture grass lightly grazed periodically with sheep. The post-development condition of the site includes a winery building, concrete receiving area and gravel driveway. 50% of the winery building is buried underground with approximately 5' - 10' of cover. The finish grading over the building and adjacent to the structure will be brought back to the pre-development contours. The disturbed areas will be re-seeded with pasture grass. Composite CN have been calculated for the post-development conditions oppose to using the general selections. The soil type in the site area is sandy clay loam soil and determined by hydrometer testing. Based on percolation tests in the area, the average percolation rate (horizon 0 - 36") is 9.0 minutes per inch, or 6.6 inches per hour. Therefore, the selection of "greater than 0.30 inches/hour infiltration rate" is being used for the soil type.

Two subareas were analyzed using the City of SR Stormwater Calculator: Area A & Area B. Area "A" includes the winery and administration building and Area "B" includes the road to the administration building. As shown in the calculations, there is zero volume capture for both areas and no change in the pre & post-development 85th Percentile 24-hour storm event flows.

HYDROLOGY & HYDRAULIC CALCULATIONS

Steve Martin Assoicates

Project: Kistler Vineyards Winery

Project No.: 2010006

By: SMM

HYDROLOGY CALCLUATIONS

Revised

Date: 8/2/13

Storm Frequency: 100

Tributary: 1 Annual Rainfall = 40"

Point of Conc.	Area	Elev.	Distance	Slope	V	T_c T_{travel}	T_c T_{total}	I	K	C	Area	$Area_{total}$	KAC	Sum (KAC)	Q	Design Dia.	Comments
1	A	18	320	0.056		7	7	3.63	1.35	0.45	0.47	0.47	0.286	0.286	1.04	8" SD	D/d=.41, n=.011
2	B	4.2	75	0.056	7.7	0.162	7.2	3.58	1.35	0.9	0.13	0.6	0.158	0.443	1.59	8" SD	D/d=.53, n=.011
3	C	7.5	175	0.043	8.7	0.335	7.5	3.50	1.35	0.9	0.03	0.63	0.036	0.480	1.68	8" SD	D/d=.56, n=.011
4	D	2.5	44	0.057	8.8	0.083	7.6	3.48	1.35	0.45	1	1.63	0.608	1.087	3.78	V-ditch & 12" SD	
4	E	2.5	44	0.057	8.8	0.083	7.7	3.46	1.35	0.45	0.35	1.98	0.213	1.300	4.49	12" SD	D/d=.7, n=.011
5	none	9	72	0.125	4.8	0.25	7.9	3.40	1.35	0	0	1.98	0.000	1.300	4.42	12" SD	D/d=.7, n=.011
6	J	3	174	0.017	4.8	0.604	8.5	3.27	1.35	0.9	0.191	2.171	0.232	1.532	5.01	18" SD	D/d=.22, n=.011
7	Trib 2 & K	4	110	0.036	7.1	0.258	8.8	3.22	1.35	0.81	0.48	2.651	0.525	2.057	6.62	18" SD	D/d=.25, n=.011

Pipe hydraulic calculations and sizing by Curtis & Callahan Circular Slide Wheel based on Mannings Formula

Tributary: 2

Point of Conc.	Area	Elev.	Distance	Slope	V	T_c T_{travel}	T_c T_{total}	I	K	C	Area	$Area_{total}$	KAC	Sum (KAC)	Q	Design Dia.	Comments
1	F	10	115	0.087		7	7	3.63	1.35	0.9	0.13	0.13	0.158	0.158	0.57	8" SD	D/d=.34, n=.011
2	G	2.8	93	0.030	5.8	0.267	7.3	3.55	1.35	0.9	0.03	0.16	0.036	0.194	0.69	8" SD	D/d=.38, n=.011
3	H2	4.1	55	0.075	6.2	0.148	7.4	3.52	1.35	0.9	0.01	0.17	0.012	0.207	0.73	8" SD	D/d=.28, n=.011
4	I	1.4	13	0.108	9.5	0.023	7.4	3.51	1.35	0.45	0.1	0.27	0.061	0.267	0.94	12" SD	D/d=.32, n=.011
5	none	18	86	0.209	4.8	0.299	7.7	3.44	1.35	0	0	0.27	0.000	0.267	0.92	12" SD	

Pipe hydraulic calculations and sizing by Curtis & Callahan Circular Slide Wheel based on Mannings Formula

Tributary: 3

Steinert Martin Assoicates

Conc.	Area	Elev.	Distance	Slope	V	T_c T_{travel}	T_{total}	I	K	C	Area	$Area_{total}$	KAC	Sum (KAC)	Q	Design Dia.	Comments
1	M & H1	20	140	0.143		7	7	3.63	1.35	0.46	0.43	0.43	0.267	0.267	0.97		Grass V-ditch

KISTLER VINEYARDS SMA

Hydraulic Calculations

	A	B	C	D	E	F
1	**KISTLER VINEYARDS WINERY**				**DATE:**	**9/25/13**
2	**HYDRAULIC CALCULATIONS**				**JOB NO.**	**2009006**
3						
4	**TRIBUTARY #1 V-Ditches**					
5	Point of Concetration	To #1				
6						
7	Q (cfs)	1.04				
8	Roughness (n)	0.02	straight uniform grass lined			
9	Side Slopes (Z:1)	3				
10	K	2.71				
11	Slope	0.01	Mannings Formula (Brater-King)			
12	Calculated Depth (ft.)	0.38	"=POWER(B7*B8/(B10*(SQRT(B11))),0.375)"			
13	Area (sf)	0.44	"=B9*POWER(B12,2)"			
14	Velocity (ft/sec)	2.38	"=B7/B13"			
15						
16	Point of Concetration	Area D to #4				
17						
18	Q (cfs)	2.2	(Q=1.35x.45x3.63x1.0)			
19	Roughness (n)	0.04	straight uniform grass lined			
20	Side Slopes (Z:1)	2				
21	K	1.74				
22	Slope	0.01				
23	Calculated Depth (ft.)	0.77	OK - D=2.0'			
24	Area (sf)	1.20				
25	Velocity (ft/sec)	1.83	"=B7/B13"			
26						
27	Point of Concetration	Area E to #4				
28						
29	Q (cfs)	0.77	(Q=0.35x.45x3.63x1.0)			
30	Roughness (n)	0.02	straight uniform grass lined			
31	Side Slopes (Z:1)	2				
32	K	1.74				
33	Slope	0.03				
34	Calculated Depth (ft.)	0.33	OK - D=2.0'			
35	Area (sf)	0.21				
36	Velocity (ft/sec)	3.58				
37						
38	**TRIBUTARY #3 V-Ditches**					
39	Point of Concetration	Area M & H1				
40						
41	Q (cfs)	0.97	(Q=0.35x.45x3.63x1.0)			
42	Roughness (n)	0.02	straight uniform grass lined			
43	Side Slopes (Z:1)	2				
44	K	1.74				
45	Slope	0.01				
46	Calculated Depth (ft.)	0.44	OK - D=2.0'			
47	Area (sf)	0.39				
48	Velocity (ft/sec)	2.51				

PRE & POST-DEVELOPMENT

CALCULATIONS

PERCOLATION TESTING EXCERPT

STORM WATER CALCULATOR

Project:	Kistler Vineyards Winery
Address/Location:	14701 Bodega Highway
Designer:	Steve Martin, P.E.
Date:	September 24, 2013
Inlet Number/Tributary Area/BMP:	Area A

NOTE: In order for this calculator to function properly macros must be enabled.

