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Water Availability Analysis

ZD Wines Use Permit Major Modification P16-00026
Planning Commission Hearing March 15, 2017

RSA+

WATER AVAILABILITY ANALYSIS

ZD WINES

8383 SILVERADO TRAIL
NAPA, CA 94558

APN 030-200-005

Prepared for:

ZD Wines, LLC
8383 Silverado Trail
Napa, CA 94558

RECEIVED

JAN 2 8 2016

Napa County Planning, Building
& Environmental Services

#4114037.0

January 28, 2016

I.   Executive Summary

The present owners of the ZD Winery, in good faith, voluntarily, pursuant to the existing Use Permit, including but not limited to the 1990 Project Revision Statement, are requesting confirmation that ZD Winery is entitled to the existing employees, visitation and parking as follows: 25 Full-time Employees, 10 Part-time Employees, 225 Visitors daily and 33 Parking Spaces. The project proposes no increase in visitation, full-time or part-time employees or production and no new construction.

Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Vineyard		
Irrigation	1.52	1.52
Reclaimed Process Wastewater for Vineyard Irrigation	-0.73	-0.73
Winery		
Process Water	1.07	1.07
Landscaping	0.35	0.35
Domestic Water	1.37	1.37
Totals (Acre-ft per Year)	3.59	3.59
Estimated Ground Water Recharge (Acre-ft per Year)	5.75	5.75

There will be no change in water use. The water use of 3.59 af/yr is less than the estimated groundwater recharge rate of 5.75 af/yr. A Groundwater recharge of 1.0 af/yr/acre for valley floor was adopted for the 5.75 acre parcel to give a total groundwater recharge of 5.75 af/yr. There are no wells within 500 feet of the existing well on the parcel as shown on Well Exhibit attached.

II.   Water Use Calculation

Existing Vineyard, Landscape and Winery Process Water Demand

Vineyard – Irrigation only – (0.5 af/ac-yr x	3.04	acres vineyard) =	1.52	af/yr
Reclaimed Process Water for Irrigation*	0.73	acre-feet/year) =	-0.73	af/yr
Landscape – (0.5 acre feet water / 100,000 gal wine x	70,000	gal wine/year) =	0.35	af/yr
Process Water – (5 gal water / 1 gallon wine x	70,000	gal wine/year) =	1.07	af/yr
		Total =	**2.21**	**af/yr**

Existing Winery Domestic Water Demand

FT Employees – (15 gal/person/day x 365 days/yr x	25	employees/day) =	0.42	af/yr
PT Employees – (15 gal/person/day x 365 days/yr x	10	employees/day) =	0.17	af/yr
Visitors – (3 gal/person/day x 365 days/yr x	225	visitors/day) =	0.76	af/yr
Charitable Marketing Events – (149 visitors average @ 10 gpd x	4	days/year) =	0.02	af/yr
Midsized Marketing Events – (25 visitors average @ 10 gpd x	12	days/year) =	0.01	af/yr
		Total =	**1.37**	**af/yr**

