



# NAPA VALLEY GROUNDWATER SUSTAINABILITY

A Basin Analysis Report for the  
Napa Valley Subbasin

APPENDICES E - L

Part 2 of 2

*FINAL DRAFT REPORT*



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**NAPA VALLEY  
GROUNDWATER  
SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

**APPENDIX E:**

**Napa County Groundwater-Surface  
Water Monitoring  
Facilities Project Report**



# Napa County Groundwater/Surface Water Monitoring Facilities Report

*California Department of Water Resources Local Groundwater  
Assistance Grant Program*

October, 2016



# **Napa County Groundwater-Surface Water Monitoring Facilities Project Report**

Prepared for  
Napa County

Prepared by



**October, 2016**

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

bgs	below ground surface
°C	degrees Celsius
cfs	cubic feet per second
ft	feet
meq/l	milliequivalents per liter
mg/l	milligrams per liter
µS/cm	microSiemens per centimeter
DWR	California Department of Water Resources
MCL	Maximum Contaminant Limit
NAD83	North American Datum of 1983
Napa RCD	Napa County Resource Conservation District
NAVD88	North American Vertical Datum of 1988
TOC	Top of Casing
USGS	U.S. Geological Survey
WCR	Well Completion Report
WICC	Watershed Information & Conservation Council of Napa County



## EXECUTIVE SUMMARY

In January of 2014 the County of Napa began implementation of a project to monitor interactions between groundwater and surface water resources in the Napa Valley Groundwater Subbasin. Funding for the project was provided by the California Department of Water Resources (DWR), through the Local Groundwater Assistance Grant Program, and the County of Napa. The project scope included monitoring facilities construction, data collection, and presentation of the results of initial data collection efforts.

Work completed for the grant took place from the first quarter of 2014 through the second quarter of 2016 and included the construction of five dual-completion monitoring wells adjacent to the Napa River and Dry Creek in the Napa Valley Groundwater Subbasin (**Figure 1.1**). Prior to construction of the monitoring facilities, hydrologic and geologic data were compiled and evaluated for each site in order to inform the monitoring well design. Monitoring well construction and development occurred in September and October of 2014. Data collection at the sites began in October of 2014 with manual groundwater level measurements followed by the installation of continuously recording transducers in December 2014 through July 2015.

Data were regularly downloaded from project transducers in 2015 and 2016, with transducers recalibrated and serviced as needed. Project data were reviewed for quality control purposes and incorporated into an existing Napa County Data Management System. Data analysis occurred as the data were collected to track groundwater-surface water interactions and at the end of the grant period to more fully consider the data collected over the course of the project, through June 2016. Project outreach occurred through a variety of means, including presentations to the Napa County Watershed Information & Conservation Council (WICC), presentations to community groups around Napa Valley, and a field tour organized by the Sacramento-based Water Education Foundation.

The construction of dedicated monitoring facilities to track groundwater-surface water interactions in the Napa Valley Subbasin provides the County with an important source of data about these interconnected resources. Data collected in 2015 and 2016 show that shallow groundwater and surface waters were hydraulically connected throughout much of the winter and spring at the mainstem Napa River sites, and longer in some locations. The direction of flow indicated by monitoring data varied between gain stream (flow of groundwater into surface water) and losing stream (flow of surface water into the groundwater system) at most sites. The only site located on a tributary to the Napa River maintained losing stream conditions throughout 2015. Water year 2015 marked the fourth year of California's current statewide drought. Continued data collection in subsequent years will provide a more robust understanding of the range of conditions at these sites.

Implementation of groundwater-surface water monitoring in the Napa Valley Subbasin has already proven to be very valuable for improving the understanding of surface water and groundwater interactions. Similar facilities at additional locations would help further this understanding and aid in on-going efforts to sustainably manage the Napa Valley Subbasin. Additional monitoring will also be key to the objective of maintaining or improving streamflow during drier years and/or seasons. As a result, it is recommended that in coordination with the Napa RCD and others, as appropriate, the County:

- Evaluate stream gaging network objectives, particularly with respect to the water budget requirements contained in the recently finalized Groundwater Sustainability Plan regulations, and determine the need and feasibility of additional streamflow monitoring sites.
- Consider additional areas that may also benefit from nearby shallow nested groundwater monitoring wells (similar to the facilities constructed as part of the current project) to monitor groundwater/surface water interactions in areas where data are lacking or where geologic conditions indicate that conditions not adequately represented by the current monitoring network.
- Continue efforts to integrate data collected at the groundwater/surface water monitoring sites with existing remote data acquisition systems in order to facilitate monitoring aquifer conditions in real-time.

# 1 INTRODUCTION

This report describes the implementation of the Napa County Groundwater-Surface Water Monitoring Project, including monitoring facilities construction, data collection, and presentation of the results of initial data collection. Funding for the project was provided by the California Department of Water Resources (DWR) and the County of Napa. The project was developed to track groundwater-surface water interrelationships in the Napa Valley Groundwater Subbasin in order to inform local decision-making processes and advance sustainable groundwater management.

## 1.1 Project Background and Objectives

The 2013 Napa County Groundwater Monitoring Plan identifies five priority sites for monitoring of groundwater and surface water interactions (LSCE, 2013). All five sites are located within the Napa Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin, as described in DWR Bulletin 118 (**Figure 1.1**). The Napa Valley Subbasin is currently classified as a medium priority subbasin through the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. Of the five groundwater basins or subbasins in Napa County, the Napa Valley Subbasin experiences the highest overall demands on groundwater resources in Napa County and was the focus of the 2013 report, *Updated Hydrogeologic Conceptualization and Characterization of Conditions* (LSCE and MBK, 2013).

Project objectives emphasize the collection of data necessary to evaluate relationships between groundwater and surface water resources. Specifically, the project objectives include:

- Install dedicated shallow groundwater monitoring facilities and groundwater and surface water instrumentation to continuously record water levels and selected water quality parameters.
- Collect groundwater and surface water data to detect changes in groundwater levels and groundwater quality and corresponding surface water stage, flow, and quality conditions.
- Collect groundwater and surface water data to establish baseline conditions that will facilitate assessments of the potential effects due to future climate change.
- Collect data that will help identify mechanisms for and quantify exchanges of water between the groundwater aquifers and surface water resources, and response of the hydrologic system due to surface and groundwater use.
- Incorporate the proposed groundwater monitoring facilities in the countywide monitoring program and also in the Napa County CASGEM program as appropriate.
- Incorporate surface water monitoring (including temperature and electrical conductivity) in the streamflow network managed by the Napa County Flood Control and Water Conservation District (NCFCWCD).
- Collect groundwater and surface water data that will help formulate strategies to address targeted water resource problems and facilitate surface waterway restoration opportunities.

## Report Organization

This report summarizes the construction of dedicated monitoring facilities developed to track groundwater-surface water interrelationships in the Napa Valley Groundwater Subbasin. The report also presents the results of initial data collection at project facilities.

The report includes the following sections:

### Section 2. Monitoring Facilities Construction and Instrumentation

- Monitoring Facilities Locations
- Monitoring Wells As-Built Summaries

### Section 3. Hydrogeologic Site Characterization

- Geologic Cross Sections

### Section 4. Groundwater and Surface Water Conditions

- Water Level and Water Quality Data

### Section 5. Hydraulic Properties Analysis

- Groundwater-Surface Water Gradients and Statistical Comparisons
- Estimates of Groundwater-Surface Water Interaction

### Section 6. Summary and Recommendations

- Monitoring Network Maintenance
- Future Monitoring Efforts

## 2 MONITORING FACILITIES CONSTRUCTION AND INSTRUMENTATION

Project monitoring facilities include project-specific groundwater monitoring wells and a combination of project specific and pre-existing surface water monitoring facilities. Project sites are located in Napa Valley from the City of Napa to the City of St. Helena (**Figure 2.1**). Sites 1, 3, 4, and 5 are located along the Napa River. Site 2 is located on Dry Creek, a tributary to the Napa River that drains portions of the Coast Range Mountains west of the Town of Yountville.

### 2.1 Groundwater Monitoring Wells and Surface Water Monitoring Sites

Dual-completion, nested monitoring wells<sup>1</sup> were constructed in September 2014 at each site to allow for data collection at discrete depths within the alluvial aquifer system (**Figure 2.2**). The upper completions, referenced in this report as the shallow casing, are screened in shallow portions of the Napa Valley Groundwater Subbasin, including the uppermost zone of saturated aquifer materials encountered, to enable observation of the groundwater processes driving groundwater-surface water interaction. Lower completions at each site, referenced in this report as the deep casing, are screened in the best available aquifer materials located at a depth of about 100 feet below ground surface. The deeper casing completions enable monitoring of the alluvial aquifer units that well completion reports reviewed by LSCE indicate is the portion of the groundwater system in Napa Valley that is more commonly developed for beneficial uses (LSCE and MBK, 2013). Project monitoring wells were constructed with multiple bentonite seals to provide hydraulic separation between the shallow and deep casings to facilitate monitoring of vertical hydraulic gradients at each site.

**Table 2.1** summarizes the locations of the project monitoring wells. Shallow casing screen intervals range from 25 feet below ground surface (bgs) to 50 feet bgs. Deep casing screen intervals range from 70 feet bgs to 95 feet bgs. **Table 2.2** summarizes the locations of the project monitoring wells. Well Completion Reports for all monitoring wells are also included in **Appendix A**.

Project monitoring wells and surface water sites are instrumented with continuously recording water level and water quality transducers. The transducers are CT2X models manufactured by Instrumentation Northwest/Seametrics of Kent, Washington and Leveloger Edge models manufactured by Solinst of Georgetown, Ontario, Canada. Transducers are set to record at hourly intervals. Data downloads, regular maintenance, and field calibrations were performed at regular intervals throughout the project.

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<sup>1</sup> Nested monitoring wells consist of multiple casings installed within a single borehole. Independent casings are visible at the surface. This construction enables monitoring and sampling at different points within an aquifer system.

**Table 2.1 Monitoring Wells As-built Summary**

Site	Ground Surface Elevation (ft. NAVD88)	Shallow Screen Start (ft bgs)	Shallow Screen End (ft bgs)	Deep Screen Start (ft bgs)	Deep Screen End (ft bgs)
Site 1- Napa River at First Street	18.58	30	50	75	95
Site 2- Dry Creek at Washington Street	103.41	25	45	71	81
Site 3- Napa River at Oak Knoll Avenue	56.32	25	35	78	88
Site 4- Napa River at Yountville Cross Road	98.40	25	40	70	80
Site 5- Napa River at Pope Street	212.36	25	35	80	95

### 2.1.1 Site 1 - Napa River at First Street

Site 1 is located adjacent to the Napa River on a vacant lot owned by the Napa County Flood Control and Water Conservation District (**Figure 2.3**). Land uses in the vicinity are predominantly commercial/retail and residential. The monitoring well at this site was constructed with screen intervals at 30 feet bgs to 50 feet bgs and 75 feet bgs to 95 feet bgs, respectively (**Figures 2.4 and 2.5**). No pre-existing surface water gauging facilities are present at this site. A surface water monitoring transducer was installed for the project on the east side of the river channel immediately downstream of the 1<sup>st</sup> Street Bridge.

### 2.1.2 Site 2 – Dry Creek at Washington Street

Site 2 is adjacent to Dry Creek. The monitoring well at this site was constructed within the Napa County right-of-way on Washington Street (**Figure 2.6**). Land uses in the vicinity are predominantly agricultural and residential. The monitoring well at this site was constructed with screen intervals at 25 feet bgs to 45 feet bgs and 71 feet bgs to 81 feet bgs, respectively (**Figures 2.7 and 2.8**). The Napa County Resource Conservation District (Napa RCD) has an existing surface water stage and discharge gauging site at this location (Napa RCD Site ID: Dry Creek at Hwy 29). An additional surface water monitoring transducer was installed to monitor water quality parameters for the project in the stream channel adjacent to a railroad bridge footing.

