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Water Availability Analysis

Flora Springs Winery P15-00111-MOD
Planning Commission Hearing Date May 3, 2017

May 2016
Job No. 96-19

BARTELT ENGINEERING

WATER AVAILABILITY ANALYSIS FOR THE FLORA SPRINGS WINERY 1978 WEST ZINFANDEL LANE, ST. HELENA, CA 94574 PARCEL 4 (PREVIOUSLY APN 027-100-037)

As required by Napa County Planning, Building & Environmental Services (PBES), this analysis outlines the availability of groundwater for a potential staffing and marketing plan increase for Flora Springs Winery located at 1978 West Zinfandel Lane, St. Helena, CA 94574. The subject parcel, previously APN 027-100-037, has been distinguished as "Parcel 4" per the pending Lot Line Adjustment (reference #W15-00140).

PROJECT DESCRIPTION

The 168.8± acre subject parcel currently contains multiple winery buildings, a tasting room, offices, landscaped areas, miscellaneous structures associated with vineyard operations and 30.4± acres of vineyard.

It is our understanding that the project proposes to modify the existing staff and marketing plan while continuing to operate an existing 120,000 gallon per year winery. The Applicant proposes 16 full-time employees, one (1) part-time employee and seven (7) harvest season employees. The Applicant also proposes to offer private tour and tasting appointments for a maximum number of 100 guests per day. Furthermore, the Applicant proposes to offer two (2) food and wine - lunch pairing events per week for parties up to 50 guests and two (2) food and wine - dinner pairing events per week for parties up to 25 guests. Additionally, the Applicant proposes to continue to host two (2) wine club events per week for groups of up to 50 guests. Wine club release events are proposed to occur three (3) times a year for parties up to 250 guests along with one (1) wine club release event - TRILOGY per year for parties up to 350 guests. Additionally, one (1) auction related event will occur per year for up to 60 guests.

To accommodate an increase in the staffing and marketing plan, two (2) domestic water storage tanks and one (1) septic tank are proposed for installation. Additionally, two (2) fire protection tanks will be installed as part of the project. An event parking plan has been prepared which includes required universal access parking. There are no planned improvements for the existing driveway.

EXHIBITS

The associated USGS "Topographic Site Location Map" shows the project site and approximate property line locations. Information regarding the location of the existing wells and structures are shown on the associated Use Permit Drawings. Geological materials that underlay the subject parcel is shown on the attached "Geological Site Location Map". All exhibits and drawings mentioned above were prepared by Bartelt Engineering.

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WATER USE CRITERIA

TABLE 1: SCREENING CRITERIA	
Parcel Zoning	Agricultural Preserve (AP) - Westerly Portion Agricultural Watershed (AW) - Easterly Portion
Project Parcel Location	All Other Areas
Parcel Size	32.7± acres (zoned AP) 136.1± acres (zoned AW)
Water Use Criteria	Parcel Specific
Well and Spring Interference	No
Groundwater/Surface Water Interaction	No
Screening Tier	Tier 1

As summarized in Table 1, the subject parcel is partially located in AP and AW Zoning Districts. Per the PBES WAA-Guidance Document dated May 12, 2015 the water use criteria for a parcel located in the Napa Valley Floor and/or All Other Areas that are not designated as a groundwater deficient area without any well or spring interference must follow Tier 1 requirements. The water use criteria for the area of the project zoned AP is defined as 1 acre-feet per acre per year. The water use criteria for the area of the project zoned AW is parcel specific and must be considered in relation to the average annual recharge available to the project property.

WATER DEMAND

Estimated Water Use

The total water demand for the existing and proposed uses for the project is calculated below based on the *Guidelines for Estimating Residential and Non-residential Water Use* from the WAA Guidance Document (2015):

TABLE 2A: EXISTING WATER DEMAND	
Description	**Estimated Water Usage (acre-feet/year)**
Winery (120,000 gallons per year)	
Process Water	2.58
Domestic and Landscaping Water	0.60
Tasting Room and Marketing Plan[1]	0.47
Vineyard (30.4± acres)	
Irrigation	15.2
Heat and Frost Protection	15.2
Total Existing Water Demand =	34.05

TABLE 2B: PROPOSED WATER DEMAND	
Description	**Estimated Water Usage (acre-feet/year)**
Winery (120,000 gallons per year)	
Process Water	2.58
Domestic and Landscaping Water	0.60
Tasting Room and Marketing Plan[1]	0.54
Vineyard (30.4± acres)	
Irrigation	15.2
Heat and Frost Protection	15.2
Total Proposed Water Demand =	34.12

As shown in Table 2A and Table 2B, the water demand is estimated to slightly increase from 34.05 acre feet per year to 34.12 acre feet per year as part of the proposed staffing and marking plan modification. Refer to the attached Table I and Table II for existing and proposed water demand calculations.

SOURCE WATER INFORMATION

The subject parcel currently sources water from an existing spring as well as three (3) existing wells. A description of each water source is summarized below:

- The "winery well" is located on the subject parcel southwest of the existing winery and currently supplies domestic water to the existing office, tasting room and winery buildings.

[1]The water demand is assumed to be equal to sanitary wastewater generated by the tasting room and marketing plan; refer to the Wastewater Feasibility Study prepared by Bartelt Engineering and submitted with the Use Permit Application for wastewater calculations.

- The "vineyard well" is located north of the existing winery on the neighboring parcel referenced as Parcel 3 per the pending Lot Line Adjustment (#W15-00140) and currently supplies irrigation and reserve domestic water.
- "Well 2" is located east of the existing winery on the neighboring parcel (APN 027-100-038) and provides irrigation water to the subject parcel.
- The spring is located on the subject parcel south of the existing winery and currently supplies irrigation water.

Prior to use, domestic water is proposed to be stored in two (2) 10,500 gallon storage tanks and irrigation water is stored in two (2) existing reservoirs. Furthermore, fire protection water is stored in two (2) proposed 10,500 gallon storage tanks as well as three (3) existing 10,000 gallon storage tanks (50,000 gallon total storage capacity).

The project proposes to use the "winery well" as the main project water source capable of meeting the water demand shown in Table 2B. The "vineyard well" is proposed to provide irrigation water and reserve (emergency) domestic water.

Well Description

Per the Well Completion Report (Permit #E15-00851), the "winery well" was constructed in 2015 by Huckfeldt Well Drilling, Incorporated and has a recorded state well number of e020736. The well is reported to be constructed of 8 inch diameter PVC F480 casing to a completed depth of 617 feet with a 55 foot cement annular seal. Refer to the attached Well Completion Report for more information.

Per the Well Completion Report (Permit #E15-00755), the "vineyard well" was constructed in 2016 by Huckfeldt Well Drilling, Incorporated and has a recorded state well number of e020739. The well is reported to be constructed of 8 inch diameter PVC F480 casing to a completed depth of 700 feet with a 67 foot cement annular seal. Refer to the attached Well Completion Report for more information.

Yield Test

A yield test was performed on the "winery well" by LGS Drilling, Incorporated in January 2016. Prior to the start of the yield test, static water level was recorded at 93 feet below surface. A sustained yield of 75 gallons per minute (gpm) was recorded after eight (8) hours of continuous pumping. Static water levels recovered to 109.50 feet below surface after 18 hours and 45 minutes of rest. Following completion of the yield test, a 50 gpm well pump was installed. Refer to the attached well yield test results for more information.

A yield test was performed on the "vineyard well" by LGS Drilling, Incorporated in March 2016. Prior to the start of the yield test, static water level was recorded at 173.3 feet below surface. A sustained yield of 325 gpm was recorded after eight (8) hours of continuous pumping. Static water levels recovered to 194.5 feet below surface after 30 minutes of rest. Following completion of the yield test, a 200 gpm well pump was installed. Refer to the attached well yield test results for more information.

Water System Classification

Per PBES guidelines, the water system may be regulated as a transient non-community (TNC) public water system (PWS). A TNC public water system is identified as a water system that has less than five (5) connections, serves less than 25 yearlong residents[2] and serves 25 people per day at least 60 days per year. Refer to the Technical, Managerial and Financial (TMF) Capacity Worksheet included with the Use Permit Application for further information regarding the PWS.

Neighboring Water Source(s)

Based on review of neighboring property records at Napa County PBES and discussions with PBES staff, there does not appear to be any neighboring wells located within 500 feet of the proposed project well. Refer to the associated "Use Permit Drawings" prepared by Bartelt Engineering for location of the existing onsite wells, neighboring wells and nearby creeks.

Water Quality

A water quality analysis was performed on the existing wells in 2016 by CalTest Analytical Laboratory. The water analysis for the "winery well" showed good water quality with primary constituents (Arsenic and Fluoride) testing below the Maximum Containment Levels (MCLs) set by the EPA Safe Drinking Water Act for a regulated PWS. Iron levels were non-detectable, however Manganese levels were reported above the secondary MCL. Elevated Manganese levels can cause aesthetic issues in and around the water system as well as near areas of use. Manganese removal is therefore recommended to be incorporated into the water treatment system. The water analysis does not reflect a full analysis of all required constituents for a PWS. Refer to the attached water quality results for more information.

GROUNDWATER OVERVIEW

According to the Napa County Watershed Information & Conservation Council (WICC), the subject parcel is partially located in the St. Helena Groundwater Subarea and the Western Mountains Groundwater Subarea of Napa County.

The St. Helena Subarea located in the Napa Valley Floor is reported to have geology primarily consisting of alluvial sediments, such as clay, silt and sand. Groundwater levels in the wells monitored by WICC were observed to be frequently very shallow at less than 10 feet below the ground surface during the spring season. Declines of about 20 feet were observed between the spring and fall seasons. Groundwater quality was observed to be generally good with some well samples exceeding constituent standards including various metals and minerals.

The Western Mountain Subarea includes some volcanic rocks with additional exposures of the sedimentary Great Valley Sequence and metamorphic Franciscan Complex. The Napa County Groundwater Monitoring Program tested wells in this area in 2014 and 2015. The observed groundwater depth in these wells ranged from 44 feet to 240 feet below ground surface. Ground elevations range from 390 feet to 1,660 feet, mean sea

[2] Yearlong resident is considered an individual served by the water system for 183 or more days annually.

level. The groundwater quality available in this subarea is reported to be generally of good quality. Elevated levels of iron and manganese occur, along with lower than average pH indicating more acidity than the Napa Valley Floor.

GEOLOGICAL FEATURES

The attached "Geological Site Location Map" prepared by Bartelt Engineering shows the parcel boundary, approximate well locations and surrounding geologic materials. The background for the exhibit is sourced from the "USGS Geological Map and Map Database of Eastern Sonoma and Western Napa Counties, California" by Graymer et al. (2007). The prominent geological materials in the project area appear to be predominantly Surficial Deposits (map unit Qf and Qls) and Sonoma Volcanics (map unit Tsr)

Figure 5-3 Cross Section A-A' Northern NVF-St. Helena Subarea, Napa County, CA from "Updated Hydrogeologic Conceptualization and Characterization of Conditions" by Luhdorff and Scalamini (L&S) in 2013 shows the subsurface geology along Zinfandel Lane. Side A of the cross section is in the proximity of the subject parcel location and existing wells. The cross-section is based on review of well completion reports along the cross-section location. The geological materials in the cross-section appear to be consistent with geological maps in this area. Both the cross-section and geological maps show a fault line near the subject parcel. Refer to the attached Cross-Section A-A' for more information.

Per the Napa County Baseline Data Report (2005), Sonoma Volcanics consist of dacite, rhyolite and andesite rock types. These rocks are exposed over much of Napa Valley and are the second most commonly exposed rocks in Napa County. In terms of groundwater resources, tuffaceous units within the Sonoma Volcanics host significant volumes of groundwater under both confined and unconfined conditions. Furthermore, surficial deposits consist of the formation of stream channel deposits, alluvium, terrace deposits, alluvial fan deposits, landslide deposits, basing deposits, bay mud, and artificial fill. In term of groundwater resources, surficial deposits are reported to be typical pathways for groundwater recharge and, depending on the properties and depths of the surficial deposits, may hold groundwater to varying capacity. Within the Napa Valley Floor, the majority of the groundwater is hosted within these deposits.

NAPA VALLEY FLOOR ALLOWABLE WATER ALLOTMENT

Per *Table 2A: Water Use Criteria* from the WAA Guidance Document (2015), the water use criteria for a parcel located in the Napa Valley Floor is defined as 1 acre-feet per acre per year. The area of the parcel zoned AP (32.7± acres) is assumed to be located in the Napa Valley Floor. The remainder of the parcel (136.1± acres) is zoned AW and assumed to be located in All Other Areas. This assumption is based on USGS topographic information and the Napa County General Plan mapping. The allowable water allotment for the applicable area is calculated below.

Allowable Water Allotment (acre-ft/yr) =

Napa Valley Floor parcel area (acres) x Water use criteria (acre-ft/acre-yr)

= 32.7 acres x 1 acre-ft/acres-yr = 32.7 acre-ft/yr

The allowable water allotment for the area of the subject parcel located in the Napa Valley Floor is estimated to be 32.7 acre feet per year.

ALL OTHER AREAS ESTIMATED GROUNDWATER RECHARGE RATE

The allowable water allotment for the area of the parcel located in All Other Areas is determined by estimating groundwater recharge. Groundwater recharge can be estimated by understanding the soil properties and geological materials present and their ability to percolate groundwater to the saturated zone of the aquifer. Water flowing into the ground consists primarily of recharge from precipitation, surface water seepage and artificial recharge. Water flowing out of the ground primary involves extraction from wells, spring discharge and evapotranspiration. In Napa County, precipitation has been primarily established as the primary source of groundwater (Kunkel and Upson, 1960). Since the subject parcel is partially located in the St. Helena and Western Mountains Groundwater Subarea with no surrounding creeks located in the proximity of the project area, direct infiltration from rainfall is likely to be the most significant factor for groundwater recharge. Without having site recorded data showing the change in groundwater, this analysis models groundwater recharge as a percent of rainfall. The amount of rainfall that is estimated to recharge groundwater is impacted by a number of factors. Some of these factors include precipitation, soil properties and underlain geological materials.

