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Water Availability Analysis & Water System Feasibility Report

Signorello Estate Winery P19-00198-MOD
Planning Commission Hearing Date December 16, 2020

RICHARD C. SLADE & ASSOCIATES LLC
CONSULTING GROUNDWATER GEOLOGISTS

MEMORANDUM

April 27, 2020

To: Mr. Raymond Signorello
Signorello Estate Winery
Sent via email (ray@signorelloestate.com)

Cc: Donna Oldford
Plans4Wine
Sent via email (dboldford@aol.com)

Job No. 719-NPA01

From: Chris Wick, Anthony Hicke, and Richard C. Slade
Richard C. Slade & Associates LLC (RCS)

Re: Results of Napa County Tier 1 Water Availability Analysis
Signorello Estate Winery
4500 Silverado Trail
Napa, CA 94558

Introduction

This Memorandum presents the key findings and conclusions, along with preliminary recommendations, regarding the Water Availability Analysis (WAA) prepared by RCS for the proposed modification to the existing winery use permit at the Signorello Estate Winery property in Napa, California. This document was prepared for the property owner to provide hydrogeologic analyses in conformance with Napa County Tier 1 requirements, as described in the Napa County WAA Guidelines Document (WAA, 2015).

The Signorello Estate Winery property (referred to herein as "subject property") is comprised by approximately 56.6 acres and is located at 4500 Silverado Trail in the vicinity of Napa in Napa County. Figure 1, "Location Map," shows the boundaries of the subject property superimposed on a USGS topographic map. Property boundaries shown on Figure 1 were adapted from the County Assessor's parcel data; County parcel data are freely available on the Napa County GIS website. Also shown on Figure 1 are the locations of the existing onsite water wells (known herein as the "Agricultural Well" and "Domestic Well") and the locations of other nearby offsite wells owned by others. The locations of the proximal offsite wells shown on Figure 1 are considered to be approximate only. Other features shown on Figure 1 are discussed later in this Memorandum. Figure 2, "Aerial Photograph Map," shows the same property boundaries and well locations that are illustrated on Figure 1, but the basemap for Figure 2 is an aerial photograph of the area; this aerial photograph was obtained from the USGS EarthExplorer website (the date of the imagery is June 2016).

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As reported by the property owner, the 56.6-acre subject property is currently developed with 30 acres of existing vineyards and associated vineyard facilities (storage, temporary office, etc.). Previous onsite developments included a residence (with a pool) and winery (with visitation and tastings), but these structures were reportedly destroyed in the Atlas Fire in 2017. The previous onsite structures are reportedly in the process of being re-designed and constructed. Water demands for the existing onsite developments (vineyards) and previously existing structures (winery and residence) have historically been met via groundwater pumped by the existing onsite "Agricultural Well". A new water-supply well (the "Domestic Well") was constructed in June 2019 to help augment water demands for the winery and proposed winery modifications, and to create a water-supply well with a sufficiently deep cement sanitary seal that meets County and State codes for a public water system.

RCS understands the proposed project is to modify the existing winery use permit to increase winery production capacity to 50,000 gallons of wine per year (existing permitted production capacity is 20,000 gallons of wine per year), and also to increase visitations and tastings. For the proposed project, future water demands for the winery are proposed to be met using groundwater pumped from the new Domestic Well.

The basic purpose of this Memorandum is to comply with Napa County's WAA guidelines for a "Tier 1" WAA ("i.e., a groundwater recharge estimate); those guidelines were promulgated by the County in May 2015. Because there are no known offsite wells located within 500 ft of the Domestic Well (i.e., the "project well"), County requirements for a "Tier 2" WAA (Well Interference Evaluation) have been "presumptively met" per the WAA Guidelines (WAA 2015).

Site Conditions

From review of in-house data provided by the property owner, and from the field reconnaissance visit by an RCS geologist to the subject property on October 15, 2019, the following key items were noted and/or observed (refer to Figures 1 and 2):

a. The Signorello Estate Winery property is comprised by a single parcel having the following Napa County Assessor's Parcel Number (APN) of 039-400-080. The total County-assessed area of the subject property is 56.6 acres.

b. The subject property is situated on the eastern side of Napa Valley along the base of the nearby foothills, and approximately 4 miles north of the City of Napa. Based on the topographic contours illustrated in Figure 1, ground surface in the eastern portion of the subject property is hilly and slopes moderately to the southwest, but then becomes relatively flat on the western portion of the property along Silverado Trail.

c. There are no perennial creeks or any mapped ephemeral drainages[1] on the subject property. However, the Napa River, which flows south towards Napa, is located approximately ½-mile to the southwest of the subject property.

d. The subject property is reportedly developed with 30 acres of vineyards, which are located throughout the property. Other onsite developments formerly existed, including a winery and residence (with a pool), but these structures were reportedly destroyed in the 2017 Atlas Fire. RCS geologists observed a few permanent and temporary structures on the subject property that were being used by vineyard

[1] Such drainages would typically be shown as "dashed lines" on a USGS topographic map (denoting ephemeral status).

personnel as temporary offices and storage facilities, until the permanent facilities are rebuilt.

e. Offsite areas surrounding the subject property consist primarily of vineyards, wineries, and residences.

f. As shown on Figures 1 and 2, there are two existing water-supply wells on the subject property. Both wells are located in the central portion of the property; the "Agricultural Well" is located approximately 300 ft northwest of the recently-constructed "Domestic Well".

g. During the October 2019 site visit, the RCS geologist traveled along Silverado Trail to the northwest and southeast of the property in attempt to identify possible locations and/or the existence of nearby but offsite wells owned by others. RCS refers to such work as "windshield surveys." During these surveys, RCS geologists attempt to identify possible offsite well locations by observing typical well-house enclosures, pressure tanks, storage tanks, power lines, or direct observation of a wellhead.

   RCS geologists also contacted Napa County Planning, Building, and Environmental Services (PBES) in attempt to acquire "Well Completion Reports" (also known as "driller's logs") that might exist for the onsite wells, and for possible wells located on those neighboring offsite properties. In addition, RCS geologists also used the California Department of Water Resources (DWR) online Well Completion Report website to download driller's logs for wells within the immediate vicinity of the subject property. As a result of those inquiries, several driller's logs were obtained for wells historically drilled in the area.

Figures 1 and 2 show the approximate locations of known, reported, and/or inferred nearby offsite wells surrounding the subject property, as determined from the field reconnaissance and well log research. It is noteworthy that none of these wells are shown on Figures 1 and 2 to be located within 500 ft of the Domestic Well (i.e., the "project well").

Key Construction and Testing Data for Onsite Wells

DWR Well Completion Reports are available for the Agricultural Well (Log No. 103401) and the Domestic Well (Log No. e03272609); a copy of each driller's log is appended to this Memorandum. Table 1, "Summary of Well Construction and Yield Data," provides a tabulation of key well construction data and original groundwater airlifting data that are available for these two onsite wells.

Well Construction Data

Key data for the two onsite wells listed on the available driller's logs and/or identified during our site visits include:

a. The Agricultural Well was constructed in October 1979 by Doshier-Gregson Drilling, Inc (Doshier-Gregson), of Vallejo, California; the drilling method for this well was reported by the driller to be direct air rotary. The Domestic Well (the "well number" is listed as "1-2019" on the driller's log) was constructed in June 2019 by Huckfeldt Well Drilling, Inc. (Huckfeldt), of Napa, California; the Domestic Well was also drilled using the direct air rotary drilling method. No geophysical survey (i.e., an electric log) was available for either onsite well.

b. Pilot hole depths (the borehole drilled before the well casing was placed downwell) were reported to be between 600 ft below ground surface (bgs) for the Domestic Well, and 670 ft bgs for the Agricultural Well.

c. The Agricultural Well was cased with steel casing having a nominal diameter of 8 inches, whereas the Domestic Well was cased with PVC casing having a nominal diameter of 6 inches; total casing depths were reported to be 600 ft bgs for the Domestic Well, and 670 ft bgs for the Agricultural Well.

d. Casing perforations for the Agricultural Well are mill-slotted, have slot opening widths of 0.125 inches (125-slot), and were placed continuously between the depths of 309 ft and 670 ft bgs. The perforations in the Domestic Well are factory-cut slots with a slot opening width of 0.032 inches (32-slot), and were placed between the following depths: 100 ft to 240 ft bgs; 260 ft to 380 ft bgs; 400 ft to 500 ft bgs; and 520 ft to 580 ft bgs.

e. The gravel pack material reported on the driller's log for the Agricultural Well is listed as "pea gravel" and the gravel pack type in the Domestic Well was reported to be a "No. 6 Sand".

f. The Agricultural Well and Domestic Well were both constructed with sanitary seals consisting of cement. The sanitary seal in the Agricultural Well is set to a depth of 25 ft bgs, whereas the sanitary seal in the new Domestic Well was set to a depth of 60 ft bgs. As such, the seal depth in the Domestic Well meets the minimum 50-foot seal depth that is required for wells to be used for public-supply purposes, per County and State water well requirements.

Summary of Key Airlifting "Test" Data

The driller's logs for the two onsite wells provided the depth to the original post-construction static water levels (SWL) for these wells, along with the original airlifting test rates (as shown on Table 1). These data include:

- Initial SWL depths following completion of well construction were reported to be 85 ft bgs in the Agricultural Well in October 1979, and 95 ft bgs in the Domestic Well on June 14, 2019.
- Reported maximum airlift rates[2] for initial post-construction airlifting operations in the onsite wells were estimated by the drillers to be approximately 200 gallons per minute (gpm) in both the Agricultural Well and Domestic Well at the time of their respective well construction.
- "Water level drawdown" values during airlifting were not listed on the driller's logs for the two onsite wells, because water level drawdown cannot be measured during airlifting operations; thus, the original post-construction specific capacity[3] value for the wells cannot be calculated from the limited data on the driller's log.

[2] As a rule of thumb, RCS geologists estimate that normal operational pumping rates for a new well equipped with a permanent pump are typically on the order of only about one-half or less of the airlifting rate reported on a driller's log.

[3] Specific capacity, in gallons per minute per foot of water level drawdown (gpm/ft ddn), represents the ratio of the pumping rate in a well (in gpm) divided by the amount of water level drawdown (in ft ddn) created in the well while pumping at that rate.

Pumping Test Data by Others for the Agricultural Well

On July 11, 2019, a 5½-hour constant rate pumping test of the Agricultural Well was performed by Doshier-Gregson. Water levels were not measured during that pumping test by the pumper. The pumper reported there was no access into the well to allow measurements of water levels during testing. The pumping test was started at an initial rate of 120 gpm and then declined to a rate of 118 gpm approximately 15 minutes into the pumping test. At the end of the 5½-hour pumping test, the final pumping rate was reported by the pumper to be 118 gpm.

Well Data from Site Visits

As discussed above, a site visit to the subject property was performed by RCS geologists on October 15, 2019. The following information for the onsite wells was gleaned from that site visit:

- The Agricultural Well was observed to be equipped with a permanent pump, and the pump was turned off (not pumping) during our October 2019 visit. A static water level (SWL) could not be measured in this well because there was no access into the wellhead for the RCS water level sounder. This well was also observed to be equipped with a totalizer flowmeter, which had a reading of 18,536,941 gallons at the time of our site visit.
- The Domestic Well, which was recently constructed in June 2019, was observed not to be equipped with a permanent pump. A SWL of 90.9 ft below the wellhead reference point (brp) was measured by the RCS geologist during the site visit on October 15, 2019; the reference point for the measurement was approximately 0.8 ft above ground surface (ags). Because this well has yet to be equipped with a permanent pump, no totalizer flowmeter device has been installed to date.