### 2.1.3 Site 3 - Napa River at Oak Knoll Avenue

Site 3 is adjacent to the Napa River. The monitoring well at this site was constructed within the Napa County right-of-way on Oak Knoll Avenue (**Figure 2.9**). Land uses in the vicinity are predominantly agricultural. The monitoring well at this site was constructed with screen intervals at 25 feet bgs to 35 feet bgs and 78 feet bgs to 88 feet bgs, respectively (**Figures 2.10 and 2.11**). The U.S. Geological Survey

(USGS) has an existing surface water stage and discharge gauging site at this location (USGS Site ID: 11458000). An additional surface water monitoring transducer was installed to monitor water quality parameters for the project on the western side of the river channel adjacent an Oak Knoll Avenue bridge footing.

#### 2.1.4 Site 4 – Napa River at Yountville Cross Road

Site 4 is adjacent to the Napa River. The monitoring well at this site was constructed within the Napa County right-of-way on Yountville Cross Road (**Figure 2.12**). Land uses in the vicinity are predominantly agricultural. The monitoring well at this site was constructed with screen intervals at 25 feet bgs to 40 feet bgs and 70 feet bgs to 80 feet bgs, respectively (**Figures 2.13 and 2.14**). Napa County Resource Conservation District (Napa RCD) has an existing surface water stage gauging site at this location (Napa RCD Site ID: Napa River at Yountville Cross Rd). An additional surface water monitoring transducer was installed to monitor water quality parameters and surface water stage for the project on the eastern side of the river channel upstream of the Yountville Cross Road Bridge.

#### 2.1.5 Site 5 – Napa River at Pope Street

Site 5 is adjacent to the Napa River. The monitoring well at this site was constructed within a City of St. Helena park (**Figure 2.15**). Land uses in the vicinity are mixture of residential, agricultural, and commercial. A City of St. Helena irrigation well is present approximately 100 feet from the project monitoring well and is used for seasonal irrigation demands for municipal parks on both side of Pope Street at this site (J. Haller, personal communication, 2014). The monitoring well at this site was constructed with screen intervals at 25 feet bgs to 35 feet bgs and 80 feet bgs to 95 feet bgs, respectively (**Figures 2.16 and 2.17**). The U.S. Geological Survey (USGS) has an existing surface water stage and discharge gauging site at this location (USGS Site ID: 11456000). An additional surface water monitoring transducer was installed to monitor water quality parameters in the river channel upstream of the Pope Street Bridge.

**Table 2.2 Project Monitoring Facilities Locations**

Site	WellID	Easting	Northing	Reference Point Elevation (ft, NAVD88)	Easting/Northing Coordinate System	RPE Description
Site 1 Napa River at First Street	NapaCounty-214s-swgw1	6481766.104	1871996.470	20.12	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-215d-swgw1	6481765.835	1871996.349	20.07	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-swgw-1	6481679.575	1872053.093	-0.70	NAD83 StatePlane California II	About 2 inches from bottom of slanted 1-inch diameter pipe (normal transducer location)
Site 2 Dry Creek at Washington Street	NapaCounty-216s-swgw2	6464900.944	1894991.705	103.10	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-217d-swgw2	6464900.778	1894991.734	103.08	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-swgw-2	<i>6464737.707</i>	<i>1894929.658</i>	86.48	NAD83 StatePlane California II	Bolt at bottom of vertical 1-inch pipe with transducer
Site 3 Napa River at Oak Knoll Avenue	NapaCounty-218s-swgw3	<i>6474230.877</i>	<i>1895714.71</i>	56.12	NAD83 StatePlane California II	North side of top of casing, approx. (TOC)
	NapaCounty-219d-swgw3	<i>6474230.877</i>	<i>1895714.71</i>	56.14	NAD83 StatePlane California II	North side of top of casing, approx. (TOC)
	NapaCounty-swgw-3	<i>6474657.005</i>	<i>1895984.265</i>	30.02	NAD83 StatePlane California II	Riverbed elevation at transducer site
Site 4 Napa River at Yountville Cross Road	NapaCounty-220s-swgw4	6460605.516	1914091.523	98.22	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-221d-swgw4	6460605.169	1914091.530	98.28	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-swgw-4	<i>6460833.732</i>	<i>1914345.444</i>	75.30	NAD83 StatePlane California II	Bolt at bottom of vertical 1-inch pipe with transducer
Site 5 Napa River at Pope Street	NapaCounty-222s-swgw5	<i>6431064.168</i>	<i>1948207.919</i>	217.07	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-223d-swgw5	<i>6431064.168</i>	<i>1948207.919</i>	217.10	NAD83 StatePlane California II	North side of top of casing (TOC)
	NapaCounty-swgw-5	<i>6431196.072</i>	<i>1948347.598</i>	191.01	NAD83 StatePlane California II	Riverbed elevation at transducer site
Note: Location data are based on a survey conducted on 9/25/2015 with a Topcon GRS-1 RTK Rover and Zeiss Ni2 Level. Horizontal coordinates in italics were calculated using GIS software here survey data were unavailable.						



### 3 HYDROGEOLOGIC SITE CHARACTERIZATION

The Napa River flows southeastward and southward out of the Coast Range, through Napa Valley and lowland marshes before entering San Pablo Bay at American Canyon (**Figure 1.1**). The Napa Valley Groundwater Subbasin (Subbasin) underlies much of Napa Valley from a southern boundary near the Highway 12/29 Bridge over the Napa River northward for approximately 30 miles to the head of Napa Valley upstream of Calistoga. The Subbasin extends laterally within Napa Valley to the extent of surficial alluvial deposits that are contiguous with the main valley floor.

The *Updated Hydrogeologic Conceptualization and Characterization of Conditions* report (LSCE and MBK, 2013) describes the geologic units and hydrogeology of Napa Valley in greater detail and provides a basis for the site characterizations presented in this report. Napa County's Groundwater-Surface Water monitoring sites are generally located within the fluvial facies of the Napa Valley Floor Quaternary alluvium:

“The fluvial facies consists of a thin narrow band of stream channel sands and gravels deposited by the Napa River. The sand and gravel beds tend to be thicker and/or more numerous in the fluvial facies area. They are interbedded with finer-grained clay beds of probable floodplain origin.” (LSCE and MBK, 2013)

Geologic cross section prepared for this report are consistent with those presented in the *Updated Hydrogeologic Conceptualization and Characterization of Conditions* report in that they present the lithologic descriptions provided by well drillers for wells along the cross section and delineate major geologic formations based on the information from individual wells and the larger hydrogeologic conceptualization. **Figure 3.1** lists the major surficial geologic deposits and rock types in Napa Valley, according to relative time of formation.

The cross sections presented in this report are focused on the areas near to the project sites, rather than spanning the entirety of the Napa Valley Floor, to support the interpretation of project data. **Figure 3.2** shows the location of the project cross sections relative to the location of geologic cross sections developed for the *Updated Hydrogeologic Conceptualization and Characterization of Conditions* report, which provides a more thorough evaluation of Napa Valley hydrogeology (LSCE and MBK, 2013).

#### 3.1 Site 1 – Napa River at First Street

Site 1 is located near the eastern margin of the Napa Valley Floor. USGS surficial geologic mapping indicates that the alluvium at the site consists of younger alluvium (Qhay) with terrace deposits (Qht) also in the vicinity (Graymer et al. 2007). Four Well Completion Reports (WCRs) used for cross section preparation at this site indicate the following (**Figure 3.3**):

- Quaternary alluvium (Qa) thicknesses range from approximate 50 feet bgs east of Site 1 to approximate 200 feet bgs west of the project site.
- WCRs for a shallow monitoring well drilled nearest to the proposed monitoring well site indicates an alluvium largely composed of sandy silt and silty sand, with sand and gravel units beginning at 19 feet to 25 feet bgs. The WRC for well 05N04W02N-01, a 560-foot boring

approximately 800 feet west of the project site, records two coarse-grained units beginning at 20 feet bgs and continuing to 70 feet bgs. The project monitoring well encountered similar materials from 29 feet bgs to 52 feet bgs.

- The lithologic log for well 05N04W02N-01 (approximately 800 feet west of the project site) records a transition from alluvial deposits to volcanic deposits at a depth of about 220 feet. Construction records for 05N04W02L-80b and 05N04W02L to the east of the project site indicate a more shallow contact with volcanic rock at depths of less than 100 feet. This offset is interpreted to occur in part due to displacement by the East Napa Fault Zone (LSCE and MBK, 2013).

### 3.2 Site 2 – Dry Creek at Washington Street

Site 2 is located near the western margin of the Napa Valley Floor. The cross section at this site is oriented north-south, which is generally parallel to the Napa Valley axis in this area. An alluvium thickness of approximately 100 feet occurs along the cross section at Site 2 (**Figure 3.4**). LSCE and MBK (2013) note the occurrence of alluvial fan deposits in the vicinity of this site. USGS surficial geologic mapping indicates that the alluvium at the site consists of younger alluvium (Qhay), which borders Dry Creek as it traverses the Napa Valley Floor (Graymer et al. 2007). Sub-alluvium mapping indicates that the alluvium is underlain by Sonoma Volcanics sedimentary rocks (Tss/h), which overlie a tuffaceous formation (Tsvt).

Four WCRs were identified in the vicinity of Site 2, among these was a well drilled within 500 feet of the project monitoring well site. Information in the WCRs includes:

- Quaternary alluvium (Qa) thickness ranges from 90 feet to 130 feet below ground surface.
- WCRs for two wells drilled nearest to the proposed monitoring well site, 06N04W18j1-71 and 06N04W18h-03, indicate an alluvium largely composed of sandy clay, with interbedded gravels or sands.

### 3.3 Site 3 – Napa River at Oak Knoll Avenue

Site 3 is located near the eastern margin of the Napa Valley Floor. **Figure 3.5** shows the alluvium increasing in thickness from the valley margin to the east to approximately 100 feet in the vicinity of the project monitoring well. As on the opposite side of the valley at Site 2, the alluvium at Site 3 is underlain by Sonoma Volcanics sedimentary rocks (Tss/h). Here the sedimentary rocks are more thin and underlain by the andesite flows and breccias (Tsva).

Four WCRs for wells nearest to the project monitoring well at Site 3 indicate the following:

- Quaternary alluvium (Qa) thickness ranges from approximately 30 feet to 100 feet below ground surface.
- WCRs on the west side of the Napa River indicate locally-thick coarse-grained lithologic units distributed throughout the alluvium. These are consistent with observations reported for wells

used in the development of Cross Section D-D' in the *Updated Hydrogeologic Conceptualization and Characterization of Conditions* report (LSCE and MBK, 2013).

### 3.4 Site 4 – Napa River at Yountville Cross Road

Site 4 is located near the center of the Napa Valley Floor north of the Town of Yountville. The Quaternary alluvium (Qa) extends to depths of approximately 120 feet to 170 feet at this Site (**Figure 3.6**). The alluvium in this area of the Napa Valley Floor contains thick beds of fluvial sand and gravel and has been noted as having some of the highest reported well yields in the valley, at up to 2,200 gallons per minute (LSCE and MBK, 2013). Wells in the vicinity of Site 4, particularly west of the Napa River indicate the presence of a unit described as Tertiary Sonoma Volcanics conglomerate/breccias (Tcg/ab), which has not been correlated with a surficial formation and therefore has not been differentiated as either a sedimentary conglomerate or a volcanic breccia (LSCE and MBK, 2013). East of the Napa River at Site 4 the alluvium is underlain by an andesitic unit of the Sonoma Volcanics (Tsva) that dips westward and continues beneath the conglomerate/breccia (Tcg/ab).

Three WCRs for wells in the vicinity of Site 4 indicate the following:

- Quaternary alluvium (Qa) thickness ranges from 120 feet to 170 feet below ground surface.
- All WCRs showed multiple coarse-grained lithologic units distributed throughout the alluvium. The first of these units was consistently reported to be about 20 feet thick beginning between 22 feet and 37 feet below ground surface.

### 3.5 Site 5 – Napa River at Pope Street

Site 5 is located within the City of St. Helena near the eastern Napa Valley margin. The Quaternary alluvium (Qa) at Site 5 ranges in thickness from approximately 70 feet to 120 feet to the west of the Napa River (**Figure 3.7**). The river channel is aligned very near the valley margin at Site 5 leaving little thickness in the alluvial materials to the east of the Napa River. Here a tuff formation (Tsvt) outcropped adjacent to the valley may be bound by faulting at the contact with the Tertiary sedimentary rocks (Tss/h), as indicated in Cross Section A-A' developed previously (LSCE and MBK, 2013). USGS surficial geologic mapping indicates that the alluvium at the site consists predominately of terrace deposits that span both sides of the Napa River mainstem (Graymer et al. 2007). Sub-alluvium mapping indicates that the alluvium is underlain by Sonoma Volcanics sedimentary rocks (Tss/h), which outcrop at the surface beginning in the hills approximately one-half mile northeast of the site (LSCE and MBK, 2013).