Precipitation

Precipitation, or rainfall, data used in this analysis is taken from two (2) sources: the PRISM Climate Group at Oregon State University and the National Climate Data Center (NCDC). The PRISM Climate Group provides spatial climate datasets for selected 800 meter or 400 kilometer (km) grid cell(s). The average annual recorded rainfall data from 1981-2010 (30-year normals) for the project location selected from two (2) 800 spatial grid cells and averaged is 36.5 inches. The NCDC rainfall data collected rainfall from a cooperative weather station in St. Helena from 1961-1990. The average recorded rainfall over this time period was 34.9 inches.

Average rainfall data from PRISM recorded over the past ten (10) years provides more recent rainfall data and shows variation between drought, dry and wet years. The 10-year average (2014 to 2004) from a 400 km spatial grid cell which includes the project location is shown in the following table.

TABLE 3: 10-YR AVERAGE RAINFALL	
Month	**PRISM Rainfall (inches)**
2014	42.2
2013	7.8
2012	47.6
2011	35.8
2010	55.2
2009	29.3
2008	29.2
2007	22.0
2006	43.7
2005	53.9
2004	38.6
AVERAGE	**36.8**

Based on the rainfall data shown in the above table, it appears rainfall outside of the normal trend occurred in 2013 as a drought year and in 2005 as a very wet year. A typical dry year occurred in 2007 with 22.0 inches of recorded rainfall and a typical wet year occurred in 2012 with 47.6 inches of recorded rainfall.

For estimating groundwater recharge, this analysis uses the most conservative rainfall data series which in this case is the 30-yr normal average rainfall amount recorded from the NCDC Cooperative Weather Station in St. Helena (34.9 inches). Refer to the attached Rainfall (Table III) for a summary of rainfall data from all sources.

Hydrologic Soil Groups

Per the USDA, hydrologic soil groups (HSG) are based on estimated potential for runoff. Soils are assigned four (4) groups (A, B, C and D) depending on the ability of water to infiltrate the soil. Group A soils have a high infiltration rate (low runoff potential) and group D has very slow infiltrative rates (high runoff potential). The infiltration rate is also affected by site slopes; higher slopes limit the time water is available for infiltration.

A custom soils report was generated by the NRCS Web Soil survey for the subject parcel. The survey shows that several soil types, HSGs and land slopes are present. Applying a weighted total to the infiltrative properties, the subject parcel has an overall "slow" infiltrative rate of 0.11 inches per hour and a corresponding "C" HSG. Refer to the attached Custom Soil Report for more information regarding soil properties.

Average Year Groundwater Recharge Rate

Based on review of several groundwater publications and WAA prepared for similar type projects, a percent of precipitation is assumed to be available for groundwater recharge. These publications include studies for City of Santa Rosa watersheds as well as Environmental Impact Reports (EIR) for large scale projects. Below is a summary of these

references and comparison to the geological materials and HSGs present on the merged subject parcel:

- The "Groundwater Study" for the 2009 Napa Pipe Project EIR prepared by others, estimates 10.5% of precipitation is available for groundwater recharge in Sonoma Volcanics.
- The "Santa Rosa Plan Watershed Groundwater Management Plan 2014" prepared by the Santa Rosa Plan Basin Advisor Panel includes a specified yield of 0-15% for Sonoma Volcanics. Specified yield refers to the amount of water contained in the saturated zone that flows by gravity and is available to wells (Johnson 1967).
- WAA prepared for the Wools Ranch Winery by L&S dated 2014 includes a 10% recharge rate for a parcel with primarily slow and some moderate infiltrative soil properties.

Based on the methodology utilized in these studies, a conservative groundwater recharge could be 10% of annual precipitation. A conservative estimate for the project site recharge area is assumed to be equal to the area of the subject parcel located in All Other Areas as well as underlain with Sonoma Volcanics. Of the 136.1± acres designated as All Other Areas, approximately 56.1± acres appear to be underlain with Sonoma Volcanics[3]. The volume of rainwater that is estimated to be available for groundwater recharge in this area is calculated below:

Annual recharge (acre-ft/yr) = Recharge area (acres) x Precipitation (ft) X Recharge rate

= 56.1 acres x (34.9 in x 1 ft/12 in) x 10%

= 16.3 acre-ft/yr

The estimated annual recharge for the area of the subject parcel zoned AW and located in All Other Areas is estimated to be 16.3 acre-feet per year.

Dry Year Recharge Rate(s)

When modeling groundwater recharge as a percentage of rainfall, dry rainfall years should also be evaluated. A drought year occurred in 2013 with only 7.8 inches of recorded precipitation near the project area according to the PRISM Database (see Table 3). This is a significantly low rainfall year and is not considered to represent historical rainfall patterns. Applying the recharge rate to the recharge area discussed above as a percentage of rainfall, the potential groundwater available during a typical dry year (2013) is 10.3 acre-feet per year.

SUMMARY

The available water for the subject parcel is the combination of the allowable water allotment for the area of the subject parcel located in the Napa Valley Floor as well as the estimated groundwater recharge for the area located in All Other Areas and underlain with Sonoma Volcanics. The available water for the subject parcel is estimated to be between

[3] Refer to the attached "Geological Site Map" for map of geological materials reported to be present at the merged subject parcel.

49.9 acre-feet per year and 49.0 acre-feet per year during average rainfall years. During dry rainfall years the estimated groundwater recharge could reduce to 43.0 acre-feet per year.

CONCLUSION

The groundwater demand generated as a result of the proposed staffing and marketing plan increase for the existing winery is estimated to slightly increase from 34.05 acre-feet per year (see Table 2A) to 34.12 acre-feet per year (see Table 2B). Groundwater is proposed to be sourced from the existing onsite "winery well" which has a reported pumping rate of 50 gpm. The existing "vineyard well", which has a reported pumping rate of 200 gpm, is proposed to continue providing irrigation water and reserve (emergency) domestic water to the subject parcel. The estimated available water for the project area is estimated to be around 49.0 acre-feet per year on average. Even during a dry rainfall year, the estimated available water of 43.0 acre-feet pear year is greater than the estimated proposed groundwater demand of 34.12 acre-feet per year.

The above analysis shows that the increase in groundwater demand can feasibly be sourced by the existing project wells. Furthermore, the estimated available water for the subject parcel satisfies the Tier 1 Water Use Criterion of the Napa County Water Availability Analysis.

ATTACHMENTS

Geological Site Map

Geological Cross-Section Location Map

Cross Section A-A' Northern NVF-St. Helena Subarea

Table I – Existing Water Demand

Table II – Proposed Water Demand

Table III – Rainfall

Table IV – Soil Group Properties

Table V – Water Availability

Well Completion Reports & Yield Test Results

Water Quality Data

Custom Soil Report

REFERENCES

Brownstein Hyatt Farber Schreck. (2011, August 25). Water Supply Assessment for the Napa Pipe Project Napa County, California.

DHI Water Environment. (2005 - Version 1, November 30). Napa County Baseline Data Report. Chapter 16. Groundwater Hydrology.

Johnson, A. (1967). Specific Yield - Completion of Specific Yields for Various Materials. California Department of Water Resources. Geological Survey Water Supply Paper 1662-D.

Luhdhorff & Scalamini. (2014). Water Availability Analysis for the Wools Ranch Winery Project, Napa County.

Luhdorff & Scalmanini Consulting Engineers and MBK Engineers. (January 2013). *Updated Hydrogeological Conceptualization and Characterization of Conditions Prepared for Napa County.*

Napa County . (2015, May 12). Water Availability (WAA) - Design, Construction and Guidance Document.

Napa County Watershed Information & Conservation Council (WICC). (n.d.). Retrieved from www.napawatershed.org

National Climate Data Center (NCDC). (1995). Retrieved from www.worldclimate.com

PRISM Climate Group, Oregan State University. (2014). Retrieved from http://prism.oregonstate.edu

Santa Rosa Plan Basin Advisor Panel. (2014). Santa Rosa Watershed Groundwater Management Plan.

Stamski, R. (2007). Geologic map and map database of eastern Sonoma and western Napa Counties, California. U.S. Geological Survey Scientific Investigations Map 2956.

United States Geological Survey (USGS). (1960). Geology and Ground Water in the Napa and Sonoma Valleys, Napa and Sonoma Counties, California. *US Geological Survey Water Supply Paper 1495*.

GEOLOGICAL SITE MAP

FROM USGS GEOLOGICAL MAP AND MAP DATABASE OF
EASTERN SONOMA AND WESTERN NAPA COUNTIES, CALIFORNIA

Scale: 1" = 3000'

LEGEND:

PARCEL BOUNDARY

SUBJECT WELL

MAP UNITS:

SONOMA VOLCANICS

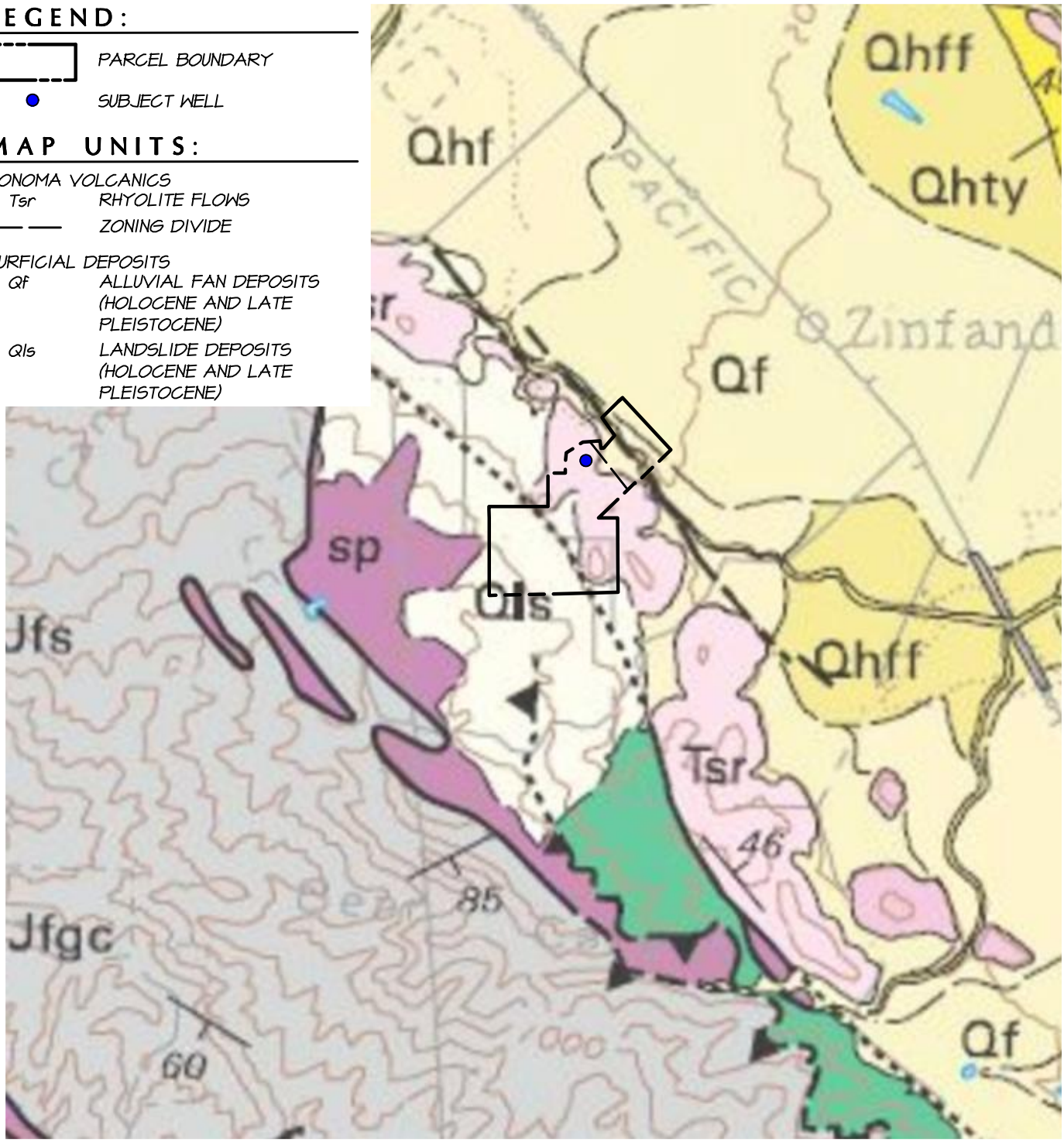
Tsr — RHYOLITE FLOWS

ZONING DIVIDE

SURFICIAL DEPOSITS

Qf — ALLUVIAL FAN DEPOSITS (HOLOCENE AND LATE PLEISTOCENE)

Qls — LANDSLIDE DEPOSITS (HOLOCENE AND LATE PLEISTOCENE)