Local Geologic Conditions

Figure 3, "Geology Map," illustrates the types, lateral extents, and boundaries between the various earth materials mapped at ground surface in the region by others. Specifically, Figure 3 has been adapted from the results of regional geologic field mapping of the Napa (2004) and Yountville (2005) quadrangles, as published by the California Geological Survey (CGS). As shown on Figure 3, the key earth materials mapped at ground surface in the area, from geologically youngest to oldest, include the following:

a. Alluvial-type deposits. These deposits consist of undifferentiated and/or undivided stream channel, stream terrace, and alluvial fan deposits (map symbols Qhc, Qhty, and Qoa on Figure 3, respectively). These deposits are generally unconsolidated, and consist of layers and lenses of sand, gravel, silt, and clay. As shown on Figure 3, these alluvial deposits primarily occur at ground surface across the floor of Napa Valley to the west of the subject property, and not onsite. These alluvial deposits (map symbol Qoa) are interpreted to be become thicker from east to west in the vicinity of the property towards the Napa River. These older alluvial deposits are mapped on Figure 3 to be exposed at ground surface in the topographically lower and flatter west side of the subject property.

b. Sonoma Volcanics. The Sonoma Volcanics are comprised by a highly variable sequence of chemically and lithologically diverse volcanic rocks. The rock types shown on Figure 3 include: dacite (map symbol Tsvdg); andesite interbedded with tuff

(map symbol Tsvaa); and andesite and flow breccias (map symbol Tsvasl). The latter two geologic units (map symbols Tsvaa and Tsvasl) are likely represented by similar geologic materials, but are mapped as different lithologic units, depending on the CGS geologic map reference. As shown on Figure 3, andesitic volcanic rocks (map symbol Tsvaa) are exposed at ground surface across the eastern portion of the subject property, and these materials extend to the north, east, and south of the property. These volcanic rocks are also known to directly underlie the alluvial-type deposits in the western portion of the property and throughout portions of the floor of Napa Valley.

c. Great Valley Sequence/Franciscan Complex. The geologically older (Cretaceous- and Jurassic-aged) Great Valley Sequence and Franciscan Complex rocks are exposed at ground surface in offsite areas to the north and northwest of the subject property (not shown on Figure 3). These rocks consist mainly of well-consolidated to cemented sandstone, siltstone, shale, and greywacke. These geologically older rocks are considered to be the bedrock of the area and are known to underlie the volcanic rocks at depth beneath the subject property.

Geologic Structure

A few unnamed faults[4], as mapped by others, have been interpreted to exist in the vicinity of the subject property (CGS, 2004 and CGS, 2005), but are not shown on Figure 3. Specifically, these northwest-southeast trending fault traces are shown to be mapped east of the subject property. There may be potential impacts of these faults on groundwater availability in the region. Faults can serve to increase the number and frequency of fracturing in the Sonoma Volcanics rocks. If such fractures were to occur, they would tend to increase the amount of open area in the rock fractures which, in turn, could increase the ability of the local earth materials to store groundwater. Faults can also act as barriers to groundwater flow.

Local Hydrogeologic Conditions

The earth materials described above can generally be separated into two basic categories, based on their relative ability to store and transmit groundwater to wells. These two basic categories are:

Potentially Water-Bearing Materials

The principal water-bearing materials beneath the subject property and its environs are represented by the hard, fractured volcanic flow rocks of the Sonoma Volcanics. The occurrence and movement of groundwater in Sonoma Volcanic rocks tend to be controlled primarily by the secondary porosity within the rock mass, that is, by the fractures and joints that have been created in these harder volcanic flow-type rocks over time by various volcanic and tectonic processes. Specifically, these fractures and joints have been created as a result of the cooling of these originally molten flow rocks and flow breccias deposits following their deposition, and also from mountain building or tectonic processes (faulting and folding) that have occurred over time in the region after the rocks were erupted and hardened. Some groundwater can also occur in zones of deep weathering between the periods of volcanic events that yielded the various flow rocks and also within the pore spaces created by the grain-to-grain interaction in volcanic tuff and ash, if and where present at depth beneath the subject property.

[4] Note that it is neither the purpose of nor within our Scope of Hydrogeologic Services for this project to assess the potential seismicity or activity of any faults that may occur in the region

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The amount of groundwater available at a particular drill site for a well constructed into the Sonoma Volcanics beneath the subject property would depend on such factors as:

- Whether or the hard fractured volcanic flow rocks are the preponderant volcanic material beneath the property.
- The number, frequency, size and degree of openness of the fractures/joints in the hard volcanic rocks.
- The degree of interconnection of the various fracture/joint systems in the subsurface and to ground surface.
- The extent to which the open fractures may have been possibly in-filled over time by chemical precipitates/deposits and/or weathering products (clay, etc.).
- The amount of recharge from local rainfall that becomes available for deep percolation to the fracture systems.
- The possible thickness of the ash flow tuffs beneath the property.
- To a lesser extent, the size of the pore-spaces formed by the grain-to-grain interactions of volcanic ash particles, if these rock types exist beneath the subject property.

As stated above, the principal rock types expected in the subsurface beneath the property, based on the driller's logs of the two onsite wells, appear to be mainly the hard, volcanic flow rocks that may be fractured to varying degrees. Descriptions of drill cuttings by the well driller that are recorded on the available driller's logs for the Agricultural Well and Domestic Well and for other nearby offsite wells owned by others are consistent with the typical descriptions of the various rocks known in the Sonoma Volcanics. From our long-term experience with the Sonoma Volcanics, based on numerous other water well construction projects in Napa County, pumping capacities in individual wells have ranged widely, from rates as low as a few gpm (if abundant ash-flow tuff is present), to rates as high as 200 gpm or more (if abundant hard fractured flow rocks are present).

Alluvial deposits are typically water-bearing, but these deposits are interpreted to be relatively thin on the subject property, and therefore they are not considered to be a source of groundwater for the project.

Potentially Nonwater-Bearing Rocks

This category includes the geologically older and fine-grained sedimentary rocks of the Great Valley Sequence and Franciscan Complex. These potentially nonwater-bearing rocks are interpreted to underlie the volcanic rocks that exist beneath the subject property at depths greater than ±670 ft bgs, as interpreted by RCS from the driller's descriptions listed on the available driller's log for the Agricultural Well.

In essence, these diverse and geologically old rocks are well-cemented and well-lithified, and have an overall low permeability. Occasionally, localized conditions can allow for small quantities of groundwater to exist in these rocks wherever they may be sufficiently fractured and/or are relatively more coarse-grained. However, even in areas with potentially favorable conditions, well yields are often only a few gpm in these rocks, and the water quality can be marginal to poor in terms of total dissolved solids concentrations, and other dissolved constituents.

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Project Groundwater Demands

For the purposes of this WAA, the new Domestic Well is considered to be the "project well," as it will represent the only onsite well that will be used to meet water demands of the proposed winery project. Water demands for the formerly existing (pre-2017 Atlas Fire) onsite developments (winery and residence) are considered to be "existing" for the purposes of this analysis. Onsite water demands for all onsite former and existing developments (residence, winery, landscaping, and vineyards) have historically been supplied by groundwater pumped from the Agricultural Well. After the proposed modified winery and residence have been rebuilt and become operational, groundwater demands for these developments will be supplied by groundwater pumped from the recently-constructed Domestic Well. Existing vineyard irrigation, landscape irrigation, and the pool water demands will continue to be supplied by groundwater pumped from the Agricultural Well.

Water use estimates for existing onsite water demands were based on the 2003 Use Permit Water Availability Analysis (WAA) prepared by Mahoney & Associates (Mahoney) for the property. Those existing water use estimates were also verified by the current project engineer, BKF Engineers (BKF), of Santa Rosa, California.

Existing Groundwater Demands

Groundwater demands for the existing vineyards (when the winery and residence were in existence before the 2017 Atlas Fire) have historically been met using groundwater pumped from the Agricultural Well. Existing groundwater demands for the subject property have been estimated by others, as follows:

a. Existing residential groundwater demand = 0.34 acre-feet per year (AF/yr)
    - This estimate is based on information provided by Mahoney in their 2003 Use Permit WAA.
    - Note that 1 AF = 325,851 gallons
b. Existing vineyard irrigation groundwater demand = 12.3 AF/yr
    - This estimate is based on information provided in the Mahoney Use Permit WAA (2003). Therein, "long-term" water use for vineyard irrigation per acre of vines was estimated to be 0.41 AF/yr, and there are currently 30 acres of existing vineyards (0.41AF/yr x 30 acres = 12.3 AF/yr).
c. Existing winery groundwater demand = 1.0 AF/yr
    - This estimate is based on information provided in the Mahoney (2003) Use Permit WAA, and includes water use for winery "process" and "domestic water", and landscaping.
d. Total estimated existing annual groundwater demand = a + b + c = 13.64 AF/yr

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Proposed Groundwater Demands

Proposed onsite groundwater demands for the property have been provided and/or estimated based on data provided by BKF Engineers. All winery water demands (including both process water and domestic water for the winery) and domestic demands for the residence are proposed to be met by pumping groundwater from the new Domestic Well. All vineyard irrigation, landscape irrigation, and pool demands will be supplied via groundwater pumped from the Agricultural Well. Thus, the total proposed onsite groundwater demands for the property (as supplied by the two onsite wells) will be as follows:

a. Proposed residential groundwater demand = 0.99 AF/yr
b. Proposed vineyard irrigation groundwater demand = 12.3 AF/yr
    - The total existing irrigated vineyard area of 30 acres is not proposed to be increased.
c. Proposed landscape irrigation and pool groundwater demand = 0.95 AF/yr
    - The estimate was provided by the landscape architect for this project, Cleaver Design Associates.
d. Proposed winery groundwater demand = 1.88 AF/yr
    - This estimate is provided by BKF and includes 1.07 AF/yr for process water and domestic demands for the winery, and 0.81 AF/yr for commercial kitchen water demands.
e. Total proposed annual groundwater demand = a + b + c + d = 16.12 AF/yr

Thus, the total groundwater demand increase (from 13.64 AF/yr existing to 16.12 AF/yr proposed) for the property is proposed to be approximately 2.5 AF/yr, or about 814,628 gallons per year.

Proposed Pumping Rates

To determine the pumping rate necessary from the Domestic Well (i.e., the project well) to meet the demands of the project, it was assumed that the proposed winery water demands (1.88 AF/yr) and the domestic demands for the residence (0.99 AF/yr) will be required year-round (365 days/year) each year. Based on these assumptions, and in order to meet the groundwater demands for the proposed project, the Domestic Well would need to pump at an average rate of about 4 gpm. This pumping rate assumes that the Domestic Well would be pumped on a 50% operational basis (12 hours/day, 7 days/week) throughout the year. Based on airlifting rates (approximately 200 gpm) reported by the driller at the date the Domestic Well was constructed in June 2019, it appears that this well is capable of meeting the instantaneous groundwater flow demands required for both the residence and the proposed winery project. RCS geologists estimate that normal operational pumping rates for a new well equipped with a permanent pump are typically on the order of only about one-half or less of the airlifting rate reported on a driller's log. Note that the Agricultural Well had a reported airlift rate of 200 gpm when it was constructed in 1979, and it was recently pumped by others at a rate of 118 gpm for 5½ hours in July 2019. These two onsite wells are relatively close to each other (±300 ft apart), were constructed to similar depths, and are perforated within similar volcanic materials, based on the driller's descriptions of the drill cuttings listed on their respective driller's logs. Thus, we would expect the two wells to have similar pumping characteristics.

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Rainfall

Long-term rainfall data are essential for estimating the average annual recharge that may occur at subject property. Average annual rainfall totals that occur specifically at the subject property are not directly known, because no onsite rain gage exists. However, relatively long-term rainfall data exist for the "Napa State Hospital" rain gage, which is located 6 miles south of the subject property. Data for this rain gage are available from the Western Regional Climate Center (WRCC) website. For this rain gage, the available period of record is 1893 through September 2019; data for this gage are listed by calendar year (January through December), not water year (beginning October 1 through September 30 of the following year). Note there are several months and/or years of rainfall data missing, such as: between 1897 and 1902; and between 1915 and 1916. For the available period of record, the average annual rainfall at this Napa State Hospital gage has been 24.7 inches (2.1 ft), as reported by the WRCC. This rainfall gage is located at a slightly lower elevation (60 ft above sea level, asl) than that of the subject property (±60 ft to ±260 ft asl), and therefore the average annual rainfall at the subject property could be slightly higher than that experienced at this known gage location.

