

Exhibit D-1

NAPA VALLEY VINEYARD ENGINEERING, INC.

176 MAIN STREET, SUITE B
ST. HELENA, NAPA VALLEY, CALIFORNIA 94574
(707) 963-4927 nvvedla@covad.net

DREW L. ASPEGREN, P.E.
CIVIL ENGINEER

ATLAS VIEW II ECP
4300 Atlas Peak Road

WATER DEMAND AND WATER AVAILABILITY ANALYSIS March 29, 2019



It is proposed that the new vineyard (17.1 net acres) will be irrigated using groundwater. This analysis presents water demand for all uses on the Atlas View II (AVII).

Water Demand

The average annual water demand is:

$(17.1 \text{ net vine acres})(1,815 \text{ vines/ac}) = 31,037 \text{ vines}$

$(31,037 \text{ vines})(80 \text{ gal/vine/yr})/(325,851 \text{ gal/af}) = 7.62 \text{ afa (acre-feet per annum)}$

Allowing .01 afa for other minor agricultural uses, total vineyard water use is expected to be 7.63 afa.

Peak vineyard irrigation is expected to be 4 gallons/vine/week. Assuming a 6 day irrigation cycle, average daily operation will irrigate 5,173 vines (31,037 vines/6 days); allowing for 10% increase because of varying convenient irrigation set sizes, peak daily vineyard irrigation will cover 5,690 vines. Peak daily vineyard demand is then $\pm 22,760$ gallons (5,690 vines x 4 gal). There are no other water using activities on the property.

Water Availability

The soils mapped for the subject property are Aiken loam and Forward gravelly loam, both of which are derived from the underlying volcanic parent material. It has been estimated that only about 9-13% of rainfall which falls on these volcanics can percolate into the underlying formation and appear in the deep aquifers (USGS Water Resources Investigation 77-82, Michael Johnson, 1977); the remaining 87-91% flows off site as direct runoff or is held in the topsoils to be evapotransported by surface vegetation.

The parcel is 115.75 acres overlying these volcanic formations, and the average annual rainfall is 34" (Napa County Flood Control and Water Conservation District Isohyetal Rainfall Map, 1975). On average, the property will receive ± 328 af of rainfall ($115.75 \text{ ac} \times 34" = 328.0 \text{ af}$). Using a conservative estimate of 10% appearing as annual groundwater recharge, it is expected that AVII will contribute about 32.8 af to the groundwater supply annually.

The Isohyetal Rainfall map shows that, on average, AVII receives about 106% of St. Helena rainfall (St. Helena = 32"/yr). NOAA rainfall records for St. Helena show that 18.15" fell during 2013-14 and 26.27" during 2014-15. We consider 2014-15 to be a "dry year" ($\pm 77\%$ of average), and 2013-14 to be an "extremely dry year" ($\pm 53\%$ of average). Assuming 106% of that rainfall at AVII, and using the same analysis presented above, it is expected that for 2013-14, ± 185.6 acre-feet (af) would fall on the 115.75 acre property, and 18.56 af would appear as groundwater. Similarly, for 2014-15, 253.40 af would fall on the property and ± 25.34 af would appear as groundwater.

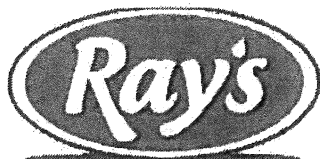
Attached are the driller's logs and a production test (Exhibit A-1 thru A-3) for the three irrigation wells, which indicate a total production of 27.9 gallons per minute (gpm). At 27 gpm, the irrigation wells will need to operate about 14 hours to meet vineyard demand on a peak day.

Conclusions

Total average annual water demand is ± 7.63 afa, or about 23% of the subject property's average annual groundwater recharge ($7.63/32.8=23.3\%$). Further, the 7.63 afa vineyard water demand then would be $\pm 41\%$ ($7.63/18.56$) of the 2013-14 rainfall contribution to groundwater, and $\pm 30\%$ ($7.63/25.3=30.2$) during 2014-15. Over the long term, it is expected that using groundwater to support the proposed project will not diminish the underlying aquifer. Even during those back to

back dry years, it is expected that vineyard irrigation would not have diminished the underlying aquifer nor impacted other wells.

Attached is a portion of the Capell Valley Quad sheet (Exhibit B) showing the project site and the existing irrigation wells which supports the vineyard. A 500' radius circle has been drawn, centered on the irrigation well, demonstrating that no wells fall within 500' of the existing wells.