Five WCRs were identified in the vicinity of Site 5 indicate the following:

- Quaternary alluvium (Qa) thickness ranges from approximately 70 feet to 120 feet below ground surface, west of the Napa River.
- While some thick coarse-grained units are recorded within the alluvium, they are less extensive with lower well yields reported than well farther south..
- Geologic units below the alluvium are consistent with mapping by LSCE (LSCE and MBK, 2013) showing Sonoma Volcanics sedimentary rocks (tss/h), described in these WCRs as large gravels (often cemented) or sandy blue clay.

## 4 GROUNDWATER AND SURFACE WATER CONDITIONS

As described above, project monitoring facilities were constructed to track interrelationships between surface water and groundwater within the Napa Valley Groundwater Subbasin. While the geologic structure of Napa Valley is very complex, the project monitoring wells are constructed to monitor conditions in the upper portions of the alluvial aquifer system where direct connection to surface waters is possible and lower portions of the alluvial aquifer system which are more likely to be influenced by groundwater pumping. The following sections summarize the results of continuous water level and water quality monitoring (**Section 4.1**) and a baseline round of water quality sample collection at all sites (**Section 4.2**)

### 4.1 Water Level and Water Quality Monitoring

#### 4.1.1 Site 1 – Napa River at First Street

At Site 1 the Napa River is perennially wetted and tidally-influenced with a 5 to 7 foot tidal range observed during the period of record<sup>2</sup> (**Figure 4.1**). Data collected at this site have shown very similar heads at all three monitoring locations, including a similar, though dampened, response to the tidal cycles in the shallow and deep casings. Heads in both monitoring well casings and the river have been more than 15 feet above the thalweg elevation over the period of record. Taken together, the water level elevations and the tidal cycle fluctuations in the shallow casing indicate some degree of hydraulic connection at this location. During the summer baseflow period, short-lived head separations of less than five feet occur during low tides between the Napa River and the shallow casing. Monitoring during the winter and spring showed heads in both casings increasing both seasonally and with peaks in the river stage. From January through March, heads in the monitoring wells were consistently a couple of feet above the river stage. During this period the magnitude of tidal fluctuations in the river stage appears to have decreased, indicating that the flow of water upstream due to incoming tides was overcome by increased river discharge due to winter rains.

Temperature (**Figure 4.2**) and conductivity (**Figure 4.3**) data from the shallow and deep monitoring well casings show relatively stable conditions compared to readings measured in the Napa River.

Conductivity readings in the deep casing were above 1,500  $\mu\text{S}/\text{cm}$  throughout the period of record, which were the highest conductivity values recorded across all of the project monitoring wells.

Conductivity values in the Napa River at Site 1 were above 30,000  $\mu\text{S}/\text{cm}$  in July and August of 2015, indicating presence of brackish water at this site, where the streambed elevation is 15 feet to 20 feet below mean sea level (**Figure 4.3**). Napa River conductivity values were similar to conductivity values in the shallow casing in March while streamflow was elevated. As streamflow declined in April and May, conductivity values in the river entered a transitional period of greatest daily variability while the balance between freshwater outflows and saline inflows from San Pablo Bay shifts with the reduction in stormwater runoff. Temperatures in the Napa River varied much more widely than did groundwater at

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<sup>2</sup> Elevated conductivity levels in the Napa River at Site 1 resulted in a failure of the instrument in August 2015. A temporary transducer was installed in November with a full replacement transducer, including conductivity sensor installed in March 2016.

this site, likely due to seasonal temperature variations with increased heat gain in the summer due to the degree of solar exposure (**Figure 4.2**).

#### 4.1.2 Site 2 – Dry Creek at Washington Street

Dry Creek at Site 2 is an intermittent stream, with flows typically dropping to about 1 cubic feet per second (cfs) or less over summer. Over the period of record from December 2014 through June 2016 the surface water and groundwater were only directly during the winter and spring of 2016, when the elevation of groundwater in the shallow casing was at or above the stream thalweg elevation (**Figure 4.4**). Heads between the shallow and deep casings were separated by as little as six feet in the spring of 2015, increasing to 15 feet by October 2015, indicating a downward vertical gradient in the upper 80 feet of the alluvial aquifer system.

Water temperature data at Site 2 show generally stable temperatures in both monitoring well casings with much more variable temperatures in Dry Creek (**Figure 4.5**). Temperatures in the shallow casing appear to show a delayed response relative to temperatures in Dry Creek. From August 2015 through mid-November 2015 shallow casing water temperatures climbed slowly from 18.6°C to 20.1°C. Dry Creek temperatures were generally above 20°C in August and September, but declined substantially with the transition to cooler air temperatures in the fall and winter precipitation and runoff in December. Shallow casing temperatures began a more gradual decline in December 2015, coinciding with the period when shallow casing water levels suggest that the stream and shallow groundwater reconnected.

Conductivity values at Site 2 are consistent with showing a direct connection between surface water and shallow groundwater from December through April 2016, when sharp declines in surface water conductivity (likely due to precipitation induced runoff) are followed by more gradual declines in conductivity in the shallow casing (**Figure 4.6**). A similar pattern also occurred from August through October 2015, with shallow groundwater conductivity values tracking fluctuations in surface water conductivity.

#### 4.1.3 Site 3 – Napa River at Oak Knoll Avenue

The Napa River at Site 3 is intermittent, with flows typically dropping to about 1 cfs or less over summer. Groundwater levels in the shallow casing at Site 3 indicate that surface water and groundwater experienced consistent to intermittent direct hydraulic connection<sup>3</sup> (**Figure 4.7**). Overall, water level data show heads in the shallow and deep casing were generally within a foot of each other. The groundwater heads also tended to remain elevated relative to the surface water elevation, except during times of sharp stream stage peaks in the winter and spring of 2016 and during the fall when surface water stages were lowest. In addition, sharp peaks in the surface water elevation were followed

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<sup>3</sup> The surface water transducer installed at Site 3 is located in a depression that is lower than the thalweg, which accounts for some surface water levels shown to be below the thalweg elevation during late summer and fall of 2015.

by lesser peaks in the shallow and deep casings. Together these observations suggest a potential for direct hydraulic connection throughout much of the period of record.

While water temperatures in both the deep and shallow casing at Site 3 remained consistent and within one degree of each other throughout the period of record, one temporary water temperature decline occurred 3/12/2016, 30 hours after the second highest surface water stage peak of the period of record and 144 hours (6 days) following the highest surface water stage peak of the period of record (**Figure 4.7 and Figure 4.8**). This may indicate that the magnitude of flow from surface water to groundwater is relatively low except during peak surface water stages, leading to limited temperature responses in the shallow casing in response to storm runoff peaks in the Napa River.

Conductivity values at Site 3 show similar concentrations at all three monitored locations from September through November 2015, when the river stage was below the thalweg (**Figure 4.9**). As river stages increased with storm runoff in December 2015, the surface water conductivity declined quickly from about 600 to 263  $\mu\text{S}/\text{cm}$ . Conductivity values in the Napa River remained generally below 300  $\mu\text{S}/\text{cm}$  through the spring of 2016, with short term peaks coinciding with the recession limb of storm hydrographs, when baseflow contributions increase.

Well completion reports for wells in the vicinity suggest that alluvial materials, particularly in the shallow alluvium, become less permeable from west to east (**Figure 3.5**). This supports the observations suggesting that the degree of flow between groundwater and surface water at this site may be limited, although water levels indicate a direct hydraulic connection over much of the period of record.

#### 4.1.4 Site 4 – Napa River at Yountville Cross Road

Existing stream gauging, by the Napa RCD, at Site 4 on the Napa River includes surface water stage monitoring, although discharge monitoring is not a focus of the Napa RCD monitoring effort. Nevertheless, for this project's period of record the Napa River remained perennially wetted (**Figure 4.10a**). Groundwater levels in the shallow casing at Site 4 indicate that surface water and groundwater experienced a consistent direct hydraulic connection from December 2014 through May 2015. Overall, water level data show heads in the shallow and deep casing are generally within a foot of each other. The groundwater heads also tend to remain elevated relative to the surface water elevation, except during times of sharp surface water stage peaks in the winter and spring and during the fall when surface water stages were lowest. However, even during the latter case shallow groundwater levels remained at an elevation above the river thalweg at the site.

**Figure 4.10b** shows continuous monitoring data collected at Site 4 for this project along with a long-term groundwater levels recorded manually by Napa County. The manually monitored well, NapaCounty-133, is located approximately 0.5 miles southeast of Site 4, at a similar land surface elevation at a total well depth of 120 feet. The long-term record from NapaCounty-133 shows that the fluctuations in groundwater levels at the Site 4 shallow and deep casings are comparable to those observed in the vicinity since 1978.

Water temperature data from Site 4 show a pattern similar to observations at Sites 1 and 3. While water temperatures in the Napa River at Site 4 ranged from 23.75°C to 5.18°C, groundwater temperatures

were much more stable<sup>4</sup> (**Figure 4.11**). These observations could indicate that the magnitude of flow from surface water to groundwater during peak stream stages is limited.

Conductivity data from Site 4 are somewhat limited temporally, but tend to show similarities in values in the Napa River and shallow casing, as would be expected under a direct hydraulic connection (**Figure 4.12**). Conductivity measurements in the deep casing were lower and more stable than values in the shallow casing, possibly indicating the influence of different geologic source material in the deeper alluvium.

#### 4.1.5 Site 5 – Napa River at Pope Street

The Napa River at Site 5 is intermittent, with flows typically dropping to about 1 cfs or less over summer. Over the period of record from December 2014 through June 2016 the surface water and groundwater were directly connected during the winter, spring, and early summer months, when the elevation of groundwater in the shallow casing was at or above the stream thalweg elevation (**Figure 4.13a**). Shallow casing groundwater elevations closely tracked the surface water elevation while water remained in the river channel. Once the river channel became dry, groundwater levels dropped by as much as five feet over the course of the late summer and fall of 2015, before quickly rebounding when flow returned to the river channel.

Heads between the shallow and deep casings were separated by as little as three feet in the spring of 2015, increasing to 15 feet by October 2015, indicating a downward vertical gradient in the upper 80 feet of the alluvial aquifer system. Water level data in the deep casing at Site 5 show the most influence from groundwater pumping in the vicinity. At Site 5, the pumping influence may be from the City of St. Helena irrigation well nearby (see **Section 2.1.5**). Manual groundwater level measurements recorded at that well (NapaCounty-212) show a close agreement with groundwater levels in the monitoring well deep casing at the time of the spring and fall 2015 measurements (**Figure 4.13b**). Despite the pumping influence seen in the deep casing, head in that casing fully recovered over the winter of 2016 relative to the winter 2015 condition. A manual measurement recorded in NapaCounty-212 shows that water levels in that nearby well recovered even further through into the spring of 2016 (**Figure 4.13b**).

Water temperatures recorded at Site 5 showed more variability in the shallow casing than at any other site (**Figure 4.14**). While temperature data from the Napa River are limited at this site, the general pattern of increasing shallow casing water temperatures during the summer of 2015 followed by declining temperatures in the winter of 2016 is similar to the pattern observed at Site 2. This along with the similarities between shallow casing and Napa River water temperatures from mid-January through mid-March 2016 also indicate a direct hydraulic connection during that time.

Conductivity data from Site 5 are somewhat limited temporally, but tend to show similarities in values in the Napa River and shallow casing, as would be expected under a direct hydraulic connection (**Figure 4.15**).

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<sup>4</sup> A temporary failure in the shallow casing transducer at Site 4 from mid-January through mid-March 2016 resulted in a data gap during that time period.



## 4.2 Water Quality Sampling

Baseline water quality samples were collected at all project monitoring wells and surface water monitoring sites in on June 3, 2015 and June 4, 2015. Results from the fifteen sites samples are summarized in **Tables 4.1a** and **4.1b**. Groundwater samples were collected by submersible pump after purging for a minimum of three casing volumes and achieving field parameter stabilization. When monitoring well casings were pumped dry during the purge process a grab sample was collected following sufficient water level recovery. Surface water samples were collected as grab samples.