Proposed Vineyard, Landscape and Winery Process Water Demand
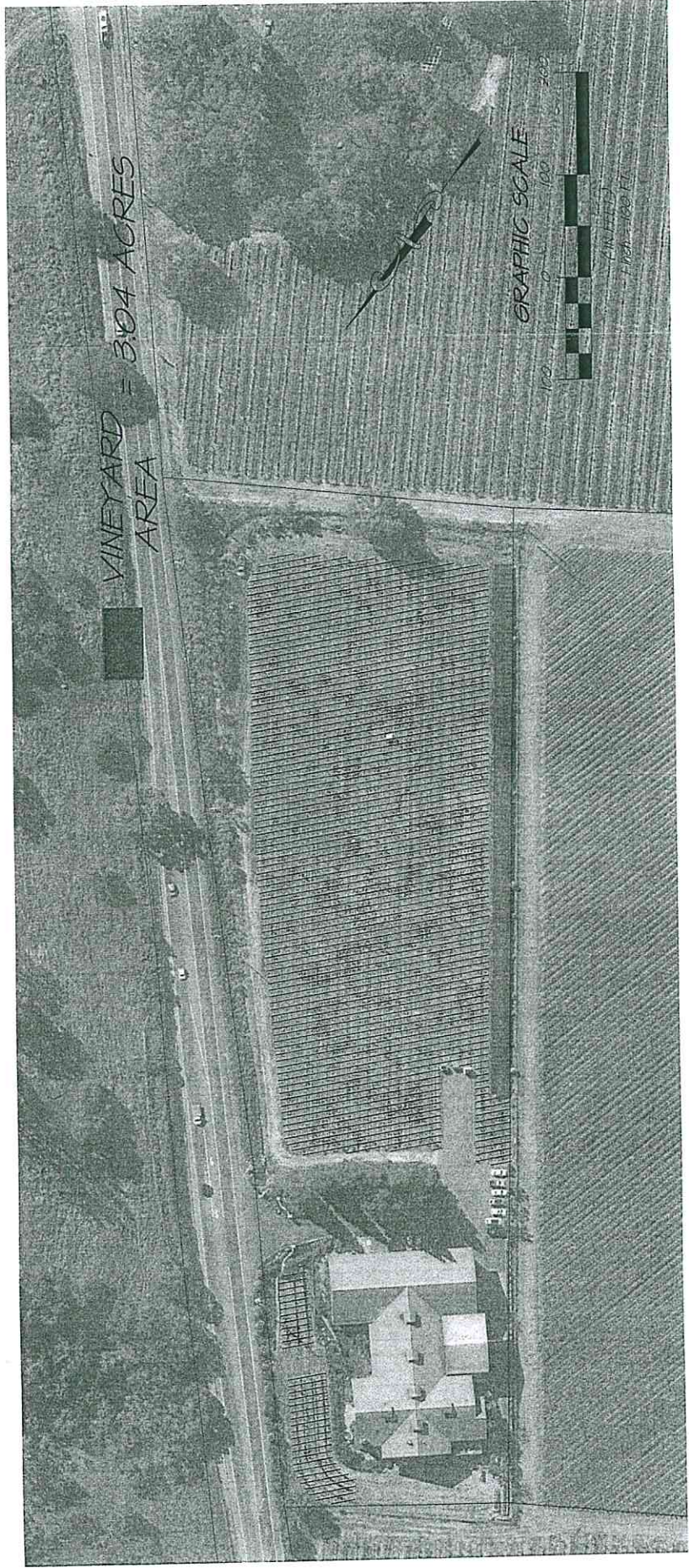
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Proposed Winery Domestic Water Demand

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		Total =	**1.37**	**af/yr**

*see attached Irrigation Water Balance for calculation

ZD WINES
TOTAL VINEYARD AREA

VINEYARD = 3.04 ACRES
AREA

GRAPHIC SCALE

Reclaimed Process Wastewater
Water Balance for Irrigation and Storage

RSA+

Project Description

Project Number:	4114037.0
Project Name:	ZD Wines
Prepared By:	MSS
Date:	December 17, 2014

Annual Process Waste Flow Volume

Wine Production:	70,000	gal/year
Annual Process Waste per Gallon Wine:	5	gal/year
Total Annual Process Waste Generated:	350,000	gal/year

Vineyard Irrigation Parameters

Acres of irrigated vineyard:	2.40 acres
Row spacing:	10.0 feet
Vine spacing:	6.0 feet
Total number of vines:	1,742 vines
Water use per vine per month (peak):	26 gal
Total peak monthly irrigation demand:	45,302 gal

Cover Crop Irrigation Parameters

Crop type / name:	Vineyard cover crop	
Total irrigated acres of crop:	2.40	acres

Infiltration Parameters

Soil Type	Acres	Infiltration Rate
Boomer-Forward-Felta complex	0.84	0.35 in/hr
Perkins gravelly loam	1.56	0.68 in/hr
Weighted Average	2.4	0.56 in/hr
Assumed steady state maximum		0.056 in/hr

Monthly Process Wastewater Generation

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly process wastewater generated as % of annual total:	4%	6%	6%	5%	6%	7%	9%	10%	14%	14%	11%	8%
Monthly process wastewater generated [gallons]:	14,000	21,000	21,000	17,500	21,000	24,500	31,500	35,000	49,000	49,000	38,500	28,000

