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Water Availability Analysis, Annual
Groundwater Recharge Rate Analysis, &
Water System Feasibility Study



WATER AVAILABILITY ANALYSIS

TRUCHARD WINERY
4062 OLD SONOMA ROAD
NAPA, CALIFORNIA

APN 043-040-001 (Winery Site)
043-061-022 (Well Location)

Prepared for:

Anthony Truchard
3234 Old Sonoma Road
Napa, CA 94559



Project# 4113042.0

October 13, 2016

I. Executive Summary

The Winery parcel is currently connected to the Congress Valley Water district and intends to derive the anticipated water demands for the Truchard Winery project entirely from this connection. The Congress Valley Water district sources their water from the City of Napa. As you can see from the attached will serve letter, the Congress Valley Water District intends to honor the current water allotment, however the water district is planning on disbanding and after July 2017 their customers will be maintained through the City of Napa Water District. To be thorough and to provide for future flexibility, we have considered an alternative to the dependence on the municipal water connection and have analyzed the entire project water demand relying on an existing groundwater well. As you will see below the analysis demonstrates that it a sustainable project in either scenario.

In accordance with the Napa County Water Availability Analysis (WAA), the following calculations demonstrate the water use of the proposed Truchard Winery. The Truchard Winery project is located at 4062 Old Sonoma Road, Napa, California 94559, APN 043-040-001 (Winery parcel). The project well is located on an adjacent 126.1 acre parcel, APN 043-061-022 (Well parcel). Both parcels are included in the groundwater demand as analyzed below.

The project well location is shown in attached well exhibit. There are no active wells on the winery parcel. The well in the south and in the west of the Winery parcel were never fully developed and have been abandoned per Napa County standards. Although the winery wastewater will be disposed on the adjacent parcel, Parcel Two, APN 043-040-003 and is analyzed in the wastewater feasibility it is not required to be analyzed in this WAA because it does not rely on groundwater provided by the Project Well but will be irrigated by the treated wastewater supplemented with the on-site irrigation pond.

A Water Use Criteria of 0.53 ac-ft/ac/year has been adopted for parcel 043-040-001 and 0.47 ac-ft/ac/year for parcel 043-061-022 from the RSA+ Groundwater Recharge Report attached. This gives an annual estimated recharge (Allowable Water Allotment) of 6.3 ac/ft (043-040-001) and 59.6 ac/ft (043-061-022) in an average rainfall year. In accordance with the Napa County Water Availability Analysis (WAA), the estimated groundwater recharge rate for average and dry years is included. In a dry year, the groundwater recharge rate is assumed to be 75% of the average year.

Two Alternatives are considered for this project:

1. Winery domestic and process water from Congress Valley Water District, irrigation water from project well.
2. All irrigation water supplied by the existing project well and winery domestic and process water supplied by a new project well.

Water demand for each alternative is shown below and detailed calculations are attached. The methods used in this analysis are based on the May 12, 2015 Napa County Water Availability Analysis guidance document.

Alternative 1 – Winery Domestic & Process Water from Congress Valley Water District

APN 043-040-001 Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Vineyard Irrigation	2.29	1.95
Winery Process Water	0.00	1.53
Landscaping	0.00	1.36
Domestic Water	0.00	0.24
Water Supplied from Congress Valley Water District	0.00	-1.77
Net Water Supplied from Well	2.29	3.31
Groundwater Recharge	6.30	6.30

APN 043-061-022 Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Vineyard Irrigation	41.20	41.20
Water Supplied from Well	41.20	41.20
Groundwater Recharge	59.59	59.59

Total (Combined Parcel) Water Supplied	Existing Usage [af/yr]	Proposed Usage [af/yr]
Water Supplied from Congress Valley Water District	0	-1.77
Water Supplied from Well	43.49	44.51
Groundwater Recharge	65.89	65.89

The proposed well water demand of 44.51 ac-ft per year is less than the estimated annual recharge of 65.89 ac-ft per year in an average rainfall year and less than the estimated annual recharge rate of 49.42 ac-ft per year in a dry year. It is proposed that winery domestic and process water will be supplied from the Congress Valley Water District. See attached Water Service Letter from Congress Valley Water District.

Alternative 2 – All Winery Water Supplied by Project Well

APN 043-040-001 Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Vineyard Irrigation	2.29	1.95
Winery Process Water	0.00	1.53
Landscaping	0.00	1.36
Domestic Water	0.00	0.24
Net Water Supplied from Well	2.29	5.08
Groundwater Recharge	6.30	6.30

APN 043-061-022 Usage Type	Existing Usage [af/yr]	Proposed Usage [af/yr]
Vineyard Irrigation	41.20	41.20
Water Supplied from Well	41.20	41.20
Groundwater Recharge	59.59	59.59

Total (Combined Parcel) Water Supplied	Existing Usage [af/yr]	Proposed Usage [af/yr]
Water Supplied from Well	43.49	46.28
Groundwater Recharge	65.89	65.89

The proposed well water demand of 46.28 ac-ft per year is less than the estimated annual recharge of 65.89 ac-ft per year in an average rainfall year and less than the estimated annual recharge rate of 49.42 ac-ft per year in a dry year.

II. Water Use Calculations

Alternative 1 – Winery Domestic & Process Water from Congress Valley Water District

Irrigation Demand (043-040-001) - Project Well

Existing Vineyard – (0.5 af/ac-yr x	4.58	acres vineyard) =	2.29	af/yr
Existing Vineyard to be Removed – (0.5 af/ac-yr x	0.89	acres vineyard) =	-0.45	af/yr
Total Existing Vineyard to Remain – (0.5 af/ac-yr x	3.69	acres vineyard) =	1.85	af/yr
New Vineyard Area – (0.5 af/ac-yr x	0.20	acres vineyard) =	+0.10	af/yr
Total Post Project Vineyard – (0.5 af/ac-yr x	3.89	acres vineyard) =	1.95	af/yr
Landscape – (see attached WELO for calculations)	1.36	af/year) =	1.36	af/yr
Total Existing (Existing Vineyard) =			2.29	af/yr
Total Proposed (Total Post Project Vineyard + Landscape) =			3.31	af/yr

Irrigation Demand (043-061-022) - Project Well

Existing Vineyard – (0.5 af/ac-yr x	82.4	acres vineyard) =	41.20	af/yr
Total Existing and Proposed Vineyard =			41.20	af/yr

Winery Domestic Water Demand - Congress Valley Water District

FT Employees – (15 gal/person/day x 300 days/yr x	4	employees/day) =	0.06	af/yr
PT Employees – (15 gal/person/day x 300 days/yr x	3	employees/day) =	0.04	af/yr
Harvest Employees – (15 gal/person/day x 45 days/yr x	2	employees/day) =	0.004	af/yr
Visitors – (3 gal/person/day x 365 days/yr x	30	visitors/day) =	0.10	af/yr
Food & Wine Pairing Events – (25 visitors @ 10 gpd x	24	days/yr) =	0.02	af/yr
Food & Wine Pairing Events – (150 visitors @ 10 gpd x	4	days/yr) =	0.02	af/yr
Total Proposed Domestic Water (Employees + Visitors + Events) =			0.24	af/yr

Winery Process Water Demand - Congress Valley Water District

Winery Process Water – (5 gal water / 1 gallon wine x	100,000	gal wine/year) =	1.53	af/yr
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Total Water Supplied from Congress Valley Water District - (Domestic + Process) =	1.77	af/yr
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Net Water Supplied by Well (Existing) =	43.49	af/yr
Net Water Supplied by Well (Proposed) =	44.51	af/yr

Alternative 2 – All Winery Water Supplied by Project Well

Irrigation Demand (043-040-001) - Project Well

Existing Vineyard – (0.5 af/ac-yr x	4.58	acres vineyard) =	2.29	af/yr
Existing Vineyard to be Removed – (0.5 af/ac-yr x	0.89	acres vineyard) =	-0.45	af/yr
Total Existing Vineyard to Remain – (0.5 af/ac-yr x	3.69	acres vineyard) =	1.85	af/yr
New Vineyard Area – (0.5 af/ac-yr x	0.20	acres vineyard) =	+0.10	af/yr
Total Post Project Vineyard – (0.5 af/ac-yr x	3.89	acres vineyard) =	1.95	af/yr
Landscape – (see attached WELO for calculations)	1.36	af/year) =	1.36	af/yr
Total Existing (Existing Vineyard) =			2.29	af/yr
Total Proposed (Total Post Project Vineyard + Landscape) =			3.31	af/yr

Irrigation Demand (043-061-022) - Project Well

Existing Vineyard – (0.5 af/ac-yr x	82.4	acres vineyard) =	41.20	af/yr
Total Existing and Proposed Vineyard =			41.20	af/yr