Samples were analyzed for general mineral, general physical, and drinking water metals by DWR's Bryte Laboratory. All reports provided by the lab and purge logs are provided in **Appendix C**.

In general, results from the water quality sampling were consistent with previously documented groundwater quality conditions in the Napa Valley Groundwater Subbasin and with the conductivity values recorded by transducers at each project site (LSCE, 2011 and LSCE, 2016).

Only one exceedance of a primary drinking water Maximum Contaminant Level (MCL) was noted in the groundwater samples collected in June 2015. The dissolved arsenic concentration in the sample collected at the deep casing at Site 3 was 0.046 mg/l, above the primary drinking water MCL of 0.010 mg/l. Nitrate concentrations were below the primary drinking water MCL in all groundwater samples collected; however, the Site 1 surface water sample had a concentration of 12.6 mg/l NO<sub>3</sub>-N compared to the primary drinking water MCL of 10 mg/l NO<sub>3</sub>-N.

A dissolved aluminum concentration of 0.432 mg/l at the deep casing at Site 2 was above the drinking water secondary MCL of 0.200 mg/l. Dissolved iron concentrations were above the drinking water secondary MCL of 0.300 mg/l in samples collected at the deep casings at Sites 2 and 5. Dissolved boron in the sample collected at the deep casing at Site 3 had a concentration of 9.1 mg/l, above the California Notification Level of 1.0 mg/l. Dissolved manganese was detected at concentration above the drinking water secondary MCL of 0.050 mg/l in all five deep casings, as well as the shallow casings at Sites 1, 4, and 5 and the surface water sample at Site 1.

A few spatial correlations between water quality constituents are evident in the Piper Diagrams (in meq/l) of **Figures 4.16**, **4.17**, and **4.18**. While the shallow casing water quality samples are generally not spatially correlated, the elevated alkalinity at Site 4 in the shallow casing (NapaCounty-220s) stands out (**Figure 4.16**). However, among the deep casing samples, similarly elevated alkalinities were found in samples from Sites 2, 4, and 5 (**Figure 4.17**). The similarity between alkalinities, and the complete cation/anion composition as well, at the shallow and deep casings at Site 4 suggests a similar geologic source. The similar alkalinities also suggest carbonate rock as a primary geologic material along the groundwater flowpath.

A Piper Diagram of deep casing water quality data suggest a spatial trend of increasing chloride concentrations in the deeper alluvium (**Figure 4.17**). A corresponding Piper Diagram of the surface water samples shows a slightly increasing trend in chloride concentration. Conductivity data records from transducers at Site 1, including stable conductivity values in shallow groundwater of between 400  $\mu\text{S}/\text{cm}$  and 500  $\mu\text{S}/\text{cm}$ , do not indicate that brackish water intermittently present in the Napa River at this site is impacting conductivity in either the shallow or deeper alluvium. In light of this, the trend in chloride concentrations in the deeper alluvium is more likely due to a combination of increasing distance along the groundwater flowpath and longer contact time with geologic source materials contributing to chloride enrichment.

**Table 4.1a June 2015 Baseline Water Quality Results Summary**

Site	Sample ID	Sample Date	Total Alkalinity mg/L as CaCO3 Std Method 2320 B [1]*	Dissolved Aluminum mg/L EPA 200.8 (D) [1]*	Dissolved Antimony mg/L EPA 200.8 (D) [1]*	Dissolved Arsenic mg/L EPA 200.8 (D) [1]*	Dissolved Barium mg/L EPA 200.8 (D) [1]*	Dissolved Beryllium mg/L EPA 200.8 (D) [1]*	Dissolved Bicarbonate (HCO3-) mg/L as CaCO3 Std Method 4500-CO2 D [1]*	Dissolved Boron mg/L EPA 200.7 (D) [1]*	Dissolved Bromide mg/L EPA 300.0 28d Hold [1]*	Dissolved Cadmium mg/L EPA 200.8 (D) [1]*	Dissolved Calcium mg/L EPA 200.7 (D) [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	117	<0.01	<0.001	<0.001	0.081	<0.001	117	0.2	0.07	<0.001	19
Site 1	NapaCounty-215d	6/3/2015 7:16	258	<0.01	<0.001	0.007	0.103	<0.001	258	1.4	0.63	<0.001	41
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	145	0.02	<0.001	0.015	0.136	<0.001	144	1.4	15.9	<0.001	145
Site 2	NapaCounty-216s	6/3/2015 13:03	93	0.089	<0.001	<0.001	0.046	<0.001	93	<0.1	0.12	<0.001	22
Site 2	NapaCounty-217d	6/3/2015 12:23	116	0.432	<0.001	0.001	0.027	<0.001	116	<0.1	0.06	<0.001	15
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	154	0.029	<0.001	<0.001	0.059	<0.001	153	0.1	0.02	<0.001	34
Site 3	NapaCounty-218s	6/3/2015 11:02	192	<0.01	<0.001	<0.001	0.091	<0.001	192	0.1	0.13	<0.001	47
Site 3	NapaCounty-219d	6/3/2015 10:04	225	<0.01	<0.001	0.046	0.088	<0.001	224	9.1	0.33	<0.001	17
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	176	0.012	<0.001	0.003	0.073	<0.001	175	0.5	0.2	<0.001	36
Site 4	NapaCounty-220s	6/4/2015 8:19	199	<0.01	<0.001	0.003	0.078	<0.001	199	0.1	0.1	<0.001	32
Site 4	NapaCounty-221d	6/4/2015 7:52	124	<0.01	<0.001	0.004	0.05	<0.001	124	<0.1	0.03	<0.001	14
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	98	<0.01	<0.001	0.001	0.042	<0.001	98	<0.1	0.08	<0.001	22
Site 5	NapaCounty-222s	6/4/2015 11:29	117	<0.01	<0.001	0.003	0.041	<0.001	117	0.6	0.12	<0.001	28
Site 5	NapaCounty-223d	6/4/2015 10:56	213	<0.01	<0.001	0.002	0.104,0.105**	<0.001	213	0.5	0.07	<0.001	16
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	92,93**	<0.01	<0.001	0.004	0.039	<0.001	93	0.8	0.12	<0.001	21
Site	Sample ID	Sample Date	Dissolved Carbonate (CO3-) mg/L as CaCO3 Std Method 4500-CO2 D [1]*	Dissolved Chloride mg/L EPA 300.0 28d Hold [1]*	Dissolved Chromium mg/L EPA 200.8 (D) [1]*	Dissolved Cobalt mg/L EPA 200.8 (D) [1]*	Conductance (EC) µS/cm Std Method 2510-B [1]*	Dissolved Copper mg/L EPA 200.8 (D) [1]*	Dissolved Fluoride mg/L EPA 300.0 28d Hold [1]*	Dissolved Hardness mg/L as CaCO3 Std Method 2340 B [1]*	Dissolved Hydroxide (OH-) mg/L as CaCO3 Std Method 4500-CO2 D [1]*	Dissolved Iron mg/L EPA 200.8 (D) [1]*	Dissolved Lead mg/L EPA 200.8 (D) [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	<1	28	<0.001	<0.005	416	<0.001	0.2	144	<1	0.009	<0.001
Site 1	NapaCounty-215d	6/3/2015 7:16	1	177	<0.001	<0.005	1174	0.001	0.2	226	<1	0.042	<0.001
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	1	4699	0.002	<0.005	14319	0.006	<0.1	1717	<1	0.025	<0.001
Site 2	NapaCounty-216s	6/3/2015 13:03	<1	15	0.001	<0.005	317	0.003	0.2	116	<1	0.066	<0.001
Site 2	NapaCounty-217d	6/3/2015 12:23	<1	5	0.001	<0.005	255	0.001	0.6	74	<1	0.331	<0.001
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	1	12	0.005	<0.005	411	0.006	0.2	159	<1	0.091	<0.001
Site 3	NapaCounty-218s	6/3/2015 11:02	<1	19	0.001	<0.005	536	<0.001	<0.1	247	<1	0.008	<0.001
Site 3	NapaCounty-219d	6/3/2015 10:04	1	73	<0.001	<0.005	712	0.005	0.3	116	<1	0.021	<0.001
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	1	27	<0.001	<0.005	515	0.001	0.2	215	<1	0.022	<0.001
Site 4	NapaCounty-220s	6/4/2015 8:19	<1	7	<0.001	<0.005	429	<0.001	0.2	190	<1	<0.005	<0.001
Site 4	NapaCounty-221d	6/4/2015 7:52	<1	6	<0.001	<0.005	263	<0.001	0.2	100	<1	0.009	<0.001
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	<1	18	<0.001	<0.005	328	0.001	0.1	128	<1	0.046	<0.001
Site 5	NapaCounty-222s	6/4/2015 11:29	<1	32	<0.001	<0.005	372	<0.001	0.3	123	<1	0.014	<0.001
Site 5	NapaCounty-223d	6/4/2015 10:56	<1	16	0.001	<0.005	453	<0.001	0.3	113	<1	0.473,0.476**	<0.001
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	<1	34	<0.001	<0.005	346	0.002	0.4	100	<1	0.019	<0.001

\*Codes in brackets ([ ]) following the analyte name refer to the Method Comparability Code. For more information, please refer to [http://www.water.ca.gov/waterdata/library/includes/mtc\\_code.cfm](http://www.water.ca.gov/waterdata/library/includes/mtc_code.cfm).