Physical Tributary Area that drains to Inlet/BMP = **433,000** ft²

This portion of the Storm water Calculator is designed to account for pollution prevention measures implemented on site. Additional information and description of these measures can be found in the Fact Sheets in Appendix F and in Chapter 4 of the narrative.

Disconnected Roof Drains [1]

Input:

Select disconnection condition: **Runoff is directed to dispersal trench or dry well**

Condition Factor = **1**

Method 1: Based on the total rooftop drainage area - to be used if rooftop information is known.

Input:

Enter amount of rooftop area that drain to disconnected downspouts = **4,000** ft²

Rooftop Area Factor = **0.01** Rooftop Area Factor= (Total Rooftop Disconnected Area/Tributary Area)

Solution:

Area reduction = (Physical Tributary Area x Conditional Factor x Rooftop Area Factor)

(433,000 x 1.00 x 0.01) = **4,000** ft² **Rooftop Drainage Area Reduction**

Method 2: Based on density (units per acre) - to be used if rooftop information is unknown.

Input:

Enter percent of rooftop area to be disconnected from downspouts: **0** %

Select Density: **3-4** Units per Acre

Density Reduction Factor= **0.2**

Solution:

Area reduction = (Physical Tributary Area x Conditional Factor x Percent Disconnected x Density Factor)

(433,000 x 1.00 x 0.00 x 0.19) = **0** ft² **Density Reduction**

NOTE:
Either Method 1 (rooftop area) or Method 2 (density) can be used. Providing input for both methods will cause an error. If rooftop area information is available, Method 1 should be used.

Paved Area Disconnection [1]

INSTRUCTIONS:
Calculates the area reduction credit for

[1] *See "Impervious Area Disconnection" Fact Sheet in Appendix E for further details.*

[2] See "Interceptor Trees" Fact Sheet in Appendix E for further details and see "Plant and Tree List" in Appendix G for approved trees.

[3] See "Vegetated Buffer Strip" and "Bovine Terrace" Fact Sheets in Appendix E for further details.

[4] *Total area reductions due to pollution Prevention Measures cannot exceed 50% of the physical Tributary Area.*

[5] *Per the "Urban Hydrology For Small Watersheds" TR-55 manual.*

[6] *Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

[7] *From Sonoma County Water Agency Flood Control Design Criteria.*

[8] *Hydrologic soil type based of infiltration rate of native soil as defined by "Urban Hydrology For Small Watersheds" TR-55 Manual.*

[9] *Composite CN calculated per "Worksheet 2 Part 1 of the Urban Hydrology For Small Watersheds" TR-55 manual.*

[10] *From "Using Site Design to Meet Development Standards For Storm water Quality" by the Bay Area Storm water Management Agencies Association (BASMAA).*

Paved Area Type (select from drop down list): Porous Pavement
Multiplier = 1

Enter area of alternatively designed paved area: 0 ft²

Area Reduction = 0 ft²

driveways designed to minimize runoff. Enter type and area of alternate design.

Interceptor Trees [2]

Number of new ***Evergreen Trees*** that qualify as interceptor trees= 0 New Evergreen Trees

Area Reduction due to new Evergreen Trees= 0 ft² (200 ft²/tree)

NOTE: ***Total Interceptor Area Reduction is limited to 50% of the physical tributary area.***

Number of new ***Deciduous Trees*** that qualify as interceptor trees= 0 New Deciduous Trees

Area Reduction due to new Deciduous Trees= 0 ft² (100 ft²/tree)

Enter square footage of qualifying existing tree canopy = 0 Existing Tree Canopy

Allowed reduction credit for existing tree canopy= 0 ft² Allowed credit for existing tree canopy = 50 % of actual canopy square footage

Area Reduction = 0 ft² = Sum of areas managed by evergreen + deciduous + existing canopy

INSTRUCTIONS:
Calculates the area reductions credit due to interceptor trees. Includes both new and existing trees. Enter the number of new deciduous and evergreen trees and the canopy area of existing trees.

Buffer Strips & Bovine Terraces [3]

Enter area draining to a Buffer Strip or Bovine Terrace = 0 ft²

Buffer Factor = 0.7

Solution:

Area Reduction = (Area draining to Buffer Strip or Bovine Terrace) x (Buffer Factor) =

Area Reduction = 0 ft²

INSTRUCTIONS:
Calculates the area reduction credit due to buffer strips and/or bovine terraces. Runoff Must be direct to these features as sheet flow. Enter the area draining to these features.

Revised Tributary Area due to Pollution Prevention Measures

Physical Tributary Area = 433,000 ft²

Tributary Area Reduction due to Pollution Prevention Measures [5] = 4,000 ft²

Reduced Tributary Area to be used for Calculations = 429,000 ft²

City of Santa Rosa

APPENDIX C
STORM WATER CALCULATOR

Kistler Vineyards Winery
14701 Bodega Highway
Steve Martin, P.E.
Area A

This worksheet calculates the quantity of storm water that needs to be addressed (captured and/or treated) to comply with the NPDES Storm Water Permit issued to the City of Santa Rosa and County of Sonoma by the North Coast Regional Water Quality Control Board.

Design Goal: 100% Volume Capture

Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by the 85th percentile 24 hour storm event.