Another rain gage with a relatively short rainfall record was found to be located near the subject property, approximately 4½ miles northwest of the subject property. Data for this "Napa River at Yountville Cross Road" rain gage are available from the Nape OneRain website between Water Year (WY) 2000-01 through WY 2018-19. Based on these data, an average water year rainfall for WY 2000-01 through WY 2018-19 at this gage was calculated to be 30.5 inches (2.5 ft). This rain gage is located at a similar elevation (95 ft asl) as that of the subject property, and thus, the average annual water year rainfall at the subject property could be similar to that experienced at this known gage location. However, because the period of record for this gage is short (19 years), RCS does not consider these data to be representative of the long-term annual average rainfall in the area surrounding the subject property.

To further help define the average annual rainfall data derived from the WRCC and Napa OneRain gages, RCS reviewed the precipitation data published by the PRISM Climate Group at Oregon State University. This data set, which is freely available from the PRISM website, contains "spatially gridded average annual precipitation at 800m [800-meter] grid cell resolution." The date range for this dataset includes the climatological period between 1981 and 2010. These gridded data provide an average annual rainfall distributed across Napa County, including the region of the subject property. Using this data set, RCS determined that the average rainfall for the subject property for the stated date range was approximately 27.5 inches (2.3 ft).

An additional, though older, rainfall data source, an isohyetal map (a map showing contours of equal average annual rainfall) was prepared by the County for all of Napa County, and is freely available for download from the online Napa County GIS database. As described in the metadata for the file (also available via the County GIS database), the isohyets are based on a 60-year data period beginning in 1900 and ending in 1960. As stated in the metadata for the file, the contour interval for the map is reported to be "variable due to the degree of variation of annual precipitation with horizontal distance", and therefore the resolution of the data for individual parcels (including the subject property) cannot be readily discerned. The subject property is situated within the boundaries of the 45-inch average annual rainfall contour on this County map. Based on our

interpretation of the actual isohyetal contour map (not provided herein), the long-term average annual rainfall at the subject property may be on the order of 27.5 inches (2.3 ft).

Table 2, "Comparison of Rainfall Data Sources," provides a comparison of the data collected from the different rainfall sources discussed above. Based on those rainfall data sources and as summarized on Table 2, RCS will consider the long-term average annual rainfall at the subject property to be 27.5 inches (2.3 ft), as derived from the PRISM and Napa County Isohyetal data sets. The 27.5-inch per year estimate is based on the data source with a relatively long period of record (30 years) and is more site-specific, when compared to the other rainfall data sources listed in Table 2 that are located at a further distance from the subject property, and/or have a shorter period of available data.

Estimate of Groundwater Recharge

Groundwater recharge on a long-term average annual basis at the subject property can be estimated as a percentage of average rainfall that falls directly on the subject property and becomes available to deep percolate into the local aquifer system(s) over the long-term. The actual percentage of rain that deep percolates can be variable based on numerous conditions, such as: the slope of the land surface; the soil type that exists at the property; the evapotranspiration that occurs on the property; the intensity and duration of the rainfall; etc. Therefore, RCS has considered various analyses of deep percolation into the rocks of the Sonoma Volcanics, as relied upon by other consultants, government agencies, and RCS for other projects in the Napa Valley. Note that this analysis assumes the entire property is underlain by only volcanic rocks, and doesn't consider the alluvial deposits; the rainfall recharge percentage in the alluvium is higher than in the volcanic rocks.

Recharge volumes estimated in this Memorandum are based on the long-term average annual rainfall values determined for the subject property using the available data presented above. Note that a calculation of average annual rainfall (by calendar year or water year) for any long-term period always includes periods of below-average rainfall and above-average rainfall that occurred during the period over which the average was calculated. Therefore, the following recharge calculations also include consideration of drought year conditions.

Updated Napa County Hydrogeologic Conceptual Model (LSCE&MBK 2013)

Estimates of groundwater recharge as a percentage of rainfall were presented for a number of watersheds (but not all watersheds) in Napa County in the report titled "Updated Napa County Hydrogeologic Conceptual Model" (LSCE&MBK, 2013) prepared for Napa County. Watershed boundaries within Napa County are shown on Figures 8-3 and 8-4 in that report (not reproduced herein). Figure 4, "Watershed Boundaries," was prepared for this project using those same watershed boundaries provided by MBK Engineers (MBK), for which watershed water balance data are available in the LSCE&MBK, 2013 report. As shown on Figure 4, the subject property is located just outside the boundaries of the watershed referred to by MBK as the "Napa River Watershed near Napa." As shown on Table 8-9 on page 97 of the referenced report (LSCE&MBK, 2013), 17% of the average annual rainfall that occurs within this named watershed was estimated to be able to deep percolate as groundwater recharge (i.e. the recharge rate). Note that, as shown on Table 8-8 of LSCE&MBK (2013), several sub-watershed areas are tributary to the "Napa River Watershed near Napa." A groundwater recharge estimation by RCS for the Mountain Peak project (2015) and Bloodlines LLC project (2017) for rainfall percolation in the Sonoma Volcanics on nearby projects located within the "Napa River Watershed near Napa," provided a more

conservative 14% estimate for those properties. Also shown on Figure 4 is the areal extent of the Northeast Napa Study Area (NENSA, as defined by the County), discussed below.

As stated above, the total surface area of the subject property is 56.6 acres. Assuming 27.5 inches (2.3 ft) of rainfall occurs on the subject property on a long-term average annual basis, then the total volume of rainfall that would fall each year directly on the property over the long term would be approximately 130.2 AF/yr (56.6 acres x 2.3 ft). Conservatively assuming that 14% of the average annual rainfall volume would be able to deep percolate to the groundwater within the Sonoma Volcanics directly beneath the subject property over the long term, then the average annual groundwater recharge at the subject property would be approximately 18.2 AF/yr (130.2 AF/yr x 14%). This estimated annual recharge volume of 18.2 AF/yr is greater than the total estimated average annual groundwater demand for the proposed project of 16.12 AF/yr.

Estimate of Groundwater in Storage

To help evaluate possible impacts to the local aquifer system(s) that might occur as a result of pumping for the proposed project, the volume of groundwater extracted for the project can be compared to an estimate of the current volume of groundwater in storage strictly within the Sonoma Volcanics beneath the subject property. To estimate the amount of groundwater currently in storage beneath the subject property, the following parameters are needed:

a) Approximate surface area of property = 56.6 acres

b) Depth of the Domestic Well = 600 ft bgs. Based on the data listed on the driller's logs for this well, rocks of the Sonoma Volcanics extend to a greater depth than the cased depth of the Domestic Well, and thus, it is likely that the saturated zone beneath the property could extend deeper than is estimated using data from the local drillers' logs.

c) To present a conservative calculation of groundwater in storage, RCS geologists have assumed that the current saturated thickness of the aquifer(s) beneath the subject property is approximately 505 vertical feet. This value is calculated using the depth of the Domestic Well (600 ft bgs) and subtracting the Huckfeldt-measured SWL depth of approximately 95 ft on June 14, 2019. Note that this Huckfeldt-measured SWL for the subject well is slightly deeper than the RCS-measured SWL of 90 ft brp on October 15, 2019; this deeper value is used for this calculation to provide a more conservative analysis of the minimum volume of groundwater in storage beneath the property. Further, as discussed in subpart (b) above, the saturated volcanic rock beneath the subject property, based on the available subsurface geologic data, could actually be thicker; this would tend to create an even greater volume of groundwater in storage beneath the property than is calculated herein.

d) Approximate average specific yield of the Sonoma Volcanics = 2%. The specific yield is essentially the ratio of the volume of water that drains from the saturated portion of the geologic materials (due to gravity) to the total volume of rocks. Specific yield of the Sonoma Volcanics can vary greatly depending on a number of factors, including the degree and interconnection of the pore spaces and/or fracture zones within the rocks. A conservative estimate by Kunkel and Upson for the specific yield of the Sonoma Volcanics ranges from 3% to 5% (USGS 1960). For other Napa County properties for which RCS has performed similar analyses, an even more conservative estimate for specific yield of 2% has been used. Hence, to present a conservative

analysis, we will assume a specific yield of 2% for the Sonoma Volcanics rocks that underlie the subject property, but the actual value, in reality, could be higher.

e) Thus, a conservative estimate of the groundwater in storage (S) beneath the subject property (based on the September 2019 SWL of the New Well) is calculated as:

S = property area ("a") times saturated thickness ("c") times average specific yield ("d") = (56.6 ac)(505 ft)(2%) = 572 AF

In contrast, the proposed average annual groundwater use for the property is estimated to be 16.12 AF/yr in the future. Hence, the estimated groundwater demand for the entire property represents only about 3% of the groundwater conservatively estimated to currently be in storage in the volcanic rocks beneath the subject property based on conservative, site-specific water level data for the Domestic Well (i.e., the project well). Furthermore, this percentage does not include annual groundwater recharge that will occur from rainfall that deep percolates as groundwater into the local aquifers. Based on the foregoing, the estimated groundwater demands of the proposed project and the entire subject property should not cause a net deficit in the volume of groundwater within the aquifer systems beneath the site, and this should not adversely impact water levels in nearby wells to a point that they would not support existing or permitted land uses.

Possible Effects of "Prolonged Drought"

California has experienced a number of periods of extended drought throughout its history. Here, drought is defined as a meteorological drought, that is, a period in which the total annual precipitation is less than the long-term average annual precipitation (DWR 2015). For similar projects in the County, Napa County PBES has asked RCS to consider what the effects on groundwater availability at a particular property might be if a period of "prolonged drought" were to occur in the region, assuming the project were to operate in the future as described herein. Recharge volumes estimated in this document are based on the long-term average rainfall value determined for the subject property using available data. Recall that a calculation of average annual rainfall for any long-term period always includes periods of below-average rainfall and above-average rainfall that occurred during the period over which the average was calculated. Therefore, it is our opinion that the preceding calculations do inherently include consideration of drought year conditions.

However, to help understand what potential conditions might exist in the local volcanic rocks beneath the property during a "prolonged drought period", a "prolonged drought" must be defined. As discussed by DWR, "there is no universal definition of when a drought begins or ends, nor is there a state statutory process for defining or declaring drought" (DWR 2015). California's most significant historical statewide droughts were defined by DWR as occurring during the following periods (DWR 2015):

- WY 1928-29 through WY1933-34 – six years
- WY 1975-76 through WY 1976-77 – two years
- WY 1986-87 through WY 1991-92 – six years
- WY 2006-07 through WY 2008-09 – three years

- Recent drought – WY 2011-12 through WY 2015-16[5] – five years

Table 3, "Drought Period Rainfall as Percentage of Average," shows the average amount of rainfall that occurred during each drought period for which rainfall data exist at the two rain gages discussed above and shown on Table 3; that drought period rainfall amount is also expressed on Table 3 as a percentage of the total rainfall that occurred. As shown on Table 3, determining the amount of rain that might fall during a "prolonged drought" is variable, and depends on the period of record for the specific rain gage. Clearly, the WY 1975-76 to WY 1976-77 drought period recorded by the Napa State Hospital rain gage and reported by the WRCC had the lowest total rainfall at 48% (drought period average was 11.8 inches), compared to the long-term average (24.7 inches), and that specific drought lasted two years. The WY 1928-29 to WY 1933-34 and WY 1986-87 to WY 1991-92 drought periods lasted for six years, but rainfall during these drought periods were 70% and 75% of the average annual rainfall at the WRCC rain gage, respectively. It is important to note that the drought year percentage listed on Table 3 is completely dependent on the period of record for each individual gage. An example of this is the Napa OneRain gage data; because the period of record for this gage is short, and includes many drought years, then the last available drought year period (WY 2011-12 to WY 2015-16) rainfall percentage is shown to be 77% of the long-term average.

Hence, for the purposes of this analysis, a "prolonged" drought period rainfall is conservatively considered to be 48% of the average annual rainfall that occurred in the region (using the rainfall data from the WRCC Napa State Hospital rain gage). Further, to again be conservative, a "prolonged drought period" is estimated to last 6 years, which is the longest drought period on record according to DWR (DWR 2015); see Table 3. This six-year period is a quite conservative estimate, because the 48%-average figure corresponds with a two-year drought period, not a six-year drought period.