WELL TESTING SERVICE

Ray's Well Testing Service Inc.
4031 Shadowhill Dr, Santa Rosa Ca 95404
Phone 707 823 3191 Fax 707 317 0057 Lic# 903708

WELL #1

CUSTOMER INFORMATION

REPORT #: 6754	DATE OF TEST: 9/29/2014
CUSTOMER NAME:	CONTACT:
AGENT NAME: Scott Andersen - Preferred Properties	CONTACT: 707-321-3168
PROPERTY ADDRESS: 4300 Atlas Peak Rd, Napa CA 94558	SENT TO: scott@napaluxury.com

WELL DATA

LOCATION OF WELL:	In field near road on south side of property
TYPE OF WELL:	Drilled
DEPTH OF COMPLETED WELL:	Unknown - Probe stopped at pump
DIAMETER OF WELL CASING:	8" Steel with 6" Steel Liner
SANITARY WELL SEAL (PLATE SEAL AT OPENING OF WELL CASING):	Yes
ANNULAR SEAL (IN-GROUND SEAL OF BOREHOLE):	Unknown - Please Refer to well log
PUMP HP AND TYPE:	2 HP 230V Submersible
DEPTH OF PUMP SUCTION:	180 Feet. 1.25" tee at well head. #10-4 sub cable

WATER PRODUCTION RESULTS

WATER LEVEL AT START (STATIC LEVEL):	62 Feet	FLOW RATE AT START:	26.7 GPM
FINAL PUMPING LEVEL:	180 Feet	FINAL FLOW RATE:	18.4 GPM
WATER LEVEL DRAWDOWN:	118 Feet	TOTAL LENGTH OF TEST:	4 Hours

CONSTANT PUMPING LEVEL INFORMATION

STABILIZED PUMPING LEVEL:	180 Feet	STABILIZED FLOW RATE (YIELD):	18.4 GPM
DURATION OF CONSTANT PUMPING LEVEL:	see pumping log	TOTAL YIELD:	see pumping log

WATER SYSTEM INSPECTION

WELL PUMP	Functional	TECHNICAL INFO: 20.4 GPM @ 100 PSI @ 64', 10.2 amps, control box dated 2009
ELECTRICAL	Functional	TECHNICAL INFO: 40 amp breaker in main panel near well head
PRESSURE TANK	Deficient	TECHNICAL INFO: 2- 86 gallon WX-252 tanks, dated 1977, 24 and 0 PSI air charges
STORAGE TANK	None	TECHNICAL INFO:
BOOSTER PUMP	None	TECHNICAL INFO:

WATER QUALITY TESTING

THE FOLLOWING SAMPLES ARE BEING ANALYZED. PLEASE REFER TO FOLLOW-UP REPORT FOR RESULTS.		
Bacteria - Coliform & E.Coli	DATED: 9/29/2014	TURNAROUND: Standard
	DATED:	TURNAROUND:
	DATED:	TURNAROUND:
	DATED:	TURNAROUND:

SEE NEXT PAGE FOR FURTHER INFORMATION...

EXHIBIT A-1

Page 1 of 1

Owner's Well No. 2-2018

Date Work Began 5/29/2018, Ended 6/8/2018

Local Permit Agency Napa County Environmental Mgmt

Permit No. E18-00177 Permit Date 3/13/2018

STATE OF CALIFORNIA
COMPLETION REPORT
Refer to Instruction Pamphlet

Refer to Instruction Pamphlet

No. e0367356

DWR USE ONLY -- DO NOT FILL IN											
STATE WELL NO./STATION NO.											
LATITUDE						LONGITUDE					
APN/TRS/OTHER											

GEOLOGIC LOG

[illegible]

TOTAL DEPTH OF BORING 420 (Feet)

TOTAL DEPTH OF COMPLETED WELL 190 (Feet)

- WELL OWNER

Name <u>Atlas View, LLC</u>		
Mailing Address <u>1535 Sage Canyon Road</u>		
<u>St. Helena</u>	<u>CA</u>	<u>94574</u>
CITY	STATE	ZIP

WELL LOCATION

Address 4300 Atlas Peak Road
City Napa CA
County Napa
APN Book 032 Page 120 Parcel 015
Township _____ Range _____ Section _____
Latitude _____

LOCATION SKETCH

A hand-drawn map of the study area. The map is oriented with North at the top. A road, labeled "WEST ATLAS PEAK ROAD", runs vertically along the left side of the map. A creek, labeled "CREEK", runs horizontally across the bottom of the map. A well, represented by a circle with a cross inside, is located in the upper right portion of the map. The well is 625' north of the creek and 450' west of the road. The word "WELL" is written to the left of the well symbol. The word "NORTH" is written at the top of the map, and "SOUTH" is written at the bottom.