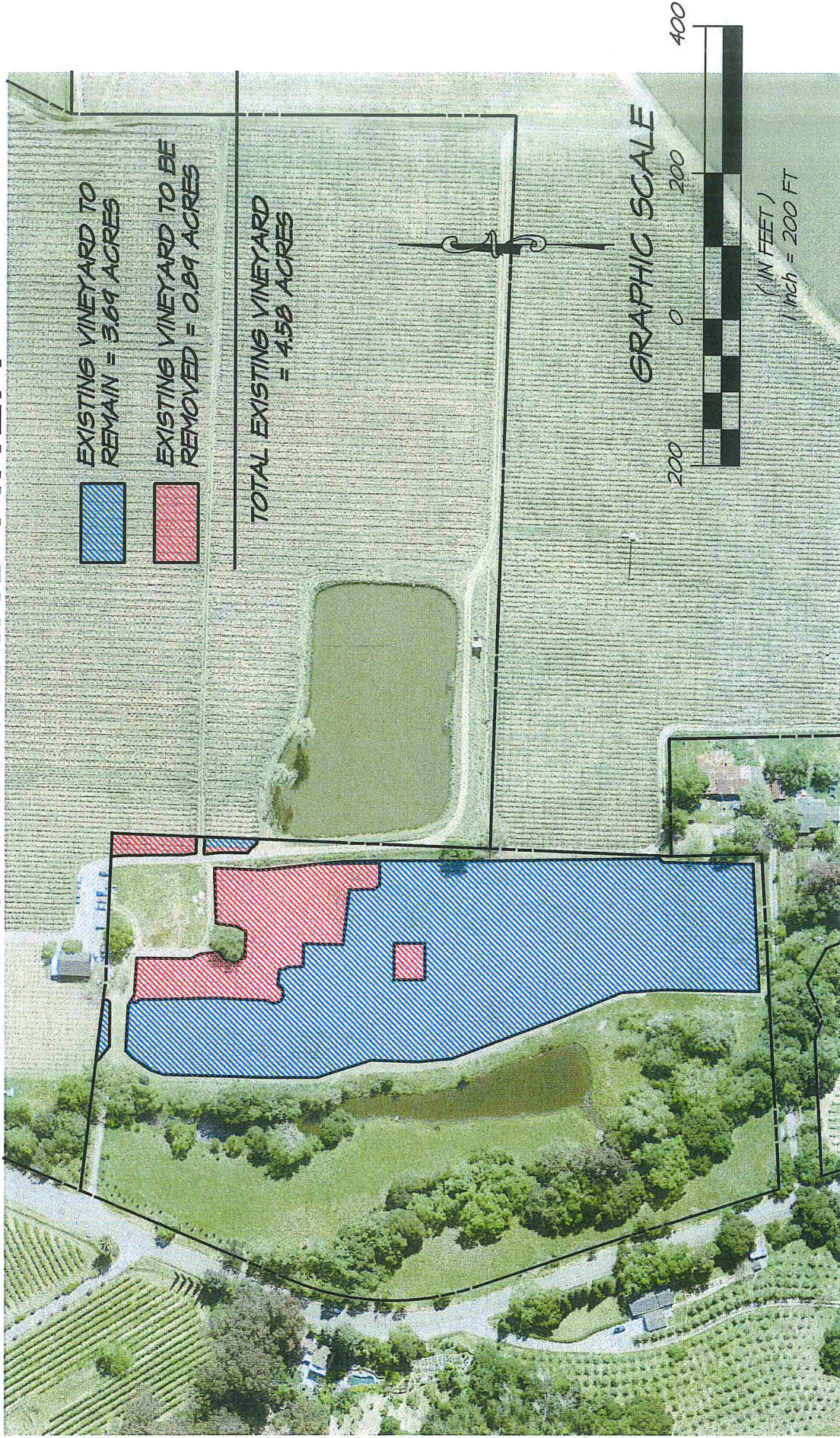
Winery Domestic Water Demand - Project Well

FT Employees – (15 gal/person/day x 300 days/yr x	4	employees/day) =	0.06	af/yr
PT Employees – (15 gal/person/day x 300 days/yr x	3	employees/day) =	0.04	af/yr
Harvest Employees – (15 gal/person/day x 45 days/yr x	2	employees/day) =	0.004	af/yr
Visitors – (3 gal/person/day x 365 days/yr x	30	visitors/day) =	0.10	af/yr
Food & Wine Pairing Events – (25 visitors @ 10 gpd x	24	days/yr) =	0.02	af/yr
Food & Wine Pairing Events – (150 visitors @ 10 gpd x	4	days/yr) =	0.02	af/yr
Total Proposed Domestic Water (Employees + Visitors + Events) =			0.24	af/yr

Winery Process Water Demand - Project Well

Winery Process Water – (5 gal water / 1 gallon wine x	100,000	gal wine/year) =	1.53	af/yr
Net Water Supplied by Well (Existing) =			43.49	af/yr
Net Water Supplied by Well (Proposed) =			46.28	af/yr

TRUCHARD WINERY EXISTING VINEYARD AREA



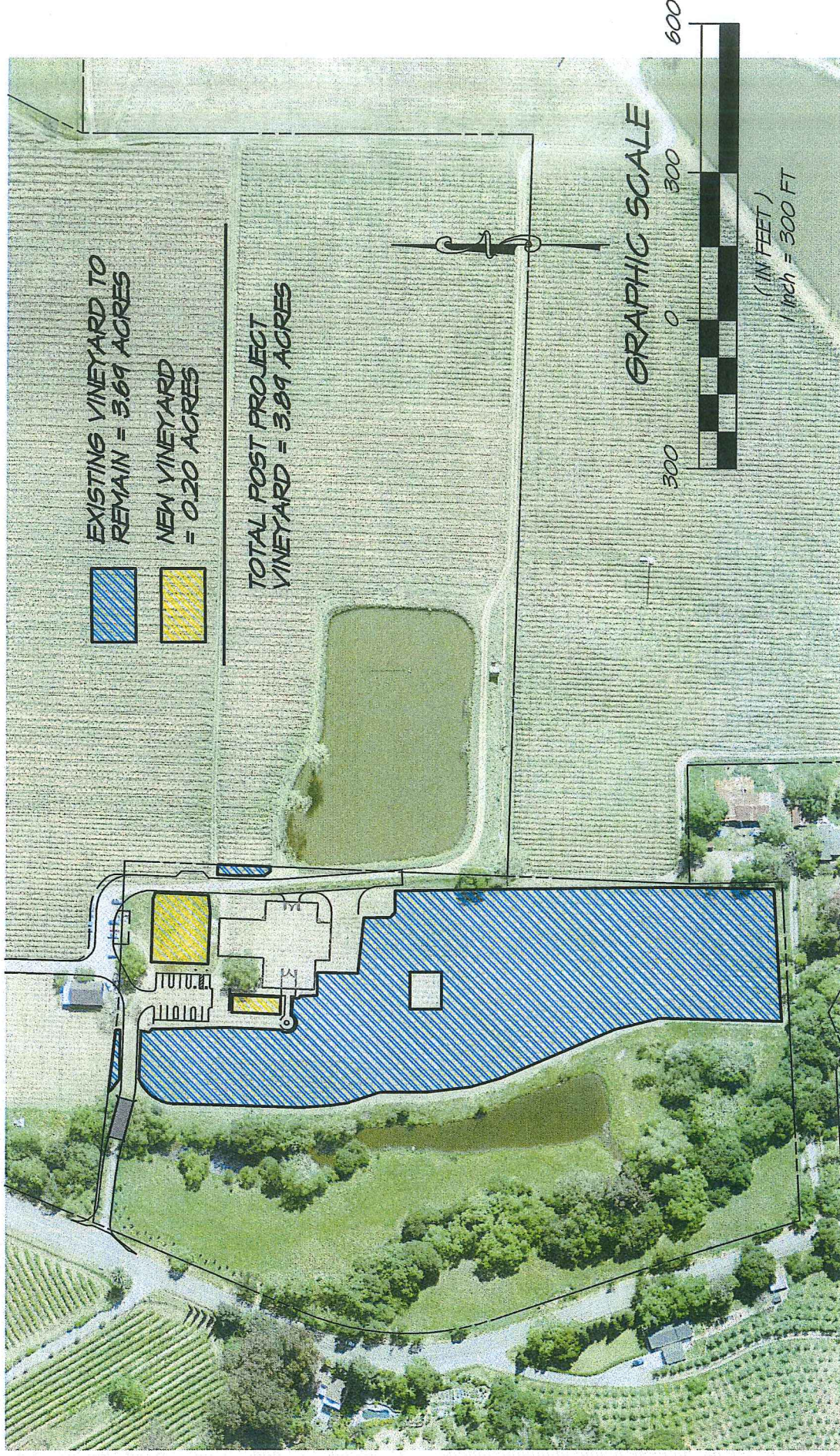
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AUGUST 10, 2016 4/13042.0 Exh-Exist Vyd.dwg

TRUCHARD WINERY POST PROJECT VINEYARD AREA



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MARCH 10, 2016 4113042.0 Exh-Prop Vjyd2.dwg

PLANTING CONCEPT

SUNSET ZONE 14-15

THE PLANT PALETTE FOR THE TRUCHARD WINERY IS BASED LOOSELY ON THE CALIFORNIA NATIVE OAK WOODLAND CONCEPT. NATIVE TREES, SHRUBS, PERENNIALS AND GRASSES ARE INTEGRATED WITH SHOWY ORNAMENTALS IN A HARMONIOUS PALETTE. EXISTING NATIVE TREES AND SHRUBS WILL BE PRESERVED THROUGHOUT THE BUILDING SITE. TWO NATIVE VALLEY OAK TREES (QUERCUS LONATA) ESTABLISH A PROMINENT FRAME WORK FOR THE NEW WINERY BUILDING. ORNAMENTAL PLANTINGS ARE INTRODUCED TO HIGHLIGHT THE BUILDING ENTRANCE AND BUILDING EDGES. TREE SELECTIONS ARE LOCATED TO MAXIMIZE PASSIVE SOLAR BENEFITS WITH PARTICULAR SENSITIVITY TO VIEW CORRIDOR PRESERVATION BOTH TO AND FROM THE BUILDING.