To meet six consecutive years of groundwater demand for the proposed subject property, a total onsite groundwater extraction of 96.7 AF is estimated to be required (16.12 AF/yr of groundwater demand multiplied by 6 years = 96.7 AF). Assuming groundwater recharge is reduced to 48% of the average annual recharge during each year of such a theoretical "prolonged drought period", then the resulting total of groundwater recharge that might occur during the six-year drought period for the subject property is calculated as follows:

- As shown herein, a conservative estimate of the average annual groundwater recharge on the subject property is estimated to be 18.2 AF/yr. Taking 48% of this annual volume yields a drought period recharge volume of 8.7 AF/yr.
- Assuming a drought period duration of 6 continuous years, then a total of 52.2 AF (8.7 AF/yr times 6 years) of water would be available to recharge the volcanic rocks beneath the property by virtue of deep percolation of the direct rainfall that occurs solely within the boundaries of the subject property.

Therefore, assuming a theoretical, extreme, six-year drought period during which only 48% of the average annual rainfall might occur, a conservative estimate of the total drought-period recharge

[5] The DWR 2015 drought document was published in February 2015 and lists the recent significant drought through the 2013-14 water year only; the drought continued throughout the State into WY 2015-16. Due to the rains in WY 2016-17, various sources, including the National Drought Mitigation Center website (NDMC 2019), declared an end to the drought in Northern California in 2017, which included Napa County. As of December 5, 2019, the area of Napa County in which the subject property lies, is currently mapped as "None" on the NDMC website (NDMC 2019)

at the subject property (52.2 AF) would be less than the estimate of the total onsite groundwater demand (96.7 AF) that may occur over the same six-year period.

As conservatively estimated above, 572 AF of groundwater are in storage within the rocks of the Sonoma Volcanics beneath the property (based on the Huckfeldt-measured June 2019 pre-test SWL from the Domestic Well). Hence, the theoretical six-year long drought period groundwater "recharge deficit" of 44.5 AF (96.7 AF – 52.2 AF) would represent about 8% of that volume of groundwater in storage. Temporarily removing an average of approximately 7.4 AF of groundwater from storage every year during this 6-year long prolonged drought (44.5 AF of total "deficit" over the entire 6-year period) may cause water levels to decrease somewhat beneath the subject property, but removal of such a relatively small percentage of groundwater from storage over an entire 6-year period of time is not expected to significantly impact groundwater levels beneath the property. Recharge that occurs during periods of average and above-average rainfall would continue to recharge the local aquifer system(s). Again, this drought analysis is quite conservative, and assumes very extreme drought (48% of average rainfall occurring every year for six consecutive years).

Northeast Napa Study Area

The subject property is also considered to be located within an area has been identified by others as an area of concern by the County with respect to groundwater use and development. The northern and eastern boundaries of the NENSA (as shaded in purple on Figures 1 and 4) are located approximately ½-mile north and east of the subject property. Through prior discussions with the County, and review of publicly available documents, including the "Northeast Napa Area: Special Groundwater Study" (LSCE 2017), it is the understanding of RCS that the County does not expect any new groundwater restrictions will be placed on projects within the NENSA in the near future. Any conditions of approval for projects located in the NENSA are expected to be related to monitoring of groundwater levels and extraction volumes[6]; specific conditions are unknown at this time. Further, as stated in the LSCE 2017 document, "Relatively small amounts of increased pumping may be considered for proposed discretionary projects in the Management Area: Northeast Napa/East of the Napa River." the subject Signorello property is in that "management area" mentioned in the document, and is proposing a relatively small increase in groundwater pumping.

Key Conclusions and Recommendations

1. The existing Signorello Estate Winery property is currently developed with 30 acres of existing vineyards. The existing winery (permitted for 20,000 gallons of wine per year) and residence were destroyed in the 2017 Atlas Fire and are currently being re-designed and constructed.
2. There are two existing onsite water wells (the "Agricultural Well" and "Domestic Well") on the subject property. The latter well was recently constructed, and was provided with a 60-foot deep, cement sanitary seal in order to permit its groundwater to be used for public supply.

[6] Specific conditions of approval are unknown and cannot be predicted by RCS.

MEMORANDUM

3. The proposed project consists of modifying the existing winery use permit to increase winery production to 50,000 gallons of wine per year, and to also increase visitations and tastings.
4. The proposed (future) average annual groundwater demand for the proposed project (including the existing vineyards) was estimated by the project engineer to be 16.12 AF/yr. Total groundwater demands for the subject property are only proposed to increase by 2.52 AF; from 13.64 AF/yr existing, to 16.12 AF/yr proposed.
5. The increased groundwater demands, which is to include domestic supply for the winery and the residence, will be met by pumping groundwater from the Domestic Well. The Agricultural Well will continue to be used to meet existing onsite vineyard irrigation demands, which are not increasing as part of the proposed project.
6. To meet the estimated groundwater demands of the proposed winery modification project (1.88 AF/yr) and existing demands of the residence (0.99 AF/yr), the Domestic Well would need to pump at a rate of approximately 4 gpm. This pumping rate assumes the Domestic Well would be pumped on a 50% operational basis (12 hours/day, 7 days/week) throughout the year.
7. Groundwater recharge at the subject property on an average annual basis is estimated to be 18.2 AF; this value is based on conservative estimates of the long-term average annual rainfall at the property (27.5 inches per year) and conservative estimates of rainfall (14%) that could be available to deep percolate into the pore spaces and/or fractures and joints in the Sonoma Volcanics that underlie the subject property. This estimate does not consider the alluvial deposits that exist at the property that likely exhibit a higher recharge percentage. This estimated groundwater recharge of 18.2 AF/yr is greater than the 16.1 AF/yr estimated to be required on an average annual basis in the future from the subject property.
8. Conservative estimates of recharge that may occur during an extreme “prolonged drought” (as defined herein) show that, over a theoretical six-year period of continuous drought in which only 48% of the average annual rainfall might occur, a total of 52.2 AF of recharge is estimated to occur strictly into the Sonoma Volcanics directly beneath the subject property. This theoretical drought period recharge estimate of 52.2 AF is less than the estimated groundwater demand of the proposed project of 96.7 AF for the same continuous six-year period. Hence, the theoretical six-year long drought period recharge “deficit” of 44.5 AF would represent about 8% of the volume of groundwater currently in storage beneath the property (estimated to be 572 AF). Rainfall recharge during years of above-average rainfall would then replenish groundwater in storage that has been used to meet the groundwater demand of the entire property during a theoretical drought of six continuous years.
9. Based on the reported airlifting rate (approximately 200 gpm) of the Domestic Well at the date of its construction, it appears that this well is capable of pumping at the rates necessary to meet the demands of the proposed project. Further, the similarly-constructed nearby Agricultural Well displayed a pumping rate in excess of 100 gpm during a 5½-hour pumping test by others in July 2019.
10. RCS recommends implementation of a groundwater monitoring program at the subject property. This would include the frequent, ongoing monitoring of static and pumping

water levels in the onsite wells, and also of the instantaneous flow rates and cumulative pumped volumes from each of the onsite wells via dual-reading flow meters (that records both flow rate and totalizing values, respectively) at each well. RCS also recommends that water level transducers be purchased and installed in the onsite wells to permit the automatic, frequent, and accurate recording of water levels in those wells. By continuing to observe the trends in groundwater levels and future well production rates/volumes over time by qualified professionals, potential declines in water levels and well production in the onsite wells, along with possible changes in operational pumping scenarios, can be addressed in a timely manner.

MEMORANDUM

References

- **(CGS 2004)** Clahan, Wagner, et all, 2004. Geologic Map of the Napa 7.5' Quadrangle, Napa County, California: A Digital Database. California Geological Survey.
- **(CGS 2005)** Bezore, Clahan, et all, 2005. Geologic Map of the Yountville 7.5' Quadrangle, Napa County, California: A Digital Database. California Geological Survey.
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- **(LSCE&MBK 2013)** Luhdorff & Scalmanini Consulting Engineers and MBK Engineers, January 2013. Updated Hydrogeologic Conceptualization and Characterization of Conditions, Prepared for Napa County.
- **(LSCE 2017)** Ludhorff & Scalmanini Consulting Engineers, September 2017. Northeast Napa Area: Special Groundwater Study, Prepared for Napa County.
- **(MAHONEY 2003)** Mahoney and Associates 2003. Use Permit Water Availability Analysis, Signorello Winery & Vineyards.
- **(WAA 2015)** Napa County Board of Supervisors, Adopted May 12, 2015. Water Availability Analysis (WAA) – Guidance Document.

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- Well Completion Report Map Application, California Department of Water Resources, 2019. https://www.arcgis.com/apps/webappviewer/index.html?id=181078580a214c0986e2da28f8623b37
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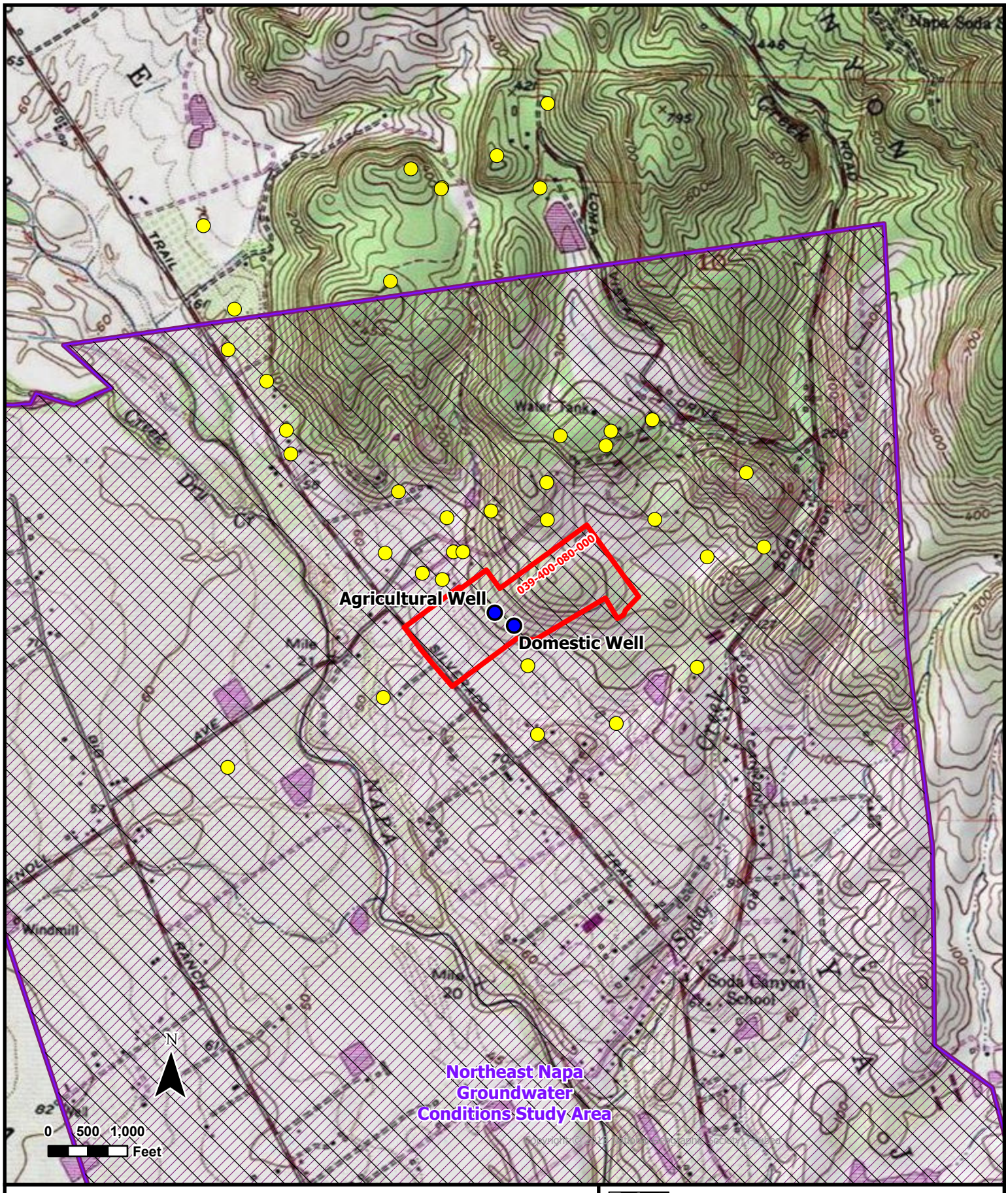