- ACTIVITY (✓)

☒ NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify) _____

— DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY

☒ Domestic _____ Public _____

☒ Irrigation _____ Industrial _____

MONITORING _____

TEST WELL _____

CATHODIC PROTECTION _____

HEAT EXCHANGE _____

DIRECT PUSH _____

INJECTION _____

VAPOR EXTRACTION _____

SPARGING _____

REMEDIATION _____

OTHER (SPECIFY) _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 120 (Ft.) BELOW SURFACE 1
 DEPTH OF STATIC WATER LEVEL 91 (Ft.) & DATE MEASURED 6/8/2018
 ESTIMATED YIELD * 3 (GPM) & TEST TYPE AIR LIFT
 TEST LENGTH 3 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)
May not be representative of a well's long-term yield.

DEPTH FROM SURFACE			BORE- HOLE DIA. (Inches)	CASING (S)							
				TYPE (✓)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
				BLANK	SCREEN	CON- DUCTOR	FILL PIPE				
0	25	12									
25	420	9									
0	110		✓				PVC F480	5	SDR-21		
110	170			✓			PVC F480	5	SDR-21	.032	
170	190		✓				PVC F480	5	SDR-21		

DEPTH FROM SURFACE		ANNULAR MATERIAL			
		TYPE			FILTER PACK (TYPE/SIZE)
Ft	to Ft	CE- MENT (✓)	BEN- TONITE (✓)	FILL (✓)	
0	3	✓			CONCRETE
3	21		✓		GROUT
31	420			✓	PEA GRAVEL

ATTACHMENTS (✓)

- ☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analysis
☐ Other _____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME HUCKFELDT WELL DRILLING, INC.

(PERSON, FIRM, OR CORPORATION) (TYPE OR PRINTED)

2110 Penny Lane

Napa
CITY

CA	94559
STATE	ZIP

Signed

WELL DRILLER/AUTHORIZED REPRESENTATIVE

06/24/18
DATE SIGNED

439-746
C-57 LICENSE NUMBER

EXHIBIT A-7

ORIGINAL
File with DWR

Page 1 of 1

Owner's Well No. 1-2018

WELL #2

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. **e0364594**

Date Work Began 2/20/2018, Ended 3/6/2018

Local Permit Agency Napa County Environmental Mgmt

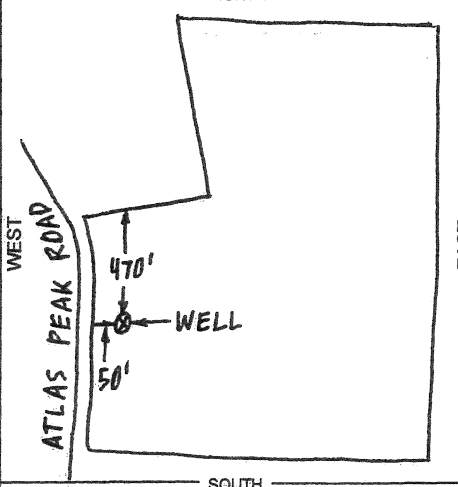
Permit No. E18-00023

Permit Date 1/16/2018

DWR USE ONLY -- DO NOT FILL IN

STATE WELL NO./STATION NO.	
LATITUDE	LONGITUDE
APN/TRS/OTHER	

ORIENTATION (✓) <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> ANGLE _____ (SPECIFY)		
DEPTH FROM SURFACE		DESCRIPTION <i>Describe material, grain, size, color, etc.</i>
Ft.	to Ft.	
0	6	BROWN ASH
6	15	TAN ASH WITH COBBLES
15	100	TAN SANDY ASH
100	130	MIXED VOLCANIC ROCK
130	200	TAN ASH WITH EMBEDDED ROCK
200	245	TAN ASH
245	310	TAN ASH WITH EMBEDDED ROCK
310	375	BROWN SANDY ASH
375	400	SHALE
400	415	80% CLAY / 20% SHALE
415	500	50% CLAY / 50% SHALE
500	520	80% CLAY / 20% SHALE
520	560	50% CLAY / 50% SHALE
NEW FILE		
TOTAL DEPTH OF BORING <u>560</u> (Feet)		
TOTAL DEPTH OF COMPLETED WELL <u>159</u> (Feet)		