PROPOSED PLANT PALETTE

BOTANICAL NAME	COMMON NAME	NATURE HEIGHT	WUCOLS
DECIDUOUS TREES			
CERCIS RENIFORMIS 'TEXAS WHITE'	TEXAS WHITE REDBUD	30'	L
PYRUS CALLERYANA 'CAPITAL'	FLOWERING PEAR	40'	M
EVERGREEN TREES			
ARBUTUS 'MARINA'	MARINA STRAWBERRY TREE	30'	L
QUERCUS AGRIOLIA	COAST LIVE OAK	70'	VL
SECOQUA SEMPERVIRENS	COAST REDWOOD	50'	H
EXISTING TREES			
VARIES - SEE PLAN FOR TYPE			
SPECIMEN SHRUBS			
CORREA PULCHELLA 'DUSKY BELLS'	'DUSKY BELLS' AUSTRALIAN FUCHSIA	L	
CARPENTERIA CALIFORNICA 'ELIZABETH'	'ELIZABETH' BUSH ANEMONE	M	
CERCIS OCCIDENTALIS	WESTERN REDBUD	VL	
CISTUS 'SUNSET'	'SUNSET' MAGENTA ROCKROSE	L	
MYRTUS COMMUNIS	MYRTLE	L	
PHILADELPHUS LEWIS 'ODDSE CREEK'	YILD MOCK ORANGE	L	
RUBUS SANQUINUM 'CLAREMONT'	RED FLOWERING CURRANT	M	
SARCOCCOCCO HOOKERIANA HUMILIS	SWEET BOX	L	
VIBURNUM TIRUS	LAURUSTINUS	M	
WESTRINGIA FRUTICOSA 'MORNING LIGHT'	COAST ROSEMARY	L	
PERENNIALS, GRASSES AND GROUND COVER			
CAREX PANISA	CALIFORNIA MEADOW SEDGE	M	
DRYOPTERIS	WOOD FERN	M	
HELIOTROPION SEMPERVIRENS 'SAPPHIRE'	BLUE OAT GRASS	L	
IRIS	SELECTED IRIS VARIETIES	L	
NONPHOTIA LUNARIA	RED-HOT FOKER	L	
LAVANDULA ANGUSTIFOLIA 'HIDCOTE'	'HIDCOTE' LAVENDER	L	
LAVANDULA 'GOODWYN CREEK'	GOODWYN CREEK LAVENDER	L	
MUNLEBERGIA RIGENS	DEER GRASS	L	
HAUSELEA TENISSIA	MEXICAN FEATHER GRASS	L	
HEPETA X FAASSEN 'SELECT BLUE'	CATMINT	L	
ROSA SPECIES (WHITE ICEBERG)	ICEBERG ROSE HYBRID	M	
ROSA WHITE CARPET	WHITE CARPET ROSE	L	
ROSMARINUS OFFICINALIS	ROSEMARY	M	
RUECKIA FULDICA 'GOLDSTURM'	BLACK EYED SUSAN	M	
SALVIA	SAGE VARIETIES	M	
BIO-RETENTION			
DESCHAMPSIA CESPITOSA	TUFTED HAIR GRASS	L	
ELEOCHARIS MACROSTACHYA	SPRUE RUSH	L	
JUNCUS PATENS	COMMON RUSH	M	
CAREX INUDATA	CA FLOWERING SEDGE	M	
BIOFILTRATION SOD	BIO FILTRATION SOD BY DELTA BLUE GRASS	L	

CONCEPTUAL IRRIGATION STATEMENT

THE IRRIGATION SYSTEM USES WATER FROM RESERVOIRS ON SITE.

THE IRRIGATION DESIGN FOR THE SITE SHALL COMPLY WITH THE STATE MANDATED MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (AS 1851).

THE IRRIGATION SYSTEMS WILL BE AUTOMATICALLY CONTROLLED BY AN ET (EVAPOTRANSPIRATION) IRRIGATION CONTROLLER CAPABLE OF MULTIPLE PROGRAMMING AND INDEPENDENT TINKING OF INDIVIDUAL IRRIGATION SYSTEMS. THE CONTROLLER WILL HAVE A 24-HOUR CLOCK TO ALLOW MULTIPLE START TIMES AND REPEAT CYCLES TO ADJUST FOR SOIL PERCOLATION RATES.

THE IRRIGATION SYSTEMS WILL CONSIST PRIMARILY OF LOW VOLUME, LOW FLOW BUBBLERS FOR TREES, POINT SOURCE DRIP IRRIGATION FOR SHRUBS AND GROUND COVERS, AND LOW VOLUME STREAM-SPRAY IRRIGATION FOR TURF PLANTINGS.

PLANTS WILL BE GROUPED ONTO SEPARATE VALVES ACCORDING TO SUN EXPOSURE AND WATER USE TO ALLOW FOR IRRIGATION APPLICATION BY HYDROZONE. THE IRRIGATION SCHEDULING WILL REFLECT THE REGIONAL EVAPO-TRANSPARATION RATES. THE ENTIRE SITE WILL BE DESIGNED TO RUN DURING HIGHTIME HOURS WHEN IRRIGATION IS MOST EFFICIENT.

ALL AS 1851 DOCUMENTATION INCLUDES IRRIGATION PLANS, WATER USE CALCULATIONS AND CERTIFICATES SHALL BE SUBMITTED WITH THE LANDSCAPE IMPROVEMENT PLANS FOR REVIEW AND APPROVAL.

SITE PLAN

SCALE: 1" = 30'-0"

WATER USE CALCULATIONS

MAXIMUM AFFLIED WATER ALLOWANCE

THE MAXIMUM AFFLIED WATER ALLOWANCE (MAWA) IS GALLONS PER YEAR IS BASED ON THE FOLLOWING FORMULA:

$$MAWA = (Eto) (0.62) (0.7 \times LA) + (0.3 \times SLA)$$

Eto = ANNUAL EVAPOTRANSPIRATION RATE (IN/YEAR)
0.7 = ET ADJUSTMENT FACTOR
LA = TOTAL LANDSCAPE AREA (SQUARE FEET)
0.62 = CONVERSION FACTOR (TO GALLONS/SQUARE FOOT)
SLA = SPECIAL LANDSCAPE AREA (SQUARE FEET)
0.3 = ET ADJUSTMENT FACTOR FOR SLA

MAWA PROJECT VALUES

Eto = 45.1
LA = 20,451 SQUARE FEET
SLA = 9,503 SQUARE FEET
MAWA = 45.1 x 0.62 (0.7 x 20,451) + (0.3 x 9,503)
MAWA = 497,758 GALLONS/YEAR

ESTIMATED TOTAL WATER USE

THE ESTIMATED TOTAL WATER USE (ETWU) IS THE SUM TOTAL OF ESTIMATED WATER USE FOR EACH HYDROZONE IN GALLONS PER YEAR AND IS BASED ON THE FOLLOWING FORMULA:

$$ETWU = (ETW) (0.62) (FF \times HME) + SLA$$

ETW = ANNUAL EVAPOTRANSPIRATION RATE (IN/YEAR)
FF = HYDROZONE PLANT FACTOR (HIGHEST)
HA = HYDROZONE AREA (SQUARE FEET)
SLA = SPECIAL LANDSCAPE AREA (SQUARE FEET)
0.62 = CONVERSION FACTOR (TO GALLONS/SQUARE FOOT)
IE = HYDROZONE IRRIGATION EFFICIENT

ETWU PROJECT VALUES

Eto = 45.1
FF = REFER TO HYDROZONE TABLE
HA = REFER TO HYDROZONE TABLE
SLA = 9,503 SQUARE FEET
IE = REFER TO HYDROZONE TABLE
ETWU = 45.1 x 0.62 (6,112 x 0.503)
ETWU = 443,404 GALLONS/YEAR

MAWA VS. ETWU: ETWU = 443,404 < MAWA = 497,758

HYDROZONE INFORMATION TABLE

HYDROZONE NUMBER	HYDROZONE WATER USE	IRRIGATION METHOD	PLANT FACTOR (FF)	HYDROZONE AREA (HA)	IRRIGATION EFFICIENCY (IE)	ADJUSTED AREA (FF X HME)
1	MODERATE SHRUB	DRIP BUBBLER	0.5	10,725	0.8	5,871
2	MODERATE TREE	DRIP BUBBLER	0.7	153	0.8	118
						23
TOTAL: 10,878 SF				TOTAL: 6,112 SF		
SLA TOTAL: 9,503 SF						

ETWU = 443,404 gal/yr
= 1.36 ac-ft/yr



SIGHUM ARCHITECTURE, LLP 707 853 6531
1650 Adams Street, Suite D, St. Helena, CA 94574

These drawings are the property of Sighum Architecture and have been prepared specifically for this project. These drawings are not to be used for any other project, by any other entity or in another location.

TRUCHARD WINERY

4082 OLD SONOMA ROAD
NAPA, CA 94559
APN 043-049-001-000

PROJECT NUMBER	1502
DATE	05.31.2015
CHECKED BY	CL
DRAWN BY	JS/FNC
SCALE	AS NOTED
REVISIONS	
USE PERMIT	05.31.2015
PLAN CHECK COMMENTS	08.19.2015

LANDSCAPE SITE PLAN

SHEET NUMBER

L-1

USE PERMIT

Coombs & Dunlap, LLP

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Writs & Appeals

March 24, 2016

mbruce@coombslaw.com

707.252.9100

Reply to Napa Office

By U.S. Mail

Dr. and Mrs. Anthony Truchard
3234 Old Sonoma Road
Napa, California 94559

RE: *Water Service*
4062 Old Sonoma Road

1211 Division Street
Napa, California
94559-3398
Tel 707.252.9100
Fax 707.252.8516

Dear Dr. and Mrs. Truchard:

Our firm represents Congress Valley Water District ("the Water District"). Your property located at 4062 Old Sonoma Road is currently served by the Water District. We understand that you have requested confirmation from the Water District that it will continue to provide water to this property within the capacity of the existing meter.

To the best of the Water District's knowledge, it will continue to provide water to 4062 Old Sonoma Road within the capacity of the existing meter; however, the Water District does not have complete control over water service within its boundaries and the Water District is set to terminate on July 1, 2017, as discussed below.