\*\*More than one analysis was made for this sample

**Table 4.1b June 2015 Baseline Water Quality Results Summary**

Site	Sample ID	Sample Date	Dissolved Lithium mg/L EPA 200.8 (D) [1]*	Dissolved Magnesium mg/L EPA 200.7 (D) [1]*	Dissolved Manganese mg/L EPA 200.8 (D) [1]*	Dissolved Mercury mg/L EPA 200.8 (Hg Dissolved) [1]*	Dissolved Molybdenum mg/L EPA 200.8 (D) [1]*	Dissolved Nickel mg/L EPA 200.8 (D) [1]*	Dissolved Nitrate mg/L as N EPA 300.0 28d Hold [1]*	Dissolved Nitrite mg/L as N Std Method 4500-NO2 B (48Hr) [1]*	Dissolved Potassium mg/L EPA 200.7 (D) [1]*	Dissolved Selenium mg/L EPA 200.8 (D) [1]*	Dissolved Silver mg/L EPA 200.8 (D) [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	0.011	23	2.53	<0.0002	<0.005	0.003	7.3	0.02	1.1	<0.001	<0.001
Site 1	NapaCounty-215d	6/3/2015 7:16	0.059	30	1.13	<0.0002	<0.005	0.002	<0.1	<0.01	4.5	0.002	<0.001
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	0.067	329	0.076	<0.0002	<0.005	0.007	12.6	<0.01	106.5	0.046	<0.001
Site 2	NapaCounty-216s	6/3/2015 13:03	0.012	15	0.041	<0.0002	<0.005	0.002	5.4	0.01	0.9	<0.001	<0.001
Site 2	NapaCounty-217d	6/3/2015 12:23	0.014	9	0.643	<0.0002	0.005	0.002	<0.1	<0.01	1.3	<0.001	<0.001
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	0.008	18	0.024	<0.0002	<0.005	0.013	0.5	<0.01	2.1	<0.001	<0.001
Site 3	NapaCounty-218s	6/3/2015 11:02	0.01	31	<0.005	<0.0002	<0.005	0.003	1.8	<0.01	0.7	<0.001	<0.001
Site 3	NapaCounty-219d	6/3/2015 10:04	0.037,0.038**	18	0.241,0.242**	<0.0002	0.013,0.014**	0.001	<0.1	<0.01	5.2	<0.001	<0.001
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	0.046	30	0.038	<0.0002	<0.005	0.004	<0.1	<0.01	2.9	<0.001	<0.001
Site 4	NapaCounty-220s	6/4/2015 8:19	<0.005	26	0.568	<0.0002	<0.005	0.005	0.7	0.03	3.6	<0.001	<0.001
Site 4	NapaCounty-221d	6/4/2015 7:52	<0.005	16	0.728	<0.0002	<0.005	0.002	<0.1	<0.01	4.7	<0.001	<0.001
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	<0.005	17	0.041	<0.0002	<0.005	0.003	<0.1	<0.01	1.7	<0.001	<0.001
Site 5	NapaCounty-222s	6/4/2015 11:29	0.063	13	0.641	<0.0002	<0.005	0.01	<0.1	<0.01	3.8	<0.001	<0.001
Site 5	NapaCounty-223d	6/4/2015 10:56	0.075,0.076**	18	0.219,0.223**	<0.0002	<0.005	0.002	0.3	<0.01	7.1	<0.001	<0.001
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	0.095	11	0.048	<0.0002	<0.005	0.003	<0.1	<0.01	3.7	<0.001	<0.001
Site	Sample ID	Sample Date	Dissolved Sodium mg/L EPA 200.7 (D) [1]*	Total Dissolved Solids mg/L Std Method 2540 C [1]*	Dissolved Strontium mg/L EPA 200.8 (D) [1]*	Dissolved Sulfate mg/L EPA 300.0 28d Hold [1]*	Dissolved Thallium mg/L EPA 200.8 (D) [1]*	Turbidity N.T.U. EPA 180.1 [D-2]*	Dissolved Vanadium mg/L EPA 200.8 (D) [1]*	Dissolved Zinc mg/L EPA 200.8 (D) [1]*	pH pH Units Std Method 2320 B [1]*		
Site 1	NapaCounty-214s	6/3/2015 8:09	31	268	0.144	45	<0.001	1.21	<0.005	<0.005	6.9		
Site 1	NapaCounty-215d	6/3/2015 7:16	164	683	0.32	74	<0.001	2.75	<0.005	<0.005	7.3		
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	2590	8830	2.19	667	<0.001	20.6	0.018	0.012	7.8		
Site 2	NapaCounty-216s	6/3/2015 13:03	22	208	0.169	38	<0.001	77.4	<0.005	<0.005	6.8		
Site 2	NapaCounty-217d	6/3/2015 12:23	29	164	0.107	9	<0.001	7.29	<0.005	<0.005	7.4		
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	28	255	0.269	44	<0.001	1.37	<0.005	0.027	7.6		
Site 3	NapaCounty-218s	6/3/2015 11:02	20	324	0.357	65	<0.001	5.06	<0.005	<0.005	6.7		
Site 3	NapaCounty-219d	6/3/2015 10:04	108	452	0.125,0.126**	32	<0.001	1.16	<0.005	0.006	7.4		
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	27	313	0.248	54	<0.001	7.48	<0.005	<0.005	7.8		
Site 4	NapaCounty-220s	6/4/2015 8:19	19	292	0.199	11	<0.001	3.29	<0.005	<0.005	6.7		
Site 4	NapaCounty-221d	6/4/2015 7:52	16	204	0.079	6	<0.001	7.11	<0.005	<0.005	7.1		
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	17	250	0.131	39	<0.001	3.4	<0.005	<0.005	7.3		
Site 5	NapaCounty-222s	6/4/2015 11:29	26	241	0.155	21	<0.001	1.33,1.48**	<0.005	<0.005	7.1		
Site 5	NapaCounty-223d	6/4/2015 10:56	56	343	0.104,0.105**	6	<0.001	18.8	<0.005	<0.005	7.2		
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	30	220	0.111	25	<0.001	1.68	<0.005	0.006	7.4		

\*Codes in brackets ([ ]) following the analyte name refer to the Method Comparability Code. For more information, please refer to [http://www.water.ca.gov/waterdatalibrary/includes/mtc\\_code.cfm](http://www.water.ca.gov/waterdatalibrary/includes/mtc_code.cfm).

\*\*More than one analysis was made for this sample

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## 5 SUMMARY AND RECOMMENDATIONS

The construction of dedicated monitoring facilities to track groundwater-surface water interactions in the Napa Valley Subbasin provides resource managers with an important source of data about these interconnected resources. Data collected in 2015 and 2016 show that shallow groundwater and surface waters were hydraulically connected throughout much of the winter and spring at the mainstem Napa River sites, and longer in some locations. Data from Site 1, the farthest downstream site, show a consistent hydraulic connection during the year, with little variability in groundwater levels. Sites on the mainstem Napa River at Oak Knoll Avenue and Yountville Cross Rd, Sites 3 and 4, showed groundwater elevations above the river stage elevation inducing groundwater flow into the Napa River (gaining conditions) from January until September, when shallow and deep groundwater elevations continued to decline, inducing losing streamflow conditions. These losing conditions persisted into the 2015 winter storms, when high magnitude stormwater Napa River flows (with high stage elevations) induced groundwater recharge.

Losing stream conditions were observed throughout 2015 at Sites 2 and 5 where the direction of groundwater flow is away from the streambed. At Site 5, water level data indicate that the river was hydraulically connected to shallow groundwater during the first half of the year, until flows in the river ceased in July, and again in December 2015 as storms generated runoff leading to renewed flow in the river. At Site 2, located along Dry Creek, groundwater levels were consistently below the streambed elevation in 2015, indicating that groundwater was disconnected from the stream, although recharge to the groundwater system was likely occurring when water flowed in the creek.

Sites 2 and 5 also showed groundwater level differences between the shallow and deep casings of at least 5 feet for most or all of 2015. Given that most groundwater withdrawals in Napa Valley occur from depths greater than 50 feet, these water level differences show how the groundwater system's response to pumping from deeper aquifer units does not necessarily lead to an equivalent reduction in shallow groundwater levels.

Water year 2015 marked the fourth year of California's current statewide drought. Continued data collection in subsequent years will provide a more robust understanding of the range of conditions at these sites.

### 5.1 Recommendations

Implementation of groundwater/surface water monitoring in the Napa Valley Subbasin has already proven to be very valuable for improving the understanding of surface water and groundwater interactions. Similar facilities at additional locations would help further this understanding and aid in ongoing efforts to sustainably manage the Napa Valley Subbasin. Additional monitoring will also be key to the objective of maintaining or improving streamflow during drier years and/or seasons. As a result, it is recommended that in coordination with the Napa RCD and others, as appropriate, the County:

- Evaluate stream gaging network objectives, particularly with respect to the water budget requirements contained in the recently finalized Groundwater Sustainability Plan regulations, and determine the need and feasibility of additional streamflow monitoring sites.

- Consider additional areas that may also benefit from nearby shallow nested groundwater monitoring wells (similar to the facilities constructed as part of the current project) to monitor groundwater/surface water interactions in areas where data are lacking or where geologic conditions indicate that conditions not adequately represented by the current monitoring network.
- Continue efforts to integrate data collected at the groundwater/surface water monitoring sites with existing remote data acquisition systems in order to facilitate monitoring aquifer conditions in real-time.

## 6 REFERENCES

Graymer, R.W., E.E. Brabb, D.L. Jones, J. Barnes, R.S. Nicholson, and R.E. Stamski. 2007. Geologic map and map database of eastern Sonoma and western Napa Counties, California: U.S. Geological Survey Scientific Investigations Map 2956, <http://pubs.usgs.gov/sim/2007/2956/>.

Haller, James. Parks Supervisor, City of St. Helena, Person Communication, 2014.

Luhdorff & Scalmanini Consulting Engineers (LSCE). 2011. Napa County groundwater conditions and groundwater monitoring recommendations. Task 4, Report.

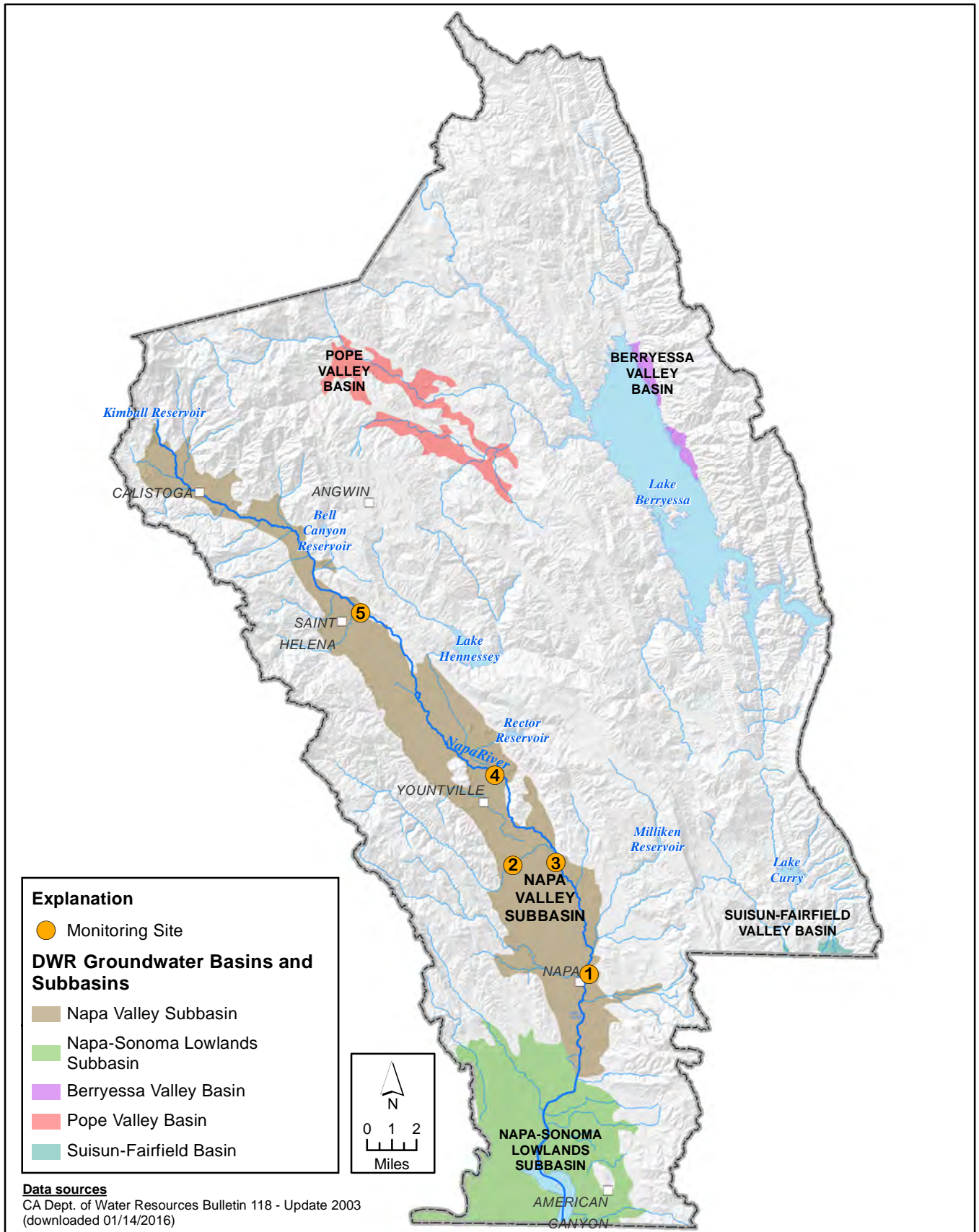
LSCE. 2013. Napa County Groundwater Monitoring Plan 2013.

LSCE. 2016. Napa County comprehensive groundwater monitoring program 2015 annual report and CASGEM update.

LSCE and MBK Engineers (LSCE and MBK). 2013. Updated Hydrogeologic Conceptualization and Characterization of Conditions. Prepared for Napa County.