WELL OWNER		
Name <u>Atlas View, LLC</u>		
Mailing Address <u>1535 Sage Canyon Road</u>		
<u>St. Helena</u>	<u>CA</u>	<u>94574</u>
CITY	STATE	ZIP
WELL LOCATION		
Address <u>4300 Atlas Peak Road</u>		
City <u>Napa CA</u>		
County <u>Napa</u>		
APN Book <u>032</u>	Page <u>120</u>	Parcel <u>015</u>
Township _____	Range _____	Section _____
Latitude _____	DEG. MIN. SEC. _____	DEG. MIN. SEC. _____
LOCATION SKETCH		
		
Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.		
ACTIVITY (✓) <input checked="" type="checkbox"/> NEW WELL		
MODIFICATION/REPAIR <input type="checkbox"/> Deepen <input type="checkbox"/> Other (Specify) _____		
DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG") _____		
PLANNED USES (✓) <input checked="" type="checkbox"/> WATER SUPPLY		
<input checked="" type="checkbox"/> Domestic <input type="checkbox"/> Public <input checked="" type="checkbox"/> Irrigation <input type="checkbox"/> Industrial		
MONITORING <input type="checkbox"/> TEST WELL <input type="checkbox"/>		
CATHODIC PROTECTION <input type="checkbox"/>		
HEAT EXCHANGE <input type="checkbox"/>		
DIRECT PUSH <input type="checkbox"/>		
INJECTION <input type="checkbox"/>		
VAPOR EXTRACTION <input type="checkbox"/>		
SPARGING <input type="checkbox"/>		
REMEDICATION <input type="checkbox"/>		
OTHER (SPECIFY) _____		
WATER LEVEL & YIELD OF COMPLETED WELL		
DEPTH TO FIRST WATER <u>100</u> (Ft.) BELOW SURFACE		
DEPTH OF STATIC WATER LEVEL <u>47</u> (Ft.) & DATE MEASURED <u>3/6/2018</u>		
ESTIMATED YIELD <u>6.5</u> (GPM) & TEST TYPE <u>AIR LIFT</u>		
TEST LENGTH <u>3</u> (Hrs.) TOTAL DRAWDOWN <u>N/A</u> (Ft.)		
May not be representative of a well's long-term yield.		

DEPTH FROM SURFACE		BORE-HOLE DIA. (Inches)	CASING (S)					ANNULAR MATERIAL				
Ft.	to Ft.		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	DEPTH FROM SURFACE	TYPE			
Ft.	to Ft.		BLANK	SCREEN	CONDUCTOR	FILL PIPE			CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	25	10										CONCRETE
25	560	9										CHIPS
0	79			✓			PVC F480	5	SDR-21			PEA GRAVEL
79	139			✓			PVC F480	5	SDR-21			TABLETS
139	159			✓			PVC F480	5	SDR-21			PEA GRAVEL

ATTACHMENTS (✓)		CERTIFICATION STATEMENT	
<input type="checkbox"/> Geologic Log <input type="checkbox"/> Well Construction Diagram <input type="checkbox"/> Geophysical Log(s) <input type="checkbox"/> Soil/Water Chemical Analysis <input type="checkbox"/> Other _____		I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.	
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.		NAME <u>HUCKFELDT WELL DRILLING, INC.</u>	
		(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)	
		2110 Penny Lane <u>Napa</u> <u>CA</u> <u>94559</u>	
		ADDRESS CITY STATE ZIP	
		Signed <u>[Signature]</u> DATE SIGNED <u>03/13/18</u> 439-746	
		WELL DRILLER/AUTHORIZED REPRESENTATIVE C-57 LICENSE NUMBER	