The Water District operates under the terms of a Water Supply Contract ("the Contract") between the City of Napa and the Water District. The Contract provides that the City of Napa is responsible for the complete operation of the Water District's water system. The total quantity of water provided to the Water District by the City of Napa is controlled by the Contract. It is possible that under certain circumstances (such as a drought), there may be a shortage in the amount of water available for delivery.

The Contract and the Water District itself will terminate on July 1, 2017. Until the Contract terminates, the Water District is bound by its terms. The Contract does not provide terms of water service after the Contract terminates. The Water District cannot make any representations regarding the water service to 4062 Old Sonoma Road after the

1312 Oak Avenue
St. Helena, California
94574-1943
Tel 707.963.5202
Fax 707.963.4519

www.coombslaw.com

Dr. and Mrs. Anthony Truchard
March 24, 2016
Page 2 of 2

Contract and Water District terminate on July 1, 2017. If you require assurances regarding water service after that date, you should contact the City of Napa.

Sincerely,



Megan E. Bruce

/meb/21359-0001
cc: Kiersten Bjorkman
Congress Valley Water District

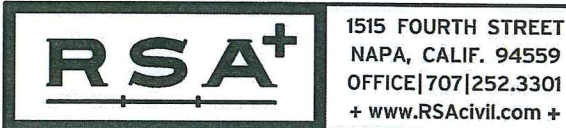
TRUCHARD WINERY WELLS WITHIN 500 FEET



GRAPHIC SCALE



(IN FEET)
1 inch = 400 FT

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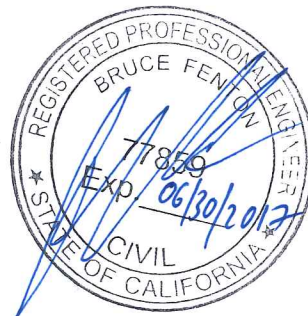
JUNE 13, 2016 4113042.0 WRKSHT_Parcel\$&Wells



ANNUAL GROUNDWATER RECHARGE RATE

TRUCHARD WINERY
4062 OLD SONOMA ROAD
NAPA, CALIFORNIA

APN 043-040-001
043-061-022



PROPERTY OWNER:

Anthony Truchard
4062 Old Sonoma Road
Napa, CA 94559

Project# 4113042.0
October 13, 2016



INTRODUCTION

This report determines the annual groundwater recharge rate for the Truchard Winery property. The Truchard Winery project is located at 4062 Old Sonoma Road, Napa, California 94559. The APN is 043-040-001. The parcel has slopes ranging from 2-20%. The project well will be located on an adjacent 126.14 acre parcel (APN 043-061-022).

Therefore additionally, the groundwater recharge rate for the adjacent parcel totaling 126.14 acres will also be calculated. The parcel will continue to serve the existing vineyard and no development is planned for this parcel. The parcel has slopes ranging from 5-30%.

For the analysis, the parcels has been divided into five areas, impervious, vineyard, grass and shrubs, coastal oak tree areas and ponds. Ponds were then excluded from the analysis as they are considered impervious and collect runoff.

METHODOLOGY

The groundwater recharge rate has been determined by examining the annual rainfall, runoff and species specific evapotranspiration during winter months. The Annual Precipitation Chart and Watershed Types and Factors page in the Napa County Road and Street Standards were used to determine the annual rainfall amount and site runoff volumes. It was determined that the average annual rainfall amounts to 28 inches per year.

The runoff volumes were determined by calculating the site specific runoff coefficient. The runoff coefficients were calculated using aerial images to view the terrain and the county topography to estimate the slopes in each area.

The evapotranspiration losses were calculated using the Water Use Classifications of Landscape Species (WUCOLS) methodology for the vineyard, grass and shrub, and coastal oak tree areas. Only evapotranspiration from the winter was considered, as it is assumed that evapotranspiration in summer will be from irrigation water.

The groundwater recharge rate was calculated as the difference of the total annual rainfall and losses from the stormwater runoff and evapotranspiration. Refer to attached calculations.

$$\text{Average Recharge Rate} = \text{Average Rainfall} - \text{Runoff} - \text{Evapotranspiration}$$

CONCLUSION

The Truchard Winery property has an annual rainfall of 28 inches per year, equating to 26.1 acre-feet per year for parcel 043-040-001 and 280.7 acre-feet per year for parcel 043-061-022 for a total of 306.8 acre-feet per year.



Total evapotranspiration and runoff on parcel 043-040-001 is 19.8 acre-feet per year. The average annual groundwater recharge is 6.3 acre-feet per year resulting in a rate of 0.53 acre-feet per acre per year.

Total evapotranspiration and runoff on parcel 043-061-022 is 221.1 acre-feet per year. The average annual groundwater recharge is 59.6 acre-feet per year resulting in a rate of 0.47 acre-feet per acre per year.



Truchard Winery
Groundwater Recharge Rate

Parcel 043-040-001

Site Description	Hydrologic Soil Group	Area (ac)	Total Annual Rainfall (in/yr)	Total Rainfall (ft ³ /yr)
Impervious Area	C/D	1.1	28	111,804
Vineyard Area	C/D	4.3	28	437,052
Grass and Shrubs	C/D	3.4	28	345,576
Coastal Oak Trees	C/D	2.4	28	243,936
Total		11.20	28	1,138,368

Note: Remaining 0.7 acres of parcel is pond area and not considered in the Groundwater Recharge Calculation. Total parcel area is 11.94 acres.

Site	January (E _{t0}) (in)	February (E _{t0}) (in)	March (E _{t0}) (in)	October (E _{t0}) (in)	November (E _{t0}) (in)	December (E _{t0}) (in)	Total E _{t0} (in)	Landscape Coefficient (k _c)	Landscape Evapotrans. (E _{t0}) (in) = Total E _{t0} x k _c	Total Landscape Evapotranspiration (ft ³ /yr)
Impervious Area	0	0	0	0	0	0	0	0	0.00	0
Vineyard Area	1.03	1.53	2.93	3.53	1.64	1.17	11.83	0.8	9.46	147,724
Grass and Shrubs	1.03	1.53	2.93	3.53	1.64	1.17	11.83	0.8	9.46	116,805
Coastal Oak Trees	1.03	1.53	2.93	3.53	1.64	1.17	11.83	0.45	5.32	46,378
Total										310,907

Site	Run-Off Coefficient (C)	Total Runoff (ft ³ /yr)
Impervious Area	0.90	100,624
Vineyard Area	0.48	209,785
Grass and Shrubs	0.41	141,686
Coastal Oak Trees	0.41	100,014
Total		552,108

Site	Total Rainfall (ft ³ /yr)	Total Crop Evapotranspiration (ft ³ /yr)	Total Runoff (ft ³ /yr)	Total Stormwater loss on site (ft ³ /yr)	Groundwater Recharge Rate (ft ³ /yr)	Groundwater Recharge Rate (ac-ft/ac/yr)
Impervious Area	111,804	0	100,624	100,624	11,180	0.23
Vineyard Area	437,052	147,724	209,785	357,509	79,543	0.42
Grass and Shrubs	345,576	116,805	141,686	258,491	87,085	0.59
Coastal Oak Trees	243,936	46,378	100,014	146,392	97,544	0.93
Total	1,138,368	310,907	552,108	863,015	275,353	0.53



Truchard Winery
Groundwater Recharge Rate

Parcel 043-061-022

Site Description	Hydrologic Soil Group	Area (ac)	Total Annual Rainfall (in/yr)	Total Rainfall (ft ³ /yr)
Impervious Area	B/C/D	9.9	28	1,006,236
Vineyard Area	B/C/D	82.4	28	8,375,136
Grass and Shrubs	B/C/D	11.1	28	1,128,204
Coastal Oak Trees	B/D	16.9	28	1,717,716
Total		120.30	28	12,227,292