Monthly Vineyard Irrigation Water Use

(Based on per-vine water use)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beginning of month reclaimed water in storage [gallons] (This number brought forward from end of previous month)	0	0	0	0	0	0	0	0	0	0	0	0
Vineyard irrigation as % of peak month irrigation demand:	6%	6%	10%	100%	100%	100%	100%	100%	100%	100%	10%	10%
Irrigation per month per vine (gallons):	1.6	1.6	2.6	26.0	26.0	26.0	26.0	26.0	26.0	26.0	2.6	2.6
Total vineyard irrigation demand [gallons]:	2,718	2,718	4,530	45,302	45,302	45,302	45,302	45,302	45,302	45,302	4,530	4,530
Will vineyard be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater generated this month, reclaimed for vineyard irrigation [gallons]	2,718	2,718	4,530	17,500	21,000	24,500	31,500	35,000	45,302	45,302	4,530	4,530
Remaining vineyard irrigation demand after using this month's process water [gallons]	0	0	0	27,802	24,302	20,802	13,802	10,302	0	0	0	0
Drawdown from storage for remaining vineyard irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Well water required to satisfy remaining vineyard irrigation demand	0	0	0	27,802	24,302	20,802	13,802	10,302	0	0	0	0
Net storage after vineyard irrigation drawdown [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
This month's process wastewater, remaining after vineyard irrigation, available for landscape irrigation [gallons]	11,282	18,282	16,470	0	0	0	0	0	3,698	3,698	33,970	23,470

Water balance continues on next page for cover crop irrigation.

Monthly Cover Crop Irrigation Water Use

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(Based on evapotranspiration crop demand and irrigated area)												
This month's process wastewater, remaining after vineyard irrigation, available for cover crop irrigation[gallons] *(From sheet 1)*	11,282	18,282	16,470	0	0	0	0	0	3,698	3,698	33,970	23,470
Reference ET (ETo) (in/month) (see note 1)	0.93	1.68	2.79	4.20	5.58	6.30	6.51	5.89	4.50	3.10	1.50	0.93
Crop Coefficient (k_c) (see note 2)	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Crop water demand per acre [inches]	0.56	1.01	1.67	2.52	3.35	3.78	3.91	3.53	2.70	1.86	0.90	0.56
Crop water demand per acre [gallons]	15,151	27,370	45,453	68,424	90,906	102,636	106,057	95,957	73,311	50,503	24,437	15,151
Total crop water demand for irrigated area [gallons]	36,362	65,687	109,087	164,218	218,175	246,327	254,537	230,296	175,948	121,208	58,649	36,362
Will cover crop be irrigated with reclaimed water this month?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Process wastewater remaining after vineyard irrigation, reclaimed for cover crop irrigation [gallons]	11,282	18,282	16,470	0	0	0	0	0	3,698	3,698	33,970	23,470
Cover Crop irrigation water required from storage or other source [gallons]	25,081	47,405	92,618	164,218	218,175	246,327	254,537	230,296	172,250	117,511	24,679	12,893
Drawdown from storage for cover crop irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Process wastewater generated this month, unused for irrigation, to be reclaimed and stored [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Net end-of-month reclaimed water storage after all irrigation [gallons]	0	0	0	0	0	0	0	0	0	0	0	0
Process waterwater applied to cover crop areas (gallons)	11,282	18,282	16,470	0	0	0	0	0	3,698	3,698	33,970	23,470
Process waterwater applied to cover crop areas (inches)	0.17	0.28	0.25	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.52	0.36

Monthly Evaporation & Infiltration Capacity

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Monthly Precipitation (inches)	7.60	6.53	4.32	2.10	0.85	0.25	0.03	0.07	0.29	1.72	3.93	6.90
100-year Monthly Precipitation (inches)	30.20	25.95	17.17	8.34	3.38	0.99	0.12	0.28	1.15	6.83	15.62	27.42
Total Monthly Soil Infiltration Capacity (inches)	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6	40.6
Total Monthly Infiltration after 100-year Precipitation (inches)	10.4	14.7	23.5	32.3	37.3	39.7	40.5	40.4	39.5	33.8	25.0	13.2
Monthly Pan Evaporation (inches)	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	5.72	2.48	1.66
Net Monthly Infiltration & Evaporation capacity available in addition to Vineyard and Cover Crop evapotranspiration (inches)	12.0	16.8	27.3	38.1	46.2	50.7	53.7	52.4	48.2	39.5	27.5	14.9
Net Monthly Infiltration & Evaporation capacity available in addition to Vineyard and Cover Crop evapotranspiration (gallons)	780,295	1,097,772	1,776,919	2,484,071	3,008,466	3,300,683	3,502,320	3,416,370	3,138,489	2,575,954	1,792,542	970,030