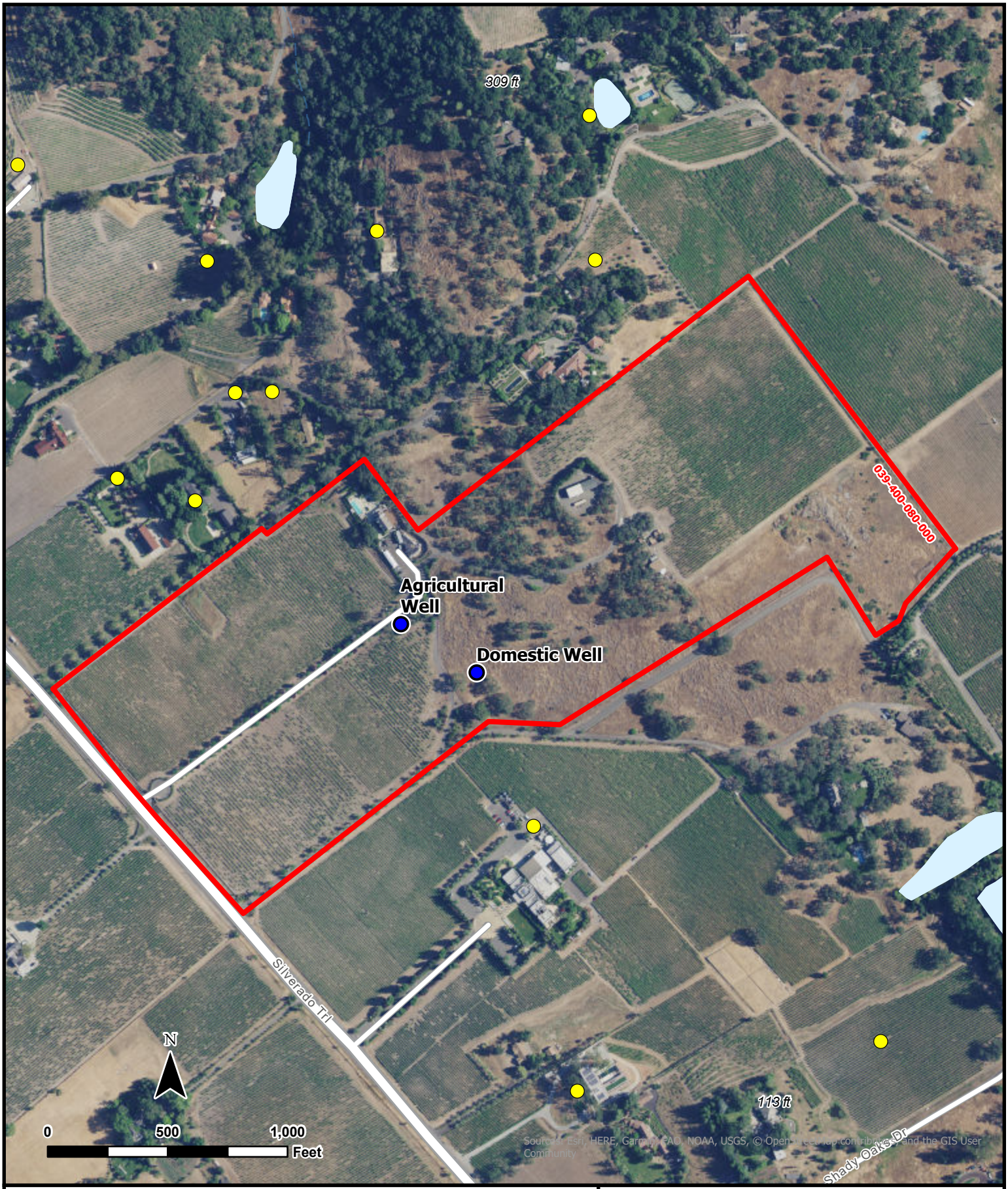
LEGEND

- Signorello Estate Winery Property
- Northeast Napa Study Area
- Onsite Well
- Offsite Well (approximate)

RCS

FIGURE 1
LOCATION MAP

RCS Job No. 719-NPA01 April 2020



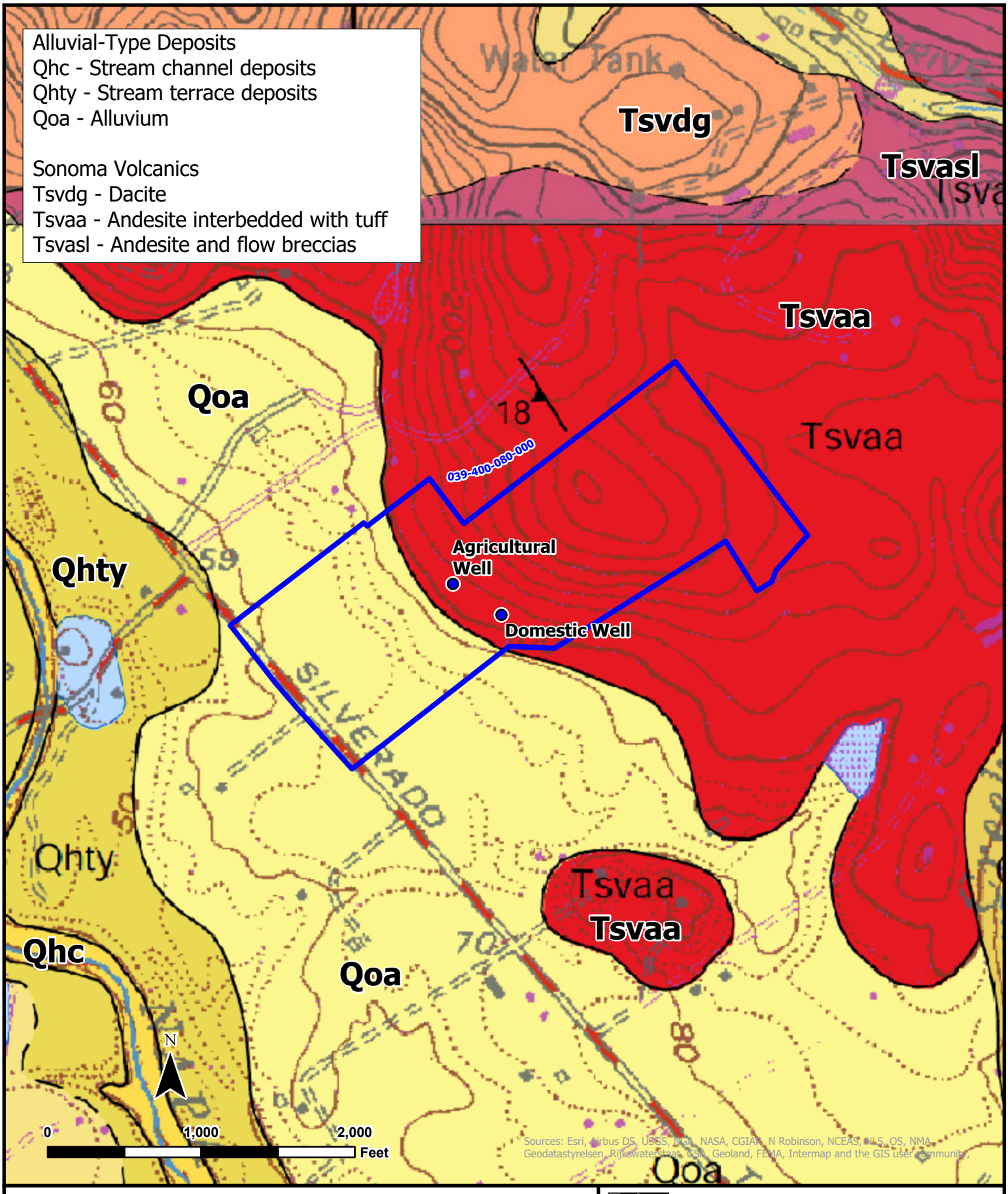
LEGEND

- Signorello Estate Winery Property
- Pond/Reservoir
- Onsite Well
- Offsite Well (approximate)

RCS

FIGURE 2
AERIAL PHOTOGRAPH MAP

RCS Job No. 719-NPA01 April 2020



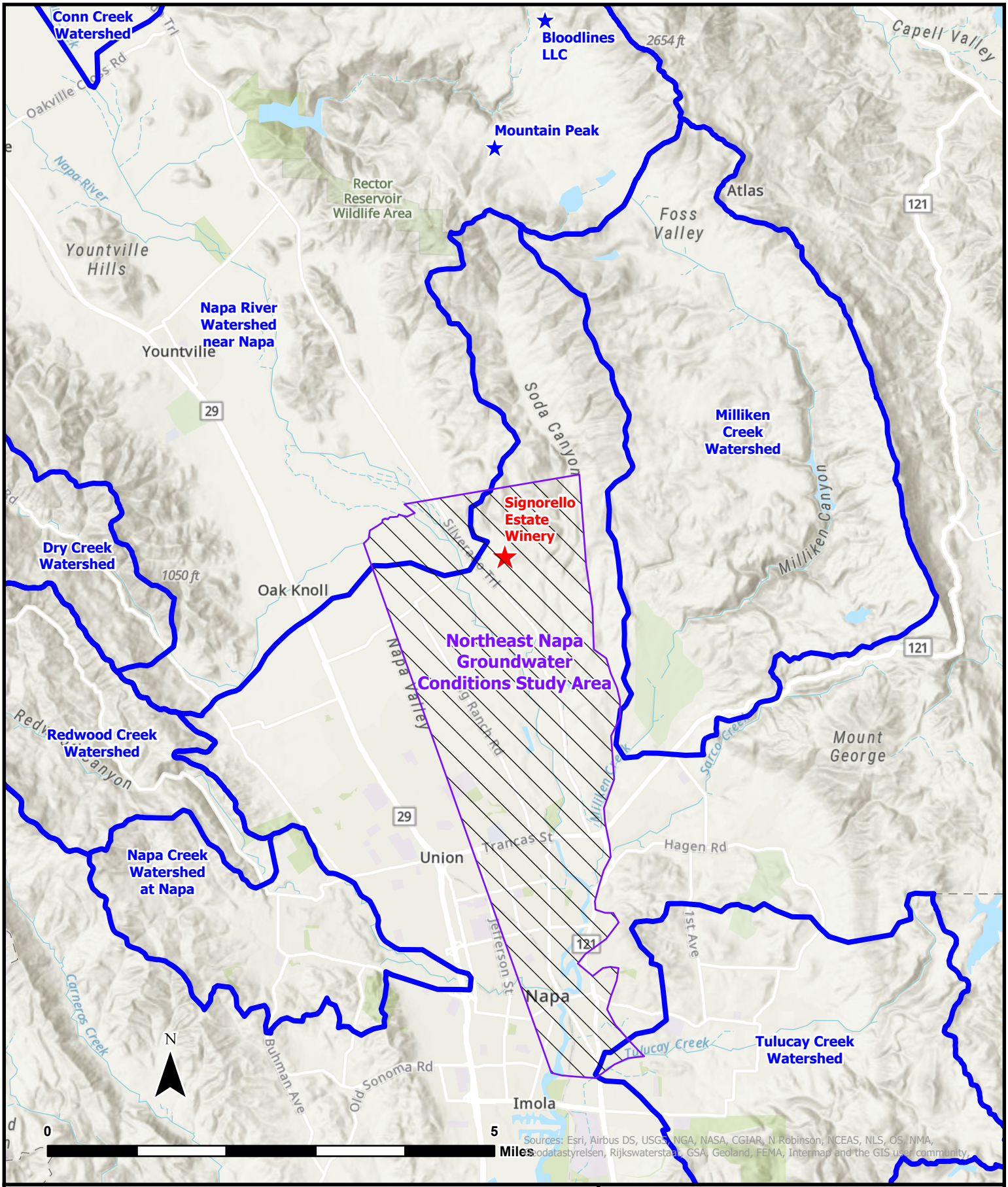
LEGEND

- Signorello Estate Winery Property
- Onsite Well

RCS

FIGURE 3
GEOLOGY MAP

RCS Job No. 719-NPA01 April 2020



LEGEND

- Subject Property Marker
- Nearby WAA Projects
- Northeast Napa Study Area

RCS

FIGURE 4
WATERSHED BOUNDARIES

RCS Job No. 719-NPA01

April 2020

Table 1
Summary of Well Construction and Yield Data
Signorello Estate Winery

WELL CONSTRUCTION DETAILS

Reported Well Designation	DWR Well Log No.	Date Drilled	Method of Drilling	Pilot Hole Depth (ft bgs)	Casing Depth (ft bgs)	Casing Type	Casing Diameter (in)	Borehole Diameter (in)	Sanitary Seal Depth (ft bgs)	Perforation Intervals (ft bgs)	Type and Size (in) of Perforations	Gravel Pack Interval (ft) and Size
Agricultural Well	103401	October 1979	Direct Air Rotary	670	670	Steel	8	13	0-25 (cement)	309-670	Mill-slotted 0.125	25-670 Pea Gravel
Domestic Well	e03272609	June 2019	Direct Air Rotary	600	600	PVC	6	12	0-60 (cement)	100-240 260-380 400-500 520-580	Factory-Cut 0.032	60-600 No. 6 Sand