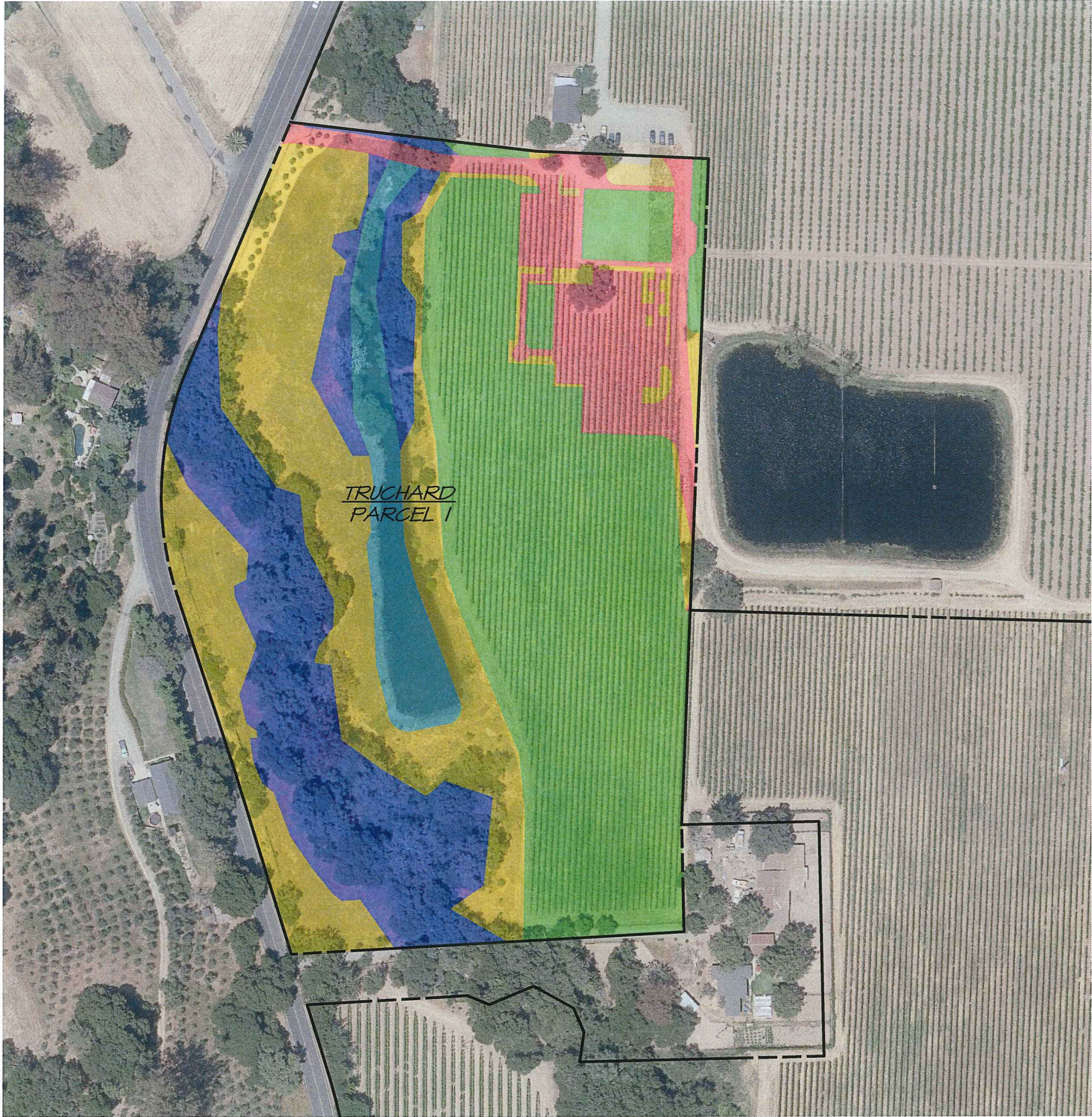
Note: Remaining 5.8 acres of parcel is pond area and not considered in the Groundwater Recharge Calculation. Total parcel area is 126.10 acres.

Site	January (E _t) (in)	February (E _t) (in)	March (E _t) (in)	Evapotranspiration (E _t)				Total ET _o (in)	Landscape Coefficient (k _c)	Landscape Evapotrans. (E _t) (in) = Total E _t x k _c	Total Landscape Evapotranspiration (ft ³ /yr)
				October (E _t) (in)	November (E _t) (in)	December (E _t) (in)					
Impervious Area	0	0	0	0	0	0		0	0	0.00	0
Vineyard Area	1.03	1.53	2.93	3.53	1.64	1.17		11.83	0.8	9.46	2,830,796
Grass and Shrubs	1.03	1.53	2.93	3.53	1.64	1.17		11.83	0.8	9.46	381,333
Coastal Oak Trees	1.03	1.53	2.93	3.53	1.64	1.17		11.83	0.45	5.32	326,581
Total											3,538,710

Site	Runoff	
	Run-Off Coefficient (C)	Total Runoff (ft ³ /yr)
Impervious Area	0.90	905,612
Vineyard Area	0.48	4,020,065
Grass and Shrubs	0.41	462,564
Coastal Oak Trees	0.41	704,264
Total		6,092,505

Site	Groundwater Recharge Rate				
	Total Rainfall (ft ³ /yr)	Total Crop Evapotranspiration (ft ³ /yr)	Total Runoff (ft ³ /yr)	Total Stormwater loss on site (ft ³ /yr)	Groundwater Recharge Rate (ac-ft/ac/yr)
Impervious Area	1,006,236	0	905,612	905,612	0.23
Vineyard Area	8,375,136	2,830,796	4,020,065	6,850,861	0.42
Grass and Shrubs	1,128,204	381,333	462,564	843,897	0.59
Coastal Oak Trees	1,717,716	326,581	704,264	1,030,844	0.93
Total	12,227,292	3,538,710	6,092,505	9,631,215	0.47

TRUCHARD WINERY
GROUNDWATER RECHARGE EXHIBIT - PARCEL 1



SITE DESCRIPTION	AREA (AC.)
IMPERVIOUS AREA	1.1
VINEYARD AREA	4.3
GRASS AND SHRUBS	3.4
COASTAL OAK TREES	2.4
POND AREA	0.7



GRAPHIC SCALE



(IN FEET)
1 Inch = 150 FT

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TRUCHARD WINERY
GROUNDWATER RECHARGE EXHIBIT - PARCEL 3



SITE DESCRIPTION	ACRE
IMPERVIOUS AREA	9.9
VINEYARD AREA	82.4
GRASS AND SHRUBS	11.1
COASTAL OAK TREES	16.9
POND AREA	5.8



GRAPHIC SCALE



(IN FEET)
1 inch = 300 FT

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A specialized weather station (CIMIS station) or a Class A evaporation pan (background) can be used to determine reference evapotranspiration (ET_c) for a site. Daily CIMIS data is available online at www.cimis.water.ca.gov.

The **crop coefficient (K_c)** is determined from field research. Water loss from a crop is measured over an extended period of time. Water loss and estimated reference evapotranspiration are used to calculate K_c as follows:

$$K_c = \frac{ET_c}{ET_o}$$

As seen in the above equation, the crop coefficient (K_c) is simply the fraction of water lost from the crop relative to reference evapotranspiration. Typically, crop water loss is less than reference evapotranspiration and, therefore, the crop coefficient is

less than 1.0. For example, if water loss from corn was measured to be 4 inches in a month, and reference evapotranspiration for the same month was 8 inches, then the crop coefficient would be 0.5. Crop coefficients have been established for many crops and for turfgrasses. A sample of values is given in Table 1.

**Table 1—
Crop Coefficients for Various Crops and
Turfgrasses**

K_c values for agricultural crops typically change during the seasons: low values are for early season (March/April) or late season (September/October) and high values for midseason (May/June/July).

K_c values		
	Low	High
Deciduous orchard*	0.50	0.97
Deciduous orchard with cover crop**	0.98	1.27
Grape	0.06	0.80
Olive	0.58	0.80
Pistachio	0.04	1.12
Citrus	0.65	year-round
Turfgrass		
Cool season species	0.8	year-round
Warm season species	0.6	year-round

Source: UC Leaflet Nos. 21427 and 21428 (see references)

* Deciduous orchard includes apples, cherries, and walnuts

** When an active cover crop is present, K_c may increase by 25 to 80%.

In summary, an estimate of crop evapotranspiration is made from reference evapotranspiration and crop coefficient values. Estimates can be made for any location where reference evapotranspiration data exists and for any crop (or turfgrass) that has a crop coefficient.

Example: A grape grower in Monterey County wants to estimate how much water the vineyard may lose in the month of July. Using the ET_c formula, two numbers are needed: reference evapotranspi-

TABLE 1. Crop coefficients used in daily modeling of soil water processes in vineyards, oak trees and grasslands

Vineyards		Oak trees		Grasslands	
Period	K_c	Period	K_c	Period	K_c
3/1-4/15	0.10	3/1-3/31	0.5	3/1-3/15	0.90
4/16-4/30	0.20	4/1-10/1	0.6	3/16-4/30	0.95
5/1-5/15	0.25	10/2-11/25	0.5	5/1-5/15	0.25
5/16-5/31	0.30	11/26-2/28	0.4	5/16-6/15*	0.10
6/1-6/15	0.35			6/16*-10/13	0.00
6/16-6/30	0.40			10/14-10/31	0.25
7/1-9/30	0.50			11/1-2/28	0.75
10/1-10/15	0.30				
10/16-10/31	0.20				
11/1-11/15	0.15				
11/16-11/30	0.05				
12/1-2/28	0.01				

Sources: Allen et al. 1998 (grasses and trees); Caprile 2007 (vineyards).

* Variable date depending on available soil moisture.

MONTH	K_c	AVERAGE $K_c = 0.45$
OCTOBER	0.5	
NOVEMBER	0.5	
DECEMBER	0.4	
JANUARY	0.4	
FEBRUARY	0.4	
MARCH	0.5	

VINEYARD AREA
WATERSHED TYPES AND FACTORS

RUN-OFF PRODUCING CHARACTERISTICS OF WATERSHEDS SHOWING FACTORS FOR EACH CHARACTERISTIC FOR VARIOUS WATERSHED TYPES				
WATERSHED TYPES AND FACTORS				
Run-off Producing Features	Extreme	High	Normal	Low
Relief	0.28 – 0.38 Steep, rugged terrain, with average slopes above 30%	0.20 – 0.28 Rolling, with average slopes of 10 to 30%	0.16 0.14 – 0.20 Rolling, with average slopes of 5 to 10%	0.08 – 0.14 Relatively flat land, with average slopes of 0 to 5%
Soil Infiltration	0.12 – 0.16 No effective soil cover either rock or thin soil mantle of negligible infiltration capacity.	0.10 0.08 – 0.12 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.	0.06 – 0.08 Normal; well drained light and medium textured soils sandy loams, silt, and silt loams.	0.04 – 0.06 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.
Vegetation Cover	0.12 – 0.16 No effective plant cover; bare or very sparse cover.	0.12 0.08 – 0.12 Poor to fair; clean cultivation crops or poor natural cover; less than 20% of drainage area under good cover.	0.06 – 0.08 Fair to good; about 50% of area in good grassland or woodland; not more than 50% of area in cultivated crops.	0.04 – 0.06 Good to excellent; about 90% of drainage area in good grassland, woodland, or equivalent crop.
Surface	0.10 – 0.12 Negligible; surface depressions, few and shallow; drainage ways steep and small; no marshes.	0.10 0.08 – 0.10 Low well-defined system of small drainage ways; no ponds or marsh.	0.06 – 0.08 Normal; considerable surface depression storage; lakes, ponds, and marshes.	0.04 – 0.06 High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds or marshes.