Formulas:

$$S = \frac{1000}{CN} - 10$$

Where:
S= Potential maximum retention after runoff (in)[5]
CN= Curve Number [5]

$$Q = \frac{[(P-K)-(0.2 \cdot S)]^2}{[(P-K)+(0.8 \cdot S)]} \times \frac{1ft}{12"}$$

Where:
Q= Runoff depth (ft) [5]
P= Precipitation (in) = 0.92
K= Seasonal Precipitation Factor [7]

0.92 inches in the Santa Rosa area, based on local historical data.

$$V = (Q)(A_t)$$

Where:
V= Volume of Storm Water to be Retained (ft^3)
A_t= Reduced Tributary Area including credit for Pollution Prevention Measures (ft^2)

Input: (Pick data from drop down lists or enter calculated values)

A_t = 429,000 ft^2
K [7] = 1.35

Drop down Lists

Select post development hydrologic soil type within tributary area [5] = A: greater than 0.30 in/hr infiltration (transmission) rate
Select post development ground cover description [5] = Farmsteads - buildings, lanes, driveways, surrounding lots

CN_{POST} = 59

OR: Composite post development CN [5] = 44

NOTE:
Entering a calculated composite CN will override selections made from the pull down menu above. Calculation worksheet should be used for all composite calculations and included with submittal.

Solution:

Volume of storm water - Post Development

S_{POST} = 12.52 in

$$S_{POST} = \frac{1000}{44} - 10$$

Where:
S_{POST}= Post development potential maximum retention after runoff (in).

Q_{POST} = 0 ft

$$Q_{POST} = \frac{[(0.92 * 1.35)-(0.2 * 12.52)]^2}{[(0.92 * 1.35)+(0.8 * 12.52)]} \times \frac{1ft}{12in}$$

Q_{POST}=Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.

V_{GOAL} = 0 ft^3

V_{GOAL} = (0.00000)(429,000)

V_{GOAL}= Post Development Volume of Storm Water to be Retained (ft^3)

Precipitation too low to generate runoff with this curve.

INSTRUCTIONS:
This Design Goal of 100% Capture is the ideal condition and if achieved satisfies all requirements so that no additional treatment is required and pages 4 and 5 of this calculator do not need to be completed.

NOTE:
If the Design Goal of 100% Capture is not achieved, 100% Treatment AND Volume Capture must be achieved and both pages 4 and 5 of this calculator need to be completed.

Requirement 1: 100% Treatment

Treatment of 100% of the flow generated by 85th percentile 24 hour mean annual rain event (0.2 in/hr).

Formula:

$$Q_{TREATMENT} = (0.2\ in/hr)(A)(C_{POST})(K)\ cfs$$

Where:
$Q_{TREATMENT}$=Design flow rate required to be treated (cfs)
C_{POST} =Rational method runoff coefficient for the developed condition [10]
A_t = Reduced Tributary Area including credit for Pollution Prevention Measures (ft^2)
K = Seasonal Precipitation Factor [7]

Input:

A_t = 429,000 ft^2 = 10 Acres
C_{POST} [10] = 0.8

INSTRUCTIONS:
If the Design Goal of 100% Capture on page 3 of this calculator is not achieved; then Requirement 1-100% Treatment, this page of the calculator, AND Requirement 2- Volume Capture, page 5 of the calculator, must be achieved.

$K^{[7]}$ = 1.2

Solution:

$Q_{TREATMENT}$ = 2 cfs $Q_{TREATMENT}$=(0.2)(9.85)(0.75)(1.20)

Requirement 2: Delta Volume Capture

No increase in volume of runoff leaving the site due to development for the 85th percentile 24 hour storm event.

INSTRUCTIONS:
If the Design Goal of 100% Capture on page 3 of this calculator is not achieved; then Requirement 1-100% Treatment, page 4 of the calculator, AND Requirement 2- Volume Capture, this page of the calculator, **must** be achieved.

NOTE:
If the amount of volume generated after development is less than or equal to that generated before development, Requirement 2-Volume Capture is not required

($C_{POST} \le C_{PRE}$ or $CN_{POST} \le CN_{PRE}$)

Formulas:

$$S = \frac{1000}{CN} - 10$$

Where:
S= Potential maximum retention after runoff (in)[5]
CN= Curve Number [5]

$$Q = \frac{[(P \cdot K)-(0.2 \cdot S)]^2}{[(P \cdot K)+(0.8 \cdot S)]} \times \frac{1ft}{12in}$$

Where:
Q= Runoff depth (ft) [5]
P= Precipitation (in) = 0.92 *0.92 inches in the Santa Rosa area, based on local historical data.*
K= Seasonal Precipitation Factor [7]

$$V = (Q)(A_r)$$

Where:
V= Volume of Storm Water to be Retained (ft^3)
A_r= Reduced Tributary Area including credit for Pollution Prevention Measures (ft^2)

Input: (Pick data from drop down lists or enter calculated values)

A_r = 429,000 ft^2
$K^{[7]}$ = 1.2

Drop down Lists

Select hydrologic soil type within tributary area [5] = A: greater than 0.30 in/hr infiltration (transmission) rate
Select predevelopment ground cover description [5] = Pasture, grassland, range - Fair (50% to 75% ground cover and not heavily grazed)
Select post development ground cover description [5] = Farmsteads - buildings, lanes, driveways, surrounding lots
CN_{PRE} = 49
CN_{POST} = 59

OR
Composite Predevelopment CN [5] =
Composite Post development CN [5] = 42

Solution:

Pre Development Storm Water Runoff Volume

S_{PRE} = 10 in $S_{PRE} = \frac{1000}{49} - 10$

Where:
S_{PRE}= Pre development potential maximum retention after runoff (in).

Q_{PRE} = 0 ft $Q_{PRE} = \frac{[(0.92*1.20)-(0.2 * 10.41)]^2}{[(0.92*1.20)+(0.8 * 10.41)]} \times \frac{1ft}{12in}$

Q_{PRE}= *Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

V_{PRE} = 0 ft^3 V_{PRE}= (0.00000)(429,000)

V_{PRE}= Pre Development Volume of Storm Water Generated (ft^3)

Post Development Storm Water Runoff Volume

S_{POST} = 14 in $S_{POST} = \frac{1000}{42} - 10$

Where:
S_{POST}= Post development potential maximum retention after runoff (in).

Q_{POST} = 0 ft $Q_{POST} = \frac{[(0.92*1.20)-(0.2 * 13.92)]^2}{[(0.92*1.20)+(0.8 * 13.92)]} \times \frac{1ft}{12in}$

Q_{POST}=*Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

V_{POST} = 0 ft^3 V_{POST}= (0.00000)(429,000)

V_{POST}=Post Development Volume of Storm Water Generated (ft^3)

Solution: Volume Capture Requirement

Increase in volume of storm water that must be retained onsite (may be infiltrated or reused).

Delta Volume Capture= $(V_{POST}-V_{PRE})$ Delta Volume Capture= (0.00) - (0.00)

V_{DELTA} = 0 ft^3

Where:
Delta Volume Capture= The increase in volume of storm water generated by the 85th percentile 24 hour storm event due to development that must be retained onsite (may be infiltrated or reused).

LID BMP Sizing Tool: 100% Volume Capture Goal; V_{GOAL}

NOTE:
LID Sizing Tool only applicable for volume based BMPs. Not required if site requires treatment only.