End of Water Balance

RSA⁺

Reclaimed Process Wastewater
Water Balance for Irrigation and Storage

Peak Monthly Storage =   0 gallons

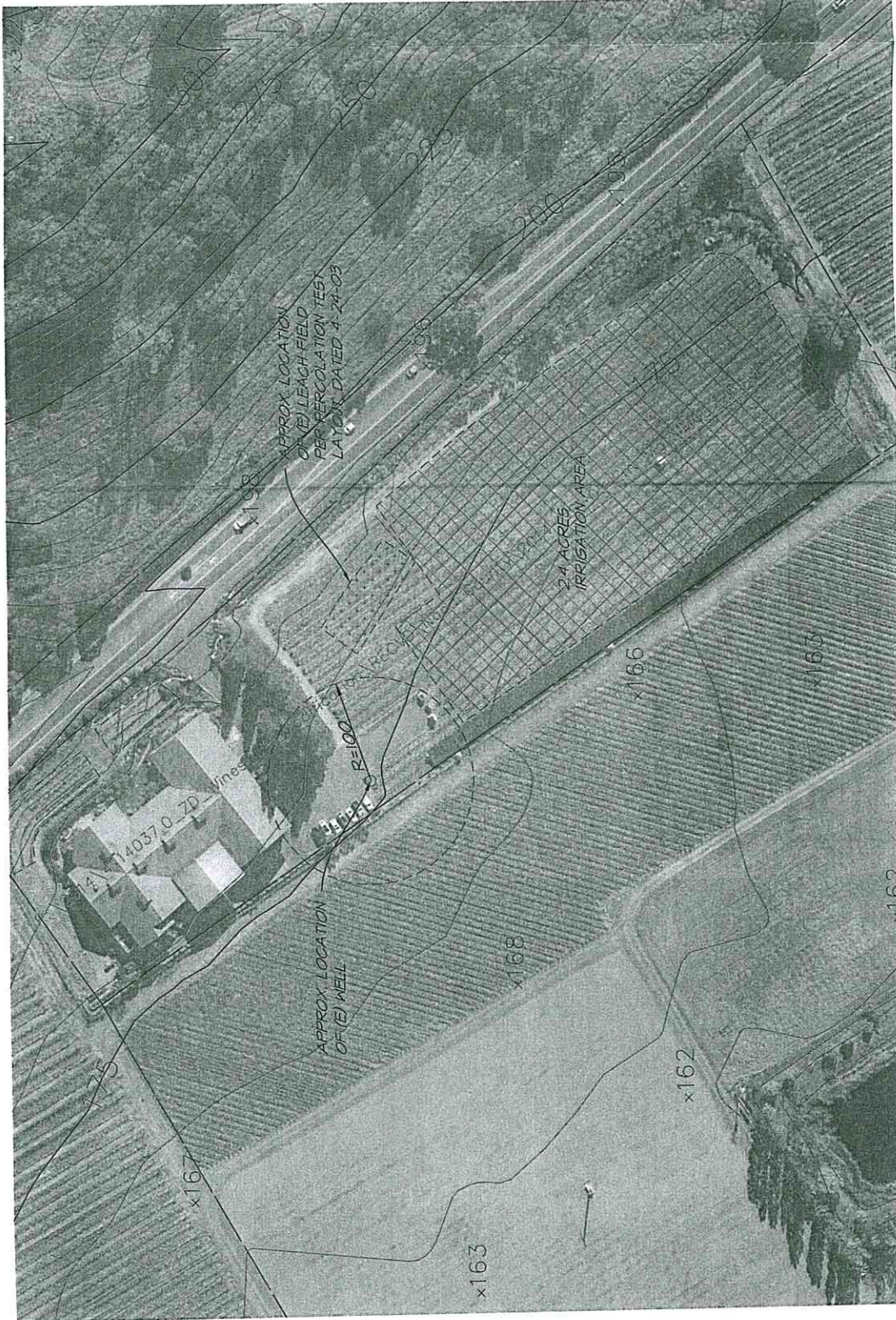**Annual Process Wastewater Reclaimed For Vineyard Irrigation =**   239,132 gallons

Notes:

1. Reference ETo from California Irrigation Management Information System

2. Crop Coefficient from Table 1 of "Estimating Irrigation Water Needs of Landscape Plantings in California", University of California Cooperative Extension, August 2000.