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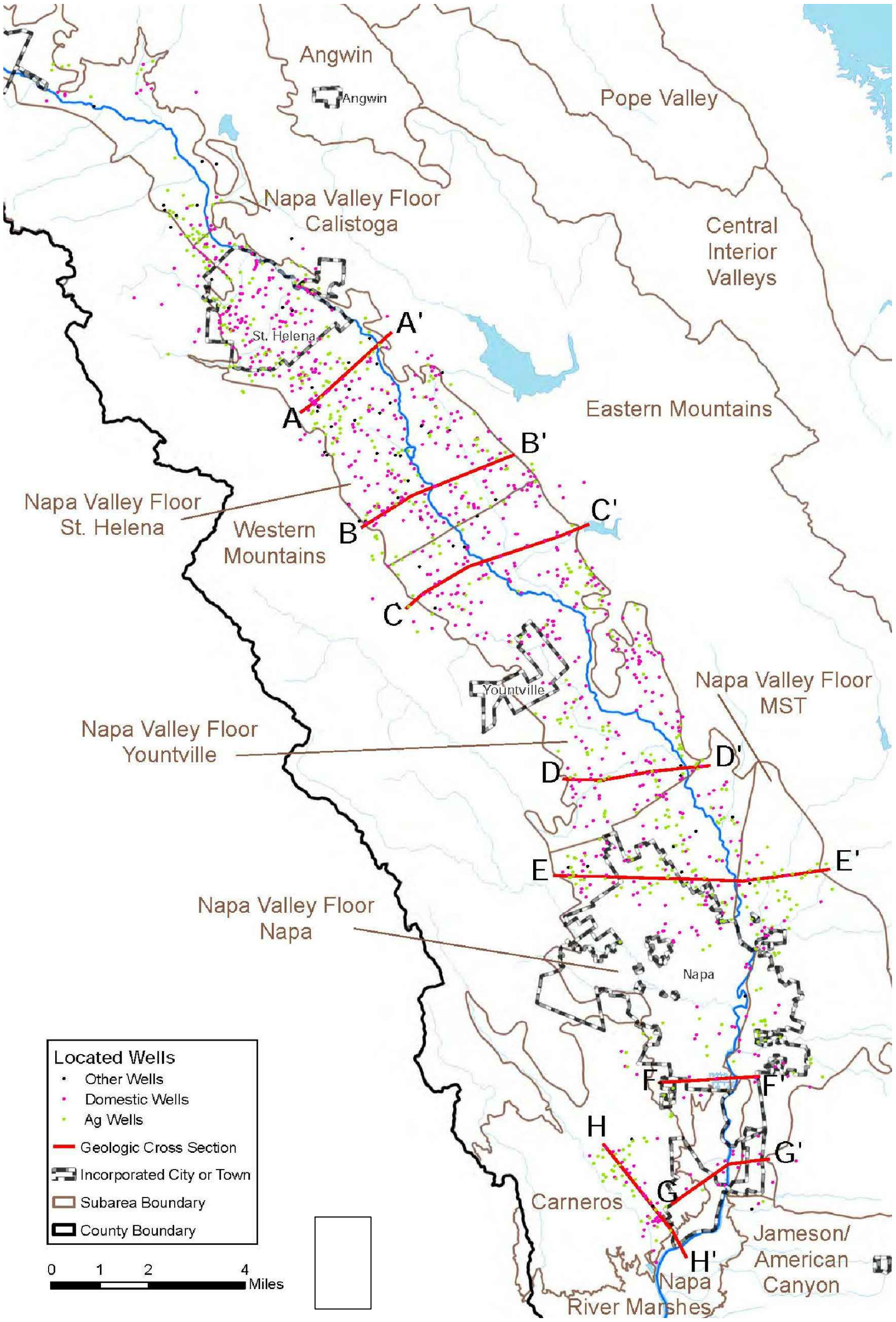
Flora Springs Winery
1978 West Zinfandel Lane
St. Helena, California
"Parcel 4"

Job No. 96-19 May 2016



AS NOTED

GEOLOGICAL CROSS SECTION LOCATION MAP

SCALE: AS NOTED

NOTE:

THE MAP USED AS A BASE FOR THIS EXHIBIT WAS REFERENCED FROM LUHDORFF & SCALMANINI CONSULTING ENGINEERS AND MBK ENGINEERS UPDATED HYDROGEOLOGICAL CONCEPTUALIZATION AND CHARACTERIZATION OF CONDITIONS PREPARED FOR NAPA COUNTY (JANUARY 2013).

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Flora Springs Winery
1978 West Zinfandel Lane
St. Helena, CA 94574
"Parcel 4"
Job No. 96-19
May 2016
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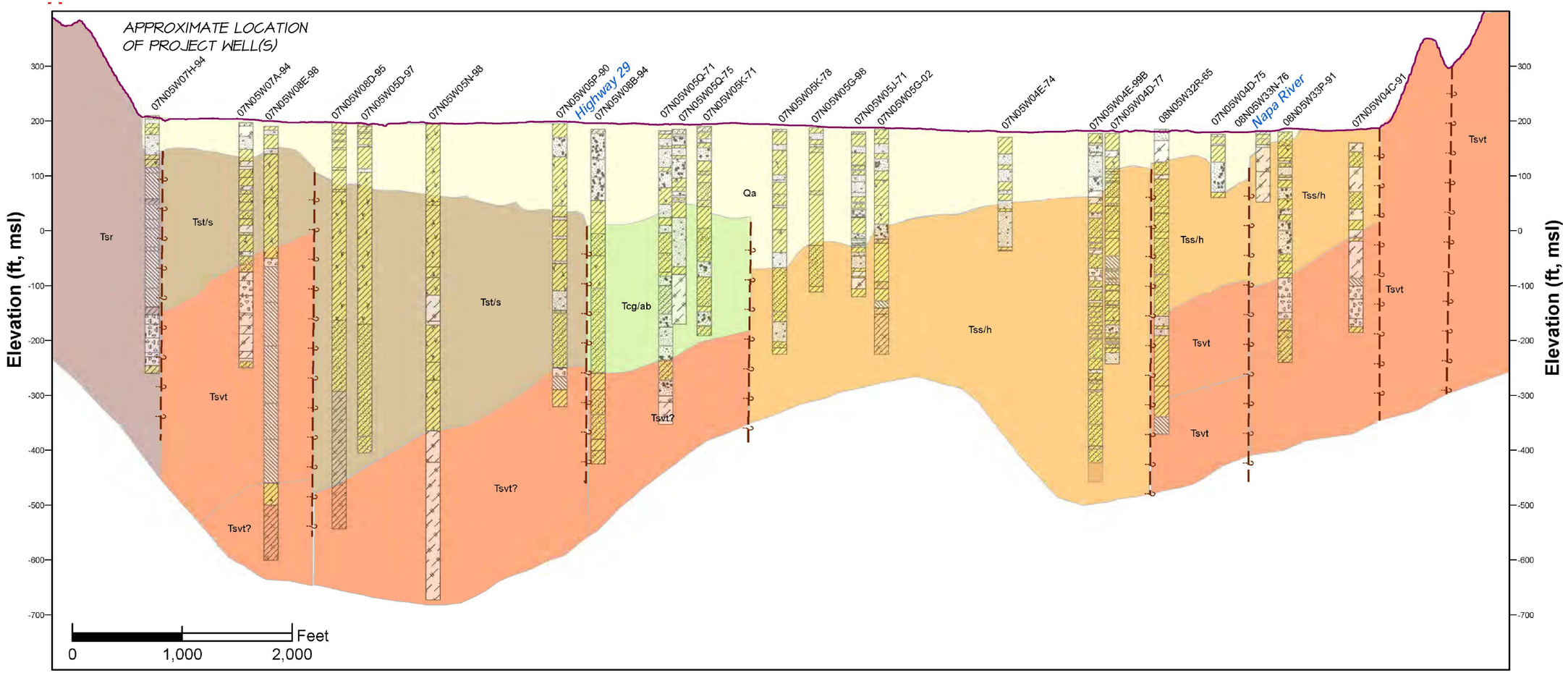

Legend

Basalt	Clay and Basalt	Clay and Sand (or Sandstone)	Clay, Sand, and Gravel	Rock	Sand (or Sandstone) and Gravel	Sandstone	Unknown	
Clay	Clay and Gravel	Clay and Tuff	Gravel	Sand	Sand and Clay	Tuff or Ash	Faults	

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CROSS SECTION A-A'
NORTHERN NVF-ST. HELENA SUBAREA

SCALE: 1" = 1,000'

NOTE:

CROSS SECTION A-A' USED AS A BASE FOR THIS EXHIBIT WAS REFERENCED FROM LUHDORFF & SCALMANINI CONSULTING ENGINEERS AND MBK ENGINEERS UPDATED HYDROGEOLOGICAL CONCEPTUALIZATION AND CHARACTERIZATION OF CONDITIONS PREPARED FOR NAPA COUNTY (JANUARY 2013).

Flora Springs Winery
1978 West Zinfandel Lane
St. Helena, CA 94574
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Flora Springs Winery
Existing Water Demand
Table I

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Winery Production Limit: **120,000 gallons/year**
Vineyard Area: **30.4 acres**

EXISTING WATER DEMAND			
Description		**Water Usage Rate[1]**	**Water Demand (acre-feet/year)**
Residential			
Primary Residence	0.75	acre-feet/acre-year	-
Secondary Residence or Farm Labor Dwelling	0.5	acre-feet/acre-year	-
Agricultural			
Vineyards			
Irrigation Only	0.5	acre-feet/acre-year	15.20
Heat Protection	0.25	acre-feet/acre-year	7.60
Frost Protection	0.25	acre-feet/acre-year	7.60
Irrigated Pastures	4	acre-feet/acre-year	-
Orchards	4	acre-feet/acre-year	-
Livestock (sheep or cows)	0.01	acre-feet/acre-year	-
Winery			
Process Water	2.15	acre-feet/100,000 gallon of wine	2.58
Domestic & Landscaping	0.5	acre-feet/100,000 gallon of wine	0.60
Tasting Room and Marketing Plan[2]			0.47
Industrial			
Food Processing	31	acre-feet/employee-year	-
Printing/Publishing	0.06	acre-feet/employee-year	
Commercial			-
Office Space	0.01	acre-feet/employee-year	-
Warehouse	0.05	acre-feet/employee-year	-

Estimated Existing Water Demand (acre-feet/year): 34.05
Estimated Existing Water Demand (gallons/year): 11,095,227

1) Water usage rates referenced from *Appendix B: Estimated Water Use of Specified Land Use* from Napa County WAA-Guidance Document (2015)
2) Water demand is assumed to equal wastewater generation rates; refer to the Wastewater Feasibility Study prepared by Bartelt Engineering and submitted with the Use Permit Application for calculations

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Flora Springs Winery
Proposed Water Demand
Table II

BARTELT ENGINEERING

Winery Production Limit: **120,000 gallons/year**
Vineyard Area: **30.4 acres**

PROPOSED WATER DEMAND		
Description	**Water Usage Rate[1]**	**Water Demand (acre-feet/year)**
Residential		
Primary Residence	0.75 acre-feet/acre-year	-
Secondary Residence or Farm Labor Dwelling	0.5 acre-feet/acre-year	-
Agricultural		
Vineyards		
Irrigation Only	0.5 acre-feet/acre-year	15.2
Heat Protection	0.25 acre-feet/acre-year	7.6
Frost Protection	0.25 acre-feet/acre-year	7.6
Irrigated Pastures	4 acre-feet/acre-year	-
Orchards	4 acre-feet/acre-year	-
Livestock (sheep or cows)	0.01 acre-feet/acre-year	-
Winery		
Process Water	2.15 acre-feet/100,000 gallon of wine	2.58
Domestic & Landscaping	0.5 acre-feet/100,000 gallon of wine	0.6
Tasting Room and Marketing Plan[2]		0.54
Industrial		
Food Processing	31 acre-feet/employee-year	-
Printing/Publishing	0.06 acre-feet/employee-year	
Commercial		-
Office Space	0.01 acre-feet/employee-year	-
Warehouse	0.05 acre-feet/employee-year	-

Estimated Proposed Water Demand (acre-feet/year): 34.12
Estimated Proposed Water Demand (gallons/year): 11,118,036

1) Water usage rates referenced from *Appendix B: Estimated Water Use of Specified Land Use* from Napa County WAA-Guidance Document (2015)
2) Water demand is assumed to equal wastewater generation rates; refer to the Wastewater Feasibility Study prepared by Bartelt Engineering and submitted with the Use Permit Application for calculations

Flora Springs Winery
Rainfall
Table III

BARTELT ENGINEERING

AVERAGE MONTHLY RAINFALL RATES		
Month	PRISM Rainfall[1] (inches)	NCDC Rainfall[2] (inches)
September	0.3	0.4
October	1.8	2.1
November	4.3	5.5
December	7.4	5.9
January	6.8	7.9
February	7.4	5.9
March	5.2	4.7
April	2.0	1.9
May	1.1	0.4
June	0.2	0.1
July	0.0	0.0
August	0.1	0.1
TOTALS	**36.5**	**34.9**

1) PRISM 30-year normall rainfall data from 1981-2010 averaged from two (2) 800 m^2 spatial grids that emcompass the total project area; see http://prism.oregonstate.edu/
2) Site rainfall from St. Helena, CA (NCDC Cooperative Stations 1961-1990); see www.worldclimate.com

10-YR AVERAGE RAINFALL	
Year	PRISM Rainfall[1] (inches)
2014	42.2
2013	7.8
2012	47.6
2011	35.8
2010	55.2
2009	29.3
2008	29.2
2007	22.0
2006	43.7
2005	53.9
2004	38.6
AVERAGE	**36.8**

1) PRISM yearly rainfall data from 2007-2014 from one (1) 400 km spatial grids which emcompass the total project area; see http://prism.oregonstate.edu/

May 2016
Job No. 96-19

Flora Springs Winery
Soil Group Properties
Table IV

BARTELT ENGINEERING

HYDROLOGIC SOIL GROUP									
Map Unit	**Map Unit Name**	**Slope Range**	**Hydrologic Rating Group**	**Acres in AOI (acres)**	**Percent of AOI (%)**	**Infiltration Rate (in/hr)**		**Estimated Infiltration Rate (in/hr)**	**Weighted Infiltration Rate (in/hr)**
138	Forward gravelly loam	2-9%	B	0.3	0.1%	Moderate	0.15-0.30	0.23	0.0002
139	Forward gravelly loam	9-30%	B	7.0	4.2%	Moderate	0.15-0.30	0.23	0.0097
140	Forward gravelly loam	30-75%	B	44.7	26.5%	Moderate	0.15-0.30	0.23	0.0610
151	Hambright-Rock outcrop complex	2-30%	D	0.8	0.5%	Very Slow	< 0.05	0.05	0.0003
154	Henneke gravelly loam	30-75%	D	67.5	40.0%	Very Slow	< 0.05	0.05	0.0200
161	Maxwell clay	2-9%	D	24.4	14.5%	Very Slow	< 0.05	0.05	0.0073
166	Montara clay loam	5-30%	D	5.5	3.3%	Very Slow	< 0.05	0.05	0.0017
169	Perkins gravelly loam	5-9%	C	6.7	4.0%	Slow	0.05-0.15	0.10	0.0040
170	Pleasanton loam	0-2%	C	11.8	7.0%	Slow	0.05-0.15	0.10	0.0070
TOTALS				168.7	100%				0.11

1) Hydrologic Soil Groups (HSGs) are based on USDA/NRCS Web Soil Survey for the project Area of Interest (AOI)
2) Infiltration Rates for each HSG is referenced from the USDA Urban Hydrology for Small Watersheds, Technical Release 55, June 1986.