THE RUNOFF FACTOR IS DETERMINED BY THE SUM OF THE FACTORS FOR RELIEF INFILTRATION, COVER, AND SURFACE. NOT APPLICABLE TO BUILT UP AREAS.

FIGURE 3

$C = 0.48$

GRASS & SHRUBS
WATERSHED TYPES AND FACTORS

RUN-OFF PRODUCING CHARACTERISTICS OF WATERSHEDS SHOWING FACTORS FOR EACH CHARACTERISTIC FOR VARIOUS WATERSHED TYPES				
WATERSHED TYPES AND FACTORS				
Run-off Producing Features	Extreme	High	Normal	Low
Relief	0.28 – 0.38 Steep, rugged terrain, with average slopes above 30%	0.20 – 0.28 Rolling, with average slopes of 10 to 30%	0.14 – 0.20 0.14 Rolling, with average slopes of 5 to 10%	0.08 – 0.14 Relatively flat land, with average slopes of 0 to 5%
Soil Infiltration	0.12 – 0.16 No effective soil cover either rock or thin soil mantle of negligible infiltration capacity.	0.08 – 0.12 0.10 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.	0.06 – 0.08 Normal; well drained light and medium textured soils sandy loams, silt, and silt loams.	0.04 – 0.06 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.
Vegetation Cover	0.12 – 0.16 No effective plant cover; bare or very sparse cover.	0.08 – 0.12 Poor to fair; clean cultivation crops or poor natural cover; less than 20% of drainage area under good cover.	0.06 – 0.08 0.07 Fair to good; about 50% of area in good grassland or woodland; not more than 50% of area in cultivated crops.	0.04 – 0.06 Good to excellent; about 90% of drainage area in good grassland, woodland, or equivalent crop.
Surface	0.10 – 0.12 Negligible; surface depressions, few and shallow; drainage ways steep and small; no marshes.	0.08 – 0.10 0.10 Low well-defined system of small drainage ways; no ponds or marsh.	0.06 – 0.08 Normal; considerable surface depression storage; lakes, ponds, and marshes.	0.04 – 0.06 High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds or marshes.

THE RUNOFF FACTOR IS DETERMINED BY THE SUM OF THE FACTORS FOR RELIEF INFILTRATION, COVER, AND SURFACE. NOT APPLICABLE TO BUILT UP AREAS.

FIGURE 3

$C = 0.41$

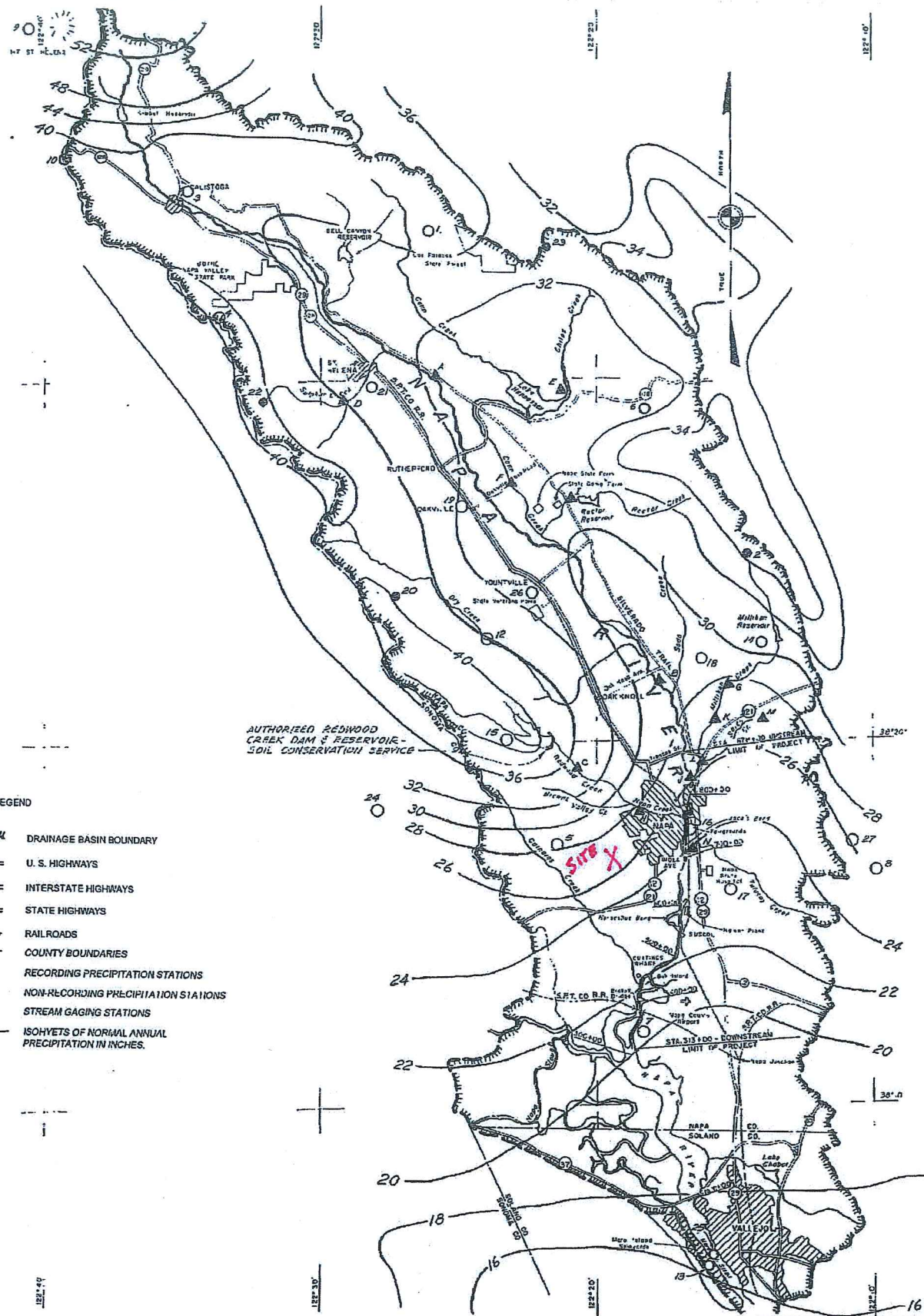
WATERSHED TYPES AND FACTORS

RUN-OFF PRODUCING CHARACTERISTICS OF WATERSHEDS SHOWING FACTORS FOR EACH CHARACTERISTIC FOR VARIOUS WATERSHED TYPES				
WATERSHED TYPES AND FACTORS				
Run-off Producing Features	Extreme	High	Normal	Low
Relief	0.28 – 0.38 Steep, rugged terrain, with average slopes above 30%	0.20 – 0.28 Rolling, with average slopes of 10 to 30%	0.14 0.14 – 0.20 Rolling, with average slopes of 5 to 10%	0.08 – 0.14 Relatively flat land, with average slopes of 0 to 5%
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Vegetation Cover	0.12 – 0.16 No effective plant cover; bare or very sparse cover.	0.08 – 0.12 Poor to fair; clean cultivation crops or poor natural cover; less than 20% of drainage area under good cover.	0.07 0.06 – 0.08 Fair to good; about 50% of area in good grassland or woodland; not more than 50% of area in cultivated crops.	0.04 – 0.06 Good to excellent; about 90% of drainage area in good grassland, woodland, or equivalent crop.
Surface	0.10 – 0.12 Negligible; surface depressions, few and shallow; drainage ways steep and small; no marshes.	0.10 0.08 – 0.10 Low well-defined system of small drainage ways; no ponds or marsh.	0.06 – 0.08 Normal; considerable surface depression storage; lakes, ponds, and marshes.	0.04 – 0.06 High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds or marshes.

THE RUNOFF FACTOR IS DETERMINED BY THE SUM OF THE FACTORS FOR RELIEF INFILTRATION, COVER, AND SURFACE. NOT APPLICABLE TO BUILT UP AREAS.