Formulas:

$V_{LID\ GOAL}=((V_{GOAL}))/(P)$ = 0 ft³

$A_{LID\ GOAL}=(W)(L)$ = 800 ft²

Where:
$V_{LID\ GOAL}$ = Required volume of soil in LID BMP.
$A_{LID\ GOAL}$ = Footprint of LID BMP area for a given depth (below perforated pipe if present).

V_{GOAL} = 0 ft³

$$\text{Percent of Goal Achieved} = \frac{(D)(A_{LID\ GOAL})}{V_{LID\ GOAL}} \times 100$$

Where:
P= Porosity (enter as a decimal)
D= Depth below perforated pipe if present (in decimal feet)
W= Width (in decimal feet)
L= Length (in decimal feet)

Input:

P =	0.3	as a decimal
D =	3.5 ft	Below perforated pipe if present
W =	8.0 ft	
L =	100.0 ft	

Solution:

Percent of Goal Achieved = 0 **%** = [(3.5 x 800) / 0] x 100

INSTRUCTIONS:
The 100% volume capture sizing tool helps the designer appropriately size a LID BMP to achieve the design goal of 100% volume capture of the post development condition. Enter the percent porosity of the specified soil and depth below perforated pipe (if present). The width and length entries will need to be interactively adjusted until "Percent of Goal" equals 100%.

LID BMP Sizing Tool Delta Volume Capture Requirement: V_{DELTA}

NOTE:
LID Sizing Tool only applicable for volume based BMPs. Not required if site requires treatment only.

Formulas:

$V_{LID\ DELTA}=((V_{DELTA}))/(P)$ = 0 ft³

$A_{LID\ DELTA}=(W)(L)$ = 800 ft²

Where:
$V_{LID\ DELTA}$ = Required volume of soil in LID BMP
$A_{LID\ DELTA}$ = Footprint of LID BMP area for a given depth (below perforated pipe if present).

V_{DELTA} = 0 ft³

$$\text{Percent of Requirement Achieved} = \frac{(D)(A_{LID\ DELTA})}{V_{LID\ DELTA}} \times 100$$

Where:
P= Porosity (enter as a decimal)
D= Depth below perforated pipe if present (in decimal feet)
W= Width (in decimal feet)
L= Length (in decimal feet)

Input:

P =	0.3	as a decimal
D =	3.5 ft	Below perforated pipe if present
W =	8.0 ft	
L =	100.0 ft	

Solution:

Percent of Requirement Achieved = 0 **%** = [(3.5 x 800) / 0] x 100

INSTRUCTIONS:
The Delta Volume Capture sizing tool helps the designer appropriately size a LID BMP to achieve the design requirement of the delta volume capture. Enter the percent of porosity of the specified soil and depth below perforated pipe (if present). The width and length entries will need to be interactively adjusted until "Percent of Requirement achieved" reaches 100%.

City of Santa Rosa

APPENDIX C
STORM WATER CALCULATOR

Kistler Vineyards Winery
14701 Bodega Highway
Steve Martin, P.E.
Area B

STORM WATER CALCULATOR

Project:	Kistler Vineyards Winery
Address/Location:	14701 Bodega Highway
Designer:	Steve Martin, P.E.
Date:	September 24, 2013
Inlet Number/Tributary Area/BMP:	Area B

NOTE: In order for this calculator to function properly macros must be enabled.

Physical Tributary Area that drains to Inlet/BMP = **95,400** ft²

This portion of the Storm water Calculator is designed to account for pollution prevention measures implemented on site. Additional information and description of these measures can be found in the Fact Sheets in Appendix F and in Chapter 4 of the narrative.

Disconnected Roof Drains [1]

Input:

Select disconnection condition: **Runoff is directed to dispersal trench or dry well**
Condition Factor = **1**

Method 1: Based on the total rooftop drainage area - to be used if rooftop information is known.

Input:

Enter amount of rooftop area that drain to disconnected downspouts = **0** ft²
Rooftop Area Factor = **0.00** Rooftop Area Factor= (Total Rooftop Disconnected Area/Tributary Area)

Solution:

Area reduction = (Physical Tributary Area x Conditional Factor x Rooftop Area Factor)

(95,400 x 1.00 x 0.00) = **0** ft² **Rooftop Drainage Area Reduction**

Method 2: Based on density (units per acre) - to be used if rooftop information is unknown.

Input:

Enter percent of rooftop area to be disconnected from downspouts: **0** %

Select Density: **3-4** Units per Acre
Density Reduction Factor= **0.2**

NOTE:
Either Method 1 (rooftop area) or Method 2 (density) can be used. Providing input for both methods will cause an error. If rooftop area information is available, Method 1 should be used.

Solution:

Area reduction = (Physical Tributary Area x Conditional Factor x Percent Disconnected x Density Factor)

(95,400 x 1.00 x 0.00 x 0.19) = **0** ft² **Density Reduction**

Paved Area Disconnection [1]

INSTRUCTIONS:
Calculates the area reduction credit for

[1] *See "Impervious Area Disconnection" Fact Sheet in Appendix E for further details.*

[2] See "Interceptor Trees" Fact Sheet in Appendix E for further details and see "Plant and Tree List" in Appendix G for approved trees.

[3] See "Vegetated Buffer Strip" and "Bovine Terrace" Fact Sheets in Appendix E for further details.

[4] *Total area reductions due to pollution Prevention Measures cannot exceed 50% of the physical Tributary Area.*

[5] *Per the "Urban Hydrology For Small Watersheds" TR-55 manual.*

[6] *Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

[7] *From Sonoma County Water Agency Flood Control Design Criteria.*

[8] *Hydrologic soil type based of infiltration rate of native soil as defined by "Urban Hydrology For Small Watersheds" TR-55 Manual.*

[9] *Composite CN calculated per "Worksheet 2 Part 1 of the Urban Hydrology For Small Watersheds" TR-55 manual.*

[10] *From "Using Site Design to Meet Development Standards For Storm water Quality" by the Bay Area Storm water Management Agencies Association (BASMAA).*

Paved Area Type (select from drop down list): Porous Pavement
Multiplier = 1

Enter area of alternatively designed paved area: 0 ft²

Area Reduction = 0 ft²

driveways designed to minimize runoff. Enter type and area of alternate design.