Flora Springs Winery
Water Availability
Table V

BARTELT ENGINEERING

Total Parcel Size: **168.8 acres**
Napa Valley Floor Parcel Size (zoned AP) **32.7 acres**
All Other Areas Parcel Size (zoned AW) **136.1 acres**

ALLOWABLE WATER ALLOTMENT - NAPA VALLEY FLOOR		
Applicable Parcel Size (acres)	**Water Use Criteria (acre-feet/acre-year)**	**Water Allotment (acre-feet/year)**
32.7	1.0	32.7

GROUNDWATER RECHARGE - ALL OTHER AREAS					
Scenario	**Rainfall[1] (inches)**	**(feet)**	**Sonoma Volcanics Recharge Area[2] (acres)**	**Sonoma Volcanics Recharge Rate (%)**	**Estimated Recharge (acre-ft/year)**
10-year Average	36.8	3.1	56.1	10%	17.2
NCDC 30-year Average	34.9	2.9	56.1	10%	16.3
Typical Dry Year (2007)	22.0	1.8	56.1	10%	10.3

1) Refer to Table I - Rainfall Data
2) Portion of All Other Areas that appears to be underlain with Sonoma Volcanics, refer to attached Geological Site Location Map for more information

TOTAL WATER AVAILABILITY				
Scenario	**Water Allotment (acre-feet/year)**	**Estimated Recharge (acre-ft/year)**	**Total Water Availability (acre-ft/year)**	**(gallons/year)**
10-year Average	32.7	17.2	49.9	16,266,946
NCDC 30-year Average	32.7	16.3	49.0	15,971,831
Typical Dry Year (2007)	32.7	10.3	43.0	13,999,088

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 020736

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

Owner's Well No. 1-2015
Date Work Began 11/3/2015, Ended 12/16/2015
Local Permit Agency Napa County Environmental Mgmt
Permit No. E15-00581 Permit Date 11/3/2015

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD ROTARY FLUID BENTONITE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0	20	GREEN, GRAY ASH W EMBEDDED ROCK
20	95	TAN SANDY ASH WITH EMBEDDED ROCK
95	195	FRACTURED TAN VOLCANIC ROCK
195	210	FRACTURED GRAY VOLCANIC ROCK
210	270	GRAY VOLCANICS W GRAY ASH STRINGERS
270	280	MIXED VOLCANIC SANDS
280	320	TAN, GRAY VOLCANICS W ASH STRINGERS
320	330	TAN SANDY ASH
330	335	RED SANDY ASH
335	350	RED VOLCANIC ROCK
350	360	FRACTURED GRAY VOLCANICS
360	380	BROWN SANDY ASH
380	420	TAN VOLCANIC SANDS
420	430	BROWN SANDY ASH
430	455	FRACTURED BLACK VOLCANICS
455	490	WHITE SANDY VOLCANIC ASH
490	555	FRACTURED BLACK VOLCANICS
555	590	HARD FRACTURED BLACK, RED VOLCANICS
590	600	BLACK VOLCANICS WITH ASH STRINGERS
600	620	WHITE SANDY VOLCANIC ASH
		CONTINUED CASING LAYOUT
376	456	SCREEN PVC 8" .032 SLOT
456	476	BLANK PVC 8"
476	556	SCREEN PVC 8" .032 SLOT
556	576	BLANK PVC 8"
576	596	SCREEN PVC 8" .032 SLOT
596	616	BLANK PVC 6"

TOTAL DEPTH OF BORING 620 (Feet)
TOTAL DEPTH OF COMPLETED WELL 617 (Feet)

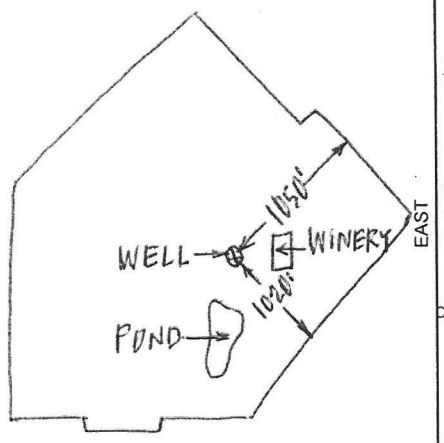
WELL OWNER

Name JMK - A LLC
Mailing Address 1889 West Zinfandel Lane
St. Helena CA 94574
CITY STATE ZIP

WELL LOCATION

Address 1978 West Zinfandel Lane
City St. Helena CA
County Napa
APN Book 027 Page 100 Parcel 037
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 (✓)

✓ 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 90 (Ft.) BELOW SURFACE 1
DEPTH OF STATIC WATER LEVEL 79 (Ft.) & DATE MEASURED 12/16/2015
ESTIMATED YIELD * 150 (GPM) & TEST TYPE AIR LIFT
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)
May not be representative of a well's long-term yield.

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	620	15								
0	96		✓				PVC F480	8	SDR-21	
96	256			✓			PVC F480	8	SDR-21	.032
256	276		✓				PVC F480	8	SDR-21	
276	356			✓			PVC F480	8	SDR-21	.032
356	376		✓				PVC F480	8	SDR-21	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	55	✓			10 SK SAND
55	617			✓	#6 SAND

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) (TYPED OR PRINTED)
2110 Penny Lane Napa CA 94559
ADDRESS CITY STATE ZIP
Signed ___ 12/29/15 439-746
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

A Tradition of Stewardship
A Commitment to Service

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa CA 94559
www.countyofnapa.org
(707) 253-4417

David Morrison
Director

JOB SET

Well Permit

Application Type:	Environmental / EM Permits / Water Wells / Class I	**Applied Date:**	7/17/2015
Permit Number:	E15-00581	**Issued Date:**	11/3/2015
Parcel Number:	027-100-037-000	**Expiration Date:**	11/2/2017
Site Address:	1978 W Zinfandel Ln, St Helena		
Owner:	JMK-A LLC ETAL	**Phone:**	(000) 000-0000
Address:	ATTN JOHN KOMES		
Applicant:	Don Huckfeldt	**Phone:**	(707) 255-7923
Business Name:	HUCKFELDT WELL DRILLING INC	**License #:**	439746
Project Type:	Environmental / EM Permits / Water Wells / Class I		

Proposed Use:

Use:	Private	**Name of Public Water System:**	
Well To Service This Parcel Only?:	Yes		

Water Supply:

Septic Setbacks Met?:	Yes	**Well Located in Flood Zone?:**	No
Actual Approved Setback:		**Hazmat Site Within 1500 feet?:**	No
Emergency Exemption Granted?:	No		
Reason For Emergency Exemption:			

Specifications:

Casing Diameter:	8.00 In.	**Method of Seal Placement:**	Pump
Boring Diameter:	15.00 In.	**Minimum Seal Depth:**	50.00 Ft.
Annular Seal:	3.00 In.	**Material:**	Concrete

TO PERMITEE:

Any work performed or operations conducted under the auspices of this permit constitutes acceptance of all conditions, inspections and comments contained in the this permit, and the incorporation of all requirements as set forth in the permit application.

Staff Signature: _____ Date: 11/3/15

11-Mar-16

Sean P. Garvey
1889 West Zinfandel Lane
St. Helena, CA 94574

Att. Sean Garvey

R.E. Komes - Garvey Well Development & Pump Testing of Well #2 - 700' deep

Well #2 at Flora Springs was developed and a pump test @ 325 GPM was preformed.

The well was mechanically developed by airlift swabbing and the use of a 10' isolation tool to remove mud from the well screens, a total of 30 hours were required to clean 480 feet of screens. Aprox. 100,000 gallons were removed by airlift / swabbing.

Pumping development was done by a 50 hp pump set at 495 feet, the pump was surged turned off to let back-wash into screens. Aprox 315,000 Gallons were pumped during pump development.

The well was pumped at a constant rate of 325 GPM for 8 hours, the final draw down was 215 feet. The estimated draw down after 24 hours would be 275 feet. A water sample was taken to Cal Test.

Given the pumping data I would recommend the following:

A. Set the permanent pump at 490'

B. A 25 hp 200 gpm pump like a 230S-250-9 Grundfos would be a good choice for a permanent pump, curve included.

C. Static (non pumping) water levels were lower every day after pumping, it may be necessary to monitor pumping levels during a full season of pumping and adjust pumping rates accordingly.

Please feel free to call me with any questions. 530-681-2012

Scott Smith

LGS Drilling, Inc.

6950 Browns Valley Rd., Vacaville, CA 95688
Tel: (530) 681-2012 • Fax: (707) 448-1459

LGS DRILLING, INC.

Date:3-9-16

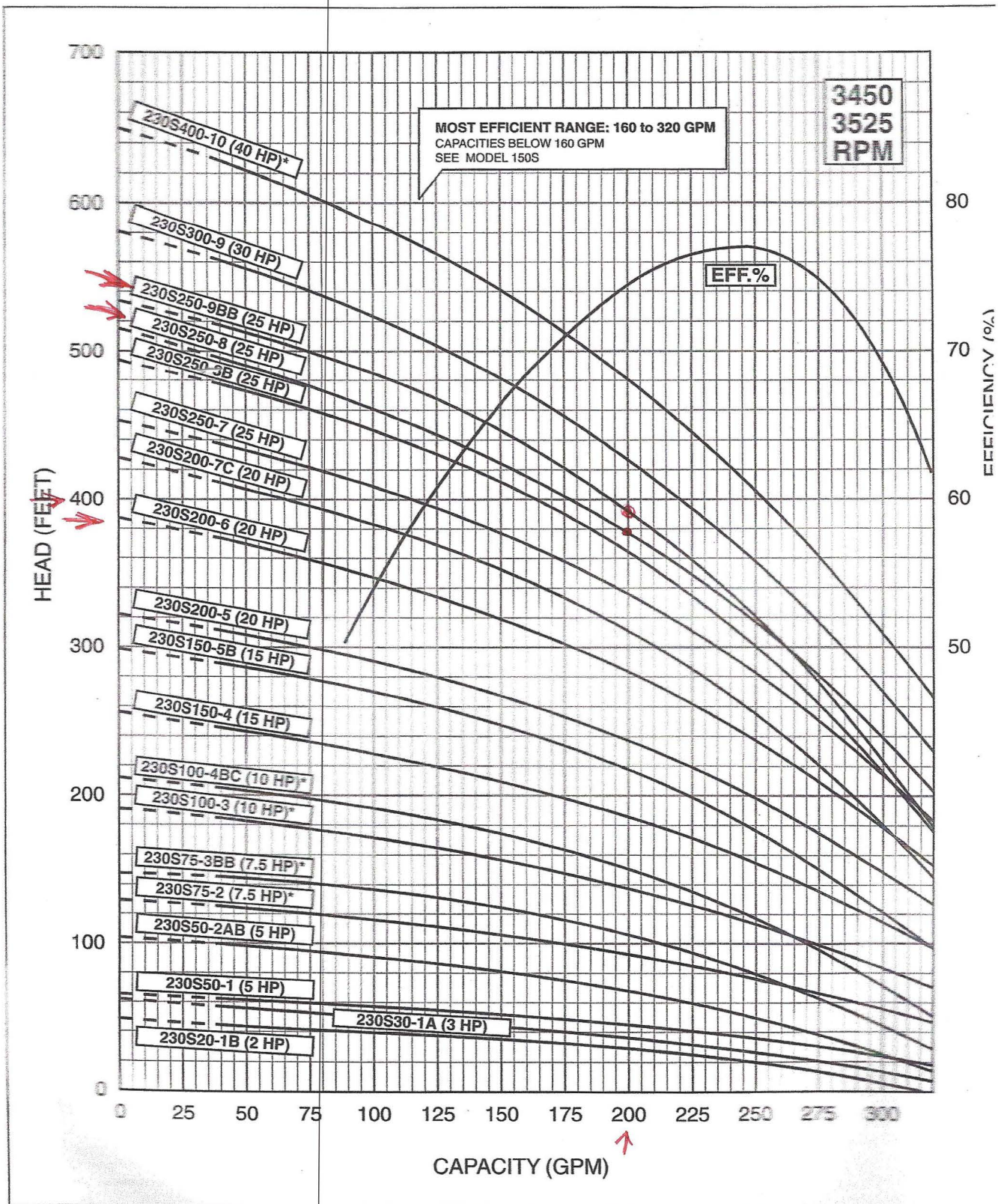
Job No: Flora Springs #2

WELL ID: 2016-2			Remarks: 8" PVC Well Depth 700 Pump Set 495 Pump HP 50 hp / 325 gpm		Sheet 1 of 1 Observers
GPS:					
			TYPE OF TEST Constant Rate @ 325 gpm		
	Time of Day	Elapsed Time min.	sec.	Depth to water from R.P. (ft)	Depth below static level. (ft)	Remarks T=27,774,800
9-Mar	6:30			173.3	0	325 GPM
	6:35			191.9		
	6:45			193.7		
	7:00			194.6		
	7:30			195.6		
	8:30			195.8		325 GPM
	9:30			197.6		
	10:30			199.8		
	11:30			203.3		Sample Taken 80*
	12:30			207.2		
	13:30			211.2		325 GPM
	14:30			215.4		T=27,930,800
recovery	14:40			197.8		
	15:00			194.5		
3/11/16	9:00			168.3		
3/14/16	9:00			160.5		Static on 2-29-16 before pumping 158.0

6950 Browns Valley Rd., Vacaville, CA 95688
Tel: (530) 681-2012 • Fax: (707) 448-1459

PERFORMANCE CURVES 230 GPM MODEL 2

FLOW RANGE: 160 -320 GPM **OUTLET SIZE: 3" NPT** **NOMINAL DI**



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
4" MOTOR STANDARD, 7.5 HP/3450 RPM.
6" MOTOR STANDARD, 10-40 HP/3450 RPM.
8" MOTOR STANDARD, 75 HP/3525 RPM.
* Alternate motor sizes available.