EXHIBIT A-2

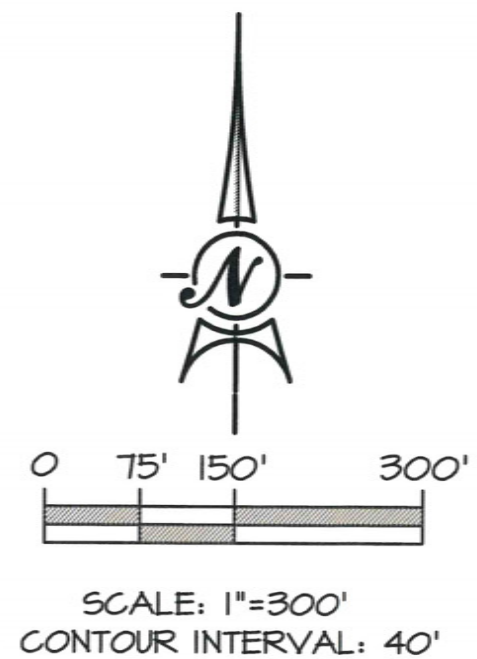
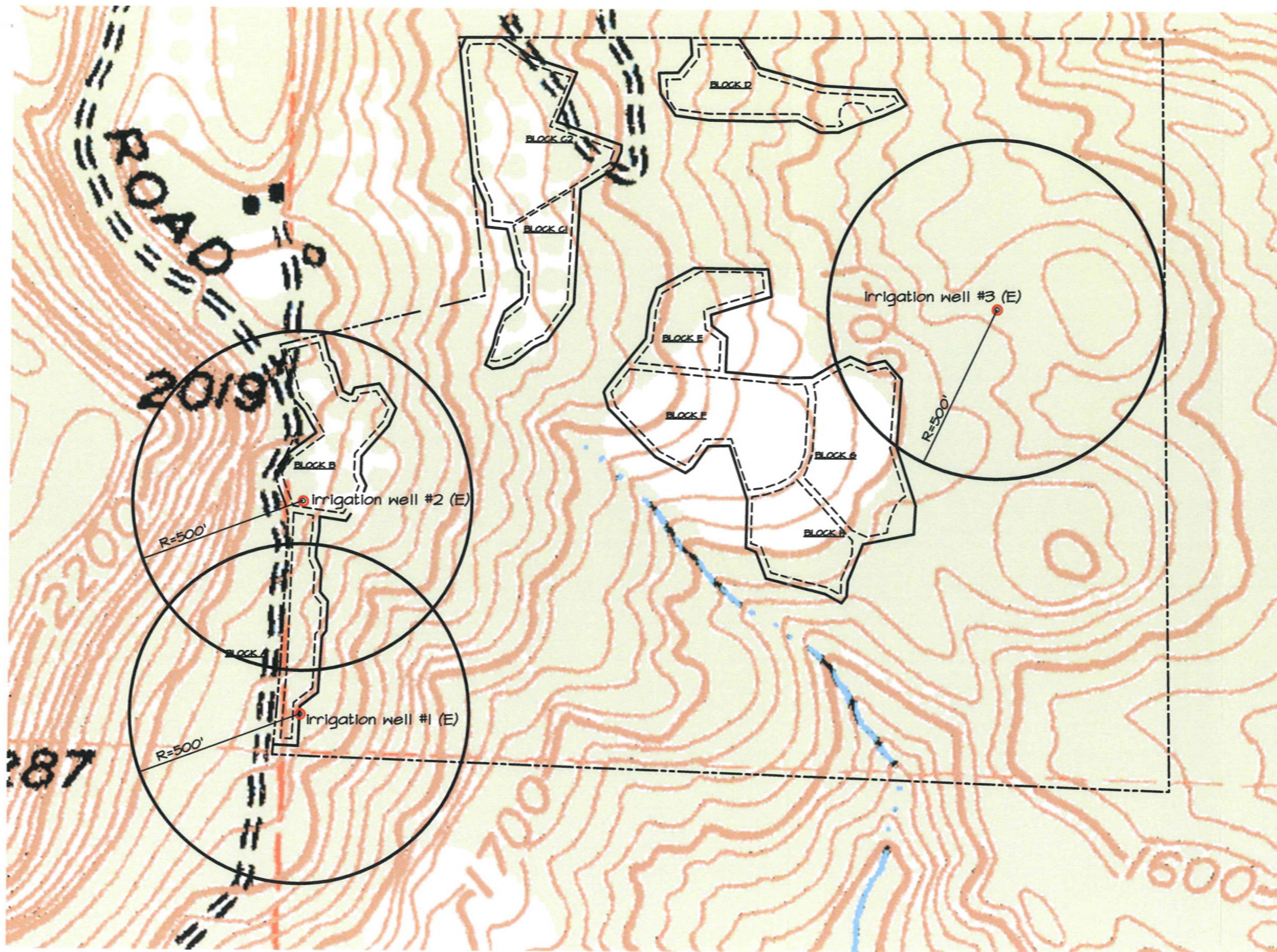


EXHIBIT B

ATLAS VIEW LLC
Atlas View II Vineyard
WELL LOCATION MAP
NVE 3-4-14