Interceptor Trees [2]

Number of new ***Evergreen Trees*** that qualify as interceptor trees= 0 **New Evergreen Trees**

Area Reduction due to new Evergreen Trees= 0 ft² (200 ft²/tree)

Number of new ***Deciduous Trees*** that qualify as interceptor trees= 0 **New Deciduous Trees**

Area Reduction due to new Deciduous Trees= 0 ft² (100 ft²/tree)

Enter square footage of qualifying **existing tree canopy** = 0 **Existing Tree Canopy**

Allowed reduction credit for existing tree canopy= 0 ft² Allowed credit for existing tree canopy = 50 % of actual canopy square footage

Area Reduction = 0 ft² = Sum of areas managed by evergreen + deciduous + existing canopy

NOTE:
Total Interceptor Area Reduction is limited to 50% of the physical tributary area.

INSTRUCTIONS:
Calculates the area reductions credit due to interceptor trees. Includes both new and existing trees. Enter the number of new deciduous and evergreen trees and the canopy area of existing trees.

Buffer Strips & Bovine Terraces [3]

Enter area draining to a Buffer Strip or Bovine Terrace = 0 ft²

Buffer Factor = 0.7

Solution:

Area Reduction = (Area draining to Buffer Strip or Bovine Terrace) x (Buffer Factor) =

Area Reduction = 0 ft²

INSTRUCTIONS:
Calculates the area reduction credit due to buffer strips and/or bovine terraces. Runoff Must be direct to these features as sheet flow. Enter the area draining to these features.

Revised Tributary Area due to Pollution Prevention Measures

Physical Tributary Area = 95,400 ft²

Tributary Area Reduction due to Pollution Prevention Measures [4] = 0 ft²

Reduced Tributary Area to be used for Calculations = 95,400 ft²

City of Santa Rosa

APPENDIX C
STORM WATER CALCULATOR

Kistler Vineyards Winery
14701 Bodega Highway
Steve Martin, P.E.
Area A

This worksheet calculates the quantity of storm water that needs to be addressed (captured and/or treated) to comply with the NPDES Storm Water Permit issued to the City of Santa Rosa and County of Sonoma by the North Coast Regional Water Quality Control Board.

Design Goal: 100% Volume Capture

Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by the 85th percentile 24 hour storm event.

Formulas:

$$S = \frac{1000}{CN} - 10$$

Where:
S= Potential maximum retention after runoff (in)[8]
CN= Curve Number [5]

$$Q = \frac{[(P-K)-(0.2 \cdot S)]^2}{[(P-K)+(0.8 \cdot S)]} \times \frac{1ft}{12"}$$

Where:
Q= Runoff depth (ft) [8]
P= Precipitation (in) = 0.92
K= Seasonal Precipitation Factor [7]

0.92 inches in the Santa Rosa area, based on local historical data.

$$V = (Q)(A_r)$$

Where:
V= Volume of Storm Water to be Retained (ft^3)
A_r= Reduced Tributary Area including credit for Pollution Prevention Measures (ft^2)

Input: (Pick data from drop down lists or enter calculated values)

A_r = 95,400 ft^2
K [7] = 1.35

Drop down Lists

Select post development hydrologic soil type within tributary area [5] = A: greater than 0.30 in/hr infiltration (transmission) rate
Select post development ground cover description [5] = Pasture, grassland, range - Good (>75% ground cover, lightly or occasionally grazed)

CN_{POST} = 39

OR: Composite post development CN [5] = 46

NOTE:
Entering a calculated composite CN will override selections made from the pull down menu above. Calculation worksheet should be used for all composite calculations and included with submittal.

Solution:

Volume of storm water - Post Development

S_{POST} = 11.74 in

$$S_{POST} = \frac{1000}{46} - 10$$

Where:
S_{POST}= Post development potential maximum retention after runoff (in).

Q_{POST} = 0 ft

$$Q_{POST} = \frac{[(0.92 * 1.35)-(0.2 * 11.74)]^2}{[(0.92 * 1.35)+(0.8 * 11.74)]} \times \frac{1ft}{12in}$$

Q_{POST}=Q *in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

V_{GOAL} = 0 ft^3

$V_{GOAL} = (0.00000)(95,400)$

V_{GOAL}= Post Development Volume of Storm Water to be Retained (ft^3)

Precipitation too low to generate runoff with this curve.

INSTRUCTIONS:
This Design Goal of 100% Capture is the ideal condition and if achieved satisfies all requirements so that no additional treatment is required and pages 4 and 5 of this calculator do not need to be completed.

NOTE:
If the Design Goal of 100% Capture is not achieved, 100% Treatment AND Volume Capture must be achieved and both pages 4 and 5 of this calculator need to be completed.

Requirement 1: 100% Treatment

Treatment of 100% of the flow generated by 85th percentile 24 hour mean annual rain event (0.2 in/hr).

Formula:

$Q_{TREATMENT} = (0.2 \text{ in/hr})(A)(C_{POST})(K)$ cfs

Where:
$Q_{TREATMENT}$=Design flow rate required to be treated (cfs)
C_{POST} =Rational method runoff coefficient for the developed condition [10]
A_r = Reduced Tributary Area including credit for Pollution Prevention Measures (ft^2)
K = Seasonal Precipitation Factor [7]

Input:

A_r = 95,400 ft^2 = 2 Acres
C_{POST} [10] = 0.5

INSTRUCTIONS:
If the Design Goal of 100% Capture on page 3 of this calculator is not achieved; then Requirement 1-100% Treatment, this page of the calculator, AND Requirement 2- Volume Capture, page 5 of the calculator, must be achieved.

$K^{[7]}$ = 1.4

Solution:

$Q_{TREATMENT}$ = 0 cfs $Q_{TREATMENT}$=(0.2)(2.19)(0.50)(1.35)

Requirement 2: Delta Volume Capture

No increase in volume of runoff leaving the site due to development for the 85th percentile 24 hour storm event.

INSTRUCTIONS:
If the Design Goal of 100% Capture on page 3 of this calculator is not achieved; then Requirement 1-100% Treatment, page 4 of the calculator, AND Requirement 2- Volume Capture, this page of the calculator, must be achieved.