Performance conforms to ISO 9906, 1999 (E)
Minimum submergence is 6 feet.

GRUNDFOS

Komes Ranch Vyd Well
Block G Main Well

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: R030478
Project ID: FLORA SPRINGS #2-2016

Lab ID R030478001 Date Collected 3/9/2016 11:45 Matrix Water
Sample ID FLORA SPRINGS #2-2016 Date Received 3/9/2016 12:31

Parameters	Result	Units	R. L.	DF	Prepared	Batch	Analyzed	Batch	Qual
pH, Electrometric Analysis	**Analytical Method:**	SM 4500-H+ B-00					**Analyzed by:**	MN	
pH	7.4	pH Units		1			03/10/16 10:39	BIO 16256	
Calculation, Adjusted SAR	**Analytical Method:**	Calculation					**Analyzed by:**	MFK	
Adj. Sodium Adsorption Ratio	1.1	units		1			03/25/16 10:11	CALC	
Calculation, Hardness	**Analytical Method:**	Calculation					**Analyzed by:**	LM	
Hardness Calculation	230	mg/L	0.5	1			03/18/16 16:05	CALC	
Calculation, Total Anions	**Analytical Method:**	Calculation					**Analyzed by:**	MYS	
Total Anions	6.1	meq/L		1			03/10/16 07:49	CALC	
Calculation, Total Cations	**Analytical Method:**	Calculation					**Analyzed by:**	LM	
Total Cations	5.9	meq/L		1			03/18/16 16:05	CALC	
Metals by ICPMS, Collision Mode, Total	**Prep Method:**	EPA 200.8			**Prep by:**	UKS			
	Analytical Method:	EPA 200.8					**Analyzed by:**	LM	
Calcium	39	mg/L	0.50	2	03/17/16 18:15	MPR 14230	03/18/16 16:05	MMS 7953	
Magnesium	31	mg/L	0.50	2	03/17/16 18:15	MPR 14230	03/18/16 16:05	MMS 7953	
Sodium	33	mg/L	1.0	2	03/17/16 18:15	MPR 14230	03/18/16 16:05	MMS 7953	
Metals by ICPMS, Collision Mode, Diss	**Prep Method:**	EPA 200.8 (filtrate)			**Prep by:**	UKS			
	Analytical Method:	EPA 200.8 (filtrate)					**Analyzed by:**	LM	
Arsenic	0.0026	mg/L	0.0020	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Boron	ND	mg/L	0.10	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Iron	ND	mg/L	0.10	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Manganese	0.19	mg/L	0.0050	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Silica (as SiO2)	88	mg/L	1.0	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Zinc	0.069	mg/L	0.020	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Turbidity Analysis	**Analytical Method:**	EPA 180.1-93					**Analyzed by:**	BCP	
Turbidity	0.5	NTU	0.05	1			03/09/16 15:29	WET 8478	
Electrical Conductance Analysis	**Analytical Method:**	SM 2510 B-97					**Analyzed by:**	CLM	
Conductivity	560	umhos/cm	10	1			03/10/16 10:36	WET 8476	
Total Dissolved Solids Analysis	**Analytical Method:**	SM 2540 C-97					**Analyzed by:**	MN	
Total Dissolved Solids	380	mg/L	10	1			03/15/16 13:28	WGR 6046	
Anions by Ion Chromatography	**Analytical Method:**	EPA 300.0					**Analyzed by:**	MYS	
Sulfate (as SO4)	6.2	mg/L	0.5	1			03/10/16 07:49	WIC 5281	
Chloride	6.9	mg/L	1	1			03/10/16 07:49	WIC 5281	
Nitrate, as NO3	ND	mg/L	0.5	1			03/10/16 07:49	WIC 5281	
Fluoride	ND	mg/L	0.1	1			03/10/16 07:49	WIC 5281	
Alkalinity, Total by Standard Methods	**Analytical Method:**	SM 2320 B-97					**Analyzed by:**	CLM	
Alkalinity, Total (as CACO3)	287	mg/L	10	1			03/10/16 14:53	WTI 2758	
Carbonate (as CO3)	ND	mg/L	6	1			03/10/16 14:53	WTI 2758	

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

ANALYTICAL RESULTS

Lab Order: R030478
Project ID: FLORA SPRINGS #2-2016

Lab ID **R030478001** Date Collected 3/9/2016 11:45 Matrix Water
Sample ID **FLORA SPRINGS #2-2016** Date Received 3/9/2016 12:31

Parameters	Result	Units	R. L.	DF	Prepared	Batch	Analyzed	Batch	Qual
Hydroxide (as OH)	ND	mg/L	2	1			03/10/16 14:53	WTI 2758	
Bicarbonate (as HCO3)	350	mg/L	12	1			03/10/16 14:53	WTI 2758	

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. e020739

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

Owner's Well No. 1-2016
Date Work Began 1/25/2016, Ended 2/23/2016
Local Permit Agency Napa County Environmental Mgmt
Permit No. E15-00755 Permit Date 11/20/2015

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD ROTARY FLUID BENTONITE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0	12	BROWN CLAY
12	16	SAND & GRAVEL
16	30	GRAY CLAY
30	60	SAND & GRAVEL
60	115	TAN, RED SANDY ASH
115	125	GREEN VOLCANIC ROCK
125	220	BLACK, RED & GREEN VOLCANICS
220	285	BROWN, TAN SANDY ASH
285	310	HARD BLACK, GRAY VOLCANICS
310	320	BLACK, RED VOLCANICS
320	410	HARD BLACK, GRAY VOLCANICS
410	420	RED VOLCANIC ROCK
420	470	HARD BLACK VOLCANICS
470	475	BLACK, TAN VOLCANICS
475	480	BLACK, RED VOLCANICS
480	490	SOFT GRAY, TAN VOLCANICS
490	550	HARD GRAY VOLCANICS
550	555	GRAY VOLCANICS WITH TAN ASH
555	570	HARD GRAY VOLCANICS
570	575	RED SANDY ASH
575	620	HARD BLACK, RED VOLCANICS
620	640	RED VOLCANIC ROCK
640	700	GREEN, GRAY VOLCANIC ROCK
		CONTINUED CASING LAYOUT
400	480	SCREEN PVC 8" .032 SLOT
480	500	BLANK PVC 8"
500	600	SCREEN PVC 8" .032 SLOT
600	620	BLANK PVC 8"
620	680	SCREEN PVC 8" .032 SLOT
680	700	BLANK PVC 8"

TOTAL DEPTH OF BORING 700 (Feet)
TOTAL DEPTH OF COMPLETED WELL 700 (Feet)

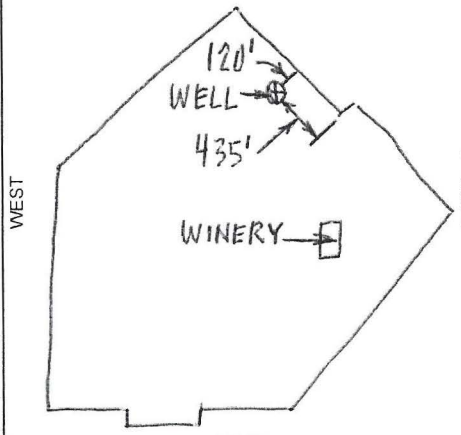
WELL OWNER

Name JMK - A LLC
Mailing Address 1889 West Zinfandel Lane
St. Helena CA 94574
CITY STATE ZIP

WELL LOCATION

Address 1978 West Zinfandel Lane
City St. Helena CA
County Napa
APN Book 027 Page 100 Parcel 037
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 (✓)

✓ 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 N/A (Ft.) BELOW SURFACE 1
DEPTH OF STATIC WATER LEVEL 158 (Ft.) & DATE MEASURED 2/23/2016
ESTIMATED YIELD 300 (GPM) & TEST TYPE AIR LIFT
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN N/A (Ft.)
May not be representative of a well's long-term yield.

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	700	15								
0	120		✓				PVC F480	8	SDR-21	
120	240			✓			PVC F480	8	SDR-21	.032
240	280		✓				PVC F480	8	SDR-21	
280	380			✓			PVC F480	8	SDR-21	.032
380	400		✓				PVC F480	8	SDR-21	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	67	✓			10 SK SAND
67	700			✓	#6 SAND

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) (TYPED OR PRINTED)
2110 Penny Lane Napa CA 94559
ADDRESS CITY STATE ZIP
Signed [signature] 02/29/16 439-746
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa CA 94559
www.countyofnapa.org
(707) 253-4417

David Morrison
Director

A Tradition of Stewardship
A Commitment to Service

JOB SET

Well Permit

Application Type:	Environmental / EM Permits / Water Wells / Class I	**Applied Date:**	9/18/2015
Permit Number:	E15-00755	**Issued Date:**	11/20/2015
Parcel Number:	027-100-037-000	**Expiration Date:**	11/19/2017
Site Address:	1978 W Zinfandel Ln, St Helena		
Owner:	JMK-A LLC ETAL	**Phone:**	(000) 000-0000
Address:	ATTN JOHN KOMES		
Applicant:	Don Huckfeldt	**Phone:**	(707) 255-7923
Business Name:	HUCKFELDT WELL DRILLING INC	**License #:**	439746
Project Type:	Environmental / EM Permits / Water Wells / Class I		
Proposed Use:			
Use:	Public	**Name of Public Water System:**	Komes Ranch
Well To Service This Parcel Only?:	Yes		
Water Supply:			
Septic Setbacks Met?:	Yes	**Well Located in Flood Zone?:**	No
Actual Approved Setback:		**Hazmat Site Within 1500 feet?:**	No
Emergency Exemption Granted?:	No		
Reason For Emergency Exemption:			
Specifications:			
Casing Diameter:	8.00 In.	**Method of Seal Placement:**	Pump
Boring Diameter:	15.00 In.	**Minimum Seal Depth:**	50.00 Ft.
Annular Seal:	3.00 In.	**Material:**	Concrete

TO PERMITEE:

Any work performed or operations conducted under the auspices of this permit constitutes acceptance of all conditions, inspections and comments contained in the this permit, and the incorporation of all requirements as set forth in the permit application.

Staff Signature: _____ Date: 11/20/15

Napa County Code Chapter 16.04

PERMIT No. ENF15-00119

Planning, Building & Environmental Services

1195 Third Street, Suite 210
Napa, CA 94559
www.countyofnapa.org

David Morrison
Director

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A Commitment to Service

NAPA COUNTY DEPARTMENT OF PLANNING, BUILDING & ENVIRONMENTAL SERVICES
FLOODPLAIN MANAGEMENT PERMIT

Applicant Name: *Huckfeldt Well Drilling* Phone: *(707) 255-7923*
Owner Name: *JMK-A LLC* Phone: *(707) 963-1688*
Poject Site Address: *1978 W. Zinfandel Avenue* APN: ***027-100-037***

Application Received By: *NG* Date: 11/16/2015
Fee Paid: $171.87 Receipt No.: 111139 Date: 11/16/15

Project Located In: ☑ Floodplain ☐ Floodway ☐ Riparian Zone (Check all that apply)

Base Flood Elevation (BFE): Zone A Community Map No. 06055C 0377E

Engineer's Findings and Comments: *This floodplain permit is issued in conjunction with* ***well permit E15-00755***

1. *The well casing shall be sealed at minimum 1' above grade and 25' below grade.*
2. *The well shall be capped with a water tight seal to prevent floodwaters from entering the well water system.*

PERMIT EXPIRES ONE YEAR FROM DATE BELOW

✓ THIS PERMIT IS HEREBY GRANTED SUBJECT TO COMPLIANCE WITH CONDITIONS.

___ THIS PERMIT IS HEREBY DENIED.

Engineer's Signature: Nathan Galland Date: 11-17-15

I HEREBY CERTIFY THAT I HAVE READ, UNDERSTAND AND AGREE TO THE ABOVE AND/OR ATTACHED REQUIREMENTS AND CONDITIONS.

Owner Signature: _____ Date: _____

Applicant Signature: Jennifer Huckfeldt Date: _____

OFFICE USE ONLY **Final Inspection By:** **Date:**

11-Mar-16

Sean P. Garvey
1889 West Zinfandel Lane
St. Helena, CA 94574

Att. Sean Garvey

R.E. Komes - Garvey Well Development & Pump Testing of Well #2 - 700' deep

Well #2 at Flora Springs was developed and a pump test @ 325 GPM was preformed.