POST-CONSTRUCITON YIELD DATA

Reported Well Designation	Date & Type of Yield Data	Duration of "Test" (hrs)	Estimated Flow Rate (gpm)	Static Water Level (ft)	Pumping Water Level (ft)	Estimated Specific Capaity (gpm/ft ddn)
Agricultural Well	October 1979 Airlift	ND	200	85	ND	ND
	7/11/19 Pump	4	118	ND	ND	ND
Domestic Well	6/14/19 Airlift	2	200	95	ND	ND

Notes:
ND = No data or not listed
ft bgs = feet below ground surface
in = inches
hrs = hours
gpm = gallons per minute
gpm/ft ddn = gallons per minute per foot of water level drawdown

Table 2
Comparison of Rainfall Data Sources
Signorello Estate Winery

Rain Gage and/or Data Source	Years of Available Rainfall Record	Average Annual Rainfall in Inches (ft)	Elevation of Rain Gage (ft asl)	Approximate Distance of Rain Gage from Subject Property (miles)	Elevation Relative to Subject Property[1]
WRCC Napa State Hospital	1893 through September 2019[2]	24.7 (2.1)	60	6.0	Lower
Napa OneRain Napa River at Yountville Cross Rd	WY 2000-01 through WY 2018-19[3]	30.5 (2.5)	95	4.5	Similar
PRISM	1981 to 2010	27.5 (2.3)	---	---	---
Napa County Isohyetal Map	1900 to 1960	27.5 (2.3)	---	---	---

Notes:

1. The subject property is located at elevations between ±60 and ±260 ft asl
2. Missing rainfall data in: 1897 to 1902; and 1915 to 1916.
3. Erroneous and/or missing rainfall data in: WY 1987-88; WY 1994-95; WY 1995-96; WY 2004-05; and WY 2006-07.

Table 3
Drought Period Rainfall as Percentage of Average

Statewide Drought Period as Defined by DWR/NDMC	Drought Duration (years)	Average Rainfall by Raingage					
		Napa State Hospital WRCC Period of Record - 1893 through September 2019			Napa River at Yountville Cross Road Napa OneRain Period of Record - WY 2000-01 to WY 2018-19		
		[A] Total Gage Average (in)	[B] Drought Period Average (in)	[B/A] Drought Period Rainfall as % of Average	[E] Total Gage Average (in)	[F] Drought Period Average (in)	[F/E] Drought Period Rainfall as % of Average
WY 1928-29 to WY 1933-34	6	24.7	17.3	70%	ND	ND	ND
WY 1975-76 to WY 1976-77	2	24.7	11.8	48%	ND	ND	ND
WY 1986-87 to WY 1991-92	6	24.7	18.5	75%	ND	ND	ND
WY 2006-07 to WY 2008-09	3	24.7	18.8	76%	30.5	22.1	72%
WY 2011-12 to WY 2015-16	5	24.7	21.0	85%	30.5	23.6	77%

Notes:

ND = No rainfall data for corresponding drought period.

MEMORANDUM

APPENDIX

CALIFORNIA DEPARTMENT OF WATER RESOURCES
WELL COMPLETION REPORTS (DRILLER'S LOGS)
"AGRICULTURAL WELL" AND "DOMESTIC WELL"
SIGNORELLO ESTATE WINERY

AGRICULTURAL WELL

39-400-080

TRS 6-4-15
B-200-670

QUADRUPLICATE
Use to comply with local requirements

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

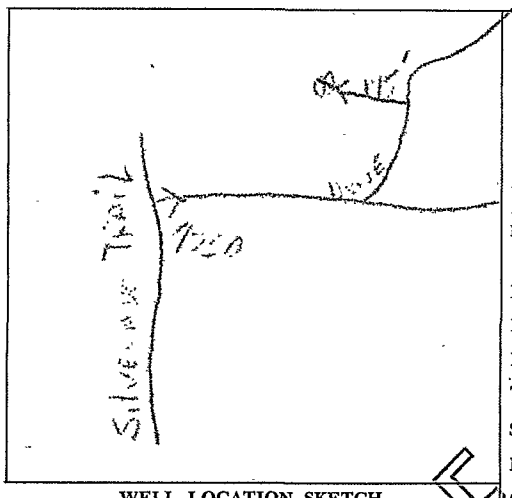
WATER WELL DRILLERS REPORT

Do not fill in
No. 103401

Notice of Intent No.
Local Permit No. or Date
State Well No.
Other Well No.

(1) OWNER:
Name [redacted]
Address [redacted]
City [redacted] Zip

(2) LOCATION OF WELL (See instructions): 39-040-49
County Napa Owner's Well Number 400
Well address if different from above Silverado Trail
Township Range Section
Distance from cities, roads, railroads, fences, etc.



WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well [X] Deepening [ ]
Reconstruction [ ]
Reconditioning [ ]
Horizontal Well [ ]
Destruction [ ] (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic [X]
Irrigation [ ]
Industrial [ ]
Test Well [ ]
Stock [ ]
Municipal [ ]
Other [ ]

(5) EQUIPMENT:
Rotary [ ] Reverse [ ]
Cable [ ] Air [X]
Other [ ] Bucket [ ]

(6) GRAVEL PACK:
Yes [X] No [ ] Size Pea Gravel
Diameter of bore 13
Packed from 25 to ft.

(7) CASING INSTALLED:
Steel [X] Plastic [ ] Concrete [ ]

From ft.	To ft.	Dia. in.	Gage or Wall
0	309	8	188

(8) PERFORATIONS: machine
Type of perforation or size of screen

From ft.	To ft.	Slot size
309	670	1x8x3

(9) WELL SEAL:
Was surface sanitary seal provided? Yes [X] No [ ] If yes, to depth 25 ft.
Were strata sealed against pollution? Yes [ ] No [X] Interval ft.
Method of sealing grout

(10) WATER LEVELS:
Depth of first water, if known 150 ft.
Standing level after well completion 85 ft.

(11) WELL TESTS:
Was well test made? Yes [X] No [ ] If yes, by whom? Driller
Type of test Pump [ ] Bailer [ ] Air lift [X]
Depth to water at start of test 85 ft. At end of test ft
Discharge 200 gal/min after hours Water temperature
Chemical analysis made? Yes [ ] No [X] If yes, by whom?
Was electric log made? Yes [ ] No [X] If yes, attach copy to this report

(12) WELL LOG:
Total depth 670 ft. Depth of completed well 670 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	25	black red green brown rock-sft
25	75	black green brown rock-medhrd
75	100	red black rock hard
100	125	red black brown rock hard
125	150	black gray white rock med hd
150	175	gray red brown rock med hard
175	250	brown red green str. wh rock med hard
250	275	red brown green rock med hard
275	300	green brown gray rock hard
300	400	black green brown rock str. red rock-med hard
400	500	black green gray rock str. red rock med hard
500	550	green gray rock fract
550	600	red green gray & brown rock hard
600	670	red green black yellow rock hard

RECEIVED
NOV 14 1979
DIVISION OF ENVIRONMENTAL HEALTH

Work started 9/20 19 79 Completed 10/2 19 79

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED (Well Driller)

NAME Doshier-Gregson Drilling, Inc. (Person, firm, or corporation) (Typed or printed)
Address 5365 Napa-Vallejo Hwy
City Vallejo, Ca Zip 94590
License No. 294001 Date of this report 10/5/79

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

DOMESTIC WELL

ORIGINAL
File with DWR

Page 1 of 1

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. e03272609

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

Owner's Well No. 1-2019
Date Work Began 5/30/2019, Ended 6/16/2019
Local Permit Agency Napa County Environmental Mgmt
Permit No. E18-00711 Permit Date 9/20/2018

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL — HORIZONTAL — ANGLE — (SPECIFY)
DRILLING METHOD ROTARY FLUID AIR

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain, size, color, etc.*
0	10	FRACTURED GREEN, GRAY VOLCANIC ROCK
10	20	SOFT RED VOLCANIC ROCK
20	40	SOFT GRAY, YELLOW VOLCANIC ROCK
40	85	RED, GRAY, YELLOW VOLCANIC ROCK
85	140	FRACTURED GRAY VOLCANIC ROCK
140	170	RED, GRAY, YELLOW VOLCANIC ROCK
170	190	SOFT RED, TAN VOLCANIC ROCK
190	220	SOFT BROWN VOLCANIC ROCK
220	260	GRAY VOLCANIC ROCK
260	280	HARD BLACK VOLCANIC ROCK
280	300	BLACK, GRAY VOLCANIC ROCK
300	340	BLACK, RED VOLCANIC ROCK
340	420	BLACK, GRAY VOLCANIC ROCK
420	455	GRAY VOLCANIC ROCK
455	460	SOFT RED VOLCANIC ROCK
460	500	GRAY VOLCANIC ROCK
500	510	GRAY, RED VOLCANIC MIX
510	520	GRAY VOLCANIC ROCK
520	540	RED VOLCANIC ROCK
540	555	GRAY, TAN VOLCANIC MIX
555	580	HARD BLACK VOLCANIC ROCK
580	600	GRAY VOLCANIC ROCK
		CONTINUED CASING LAYOUT
380	400	BLANK PVC 8"
400	500	SCREEN PVC 8" .032 SLOT
500	520	BLANK PVC 8"
520	580	SCREEN PVC 8" .032 SLOT
580	600	BLANK PVC 8"

TOTAL DEPTH OF BORING 600 (Feet)
TOTAL DEPTH OF COMPLETED WELL 600 (Feet)

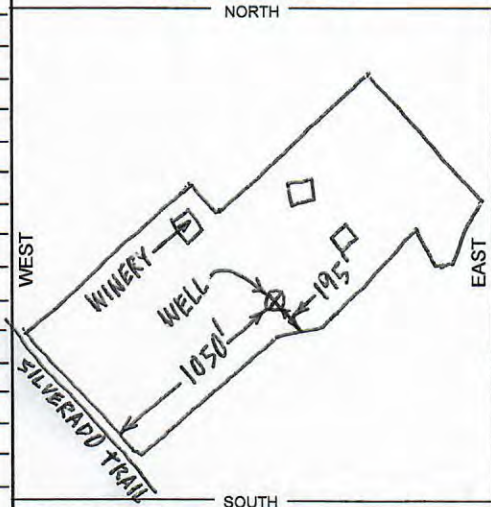
WELL OWNER

Name Signorello Estate
Mailing Address 4500 Silverado Trail
Napa CA 94558
CITY STATE ZIP

WELL LOCATION

Address 4500 Silverado Trail
City Napa CA
County Napa
APN Book 039 Page 400 Parcel 080
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 95 (Ft.) BELOW SURFACE 1
DEPTH OF STATIC WATER LEVEL 67 (Ft.) & DATE MEASURED 6/14/2019
ESTIMATED YIELD * 200 (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	60	15								
60	600	12								
0	100		✓				PVC F480	8	SDR-21	
100	240			✓			PVC F480	8	SDR-21	.032
240	260		✓				PVC F480	8	SDR-21	
260	380			✓			PVC F480	8	SDR-21	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	60	✓			10 SK SAND
60	600			✓	#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] 07/20/19 439-746
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

BkF 100+ YEARS
ENGINEERS . SURVEYORS . PLANNERS

JOB NO. 20179199-10

USE PERMIT WATER SYSTEM FEASIBILITY REPORT

FOR

SIGNORELLO ESTATE WINERY

4500 SILVERADO TRAIL

COUNTY OF NAPA, CALIFORNIA

APN 039-400-080

JULY 2020

Rebecca Dower, P.E.
NO. C-80868

200 Fourth Street, Suite 300, Santa Rosa, CA 95401 | 707.583.8500

VICINITY MAP
NOT TO SCALE

Introduction

Signorello Estate Winery has applied for a Major Modification Use Permit to increase production capability and rebuild after the winery was destroyed by the 2017 Atlas wildfire. This report analyzes the feasibility of a new transient non-community water system for the Signorello Estate Winery at 4500 Silverado Trail, Napa, California. The Assessor's Parcel Number is 039-400-080.