NOTE:
If the amount of volume generated after development is less than or equal to that generated before development, Requirement 2-Volume Capture is not required

($C_{POST} \le C_{PRE}$ or $CN_{POST} \le CN_{PRE}$)

Formulas:

$$S = \frac{1000}{CN} - 10$$

Where:
S= Potential maximum retention after runoff (in)[5]
CN= Curve Number [5]

$$Q = \frac{[(P-K)-(0.2 \cdot S)]^2}{[(P-K)+(0.8 \cdot S)]} \times \frac{1ft}{12in}$$

Where:
Q= Runoff depth (ft) [6]
P= Precipitation (in) = 0.92 *0.92 inches in the Santa Rosa area, based on local historical data.*
K= Seasonal Precipitation Factor [7]

$V = (Q)(A_r)$

Where:
V= Volume of Storm Water to be Retained (ft^3)
A_r= Reduced Tributary Area including credit for Pollution Prevention Measures (ft^2)

Input: (Pick data from drop down lists or enter calculated values)

A_r = 95,400 ft^2
$K^{[7]}$ = 1.4

Drop down Lists

Select hydrologic soil type within tributary area [8] = A: greater than 0.30 in/hr infiltration (transmission) rate
Select predevelopment ground cover description [5] = Meadow - continuous grass (No Grazing), generally mowed for hay
Select post development ground cover description [5] = Woods, No Grass - Fair (grazed and some forest litter)
CN_{PRE} = 30
CN_{POST} = 36

OR
Composite Predevelopment CN [9] =
Composite Post development CN [9] = 46

Solution:

Pre Development Storm Water Runoff Volume

S_{PRE} = 23 in $S_{PRE} = \frac{1000}{30} - 10$

Where:
S_{PRE}= Pre development potential maximum retention after runoff (in).

Q_{PRE} = 0 ft $Q_{PRE} = \frac{[(0.92*1.35)-(0.2 * 23.33)]^2}{[(0.92*1.35)+(0.8 * 23.33)]} \times \frac{1ft}{12in}$

Q_{PRE}= *Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

V_{PRE} = 0 ft^3 V_{PRE}= (0.00000)(95,400)

V_{PRE}= Pre Development Volume of Storm Water Generated (ft^3)

Post Development Storm Water Runoff Volume

S_{POST} = 12 in $S_{POST} = \frac{1000}{46} - 10$

Where:
S_{POST}= Post development potential maximum retention after runoff (in).

Q_{POST} = 0 ft $Q_{POST} = \frac{[(0.92*1.35)-(0.2 * 11.74)]^2}{[(0.92*1.35)+(0.8 * 11.74)]} \times \frac{1ft}{12in}$

Q_{POST}=*Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.*

V_{POST} = 0 ft^3 V_{POST}= (0.00000)(95,400)

V_{POST}=Post Development Volume of Storm Water Generated (ft^3)

Solution: Volume Capture Requirement

Increase in volume of storm water that must be retained onsite (may be infiltrated or reused).

Delta Volume Capture= $(V_{POST}-V_{PRE})$ Delta Volume Capture= (0.00) - (0.00)

V_{DELTA} = 0 ft^3

Where:
Delta Volume Capture= The increase in volume of storm water generated by the 85th percentile 24 hour storm event due to development that must be retained onsite (may be infiltrated or reused).

LID BMP Sizing Tool: 100% Volume Capture Goal; V_{GOAL}

NOTE:
LID Sizing Tool only applicable for volume based BMPs. Not required if site requires treatment only.

Formulas:

$V_{LID\ GOAL}=((V_{GOAL}))/(P)$ = 0 ft³

$A_{LID\ GOAL}=(W)(L)$ = 800 ft²

Where:
$V_{LID\ GOAL}$ = Required volume of soil in LID BMP.
$A_{LID\ GOAL}$ = Footprint of LID BMP area for a given depth (below perforated pipe if present).

V_{GOAL} = 0 ft³

$$\text{Percent of Goal Achieved} = \frac{(D)(A_{LID\ GOAL})}{V_{LID\ GOAL}} \times 100$$

Where:
P= Porosity (enter as a decimal)
D= Depth below perforated pipe if present (in decimal feet)
W= Width (in decimal feet)
L= Length (in decimal feet)

Input:

P =	0.3	as a decimal
D =	3.5 ft	Below perforated pipe if present
W =	8.0 ft	
L =	100.0 ft	

Solution:

Percent of Goal Achieved = 0 **%** = [(3.5 x 800) / 0] x 100

INSTRUCTIONS:
The 100% volume capture sizing tool helps the designer appropriately size a LID BMP to achieve the design goal of 100% volume capture of the post development condition. Enter the percent porosity of the specified soil and depth below perforated pipe (if present). The width and length entries will need to be interactively adjusted until "Percent of Goal" equals 100%.

LID BMP Sizing Tool Delta Volume Capture Requirement: V_{DELTA}

NOTE:
LID Sizing Tool only applicable for volume based BMPs. Not required if site requires treatment only.

Formulas:

$V_{LID\ DELTA}=((V_{DELTA}))/(P)$ = 0 ft³

$A_{LID\ DELTA}=(W)(L)$ = 800 ft²

Where:
$V_{LID\ DELTA}$ = Required volume of soil in LID BMP
$A_{LID\ DELTA}$ = Footprint of LID BMP area for a given depth (below perforated pipe if present).

V_{DELTA} = 0 ft³

$$\text{Percent of Requirement Achieved} = \frac{(D)(A_{LID\ DELTA})}{V_{LID\ DELTA}} \times 100$$

Where:
P= Porosity (enter as a decimal)
D= Depth below perforated pipe if present (in decimal feet)
W= Width (in decimal feet)
L= Length (in decimal feet)

Input:

P =	0.3	as a decimal
D =	3.5 ft	Below perforated pipe if present
W =	8.0 ft	
L =	100.0 ft	

Solution:

Percent of Requirement Achieved = 0 **%** = [(3.5 x 800) / 0] x 100

INSTRUCTIONS:
The Delta Volume Capture sizing tool helps the designer appropriately size a LID BMP to achieve the design requirement of the delta volume capture. Enter the percent of porosity of the specified soil and depth below perforated pipe (if present). The width and length entries will need to be interactively adjusted until "Percent of Requirement achieved" reaches 100%.

Worksheet 2: Runoff curve number and runoff

Project	By	Date
Kistler Vineyards	SMM	9-25-13
Location	**Checked**	**Date**
14701 Rodega Hwy	SMM	

Check one: ☐ Present ☒ Developed

1 Runoff curve number

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1] Table 2-2	CN [1] Figure 2-3	CN [1] Figure 2-4	Area ☐ acres ☐ mi² ☐ %	Product of CN x area
SubArea A						
A-SCL	Grass	39			9.04	353
	Roof	98			.38	37.2
	Pavement	98			.52	51.0
	441/9.94 ⇒ CN = 44.3				9.94	441
SubArea B						
A-SCL	Grass	39			1.94	75.7
	Road	98			.25	24.5
[1] Use only one CN source per line				Totals ➡	2.19	100.2

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{100.2}{2.19} = 45.7$: Use CN ➡ **45.7**

2 Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr			
Rainfall, P (24-hour)	in			
Runoff, Q	in			

(Use P and CN with table 2-1, figure 2-1, or equations 2-3 and 2-4)

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SOIL PERCOLATION

TEST REPORT

For

Kistler Vineyards
Pozzi Ranch
14701 Bodega Highway
Freestone, California
APN 026-120-006

By

RAM Engineering
Wastewater & Civil Engineering
July 20, 2010

PURPOSE

The purpose of this report is to present the background information, soil investigation results, and percolation test results for the property located at 14701 Bodega Highway in Freestone, California (APN 026-120-006).