The well was mechanically developed by airlift swabbing and the use of a 10' isolation tool to remove mud from the well screens, a total of 30 hours were required to clean 480 feet of screens. Aprox. 100,000 gallons were removed by airlift / swabbing.

Pumping development was done by a 50 hp pump set at 495 feet, the pump was surged turned off to let back-wash into screens. Aprox 315,000 Gallons were pumped during pump development.

The well was pumped at a constant rate of 325 GPM for 8 hours, the final draw down was 215 feet. The estimated draw down after 24 hours would be 275 feet. A water sample was taken to Cal Test.

Given the pumping data I would recommend the following:

A. Set the permanent pump at 490'

B. A 25 hp 200 gpm pump like a 230S-250-9 Grundfos would be a good choice for a permanent pump, curve included.

C. Static (non pumping) water levels were lower every day after pumping, it may be necessary to monitor pumping levels during a full season of pumping and adjust pumping rates accordingly.

Please feel free to call me with any questions. 530-681-2012

Scott Smith

LGS Drilling, Inc.

6950 Browns Valley Rd., Vacaville, CA 95688
Tel: (530) 681-2012 • Fax: (707) 448-1459

LGS DRILLING, INC.

Date:3-9-16

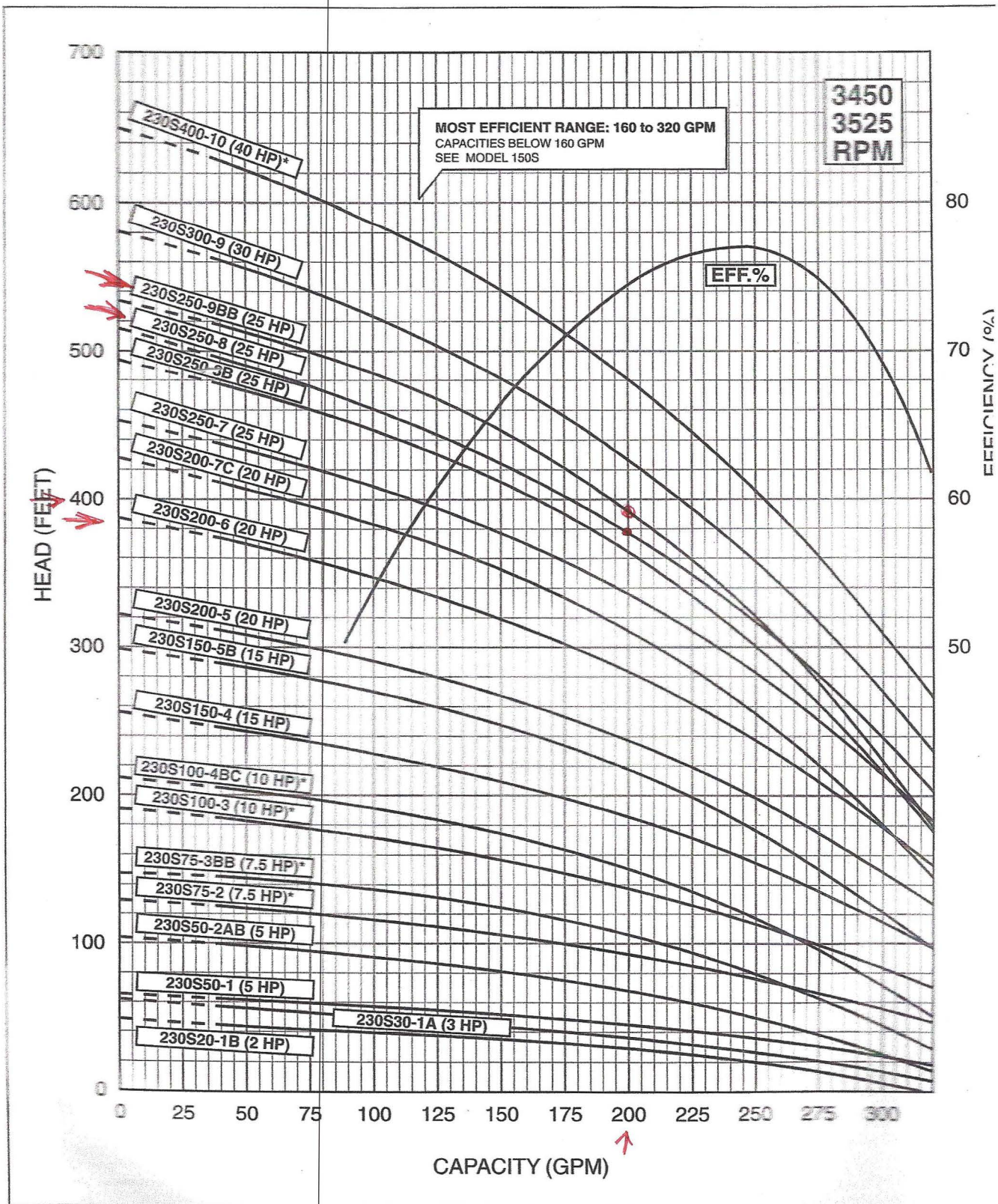
Job No: Flora Springs #2

WELL ID: 2016-2			Remarks: 8" PVC Well Depth 700 Pump Set 495 Pump HP 50 hp / 325 gpm		Sheet 1 of 1 Observers
GPS:					
			TYPE OF TEST Constant Rate @ 325 gpm		
	Time of Day	Elapsed Time min.	sec.	Depth to water from R.P. (ft)	Depth below static level. (ft)	Remarks T=27,774,800
9-Mar	6:30			173.3	0	325 GPM
	6:35			191.9		
	6:45			193.7		
	7:00			194.6		
	7:30			195.6		
	8:30			195.8		325 GPM
	9:30			197.6		
	10:30			199.8		
	11:30			203.3		Sample Taken 80*
	12:30			207.2		
	13:30			211.2		325 GPM
	14:30			215.4		T=27,930,800
recovery	14:40			197.8		
	15:00			194.5		
3/11/16	9:00			168.3		
3/14/16	9:00			160.5		Static on 2-29-16 before pumping 158.0

6950 Browns Valley Rd., Vacaville, CA 95688
Tel: (530) 681-2012 • Fax: (707) 448-1459

PERFORMANCE CURVES 230 GPM MODEL 2

FLOW RANGE: 160 -320 GPM **OUTLET SIZE: 3" NPT** **NOMINAL DI**



SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.
4" MOTOR STANDARD, 7.5 HP/3450 RPM.
6" MOTOR STANDARD, 10-40 HP/3450 RPM.
8" MOTOR STANDARD, 75 HP/3525 RPM.
* Alternate motor sizes available.

Performance conforms to ISO 9906, 1999 (E)
Minimum submergence is 6 feet.

GRUNDFOS

Komes Ranch Vyd Well
Block G Main Well

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: R030478
Project ID: FLORA SPRINGS #2-2016

Lab ID R030478001 Date Collected 3/9/2016 11:45 Matrix Water
Sample ID FLORA SPRINGS #2-2016 Date Received 3/9/2016 12:31

Parameters	Result	Units	R. L.	DF	Prepared	Batch	Analyzed	Batch	Qual
pH, Electrometric Analysis	**Analytical Method:**	SM 4500-H+ B-00					**Analyzed by:**	MN	
pH	7.4	pH Units		1			03/10/16 10:39	BIO 16256	
Calculation, Adjusted SAR	**Analytical Method:**	Calculation					**Analyzed by:**	MFK	
Adj. Sodium Adsorption Ratio	1.1	units		1			03/25/16 10:11	CALC	
Calculation, Hardness	**Analytical Method:**	Calculation					**Analyzed by:**	LM	
Hardness Calculation	230	mg/L	0.5	1			03/18/16 16:05	CALC	
Calculation, Total Anions	**Analytical Method:**	Calculation					**Analyzed by:**	MYS	
Total Anions	6.1	meq/L		1			03/10/16 07:49	CALC	
Calculation, Total Cations	**Analytical Method:**	Calculation					**Analyzed by:**	LM	
Total Cations	5.9	meq/L		1			03/18/16 16:05	CALC	
Metals by ICPMS, Collision Mode, Total	**Prep Method:**	EPA 200.8			**Prep by:**	UKS			
	Analytical Method:	EPA 200.8					**Analyzed by:**	LM	
Calcium	39	mg/L	0.50	2	03/17/16 18:15	MPR 14230	03/18/16 16:05	MMS 7953	
Magnesium	31	mg/L	0.50	2	03/17/16 18:15	MPR 14230	03/18/16 16:05	MMS 7953	
Sodium	33	mg/L	1.0	2	03/17/16 18:15	MPR 14230	03/18/16 16:05	MMS 7953	
Metals by ICPMS, Collision Mode, Diss	**Prep Method:**	EPA 200.8 (filtrate)			**Prep by:**	UKS			
	Analytical Method:	EPA 200.8 (filtrate)					**Analyzed by:**	LM	
Arsenic	0.0026	mg/L	0.0020	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Boron	ND	mg/L	0.10	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Iron	ND	mg/L	0.10	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Manganese	0.19	mg/L	0.0050	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Silica (as SiO2)	88	mg/L	1.0	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Zinc	0.069	mg/L	0.020	4	03/15/16 00:00	MPR 14215	03/16/16 18:57	MMS 7949	
Turbidity Analysis	**Analytical Method:**	EPA 180.1-93					**Analyzed by:**	BCP	
Turbidity	0.5	NTU	0.05	1			03/09/16 15:29	WET 8478	
Electrical Conductance Analysis	**Analytical Method:**	SM 2510 B-97					**Analyzed by:**	CLM	
Conductivity	560	umhos/cm	10	1			03/10/16 10:36	WET 8476	
Total Dissolved Solids Analysis	**Analytical Method:**	SM 2540 C-97					**Analyzed by:**	MN	
Total Dissolved Solids	380	mg/L	10	1			03/15/16 13:28	WGR 6046	
Anions by Ion Chromatography	**Analytical Method:**	EPA 300.0					**Analyzed by:**	MYS	
Sulfate (as SO4)	6.2	mg/L	0.5	1			03/10/16 07:49	WIC 5281	
Chloride	6.9	mg/L	1	1			03/10/16 07:49	WIC 5281	
Nitrate, as NO3	ND	mg/L	0.5	1			03/10/16 07:49	WIC 5281	
Fluoride	ND	mg/L	0.1	1			03/10/16 07:49	WIC 5281	
Alkalinity, Total by Standard Methods	**Analytical Method:**	SM 2320 B-97					**Analyzed by:**	CLM	
Alkalinity, Total (as CACO3)	287	mg/L	10	1			03/10/16 14:53	WTI 2758	
Carbonate (as CO3)	ND	mg/L	6	1			03/10/16 14:53	WTI 2758	

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax (707) 226-1001 • e-mail: info@caltestlabs.com

ANALYTICAL RESULTS

Lab Order: R030478
Project ID: FLORA SPRINGS #2-2016

Lab ID **R030478001** Date Collected 3/9/2016 11:45 Matrix Water
Sample ID **FLORA SPRINGS #2-2016** Date Received 3/9/2016 12:31

Parameters	Result	Units	R. L.	DF	Prepared	Batch	Analyzed	Batch	Qual
Hydroxide (as OH)	ND	mg/L	2	1			03/10/16 14:53	WTI 2758	
Bicarbonate (as HCO3)	350	mg/L	12	1			03/10/16 14:53	WTI 2758	

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9-Jan-16

Sean P. Garvey
1889 West Zinfandel Lane
St. Helena, CA 94574

Att. Sean Garvey

R.E. Komes - Garvey Well Development & Pump Testing

The well at Flora Springs was developed and a pump test @ 75 GPM was preformed.

The well was mechanically developed by airlift swabbing and the use of a 10' isolation tool to remove mud from the well screens, a total of 28 hours were required to clean 420 feet of screens. Aprox. 100,000 gallons were removed by airlift / swabbing.

Pumping development was done by a 30 hp pump set at 465 feet, the pump was surged turned off to let back-wash into screens. Aprox 112,000 Gallons were pumped during pump development.

The well was pumped at a constant rate of 75 GPM for 8 hours, the final draw down was 409 feet. The estimated draw down after 24 hours would be 425 feet. A water sample was taken to Cal Test.

Given the pumping data I would recommend the following:

A. Set the ~~perme~~ anent pump at 560'

B. A 10 hp 50 gpm pump like a FPS F6P50x20 would be a good choice for a permanent pump, curve included.

C. Static (non pumping) water levels were lower every day after pumping, it may be necessary to monitor pumping levels during a full season of pumping and adjust pumping rates accordingly.

Please feel free to call me with any questions. 530-681-2012

Scott Smith

LGS Drilling, Inc.