The Use Permit application under review proposes the following:

- Production Capacity
    - 50,000 gallon/year production capacity
- Visitation and Operation
    - 60 Maximum daily tours/tastings visitation
    - 350 Maximum weekly tours/tastings visitation
    - 4 Food and Wine Parings per month
        - Half with 24 persons attending
        - Half with 40 persons attending
    - 3 Wine Release/Wine Club Events per year with up to 75 persons attending each
    - 2 Auction Related Events per year with up to 125 persons attending each
        - Portable bathroom facilities, no separate tours or tastings

Since it is expected there will be more than 24 visitors for 60 or more days of the year, a Transient Non-Community Public Water System is required.

An existing well on-site (associated with Domestic Water Supply Permit #46-1943) has a 25' annular seal and does not meet current requirements for a public water system. Therefore it will be repurposed to supply the fire water and agricultural irrigation storage tank, and will not be part of the public water system. For the purposes of this report, this older well will be referred to as "Agricultural Well."

Water System Name

The public water system will be named "Signorello Estate Winery Water System".

Name of Person Who Prepared This Report

This report was prepared by Rebecca Dower, PE of BKF Engineers. Use Permit information and supporting documents were obtained from county records.

Technical Capacity

System Description

A new well, identified as "Domestic Well" for the purposes of this report, has been constructed and was permitted September 20, 2018 under County Permit # E18-00711. The well permit is included in **Appendix A**. This well will serve as the sole source of water for the system, which will supply both domestic and process facilities. Based on preliminary design, treatment is expected to consist of the following:

- Domestic Water
    - 5 Micron Sediment Filtration
    - Ion Exchange Softener
    - Reverse Osmosis and Remineralization
- Process Water
    - 5 Micron Sediment Filtration
    - Ion Exchange Softener

Following treatment, domestic water and process water will be stored in two separate 10,000 gal storage tanks. Process water will supply the fermentation building, caves, and hose bibs away from the residence. Domestic water will supply the residence, winery, office/hospitality, caves, and pool. If necessary based on testing, UV disinfection will provide additional treatment for both the process and domestic systems downstream of the storage tanks.

Water Demand Projection

Proposed demands for Domestic Well are as follows:

- Residential groundwater demand = 0.99 AF/yr
- Landscape irrigation and pool groundwater demand = 0.95 AF/yr
- Winery process water and domestic groundwater demand = 1.07 AF/yr
- Commercial Kitchen groundwater demand = 0.81 AF/yr

The total proposed water use for the Domestic Well is estimated to be 3.82 AF/yr, with an average daily water use of 3,410 gallons. Using a peaking factor of 2.25 (in accordance with the California Waterworks Standard 64554.b.3.c), the maximum daily demand (MDD) is estimated to be 7,672 gallons. With a domestic water storage tank of 10,000 gallons, and a process water storage tank of 10,000 gallons, the proposed storage capacity exceeds the MDD.

Source Adequacy

As noted in the Well Permit and Well Completion Report located in **Appendix B** of this document, the well has a 50 foot concrete seal with an 8 inch casing, and a total depth of 600 feet.

Water Supply Capacity

Since the Domestic Well is located approximately 300 feet from the Agricultural Well, it can be expected that the wells will have similar pumping rates. The Agricultural Well has historically yielded 118 to 200 gallons per minute. It is expected that the new Domestic Well will have similar capacity. The Water Availability Analysis (WAA) performed by Richard Slade & Associates, and included in **Appendix C** of this document, further describes capacity estimates. According to the WAA, it is estimated that the annual total groundwater demand is approximately 3% of the groundwater stored in the volcanic rocks beneath the property.

Water Quality Characteristics

The Agricultural Well has historically supplied domestic water using treatment which is similar to the treatment proposed for the Domestic Well. Prior to final design and construction of the treatment system, comprehensive water quality testing will be performed to ensure the proposed treatment system will reduce all contaminants to levels below those required. Therefore it is feasible the Domestic Well treatment will meet the requirements.

Consolidation Feasibility

Two systems are located within 3 miles of the property:

1. Mondavi Farm Worker Center
2. City of Napa

Based on correspondence with the Napa County Local Agency Formation Commission, it is not feasible to connect to either of these existing systems due to the fact that the Signorello Estate is outside the jurisdictional boundaries and spheres of influence of all government agencies in Napa County that are authorized to provide public water service. A copy of the correspondence is included in **Appendix D**.

Managerial

The routine maintenance and operation of the water system will be managed by on-site winery staff. Water sampling and testing will be contracted via an outside company to meet the testing requirements of the County of Napa Environmental Health Department. The owner plans to have a single company design, build, and provide maintenance as needed in order to minimize costs and labor.

The well, treatment system, and storage tanks are to be located on the same property as the residence and winery it serves. The property owner is Signorello Estate Winery, and the groundwater is from a non-adjudicated groundwater basin and is not subject to water rights through the State Water Resources Control Board.

Financial

The water system will not generate revenue and will be financed with the construction of the new winery. The startup cost includes the drilled well, controls, pump, storage tank, treatment equipment, meter, and distribution valves. These costs are estimated to be approximately $218,000. Annual operating costs are expected to be between $25,000 and $30,000. A Capital Improvement Plan and Five Year Budget Projection spreadsheet are included in **Appendix E**.

APPENDICES

APPENDIX A: Well Permit

APPENDIX B: Well Completion Report

APPENDIX C: Water Availability Analysis by Richard C. Slade & Associates

APPENDIX D: Consolidation Correspondence with LAFCO

APPENDIX E: Capital Improvement Plan and 5 Year Budget Spreadsheets

APPENDIX A: WELL PERMIT

Planning, Building & Environmental Services

1195 Third Street, 2nd Floor
Napa CA 94559
www.countyofnapa.org
Main: (707) 253-4417

David Morrison
Director

A Tradition of Stewardship
A Commitment to Service

JOB SET

WELL PERMIT

Planning, Building & Environmental Services - Environmental Health Division

Record Number: E18-00711
Parcel Number: 039-400-080-000

Submittal Date: 9/11/2018
Issued Date: 9/20/2018
Expiration Date: 9/17/2020

Application Type: Environmental / Online / Water Wells / Class I
Site Address: 4500 Silverado Trl, Napa
Contact: Don Huckfeldt **Owner:** RES INC ETAL

WELL CONSTRUCTION

Proposed use:	Public		
To serve this parcel only?	Yes	If No, list other APN(s):	
Is this a replacement well?	No	Replacement reason:	

Additional Comments:

Setbacks

Setbacks Met? Yes

Sewer Line:	100.00 ft	Septic Tank:	100.00 ft	Disposal Field:	850.00 ft

Additional Comments:

Well Specifications

Casing Diameter:	8.00 in	Boring Diameter:	15.00 in	Annular Seal:	3.50 in
Sealing Method:	Tremie Pipe/Pump	Min. Seal Depth:	50 ft or first impervious layer, whichever is greater		
Sealing Material:	Concrete	Other Material:			

Additional Comments:

TO PERMITEE:

By executing this application, the applicant agrees to comply with all conditions, inspections and comments of the issued permit and all federal, state and county code requirements applicable to this permit.

Issued By:

Staff Signature  Date: 09/20/2018

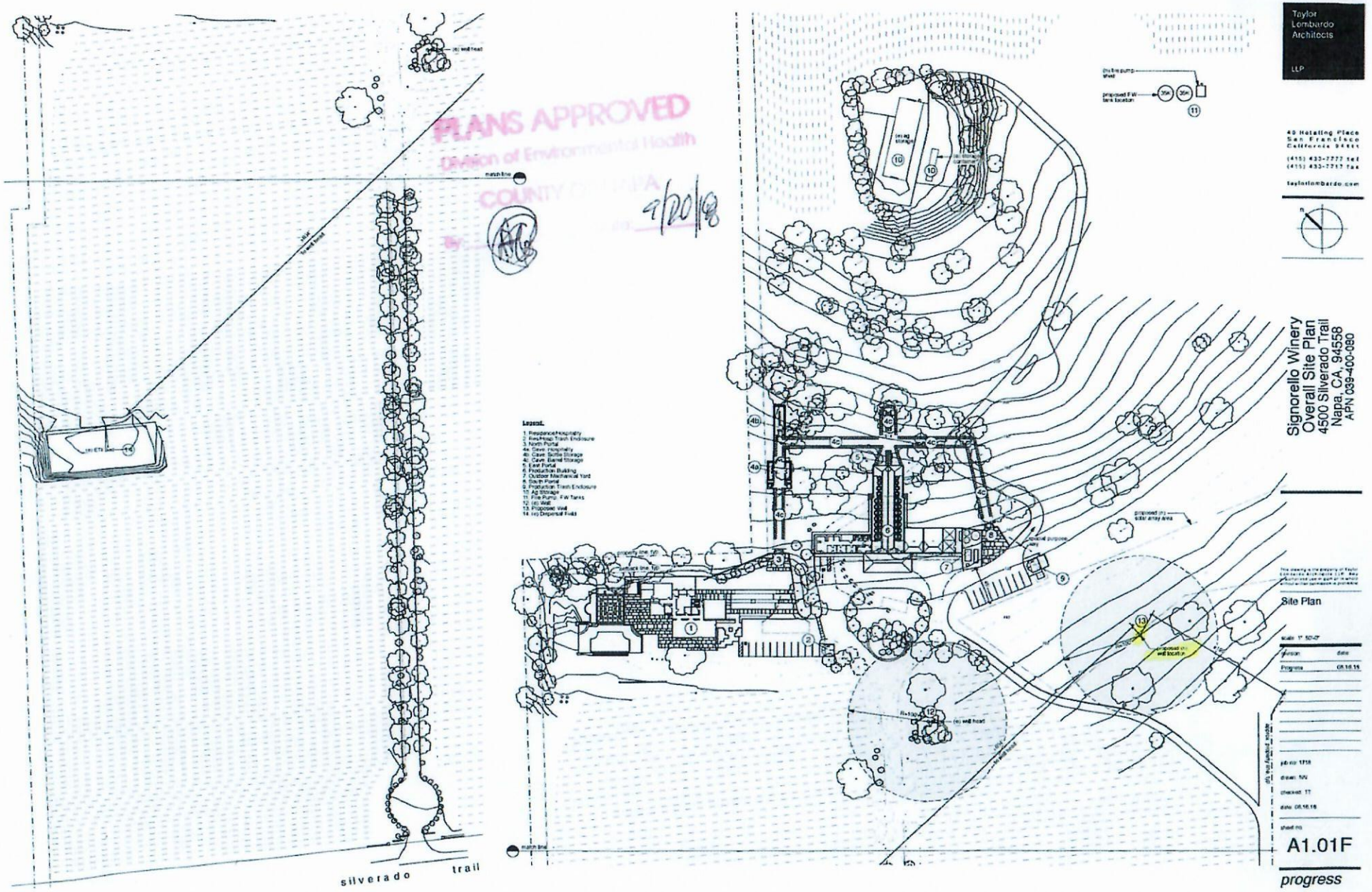

PLANS APPROVED
Division of Environmental Health
COUNTY OF NAPA
By
9/20/18
silverado trail
Taylor Lombardo Architects LLP
Signorello Winery
Overall Site Plan
4500 Silverado Trail
Napa, CA, 94558
APN 039-400-080
Site Plan
A1.01F
progress