BACKGROUND INFORMATION

Tamara Martin, REHS of RAM Engineering and Dave Donavan, REHS of Sonoma County Permit and Resource Management Department (PRMD) performed a pre-perc site evaluation at the subject property on July 16, 2009. Six soil profile pits were excavated and logged labeled A through F.

The purpose of the pre-perc site evaluation was to identify suitable soil for a potential future winery on site. Profiles A, B, and C showed potential for a 30" standard system, and profiles D, E, and F showed potential for a 36" standard system. A soil sample was taken at 66" in profile A for hydrometer testing. The sample was identified as Zone 2 Sandy Clay Loam. As a result, no wet weather percolation testing was required. With the intent to design a standard system for the future winery, percolation testing was conducted at the proposed trench bottom, 30" and 36", and 3 feet below, respectively.

PERCOLATION TESTING

The percolation test was conducted in accordance with the requirements of the SCPRMD on July 20, 2010. Two sites were tested. The upper site in the vicinity of profiles A-C, is called Site 1. There were a total of 11 perc holes in Site 1, with nine at a depth of 30" (holes 1-4, 6-8, & 10-11) and two at a depth of 66" (holes 5 & 9). The lower site, in the vicinity of profiles D-F, is called Site 2. There were a total of 10 perc holes in Site 2, with seven at a depth of 36" (holes 13, 15-17, & 19-21) and three at a depth of 72" (holes 12, 14, & 18). The results of the testing are indicated in the attached Soil Percolation Test Data forms and corresponding mapping.

In Site 1, the average of the 30" perc holes was 9.0 mpi. The average of the two 66" deep perc holes was 72 mpi.

In Site 2, the average of the 36" perc holes was 11.6 mpi. The average of the three 72" deep perc holes was 36.3 mpi.

Project Name:Kistler
Job #:SMA 2009006

SMA
WASTEWATER AND CIVIL ENGINEERING

Site Location:14701 Bodega Ave
Date:7/20/2010

Name: Site 2

Soil Percolation Test Data

Hole No.	Depth of Hole	Pipe Length	Presoak Remaining	Start		First Measurement		Second Measurement		Third Measurement		Fourth Measurement		Fifth Measurement		Sixth Measurement		Rate (MPI)
				Time	Inches	Time	Inches	Time	Inches	Time	Inches	Time	Inches	Time	Inches	Time	Inches	
12	72	36 1/2	0	10:45	24 1/2	11:45	26 3/8	12:45	28 1/8	1:45	29 7/8	2:45	31 3/8	3:45	32 7/8	4:45	34 3/8	40.0
13	36	36 1/2	0	10:45	24 1/2	11:45	DRY 24 1/2	11:55	30 1/2	12:05	DRY 24 1/2	12:15	30 1/4	12:25	35 1/2 24 1/2	12:35	29 5/8	
				12:45	34 1/2 24 1/2	12:55	29	1:05	33 3/4	1:15	DRY 24 1/2	1:25	27 5/8	1:35	30 3/4	1:45	33 3/4	3.3
14	72	34 3/4	0	10:46	22 3/4	11:46	25 1/4	12:46	27 3/4	1:46	30 1/8	2:46	32 1/4	3:46	34 1/8 22 3/4	4:46	24 7/8	32.0
15	36	36 1/2	0	10:46	24 1/2	11:46	DRY 24 1/2	11:56	27 5/8	12:06	30 3/4	12:16	33 1/2	12:26	36 1/8 24 1/2	12:36	27 1/8	
				12:46	29 5/8	12:56	32	1:06	34 3/8	1:16	DRY 24 1/2	1:26	26 1/2	1:36	28 5/8	1:46	30 3/4	4.7
16	36	34 7/8	0	10:47	22 7/8	11:47	DRY 22 7/8	11:57	25	12:07	27 1/4	12:17	29 3/8	12:27	31 3/8	12:37	33 3/8 22 7/8	
				12:47	25 1/8	12:57	27 1/8	1:07	29	1:17	30 7/8	1:27	32 3/4	1:37	34 1/2 22 7/8	1:47	24 1/4	7.3
17	36	36	0	10:47	24	11:47	29 3/4	12:47	35 1/4	1:47	DRY 24	2:47	29 1/2	3:47	34 1/8	4:47	DRY	12.9
18	72	25 1/8	0	10:48	13 1/8	11:48	16 3/8	12:48	19 3/8	1:48	22 1/4	2:48	25 13 1/8	3:48	15 3/4	4:48	17 3/8	36.9
19	36	35 1/8	0	10:48	23 1/8	11:48	26 3/8	12:48	29 3/8	1:48	32 3/8	2:48	35 1/8 23 1/8	3:48	25 5/8	4:48	28 1/8	24.0
20	36	36 1/8	0	10:49	24	11:49	DRY 24 1/8	11:59	28 7/8	12:09	33 3/8	12:19	DRY 24 1/8	12:29	28 5/8	12:39	32 5/8	
				12:49	DRY 24 1/8	12:59	28 1/8	1:09	32	1:19	33 7/8	1:29	35 1/4 24 1/8	1:39	25 1/2	1:49	26 3/4	8.0
21	36	37 1/2	0	10:49	25 1/2	11:49	34 3/4	12:49	DRY 25 1/2	1:49	34	2:49	DRY 25 1/2	3:49	33 5/8	4:49	36 1/2	20.9