6950 Browns Valley Rd., Vacaville, CA 95688
Tel: (530) 681-2012 • Fax: (707) 448-1459

Date:1-7-16

Job No: Flora Springs / Komes - Garvey

WELL ID: 2015-A	Remarks:	Well Depth: 616	Sheet 1 of 1
		Pump Intake: 465	Observers M. Bruhn
GPS:		Pump; 30 hp	
		Casing: 8" PVC	

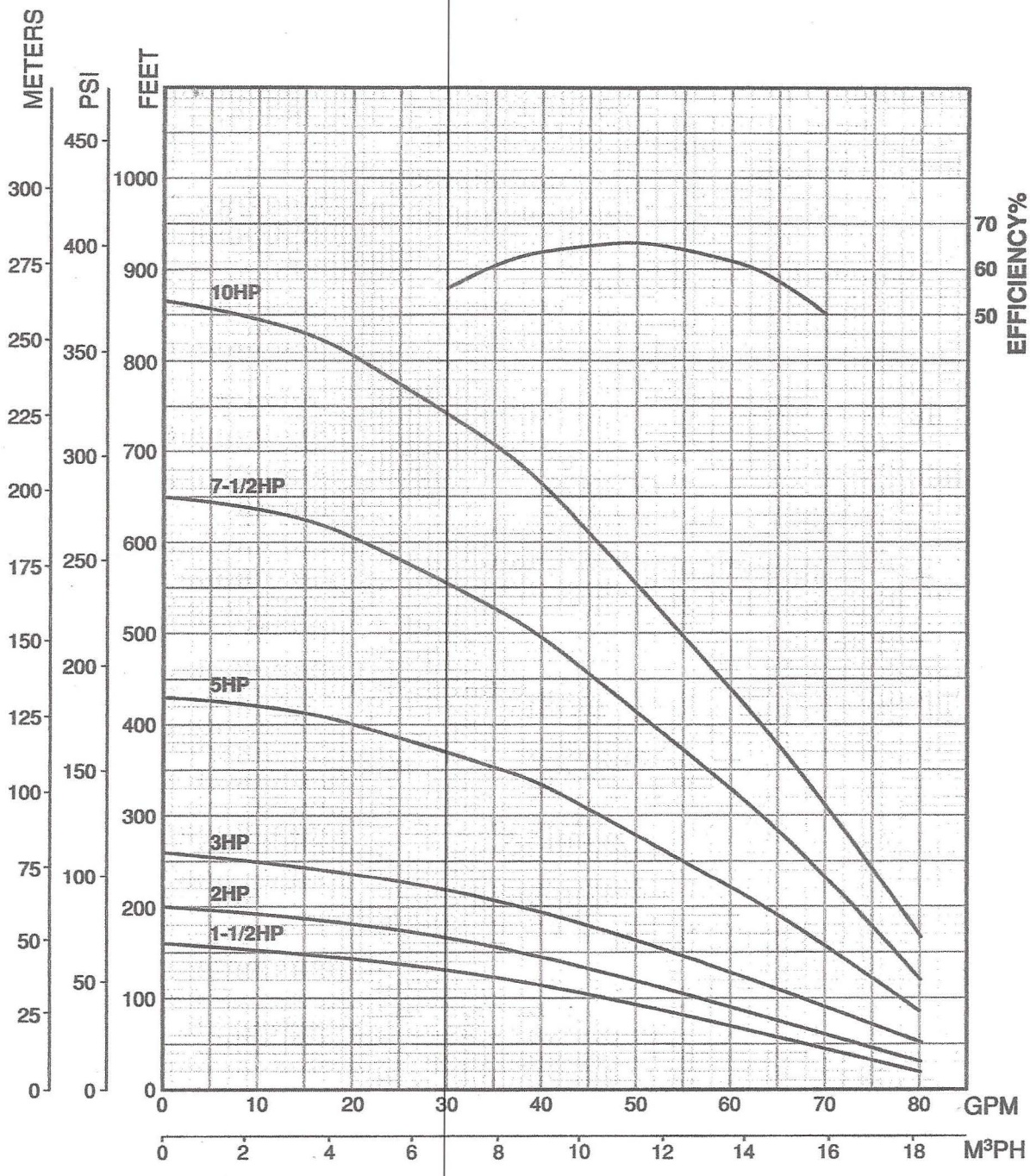
TYPE OF TEST
Development & Test Pumping

	Time of Day	Elapsed Time min.	sec.	Depth to water from R.P. (ft)	Depth below static level. (ft)	Remarks
4-Jan	13:00			93.00	0.00	Water Level Before Pumping
						T=2,535,400
						Develop Pumping - Very Dirty
5-Jan	9:30			94.70		T=2,541,100
	13:00					Develop Pumping - Very Dirty
	17:30					Turbid at Surge
6-Jan	9:00			102.70		T=2,579,850
	17:00					Develop Pumping
7-Jan	10:10			106.00		T-2,611,940
	10:15			146.80		75 GPM 8 hr Test
	10:20			177.50		
	10:30			228.50		
	10:40			258.40		
	11:00			298.00		
	11:40			314.65		
	12:10			318.35		Water Sample Taken - Cal-Test
	13:10			333.10		
	14:10			365.25		
	15:10			405.20		
	16:10			406.60		
	17:10			407.90		
	18:10			408.40		T=2,647,940 75 GPM
recovery	18:15			238.40		
	18:20			206.80		
	18:25			126.40		
8-Jan	9:30			110.60		
	13:00			109.50		

6950 Browns Valley Rd., Vacaville, CA 95688
Tel: (530) 681-2012 • Fax: (707) 448-1459

6" High Capacity
50 GPM Performance Curve

PAGE: SP-105
DATE: June 5, 2006



FPS4400

6" High Capacity
50 GPM Performance Chart

Capacities in U.S. Gallons per Minute

HP	PSI	DEPTH TO PUMPING WATER LEVEL, OR LIFT, IN FEET SHADED AREAS INDICATE MOST EFFICIENT PERFORMANCE																					
		40	60	80	100	120	140	160	180	200	250	300	350	400	450	500	550	600	650	700	750	800	
1-1/2	0	73	65	57	48	39	26																Shut-off 158 ft.
	20	54	46	36	20																		
	30	45	34	18																			
	40	32	13																				
	50																						
2	0	75	69	63	57	50	43	34	23														Shut-off 198 ft.
	20	62	55	48	41	32	18																
	30	54	47	39	30	15																	
	40	46	38	28																			
	50	37	26																				
	60	24																					
3	0	-	78	73	68	63	58	52	46	40	13												Shut-off 260 ft.
	20	71	66	61	56	50	44	37	29	16													
	30	66	61	55	49	43	36	27	14														
	40	60	54	48	42	35	25																
	50	53	47	41	34	23																	
	60	46	40	32	22																		
5	0	-	0	0	78	75	72	69	66	63	55	46	36	21									Shut-off 434 ft.
	20	-	-	74	71	68	65	62	59	56	47	37	23										
	40	73	70	67	64	61	58	54	51	47	48	24											
	50	70	67	64	61	57	54	51	47	43	32												
	60	66	65	61	57	54	50	47	43	39	25												
7-1/2	0	-	-	-	-	-	79	77	75	73	68	63	58	52	46	40	31	21					Shut-off 650 ft.
	20	-	-	-	-	-	74	72	70	68	63	58	53	47	40	33	22						
	30	-	-	-	-	74	72	70	68	66	61	56	50	44	37	28							
	40	-	-	-	74	72	70	68	66	64	59	53	47	41	33	23							
	50	-	-	73	71	69	68	66	64	62	56	51	45	38	29	16							
	60	-	74	72	70	68	65	63	61	59	54	48	41	34	24								
F6P50x20 10	0	-	-	-	-	-	-	-	-	78	74	70	67	63	59	55	51	46	41	36	30	21	Shut-off 865 ft.
	20	-	-	-	-	-	-	-	-	74	71	67	63	59	55	51	47	42	36	30	22	8	
	30	-	-	-	-	-	-	-	74	73	69	65	61	57	53	49	44	39	34	27	17		
	40	-	-	-	-	-	-	74	72	71	67	63	59	55	51	47	42	37	30	22			
	50	-	-	-	-	75	73	72	70	69	65	61	57	53	49	45	40	34	27	18			
	60	-	-	-	-	74	72	71	69	67	63	59	55	51	47	43	37	31	12				

Discharge tapping 3" FNPT.

Notes: 1. Performance shown does not include friction loss in the drop pipe.
2. All performance data is based on rated motor nameplate voltage.

Franklin Electric
400 East Spring Street, Bluffton, IN 46714
Tel: 260.824.2900 Fax: 260.824.2909
www.franklinpumps.com

KOMES RANCH
WINERY WELL

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

ANALYTICAL RESULTS

Lab Order: R010299
Project ID: FLORA SPRINGS 2015A

Lab ID R010299001 Date Collected 1/7/2016 13:00 Matrix Water
Sample ID FLORA SPRINGS 2015A Date Received 1/7/2016 13:47

Parameters	Result	Units	R. L.	DF	Prepared	Batch	Analyzed	Batch	Qual
pH, Electrometric Analysis	**Analytical Method:**	SM 4500-H+ B-00					**Analyzed by:**	CCZ	
pH	6.9	pH Units		1			01/16/16 13:49	BIO 16060	
Calculation, Adjusted SAR	**Analytical Method:**	Calculation					**Analyzed by:**	MFK	
Adj. Sodium Adsorption Ratio	1.1	units		1			01/24/16 21:03	CALC	
Calculation, Hardness	**Analytical Method:**	Calculation					**Analyzed by:**	LM	
Hardness Calculation	130	mg/L	0.5	1			01/14/16 23:36	CALC	
Calculation, Total Anions	**Analytical Method:**	Calculation					**Analyzed by:**	CLM	
Total Anions	3.7	meq/L		1			01/18/16 15:29	CALC	
Calculation, Total Cations	**Analytical Method:**	Calculation					**Analyzed by:**	LM	
Total Cations	3.9	meq/L		1			01/14/16 23:36	CALC	
Metals by ICPMS, Collision Mode, Total	**Prep Method:**	EPA 200.8			**Prep by:**	UK			
	Analytical Method:	EPA 200.8					**Analyzed by:**	LM	
Calcium	33	mg/L	0.50	10	01/11/16 00:00	MPR 14058	01/14/16 23:36	MMS 7868	
Magnesium	12	mg/L	0.50	10	01/11/16 00:00	MPR 14058	01/14/16 23:36	MMS 7868	
Sodium	28	mg/L	1.0	10	01/11/16 00:00	MPR 14058	01/14/16 23:36	MMS 7868	
Metals by ICPMS, Collision Mode, Diss	**Prep Method:**	EPA 200.8 (filtrate)			**Prep by:**	UK			
	Analytical Method:	EPA 200.8 (filtrate)					**Analyzed by:**	LM	
Arsenic	ND	mg/L	0.0020	1	01/13/16 00:00	MPR 14063	01/14/16 21:37	MMS 7871	
Boron	ND	mg/L	0.10	1	01/13/16 00:00	MPR 14063	01/14/16 21:37	MMS 7871	
Iron	ND	mg/L	0.050	1	01/13/16 00:00	MPR 14063	01/14/16 21:37	MMS 7871	
Manganese	0.096	mg/L	0.0050	1	01/13/16 00:00	MPR 14063	01/14/16 21:37	MMS 7871	
Silica (as SiO2)	74	mg/L	1.0	2	01/13/16 00:00	MPR 14063	01/18/16 12:58	MMS 7871	
Zinc	0.84	mg/L	0.020	4	01/13/16 00:00	MPR 14063	01/18/16 12:52	MMS 7871	
Turbidity Analysis	**Analytical Method:**	EPA 180.1-93					**Analyzed by:**	BCP	
Turbidity	5.1	NTU	0.05	1			01/08/16 12:22	WET 8404	
Electrical Conductance Analysis	**Analytical Method:**	SM 2510 B-97					**Analyzed by:**	CLM	
Conductivity	400	umhos/cm	10	1			01/18/16 11:09	WET 8409	
Total Dissolved Solids Analysis	**Analytical Method:**	SM 2540 C-97					**Analyzed by:**	MN	
Total Dissolved Solids	310	mg/L	10	1			01/12/16 15:32	WGR 5982	
Anions by Ion Chromatography	**Analytical Method:**	EPA 300.0					**Analyzed by:**	MYS	
Nitrate, as NO3	26	mg/L	0.5	1			01/08/16 15:44	WIC 5221	
Fluoride	ND	mg/L	0.1	1			01/08/16 15:44	WIC 5221	
Sulfate (as SO4)	23	mg/L	0.5	1			01/08/16 15:44	WIC 5221	
Chloride	19	mg/L	10	10			01/08/16 18:02	WIC 5221	
Alkalinity, Total by Standard Methods	**Analytical Method:**	SM 2320 B-97					**Analyzed by:**	CLM	
Alkalinity, Total (as CACO3)	115	mg/L	10	1			01/18/16 15:29	WTI 2737	
Bicarbonate (as HCO3)	140	mg/L	12	1			01/18/16 15:29	WTI 2737	

1885 North Kelly Road • Napa, California 94558
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ANALYTICAL RESULTS

Lab Order: R010299
Project ID: FLORA SPRINGS 2015A

Lab ID **R010299001** Date Collected 1/7/2016 13:00 Matrix Water
Sample ID **FLORA SPRINGS 2015A** Date Received 1/7/2016 13:47

Parameters	Result	Units	R. L.	DF	Prepared	Batch	Analyzed	Batch	Qual
Carbonate (as CO3)	ND	mg/L	6	1			01/18/16 15:29	WTI 2737	
Hydroxide (as OH)	ND	mg/L	2	1			01/18/16 15:29	WTI 2737	