FIGURE 3

$$C = 0.41$$



ANNUAL RAINFALL = 28 in/yr

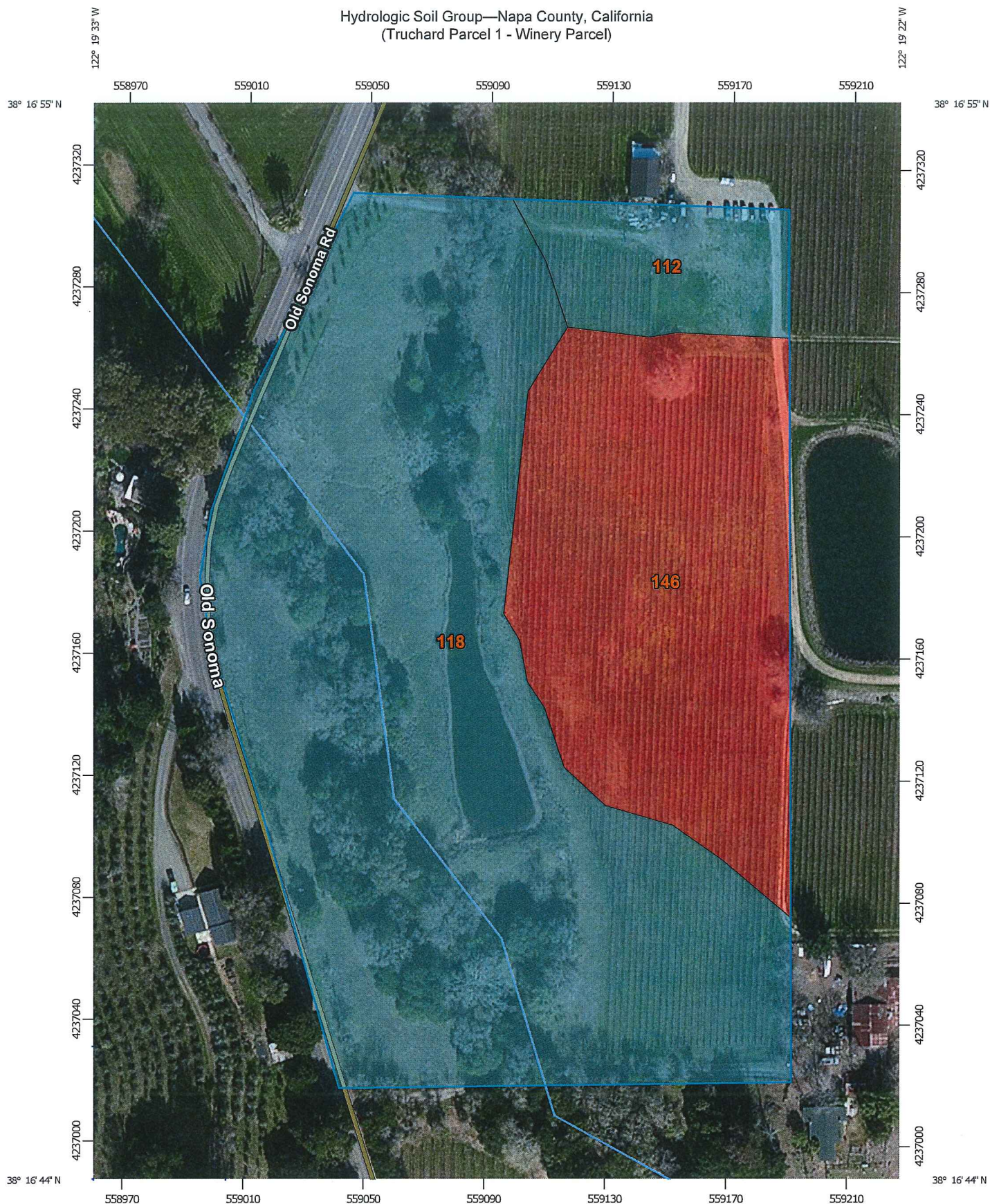
PRECIPITATION CHART LOWER COUNTY

FLOOD CONTROL
GENERAL DESIGN MEMORANDUM
NAPA RIVER CHANNEL IMPROVEMENTS
NAPA COUNTY, CALIFORNIA
HYDROLOGY AND HYDRAULIC ANALYSIS
NORMAL ANNUAL PRECIPITATION AND
HYDROLOGIC INDEX MAP
U.S. ARMY ENGINEER DISTRICT, SAN FRANCISCO, CORPS OF
ENGINEERS

TO ACCOMPANY REPORT
DATED 12 March 75

FILE NO.
50-47-1

Hydrologic Soil Group—Napa County, California (Truchard Parcel 1 - Winery Parcel)



Map Scale: 1:1,720 if printed on A portrait (8.5" x 11") sheet.

0 25 50 100 150 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

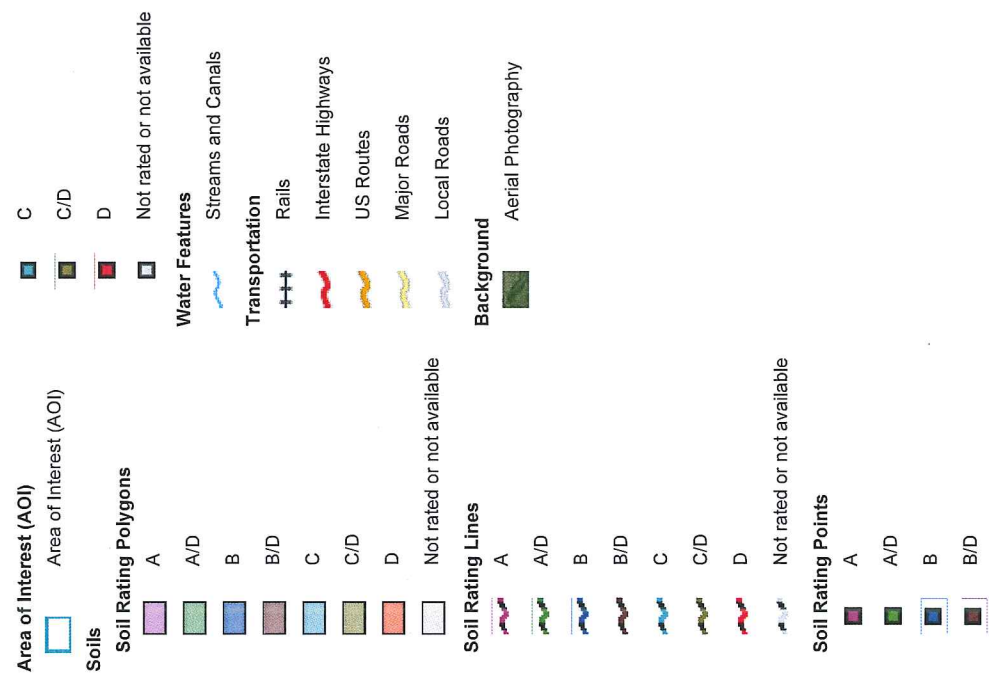


Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

8/11/2016
Page 1 of 4

MAP LEGEND



MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Napa County, California
Survey Area Data: Version 8, Sep 23, 2015

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

Date(s) aerial images were photographed: Feb 4, 2012—Feb 17, 2012

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
112	Bressa-Dibble complex, 5 to 15 percent slopes	C	0.8	6.8%
118	Cole silt loam, 0 to 2 percent slopes	C	8.2	65.3%
146	Haire loam, 2 to 9 percent slopes	D	3.5	27.9%
Totals for Area of Interest			12.5	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

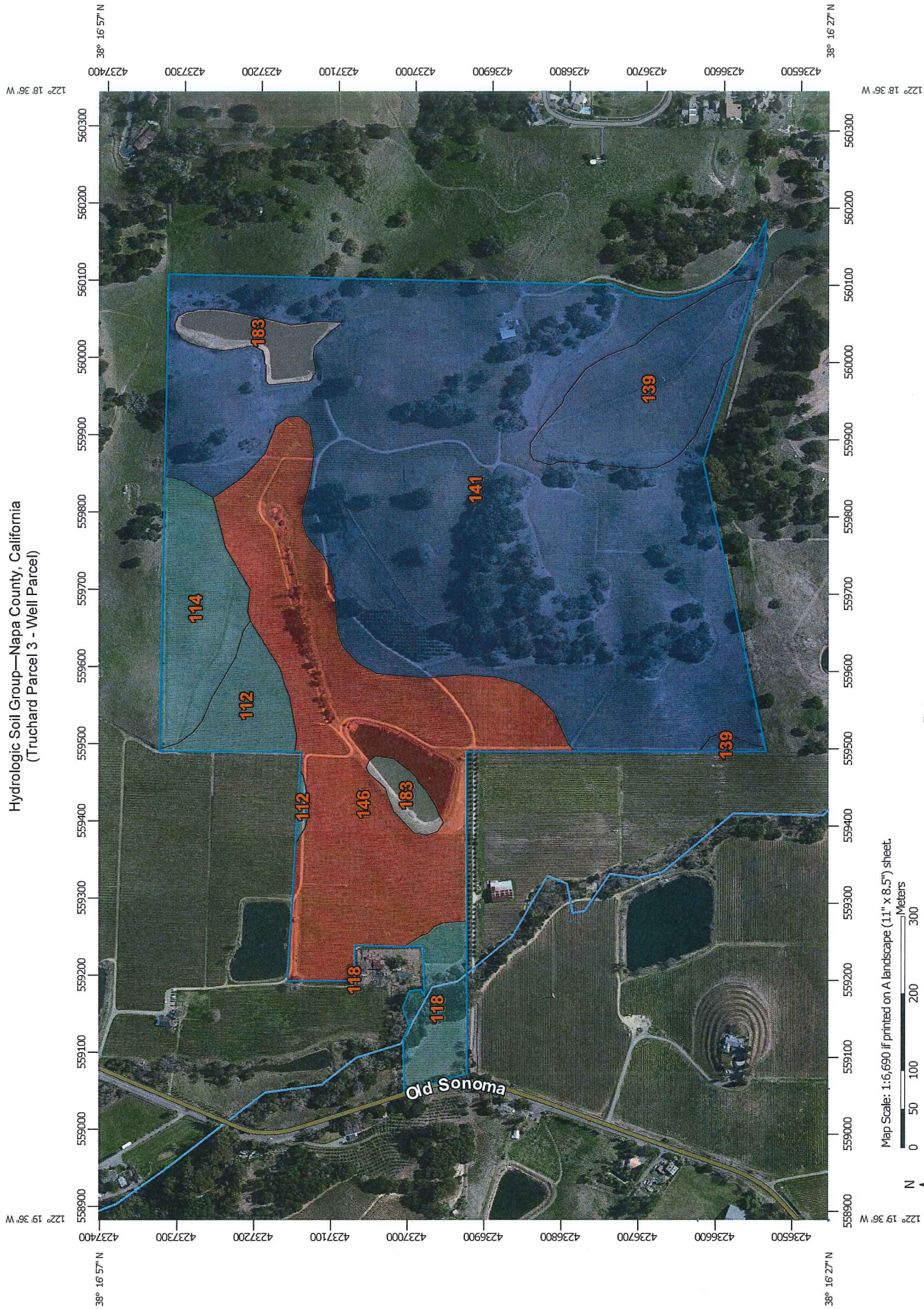
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Hydrologic Soil Group—Napa County, California (Truchard Parcel 3 - Well Parcel)



Map Scale: 1:6,690 if printed on A landscape (11" x 8.5") sheet.