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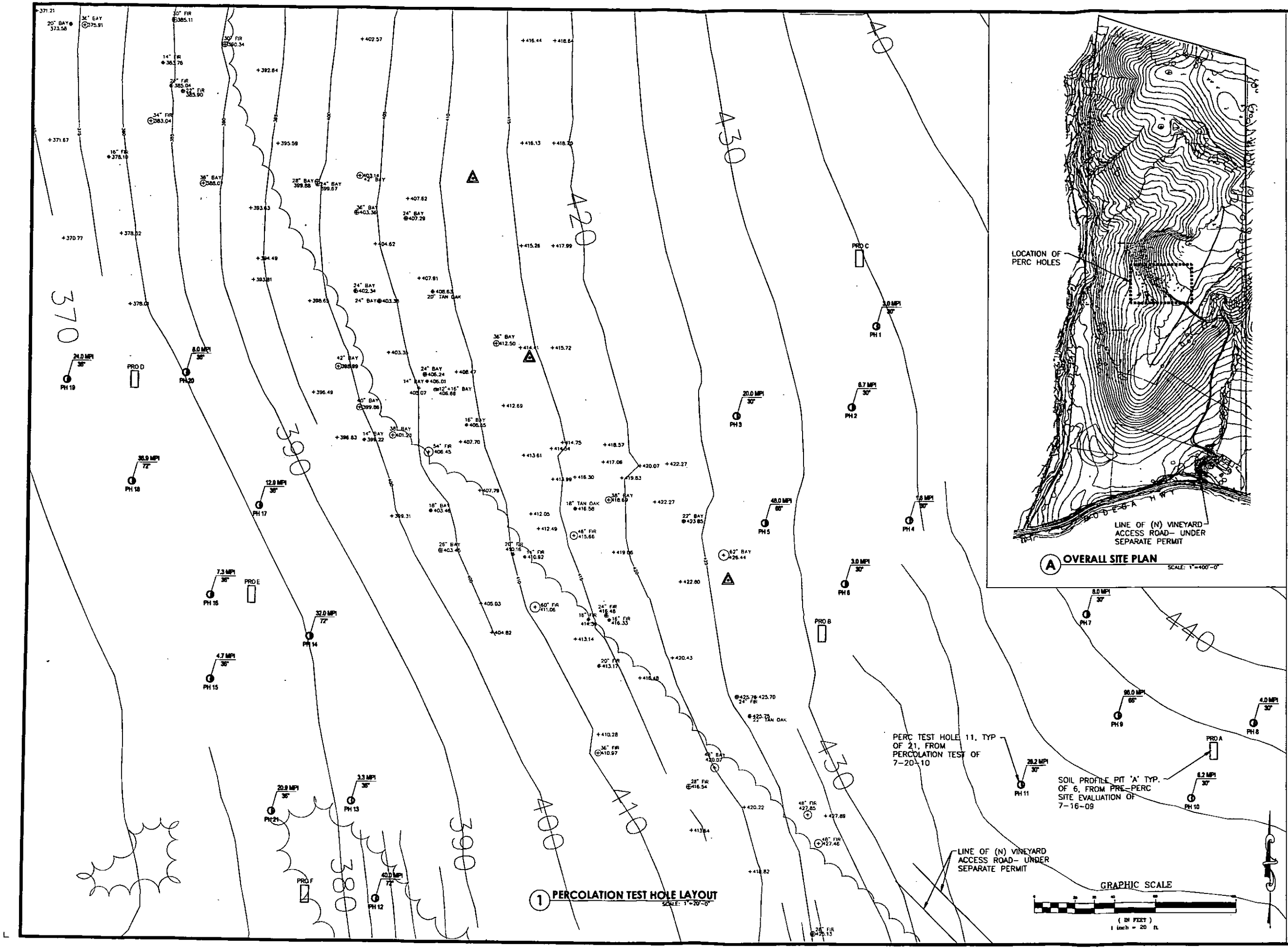

A OVERALL SITE PLAN
SCALE: 1"=400'-0"

1 PERCOLATION TEST HOLE LAYOUT
SCALE: 1"=20'-0"

SMA
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REGISTERED ENVIRONMENTAL HEALTH SPECIALIST
TAMARA ANN MARTIN
No. 7254
Exp. 12-31-10
REHS
STATE OF CALIFORNIA

WASTEWATER

PERCOLATION TEST HOLE LAYOUT

KISTLER VINEYARDS
POZZI RANCH WINERY
14701 Bodega Hwy, Sonoma Cnty, CA
AP# 026-120-006

REVISIONS	
DATE	DESCRIPTION

JOB NO.	SMA 2009006
DATE	October 4, 2010
DRAWN	cM CHKD TM
FILE NO.	0906-Perchole
SHEET	PH1

Required Grading Inspections

ENG-001

This is a list of required inspections to be performed by the grading inspector and, if engineered grading, by the engineer providing grading controls. If work requiring inspection is covered or concealed without first having been inspected, the grading inspector may require, by written notice, that such work be exposed for examination.

Project Address: 14701 BODEGA HWY City: BODEGA

Grading Plan Check or Permit # GRD12-0083 APN: 026-120-006

☒ The project plans have been checked and classified as **engineered grading**. (Chapter 11 Sonoma County Code)
☐ The project plans have been checked and classified as **non-engineered** grading. (Chapter 11 Sonoma County Code)

Note: Inspections, tests and reports are required when the corresponding box is checked.

Grading Inspector	Engineer
☒ Pre-construction meeting with contractor, grading inspector and/or others.	☒ Pre-construction meeting with contractor, geotechnical engineer, grading inspector and others, as applicable.
☒ Other inspections, as agreed at pre-construction meeting.	☒ Other inspections, as agreed at pre-construction meeting.
☒ Preparation of ground for fill placement, organic layer removed, competent material exposed, surface scarified, etc.	☒ Preparation of ground for fill placement, organic layer removed, competent material exposed, surface scarified, etc.
☐ Surface benched where surface receiving fill is steeper than 5h:1v.	☐ Surface benched where surface receiving fill is steeper than 5h:1v. (The geotechnical engineer may require benching at flatter than 5h:1v.)
☐ Key or core.	☐ Key or core.
☐ Terraces, as required.	☐ Subsurface drainage facilities.
☒ Surface drainage facilities including interceptor drains, swales, ditches on terraces, concrete or shotcrete ditch lining, etc.	☒ Fill placement method, suitability of materials, lift thickness, moisture content and density monitored and reported to contractor, etc. (Design specifications).
☒ Final rough grading of both cut and fill slopes, including terracing, rounding of top soil layer, setbacks from permit area boundaries, etc.	☐ Terraces, as required.
☒ Erosion control measures, either temporary or permanent, including sediment fences, installation of fabrics, seeding slopes, etc.	☒ Surface drainage facilities including interceptor drains, swales, ditches on terraces, concrete or shotcrete ditch lining, etc.
☒ Final inspection for code compliance. If engineered grading, the final report is also reviewed by grading inspector before the grading permit is finaled.	☒ Final rough grading of both cut and fill slopes, including terracing, rounding of top soil layer, setbacks from permit area boundaries, etc.
	☒ Density tests and moisture content with moisture/density curve at locations chosen by engineer providing grading controls, not by contractor.
	☒ Erosion control measures, either temporary or permanent, including sediment fences, installation of fabrics, seeding slopes, etc.
	☒ "As Built" plans by civil engineer, if changes have been made during construction. Verification on line & grade by civil engineer may be requested by soils engineer or this department.
	☒ Final report by the soils engineer providing grading controls meeting the requirements.

Plan Checker: _____ Date: 10/7/13

*Engineer: _____ Date: 10-3-13

*Engineer's signature is required for "engineered" grading.

Steve Martin, P.E.