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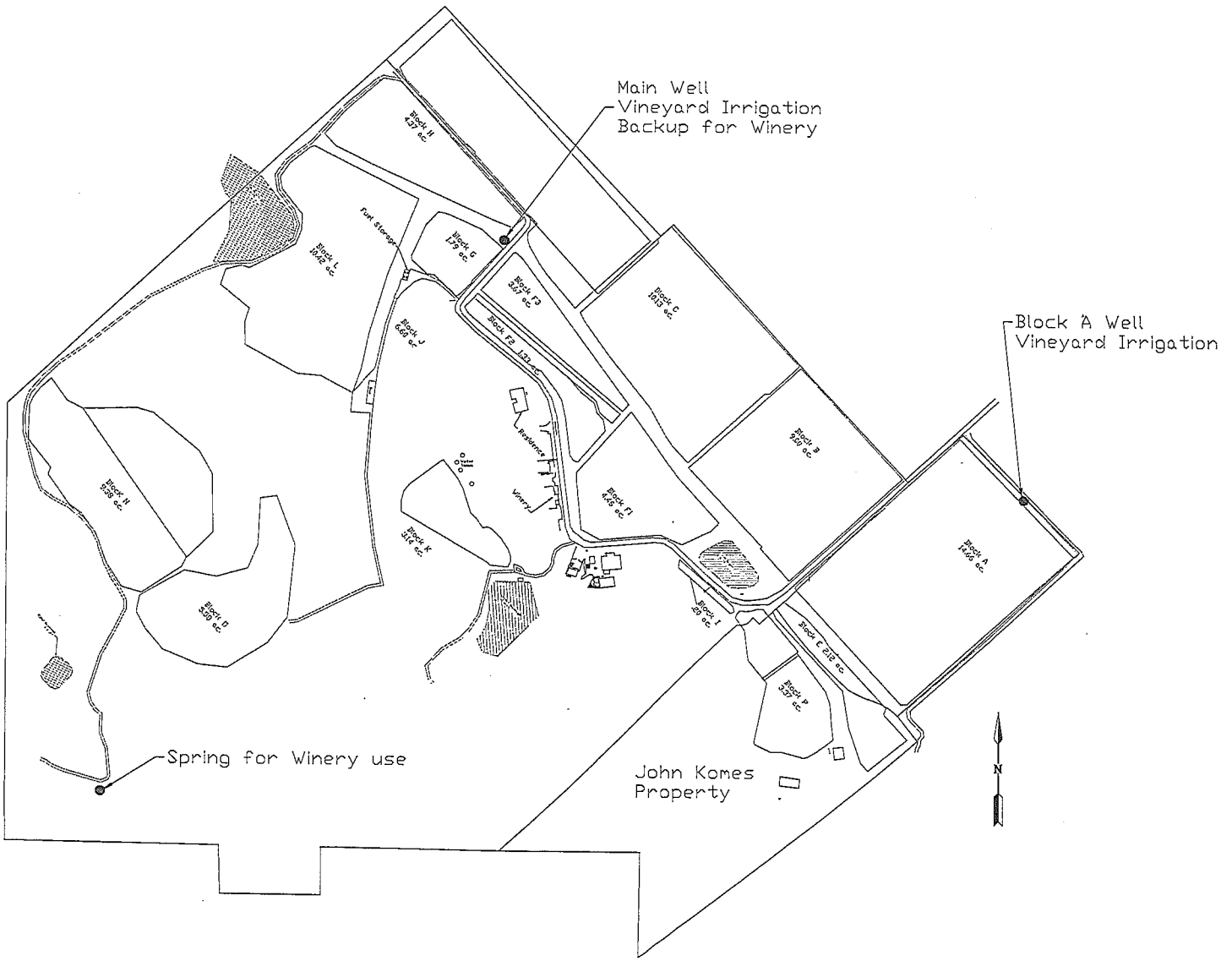


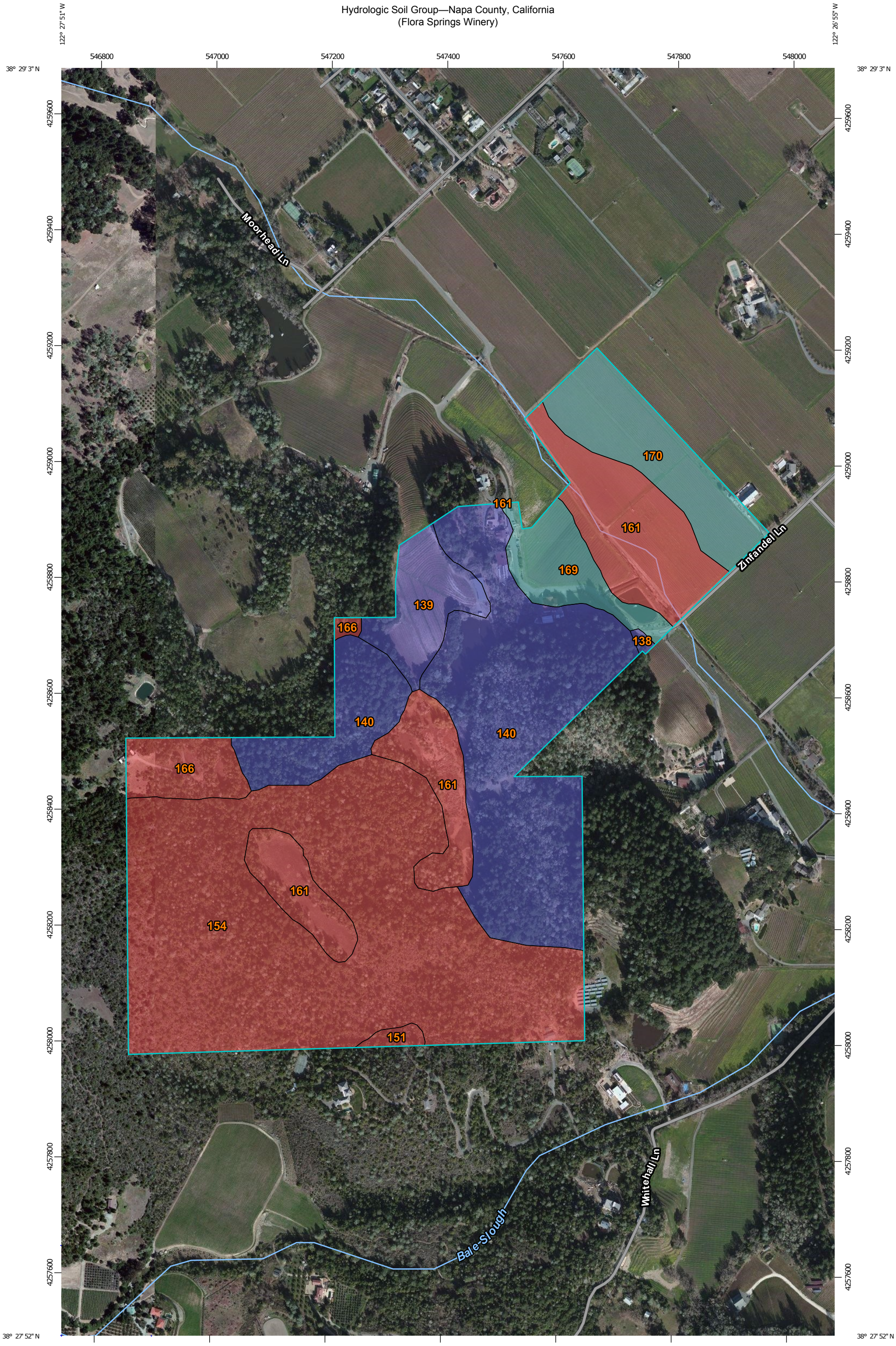
LincolnAE LLC
Agricultural Engineering

William D. Lincoln
707.533.5337
bill@lincolnae.com
LincolnAE.com
CPESC #2296
QSD #00515

Komes Ranch Vineyards

01/07/15		1"=200'
Date	Revised	Scale

Hydrologic Soil Group—Napa County, California
(Flora Springs Winery)



Map Scale: 1:6,130 if printed on B portrait (11" x 17") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

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**
138	Forward gravelly loam, 2 to 9 percent slopes	B	0.3	0.1%
139	Forward gravelly loam, 9 to 30 percent slopes	B	7.0	4.2%
140	Forward gravelly loam, 30 to 75 percent slopes	B	44.7	26.5%
151	Hambright-Rock outcrop complex, 2 to 30 percent slopes	D	0.8	0.5%
154	Henneke gravelly loam, 30 to 75 percent slopes	D	67.5	40.0%
161	Maxwell clay, 2 to 9 percent slopes	D	24.4	14.5%
166	Montara clay loam, 5 to 30 percent slopes	D	5.5	3.3%
169	Perkins gravelly loam, 5 to 9 percent slopes	C	6.7	4.0%
170	Pleasanton loam, 0 to 2 percent slopes	C	11.8	7.0%
Totals for Area of Interest			**168.7**	**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.

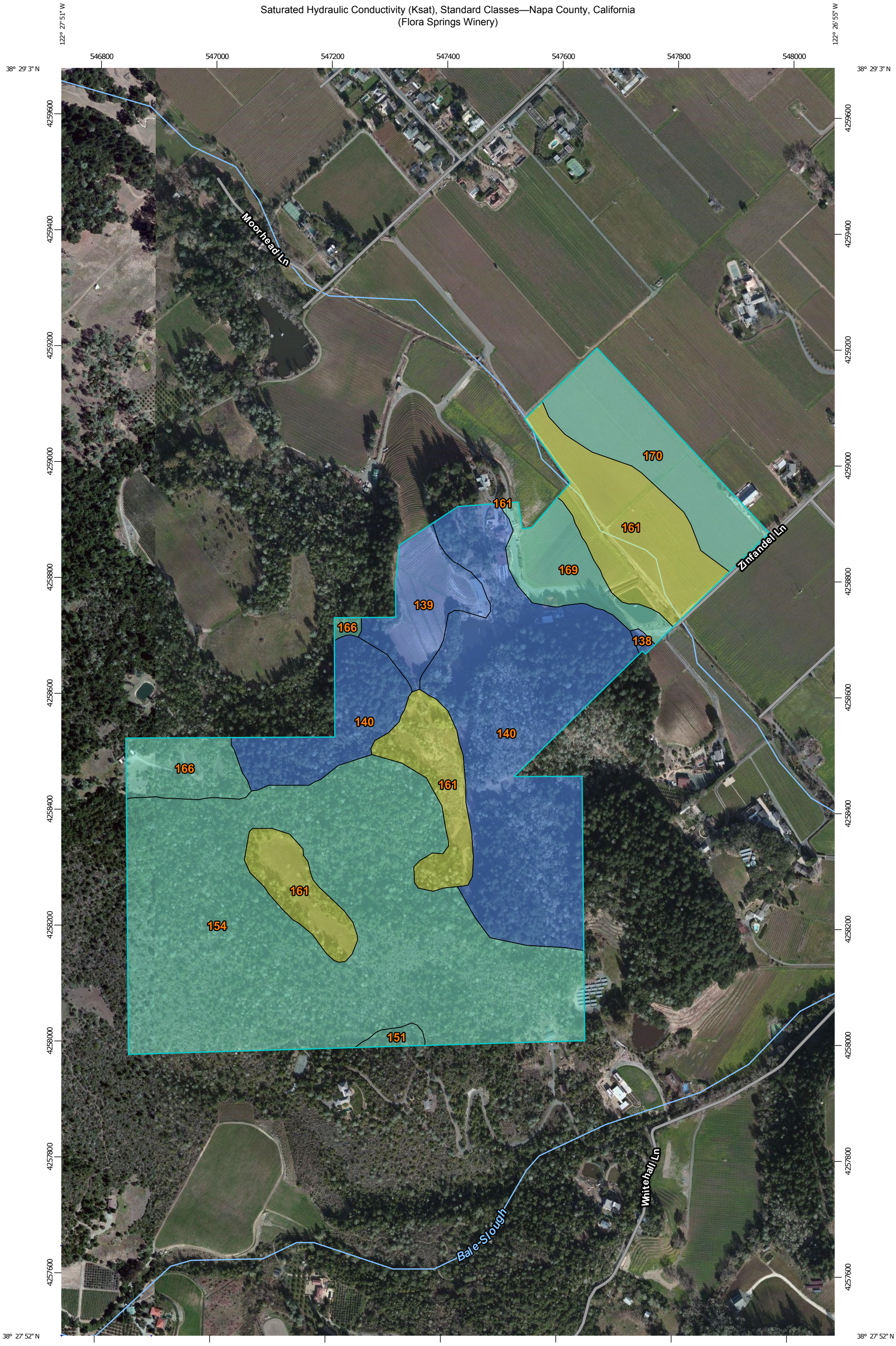
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Saturated Hydraulic Conductivity (Ksat), Standard Classes—Napa County, California
(Flora Springs Winery)



Map Scale: 1:6,130 if printed on B portrait (11" x 17") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Lines
- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Soil Rating Points
- Very Low (0.0 - 0.01)
- Low (0.01 - 0.1)
- Moderately Low (0.1 - 1)
- Moderately High (1 - 10)
- High (10 - 100)
- Very High (100 - 705)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

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.

Saturated Hydraulic Conductivity (Ksat), Standard Classes

Saturated Hydraulic Conductivity (Ksat), Standard Classes— Summary by Map Unit — Napa County, California (CA055)				
Map unit symbol	**Map unit name**	**Rating (micrometers per second)**	**Acres in AOI**	**Percent of AOI**
138	Forward gravelly loam, 2 to 9 percent slopes	28.0000	0.3	0.1%
139	Forward gravelly loam, 9 to 30 percent slopes	28.0000	7.0	4.2%
140	Forward gravelly loam, 30 to 75 percent slopes	28.0000	44.7	26.5%
151	Hambright-Rock outcrop complex, 2 to 30 percent slopes	9.0000	0.8	0.5%
154	Henneke gravelly loam, 30 to 75 percent slopes	9.0000	67.5	40.0%
161	Maxwell clay, 2 to 9 percent slopes	0.2150	24.4	14.5%
166	Montara clay loam, 5 to 30 percent slopes	2.7000	5.5	3.3%
169	Perkins gravelly loam, 5 to 9 percent slopes	9.0000	6.7	4.0%
170	Pleasanton loam, 0 to 2 percent slopes	9.0000	11.8	7.0%
Totals for Area of Interest			**168.7**	**100.0%**

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits. The classes are:

Very low: 0.00 to 0.01

Low: 0.01 to 0.1

Moderately low: 0.1 to 1.0

Moderately high: 1 to 10

High: 10 to 100

Very high: 100 to 705

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: *None Specified*

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)