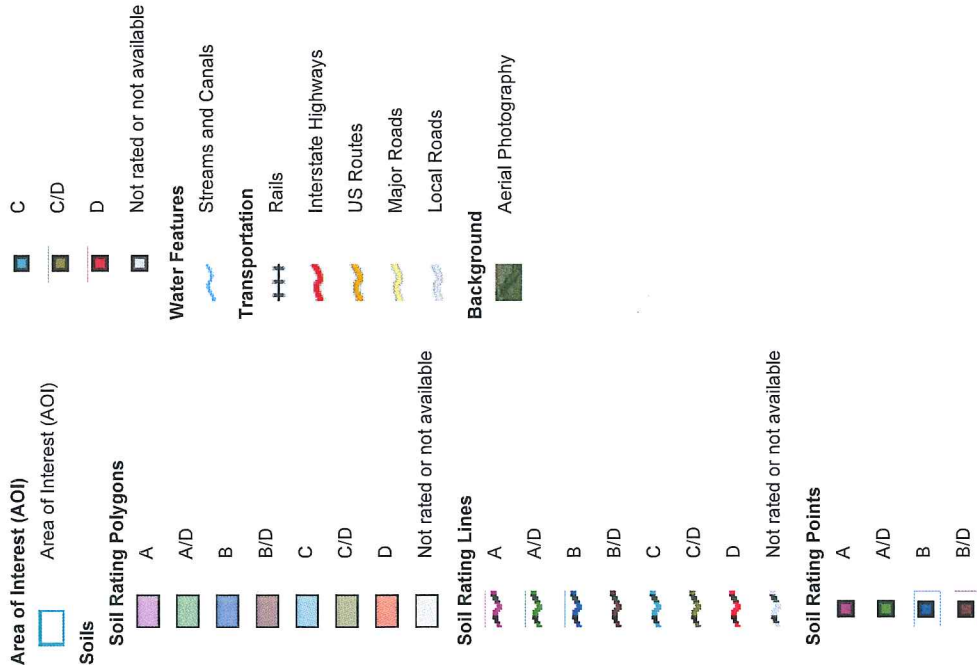
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

MAP LEGEND



MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

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

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Soil Survey Area: Napa County, California
Survey Area Data: Version 8, Sep 23, 2015

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

Date(s) aerial images were photographed: Feb 4, 2012—Feb 17, 2012

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

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
112	Bressa-Dibble complex, 5 to 15 percent slopes	C	3.8	2.9%
114	Bressa-Dibble complex, 30 to 50 percent slopes	C	6.9	5.3%
118	Cole silt loam, 0 to 2 percent slopes	C	3.6	2.8%
139	Forward gravelly loam, 9 to 30 percent slopes	B	9.3	7.2%
141	Forward-Kidd complex, 50 to 75 percent slopes	B	73.2	56.3%
146	Haire loam, 2 to 9 percent slopes	D	29.4	22.6%
183	Water		3.9	3.0%
Totals for Area of Interest			130.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

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Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



WATER SYSTEM FEASIBILITY STUDY

TRUCHARD WINERY
4062 OLD SONOMA ROAD
NAPA, CALIFORNIA

APN 043-040-001

Prepared for:

Anthony Truchard
3234 Old Sonoma Road
Napa, CA 94559



#4113042.0
December 12, 2016

TECHNICAL CAPACITY

System Description

The Winery parcel is currently connected to the Congress Valley Water district and intends to derive the anticipated water demands for the Truchard Winery project entirely from this connection. The Congress Valley Water district sources their water from the City of Napa. As you can see from the attached will serve letter, the Congress Valley Water District intends to honor the current water allotment, however the water district is planning on disbanding and after July 2017 their customers will be maintained through the City of Napa Water District. To be thorough and to provide for future flexibility, we have considered an alternative to the dependence on the municipal water connection and have analyzed the feasibility of the entire project public water system relying on existing and proposed groundwater wells.

The Truchard Winery project is located at 4062 Old Sonoma Road, Napa, California 94559, APN 043-040-001 (Winery parcel). There is an existing project well located on an adjacent 126.1 acre parcel, APN 043-061-022 (Well parcel). If required a new project well will be located on the well parcel.

There are no active wells on the winery parcel. The well in the south and in the west of the Winery parcel were never fully developed and have been abandoned per Napa County standards.

The existing well is east of the proposed winery and was drilled in 1998 by D. Bess Water Well Drilling. It has an annular seal of concrete to 22 feet and a 6" plastic casing to a depth of 425 feet.

Water from the well will be filtered through a 5-micron filter and treated by ultra-violet light. No additional biological or chemical treatment will be performed on the well water unless quarterly testing results deem this treatment is necessary.

Projected Water Demand

The projected annual water demand including irrigation, winery process and domestic water is 16.3 MG, and the daily average demand is 44,613 gallons. Peak daily demand is estimated at 89,225 gallons per day being 200% of average daily demand.

The projected annual irrigation water demand is 14.5 MG, and the daily average demand is 39,736 gallons. Peak daily demand is estimated at 79,471 gallons per day being 200% of average daily demand.

The projected annual winery process and domestic water demand is 0.58 MG, and the daily average demand is 1,590 gallons. Peak daily demand is estimated at 3,180 gallons per day being 200% of average daily demand.



Water Supply Capacity

The well drillers report estimates that the well can supply 60-gal/min. The well driller's reports are on file at Napa County. The well will be capable of supporting the proposed peak daily irrigation demand of 79,471-gal/day.

$$60 \text{ gpm} * 1440 \text{ min/day} = 86,400 \text{ gal/day} > 79,471 \text{ gal/day}$$

The proposed well will require a minimum yield of 2.3 gpm (580,000 gal/year) for process and domestic water.

$$2.3 \text{ gpm} * 1440 \text{ min/day} = 3,312 \text{ gal/day} > 3,180 \text{ gal/day}$$

Source Adequacy

The irrigation well is a Class 1A well with a 22 foot deep annular seal, and will comply with Napa County Code 13.12.270.

The proposed well will be a Class 1A well with a minimum 50 foot deep annular seal, and complies with Napa County Code 13.12.270.

Water Quality

Water sampling was conducted on January 2, 2014 by Analytical Sciences resulting in the well water meeting the recommended drinking water standards. Water quality is expected to meet or exceed all requirements of Chapter 15 of Title 22, California Code of Regulations (CCR).

MANAGERIAL

General

The owner of the water system will be the property owner of the parcel. The costs of operation will be covered in the winery operation costs. The owner will also hold the responsibility of water system manager for the property.

Operation and Maintenance

The following is a summary of the required Operations and Maintenance schedule:

Tasks	Frequency	Action
System Water Level	Daily	Visual Inspection
System Pressure and Conveyance	Daily	Visual Inspection
Water Tanks	Quarterly	Visual Inspection
Manually Operate Valves and Pumps	Quarterly	Operation

A certified distribution operator or treatment operator (T1 level or above) as specified by Chapter 13 of Title 22 CCR will be contracted by the owner and will be responsible for system repairs.



Monitoring and Testing

Water quality testing will be conducted, if necessary, to comply with Chapter 15 of Title 22 of CCR. Samples will be taken to Caltest or approved laboratory for testing.

Financial

Below is a brief summary of the system's annual estimated financial capacity. Capital improvement costs, including installation of the new well, as well as the treatment and distribution systems, are estimated to be a one-time expense of \$150,000, amortized over 20 years.

Capital Improvements: \$7,500

Power: \$2,000

Maintenance: \$2,500

Water Quality Testing: \$2,500

Total: \$14,500

Projected Annual Gross Revenue: \$12,600,000 (Based on 42,000 cases at \$300/case)

Annual Operating Costs: \$10,080,000 (at 20% profit)

Percent of Total Operating Costs: 1.4%

Coombs & Dunlap, LLP

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March 24, 2016

mbruce@coombslaw.com
707.252.9100
Reply to Napa Office

By U.S. Mail

Dr. and Mrs. Anthony Truchard
3234 Old Sonoma Road
Napa, California 94559

RE: *Water Service*
4062 Old Sonoma Road

1211 Division Street
Napa, California
94559-3398
Tel 707.252.9100
Fax 707.252.8516

Dear Dr. and Mrs. Truchard:

Our firm represents Congress Valley Water District ("the Water District"). Your property located at 4062 Old Sonoma Road is currently served by the Water District. We understand that you have requested confirmation from the Water District that it will continue to provide water to this property within the capacity of the existing meter.

To the best of the Water District's knowledge, it will continue to provide water to 4062 Old Sonoma Road within the capacity of the existing meter; however, the Water District does not have complete control over water service within its boundaries and the Water District is set to terminate on July 1, 2017, as discussed below.

The Water District operates under the terms of a Water Supply Contract ("the Contract") between the City of Napa and the Water District. The Contract provides that the City of Napa is responsible for the complete operation of the Water District's water system. The total quantity of water provided to the Water District by the City of Napa is controlled by the Contract. It is possible that under certain circumstances (such as a drought), there may be a shortage in the amount of water available for delivery.

The Contract and the Water District itself will terminate on July 1, 2017. Until the Contract terminates, the Water District is bound by its terms. The Contract does not provide terms of water service after the Contract terminates. The Water District cannot make any representations regarding the water service to 4062 Old Sonoma Road after the

1312 Oak Avenue
St. Helena, California
94574-1943
Tel 707.963.5202
Fax 707.963.4519

www.coombslaw.com

Dr. and Mrs. Anthony Truchard
March 24, 2016
Page 2 of 2

Contract and Water District terminate on July 1, 2017. If you require assurances regarding water service after that date, you should contact the City of Napa.

Sincerely,



Megan E. Bruce

/meb/21359-0001
cc: Kiersten Bjorkman
Congress Valley Water District