# FIGURES



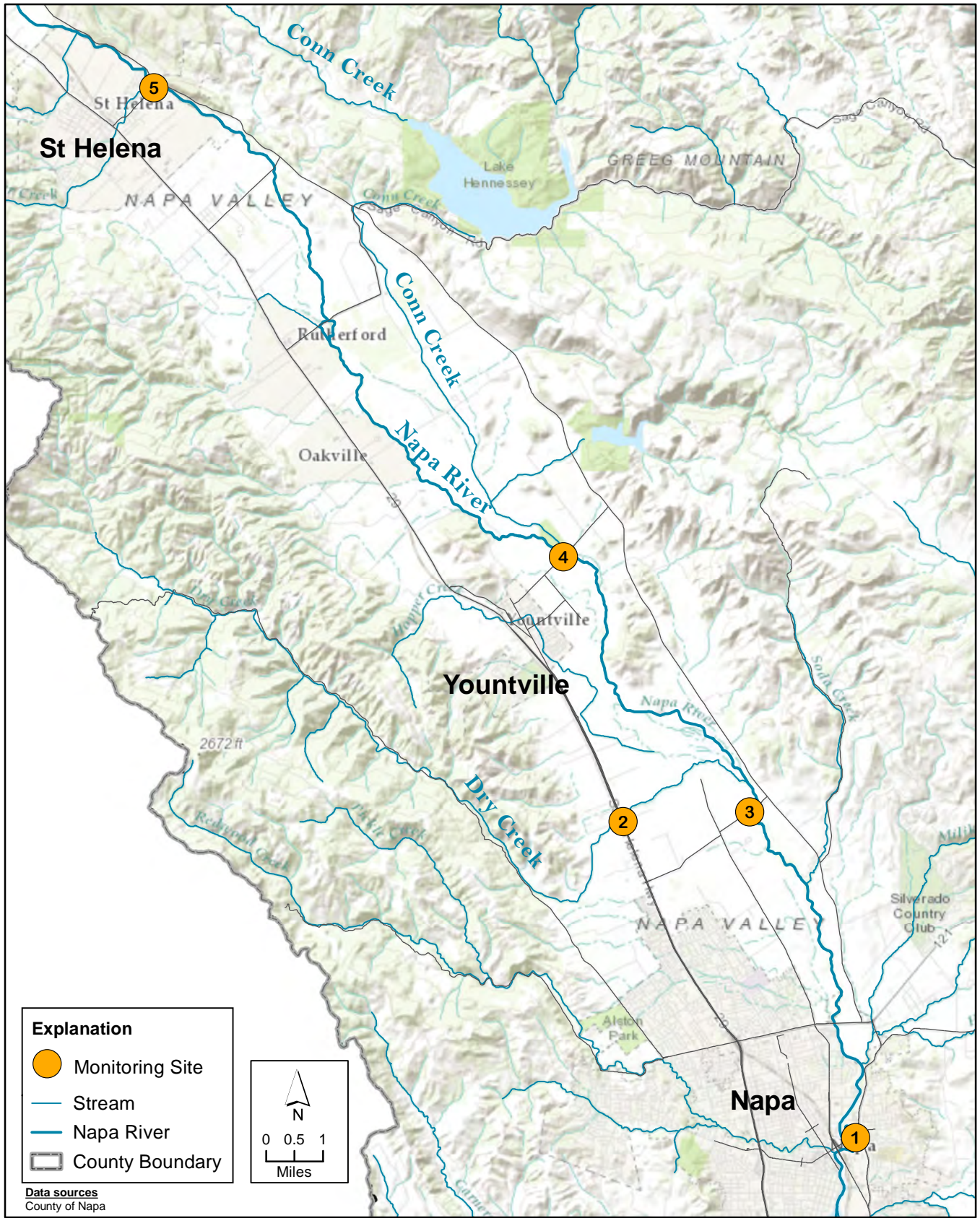


X:\2012 Job Files\12-071\GIS\Figure 1.1 GW-SW Sites and GW Basins.mxd



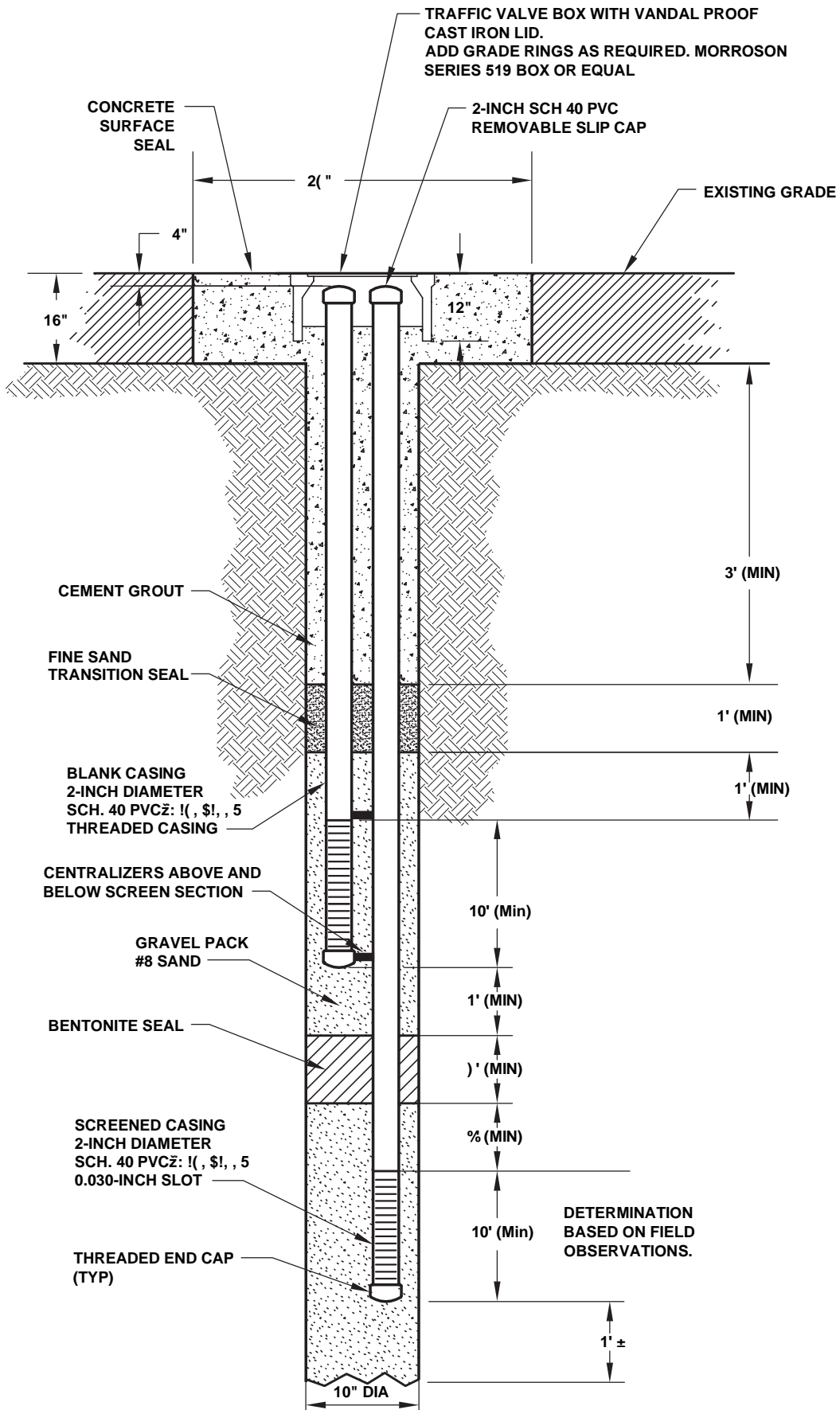
**FIGURE 1.1**  
**Napa County Groundwater-Surface Water Monitoring Sites**  
**and Groundwater Basins and Subbasins**

*Napa County Groundwater/Surface Water Monitoring Facilities Report,  
 DWR LGA Grant Program*



X:\2012 Job Files\12-071\GIS\Figure 2.1 GW-SW Monitoring Sites.mxd

**FIGURE 2.1**  
**Napa County Groundwater-Surface Water**  
**Monitoring Sites Overview**



**Figure 2.2**  
**Typical Nested Groundwater**  
**Monitoring Well Profile**



**FIGURE 2.3**  
**Site Map**  
**Site 1: Napa River at 1st St**

LSCE Project No. 12-1-071

Site:

Site #1- Napa River at 1st Street

Well Name: Napa County-214s-swgw1

Drilling Method:

Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.30223/-122.27845

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/2/14 - 9/4/14

Well Depth (ft): 53

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100

Well Screen (ft): 30-50

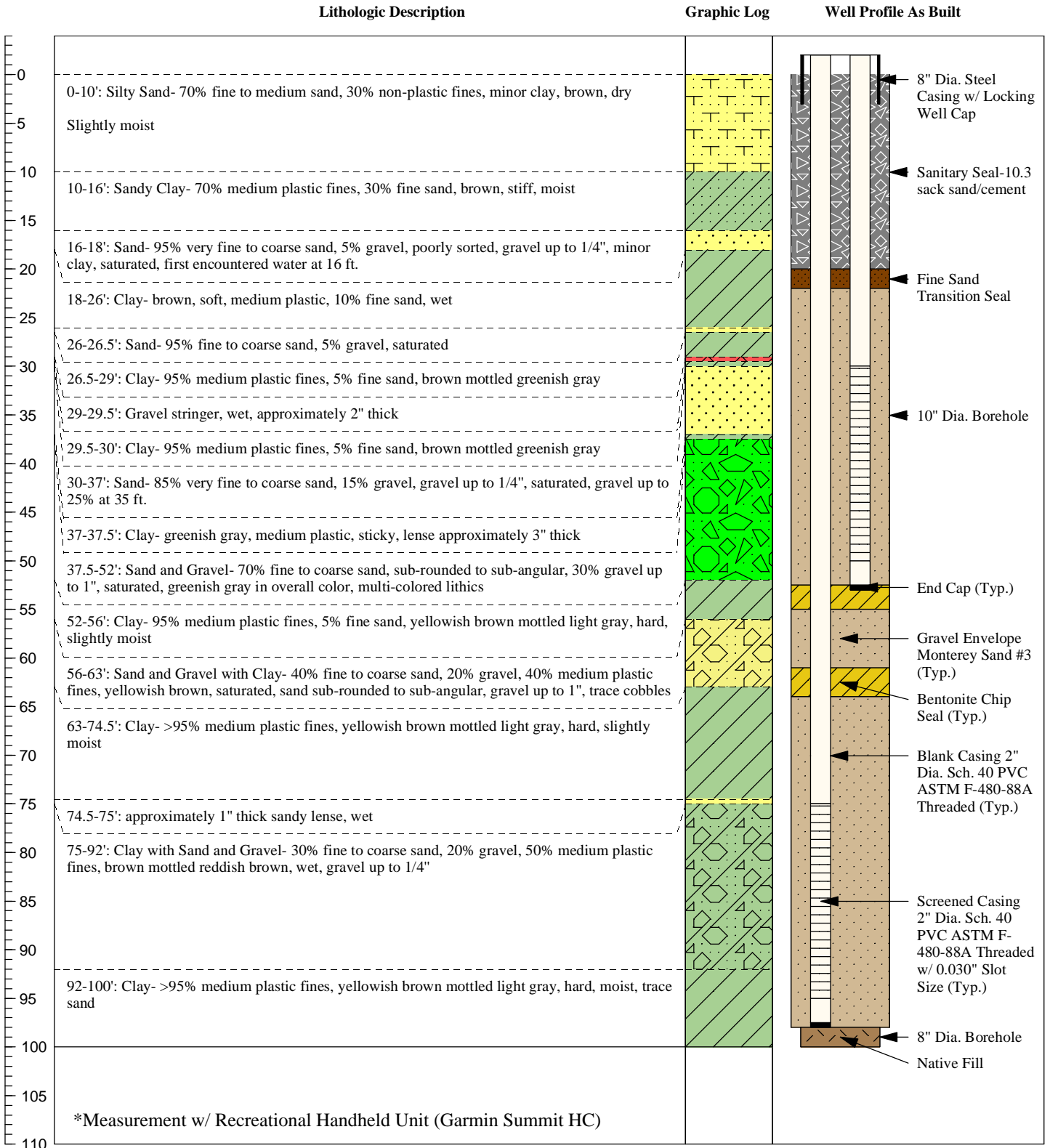


FIGURE 2.4

LSCE Project No. 12-1-071

Site: Site #1- Napa River at 1st Street

Well Name: Napa County-215d-swgw1

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.30223/-122.27845

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/2/14 - 9/4/14 Well Depth (ft): 98