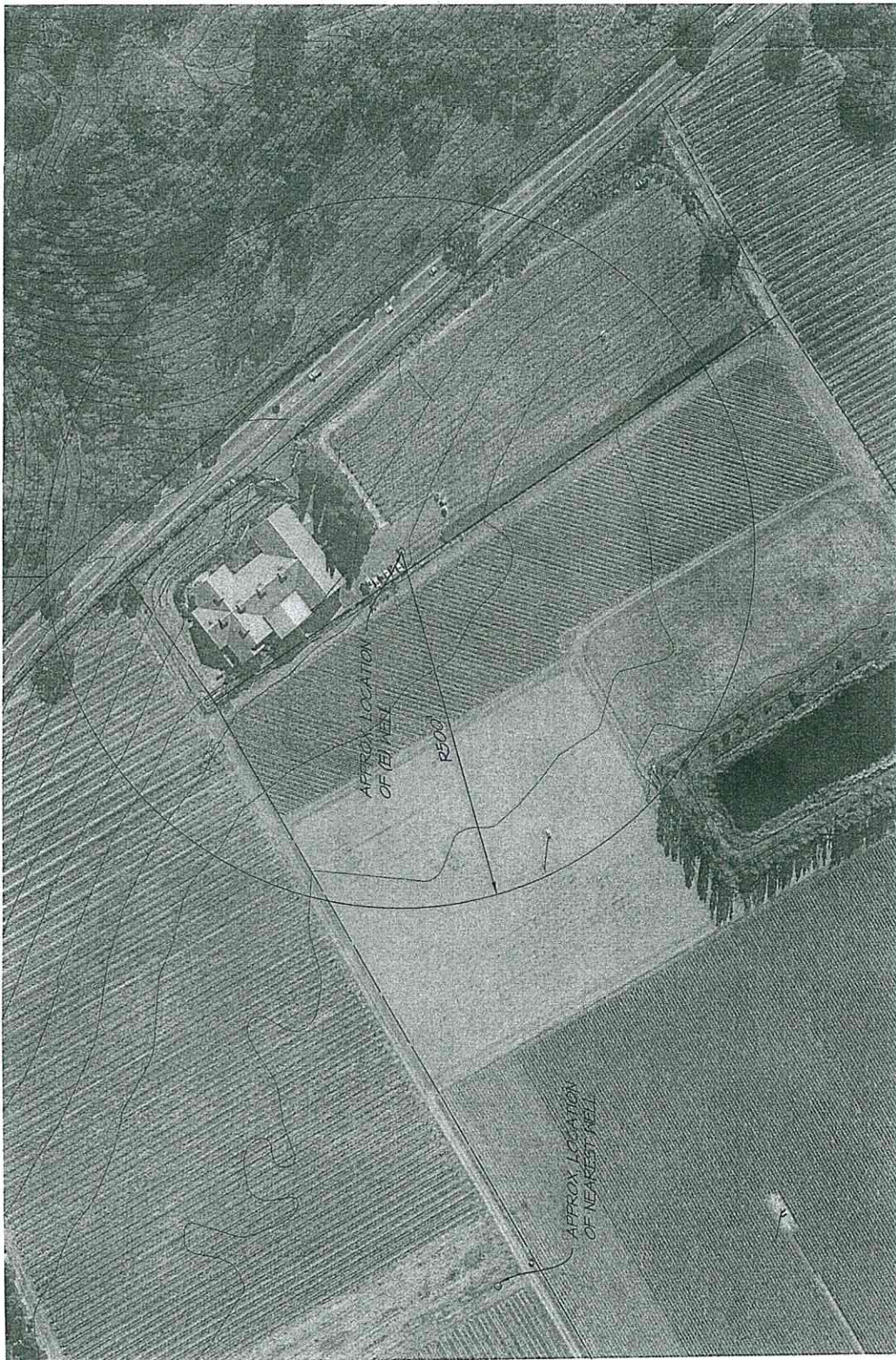# ZD WINES
VINEYARD IRRIGATION EXHIBIT
NAPA   CALIFORNIA

APPROX. LOCATION OF (E) LEACH FIELD PER PERCOLATION TEST LAYOUT DATED 4-24-03

2.4 ACRES IRRIGATION AREA

APPROX. LOCATION OF (E) WELL

R=100

4114037.0 ZD Wines

×198

×199

×166

×163

×162

×168

×167

×163

×162

×167

GRAPHIC SCALE

100   0   100   200

(IN FEET)
1 inch = 100 FT

ZD WINES
WELL EXHIBIT

APPROX LOCATION OF (E) WELL

R500'

APPROX LOCATION OF NEAREST WELL

GRAPHIC SCALE

150   0   150   300

(IN FEET)
1 Inch = 150 FT