Table 1
Summary of Well Construction and Yield Data
Signorello Estate Winery

WELL CONSTRUCTION DETAILS

Reported Well Designation	DWR Well Log No.	Date Drilled	Method of Drilling	Pilot Hole Depth (ft bgs)	Casing Depth (ft bgs)	Casing Type	Casing Diameter (in)	Borehole Diameter (in)	Sanitary Seal Depth (ft bgs)	Perforation Intervals (ft bgs)	Type and Size (in) of Perforations	Gravel Pack Interval (ft) and Size
Agricultural Well	103401	October 1979	Direct Air Rotary	670	670	Steel	8	13	0-25 (cement)	309-670	Mill-slotted 0.125	25-670 Pea Gravel
Domestic Well	e03272609	June 2019	Direct Air Rotary	600	600	PVC	6	12	0-60 (cement)	100-240 260-380 400-500 520-580	Factory-Cut 0.032	60-600 No. 6 Sand

POST-CONSTRUCITON YIELD DATA

Reported Well Designation	Date & Type of Yield Data	Duration of "Test" (hrs)	Estimated Flow Rate (gpm)	Static Water Level (ft)	Pumping Water Level (ft)	Estimated Specific Capaity (gpm/ft ddn)
Agricultural Well	October 1979 Airlift	ND	200	85	ND	ND
	7/11/19 Pump	4	118	ND	ND	ND
Domestic Well	6/14/19 Airlift	2	200	95	ND	ND

Notes:
ND = No data or not listed
ft bgs = feet below ground surface
in = inches
hrs = hours
gpm = gallons per minute
gpm/ft ddn = gallons per minute per foot of water level drawdown

Table 2
Comparison of Rainfall Data Sources
Signorello Estate Winery

Rain Gage and/or Data Source	Years of Available Rainfall Record	Average Annual Rainfall in Inches (ft)	Elevation of Rain Gage (ft asl)	Approximate Distance of Rain Gage from Subject Property (miles)	Elevation Relative to Subject Property[1]
WRCC Napa State Hospital	1893 through September 2019[2]	24.7 (2.1)	60	6.0	Lower
Napa OneRain Napa River at Yountville Cross Rd	WY 2000-01 through WY 2018-19[3]	30.5 (2.5)	95	4.5	Similar
PRISM	1981 to 2010	27.5 (2.3)	---	---	---
Napa County Isohyetal Map	1900 to 1960	27.5 (2.3)	---	---	---

Notes:

1. The subject property is located at elevations between ±60 and ±260 ft asl
2. Missing rainfall data in: 1897 to 1902; and 1915 to 1916.
3. Erroneous and/or missing rainfall data in: WY 1987-88; WY 1994-95; WY 1995-96; WY 2004-05; and WY 2006-07.

Table 3
Drought Period Rainfall as Percentage of Average

Statewide Drought Period as Defined by DWR/NDMC	Drought Duration (years)	Average Rainfall by Raingage					
		Napa State Hospital WRCC Period of Record - 1893 through September 2019			Napa River at Yountville Cross Road Napa OneRain Period of Record - WY 2000-01 to WY 2018-19		
		[A] Total Gage Average (in)	[B] Drought Period Average (in)	[B/A] Drought Period Rainfall as % of Average	[E] Total Gage Average (in)	[F] Drought Period Average (in)	[F/E] Drought Period Rainfall as % of Average
WY 1928-29 to WY 1933-34	6	24.7	17.3	70%	ND	ND	ND
WY 1975-76 to WY 1976-77	2	24.7	11.8	48%	ND	ND	ND
WY 1986-87 to WY 1991-92	6	24.7	18.5	75%	ND	ND	ND
WY 2006-07 to WY 2008-09	3	24.7	18.8	76%	30.5	22.1	72%
WY 2011-12 to WY 2015-16	5	24.7	21.0	85%	30.5	23.6	77%

Notes:

ND = No rainfall data for corresponding drought period.

APPENDIX D:
CONSOLIDATION CORRESPONDENCE WITH LAFCO

James Peterson

From: Freeman, Brendon <bfreeman@napa.lafco.ca.gov>
Sent: Thursday, July 16, 2020 3:22 PM
To: James Peterson
Subject: RE: Water Service at 4500 Silverado Trail, Napa County

Good afternoon James,

I am confirming 4500 Silverado Trail, Napa County, CA (APN 039-400-080) is located outside the jurisdictional boundaries and spheres of influence of all government agencies in Napa County that are authorized to provide public water service. The property is located approximately 8,500 feet away from the City of Napa, which is the nearest public water provider.

Under California Government Code Section 56133, the City is prohibited from providing new or extended water service to the subject property under state law unless there is a documented threat to public health or safety involving existing facilities on the property.

With this in mind, there are no public water service options available to 4500 Silverado Trail. Please let me know if you have any questions.

Thank you,

Brendon Freeman, Executive Officer
Local Agency Formation Commission of Napa County
1030 Seminary Street, Suite B
Napa, California 94559
Office: (707) 259-8645
Mobile: (707) 363-1783
www.napa.lafco.ca.gov
Like Us

Please note the LAFCO office is closed to the public until further notice in response to the COVID-19 pandemic. Staff is working remotely from home during this time. If an in-person appointment is necessary, please coordinate with LAFCO staff to meet at a set time with appropriate physical distancing.

From: James Peterson <jpeterson@bkf.com>
Sent: Thursday, July 16, 2020 11:12 AM
To: Freeman, Brendon <bfreeman@napa.lafco.ca.gov>
Subject: Water Service at 4500 Silverado Trail, Napa County

[External Email - Use Caution]

Hello Brendon,

We are working with a client to propose a non-community transient water system at 4500 Silverado Trail, Napa County, CA. The APN is 039-400-080. Per Napa County and state requirements, we must evaluate whether it is feasible to consolidate with another public system.

Please let me know if you can provide information to satisfy this requirement.

Thank you,
JAMES PETERSON
Project Engineer
BKF ENGINEERS Delivering Inspired Infrastructure
150 California Street, Suite 600, San Francisco, CA 94111
d 707.583.8534 jpeterson@bkf.com BKF.com

We all need to do our part to reduce the spread of COVID-19 in our communities. Our top priority at BKF is the health and safety of our staff and we have successfully transitioned all of our employees to a remote work environment. Additionally, our robust infrastructure allows us to keep our projects moving forward and to continue being responsive to our work, our deadlines, and our clients.
We remain available to you via email, phone, and virtual meetings during our normal business hours.

APPENDIX E:
CAPITAL IMPROVEMENT PLAN AND 5 YEAR BUDGET SPREADSHEETS

SIMPLIFIED CAPITAL IMPROVEMENT PLAN

Date: 7/17/2020

System ID No.: TBD

System Name: Signorello Winery

Service Connections: 1

*Enter information only in shaded cells

QTY	COMPONENT		UNIT COST	INSTALLED COST	AVG LIFE, YEARS	ANNUAL RESERVE	MONTHLY RESERVE	MONTHLY RESERVE PER CUSTOMER
0	Drilled Well, 6", steel casing	Depth:	80	0	25	0.00	0.00	0.00
1	Drilled Well, 8", steel casing	Depth: 600	156.75	94050	25	3762.00	313.50	313.50
0	Drilled Well, 12", steel casing	Depth:	200	0	25	0.00	0.00	0.00
1	Wellhead Electrical Controls		700	700	25	28.00	2.33	2.33
0	Submersible Pump, 20 HP (1 standby spare)		9000	0	7	0.00	0.00	0.00
0	Submersible Pump, 3 HP		2000	0	7	0.00	0.00	0.00
1	Submersible Pump, 5 HP		3500	15500	7	2214.29	184.52	184.52
2	Booster Pump Station, 2.5 HP, complete		14000	16975	5	3395.00	282.92	282.92
2	Booster Pump Station Electrical Controls		700	1400	5	280.00	23.33	23.33
0	Pressure Tank	Gallons:	1.5	0	10	0.00	0.00	0.00
0	Pressure Tank	Gallons:	1.5	0	10	0.00	0.00	0.00
0	Storage Tank, Plastic	Gallons:	0.5	0	10	0.00	0.00	0.00
0	Storage Tank, Redwood	Gallons:	1.3	0	40	0.00	0.00	0.00
0	Storage Tank, Redwood	Gallons:	1.3	0	40	0.00	0.00	0.00
0	Storage Tank, Steel	Gallons:	1.2	0	50	0.00	0.00	0.00
0	Storage Tank, Steel	Gallons:	1.2	0	50	0.00	0.00	0.00
0	Storage Tank, Steel	Gallons:	1.2	0	50	0.00	0.00	0.00
2	Storage Tank, Concrete	Gallons: 10,500 EA	1.5	27100	80	338.75	28.23	28.23
0	Master Meter, 2"		450	0	10	0.00	0.00	0.00
0	Master Meter, 3"		800	0	10	0.00	0.00	0.00
0	Master Meter, 4"		2500	0	10	0.00	0.00	0.00
1	Water Treatment Equipment		800	36370	10	3637.00	303.08	303.08
0	Pipe w/ sand bedding, 1" (Enter linear feet for quantity)		30	0	50	0.00	0.00	0.00
0	Pipe w/ sand bedding, 2" (Enter linear feet for quantity)		35	0	50	0.00	0.00	0.00
0	Pipe w/ sand bedding, 3" (Enter linear feet for quantity)		40	0	50	0.00	0.00	0.00
480	Pipe w/ sand bedding, 4" (Enter linear feet for quantity)		45	21600	50	432.00	36.00	36.00
0	Pipe w/ sand bedding, 6" (Enter linear feet for quantity)		60	0	50	0.00	0.00	0.00
0	Standpipe Hydrant, 1-1/2"		700	0	20	0.00	0.00	0.00
0	Standpipe Hydrant, 6"		900	0	20	0.00	0.00	0.00
3	Customer Meter w/ Box & Shutoff, Complete		250	750	20	37.50	3.13	3.13
0	Distribution Valve, 2"		150	0	10	0.00	0.00	0.00
0	Distribution Valve, 3"		250	0	10	0.00	0.00	0.00
6	Distribution Valve, 4"		375	2250	20	112.50	9.38	9.38
0	Distribution Valve, 6"		600	0	20	0.00	0.00	0.00
3	Air & Vacuum Relief Valve, Typical		375	1125	20	56.25	4.69	4.69
	TOTALS:			$217,820.00		$14,237.04	$1,186.42	$1,186.42

NOTE: Installed costs are averages, and include all materials and contracted labor and equipment.

FIVE YEAR BUDGET PROJECTION

Non-community Water System

INFLATION FACTOR (%) - 2.5

System Name: Signorello Winery

PWS I.D. Number:

LINE	EXPENSES		Current Year	Year 2	Year 3	Year 4	Year 5
1	OPERATIONS & MAINTENANCE						
2		Salaries and benefits	1200.00	1230.00	1260.75	1292.27	1324.58
3		Contract operation and maintenance	5500.00	5637.50	5778.44	5922.90	6070.97
4		Power and other utilities	2500.00	2562.50	2626.56	2692.23	2759.53
5		Fees	600.00	615.00	630.38	646.13	662.29
6		Treatment chemicals	100.00	102.50	105.06	107.69	110.38
7		Coliform monitoring	250.00	256.25	262.66	269.22	275.95
8		Chemical monitoring	50.00	51.25	52.53	53.84	55.19
9		Transportation	0.00	0.00	0.00	0.00	0.00
10		Materials, supplies, and parts	500.00	512.50	525.31	538.45	551.91
11		Miscellaneous	250.00	256.25	262.66	269.22	275.95
12				0.00	0.00	0.00	0.00
13				0.00	0.00	0.00	0.00
14		Total Operation and Maintenance	$10,950.00	$11,223.75	$11,504.34	$11,791.95	$12,086.75
15							
16	GENERAL & ADMINISTRATIVE						
17		Engineering and professional services	700.00	717.50	735.44	753.82	772.67
18		Depreciation and amortization	0.00	0.00	0.00	0.00	0.00
19		CIP Reserve (from Sheet 2, Column J Total)	14237.04	14592.96	14957.79	15331.73	15715.02
20		Insurance	0.00	0.00	0.00	0.00	0.00
21				0.00	0.00	0.00	0.00
22				0.00	0.00	0.00	0.00
23		Total General and Administrative	$14,937.04	$15,310.46	$15,693.22	$16,085.55	$16,487.69
24							
25	TOTAL EXPENSES		$25,887.04	$26,534.21	$27,197.57	$27,877.51	$28,574.44