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 75-95

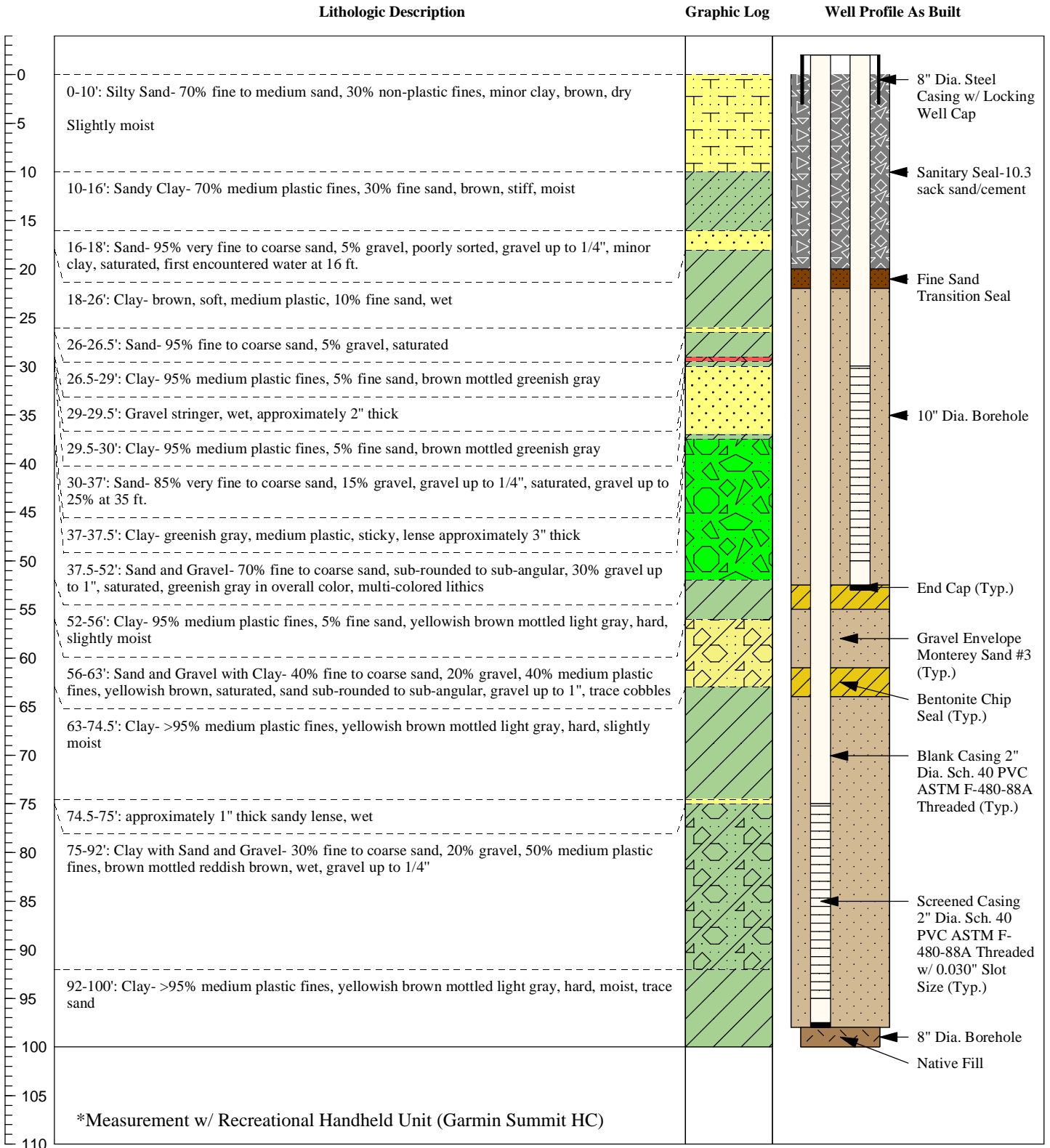


FIGURE 2.5

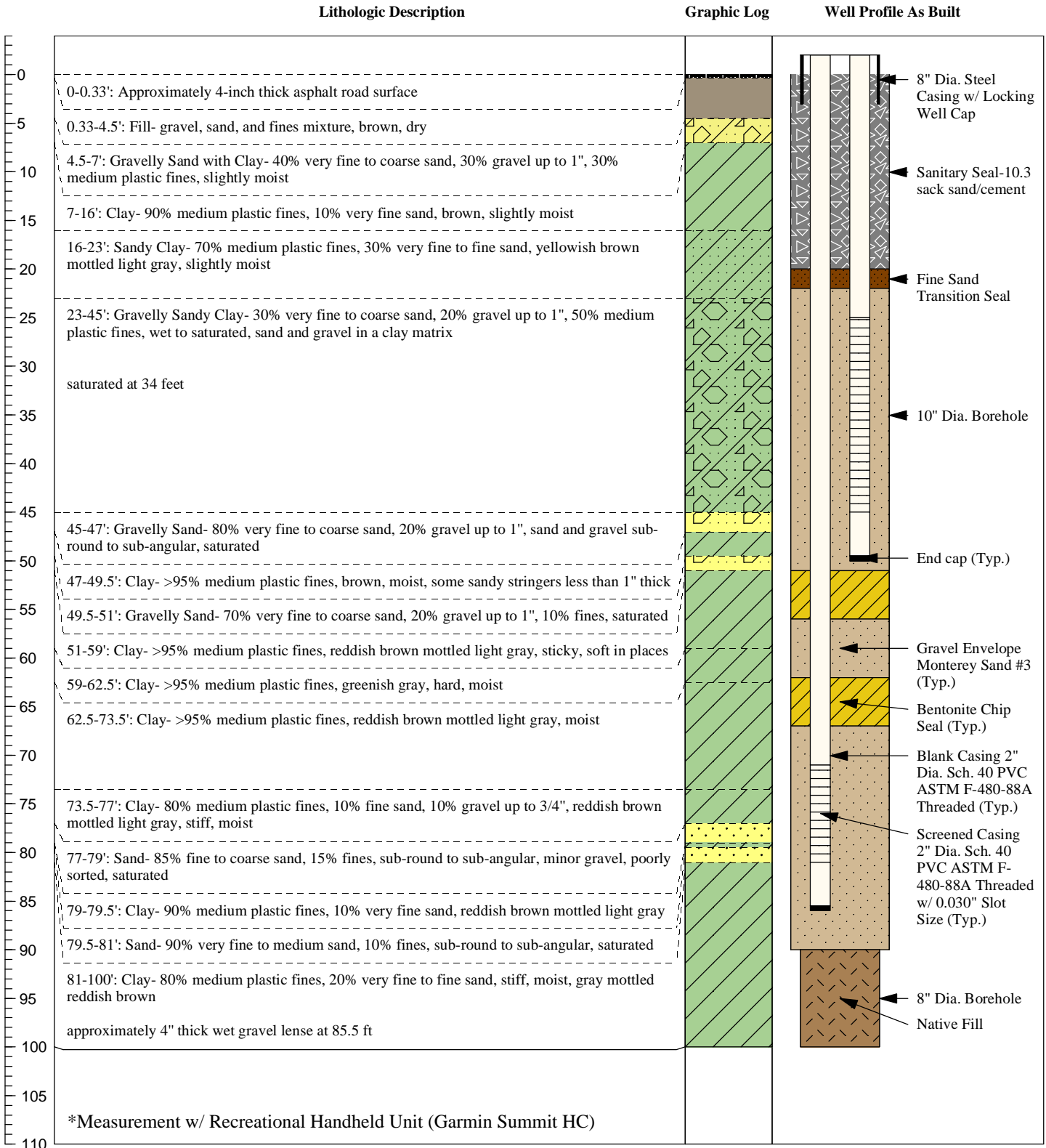


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**FIGURE 2.6**  
**Site Map**  
**Site 2: Dry Creek at Washington St**

LSCE Project No. 12-1-071  
 Well Name: Napa County-216s-swgw2  
 Lat./Long.: 38.365231/-122.337532  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #2- Dry Creek at Washington Street  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/22/14 - 9/23/14 Well Depth (ft): 50  
 Boring Depth (ft): 100 Well Screen (ft): 25-45

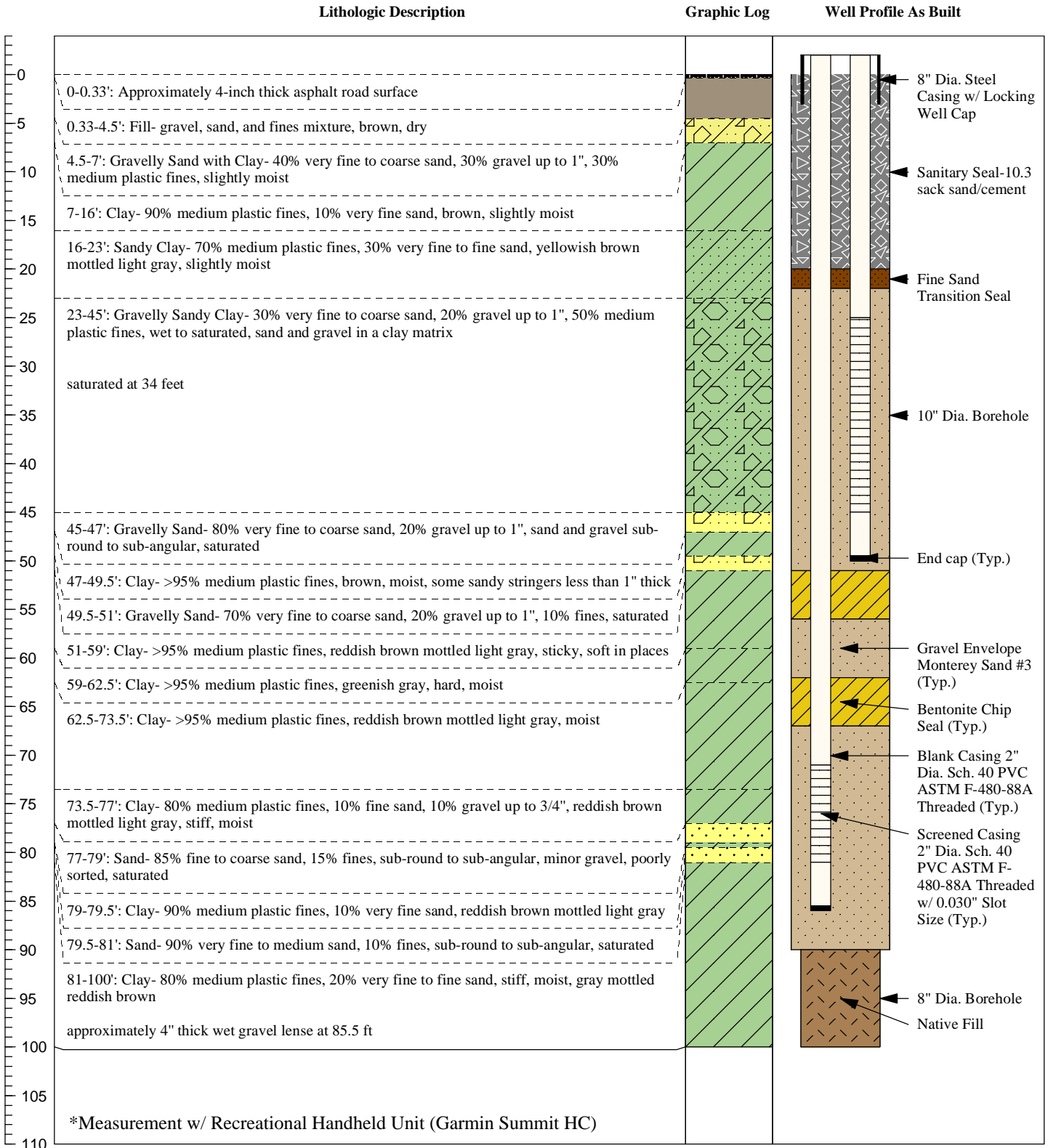


**FIGURE 2.7**



LSCE Project No. 12-1-071  
 Well Name: Napa County-217d-swgw2  
 Lat./Long.: 38.365231/-122.337532  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #2- Dry Creek at Washington Street  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/22/14 - 9/23/14 Well Depth (ft): 86  
 Boring Depth (ft): 100 Well Screen (ft): 71-81



**FIGURE 2.8**



**FIGURE 2.9**  
**Site Map**  
**Site 3:Napa River at Oak Knoll Ave**

LSCE Project No. 12-1-071

Site: Site #3- Napa River at Oak Knoll Avenue

Well Name: Napa County-218s-swgw3

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.367255/-122.304954

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/8/14 - 9/9/14 Well Depth (ft): 40

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 25-35

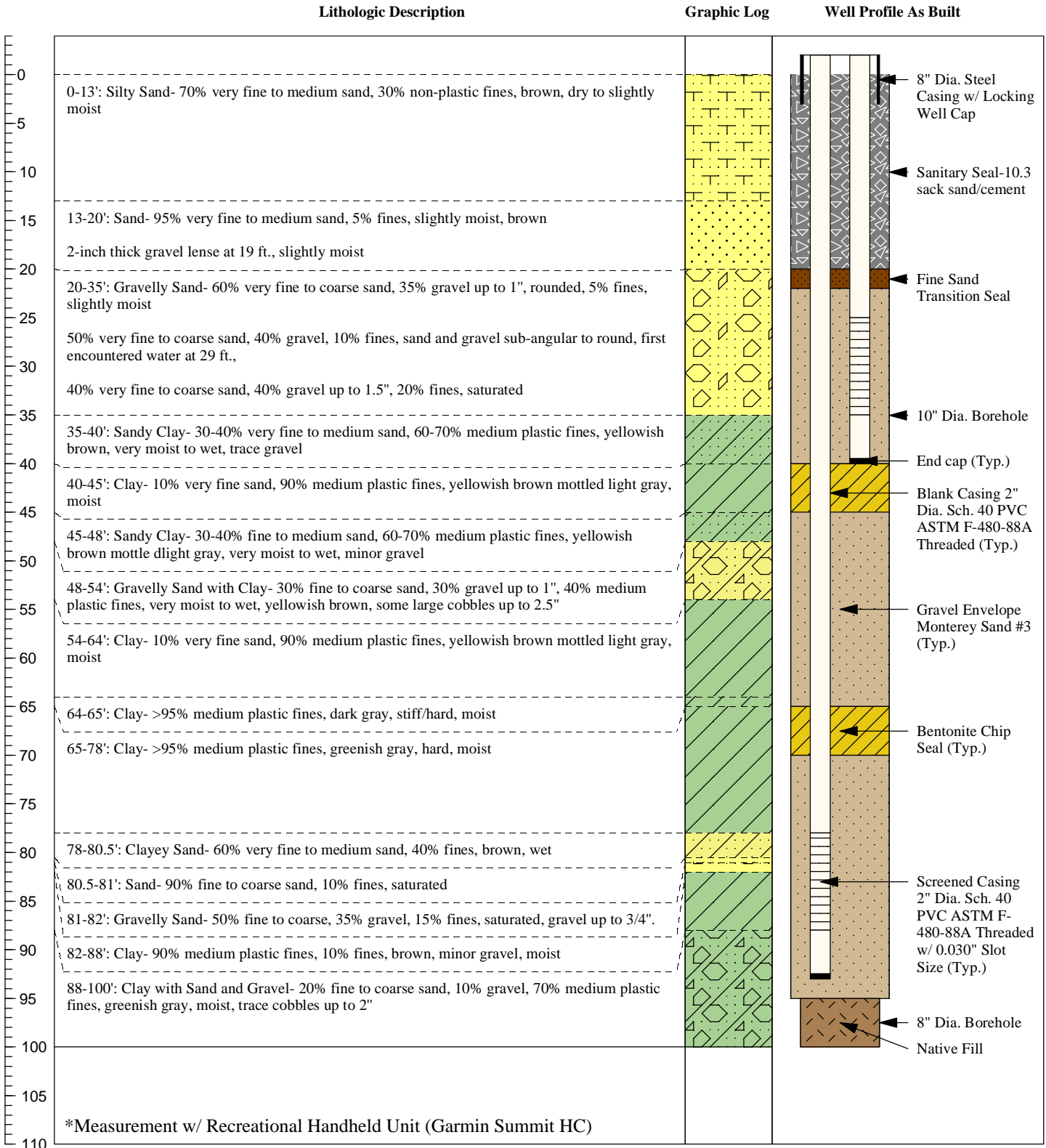


FIGURE 2.10

LSCE Project No. 12-1-071

Site: Site #3- Napa River at Oak Knoll Avenue

Well Name: Napa County-219d-swgw3

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.367255/-122.304954

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/8/14 - 9/9/14 Well Depth (ft): 93

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 78-88

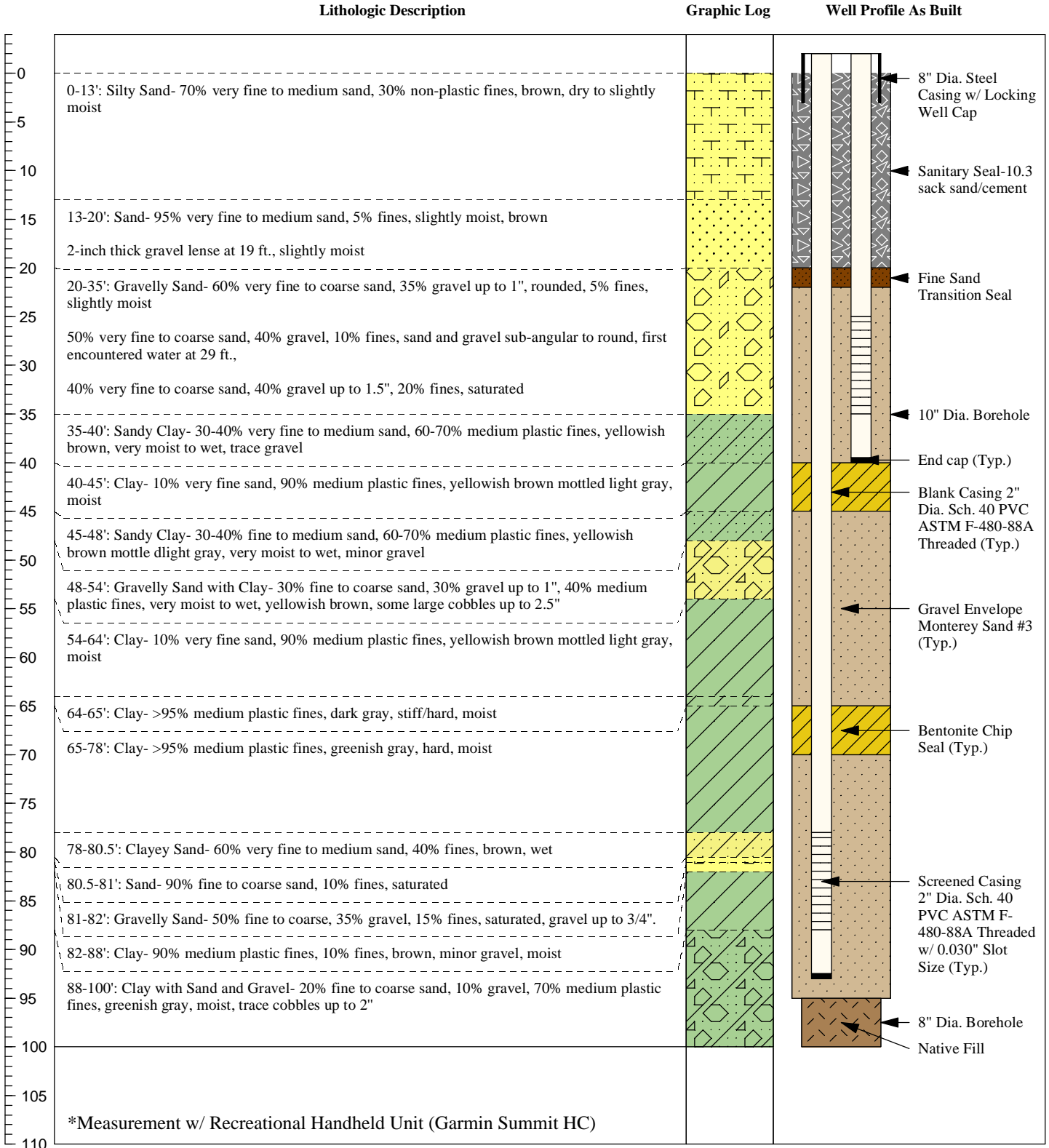


FIGURE 2.11

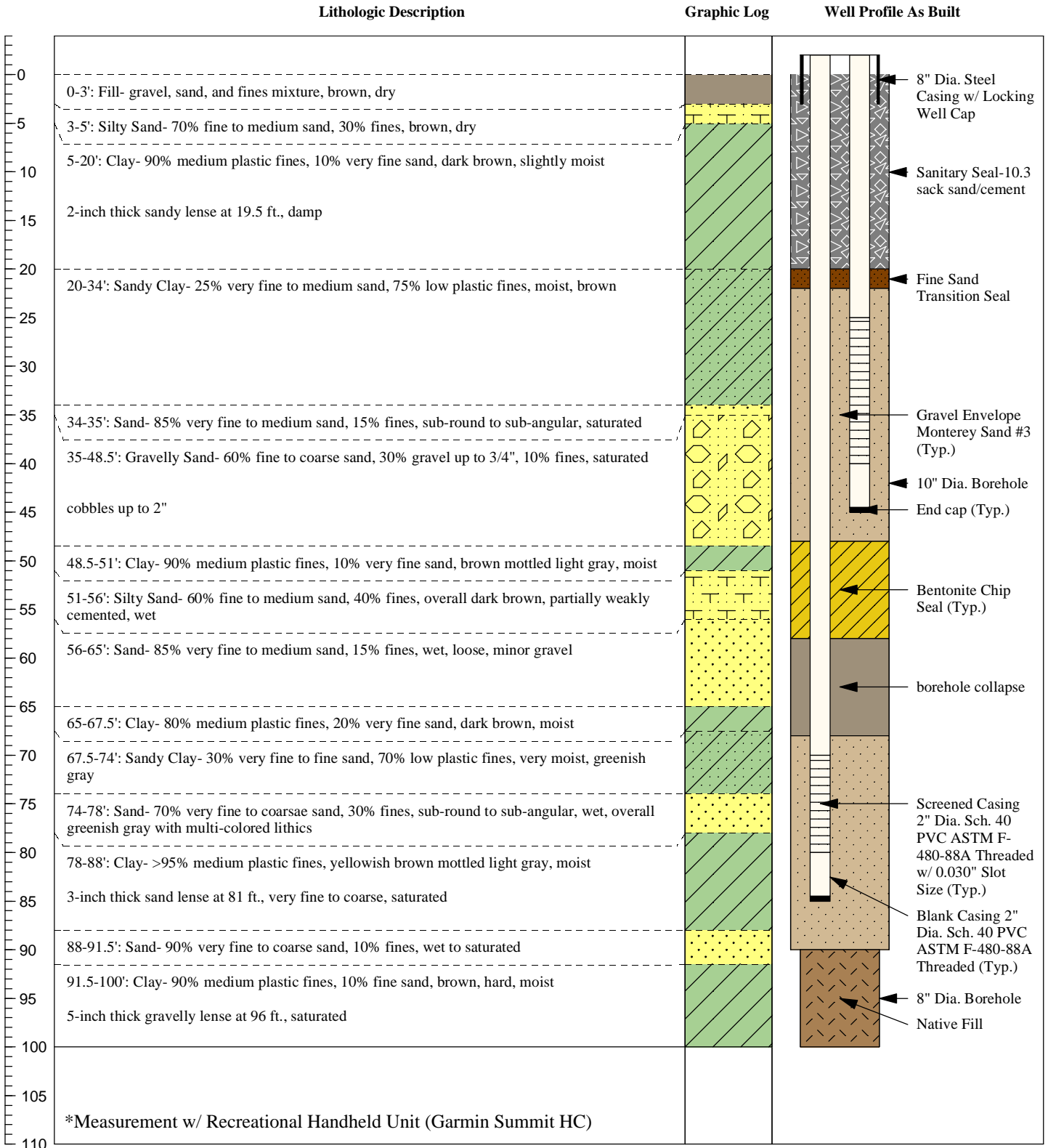


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**FIGURE 2.12**  
**Site Map**  
**Site 4: Napa River at Yountville Cross Rd**

LSCE Project No. 12-1-071  
 Well Name: Napa County-220s-swgw4  
 Lat./Long.: 38.417573/-122.352665  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #4- Napa River at Yountville Cross Road  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/10/14 - 9/11/14 Well Depth (ft): 45  
 Boring Depth (ft): 100 Well Screen (ft): 25-40



**FIGURE 2.13**

LSCE Project No. 12-1-071

Site: Site #4- Napa River at Yountville Cross Road

Well Name: Napa County-221d-swgw4

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.417573/-122.352665

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/10/14 - 9/11/14 Well Depth (ft): 85

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 70-80

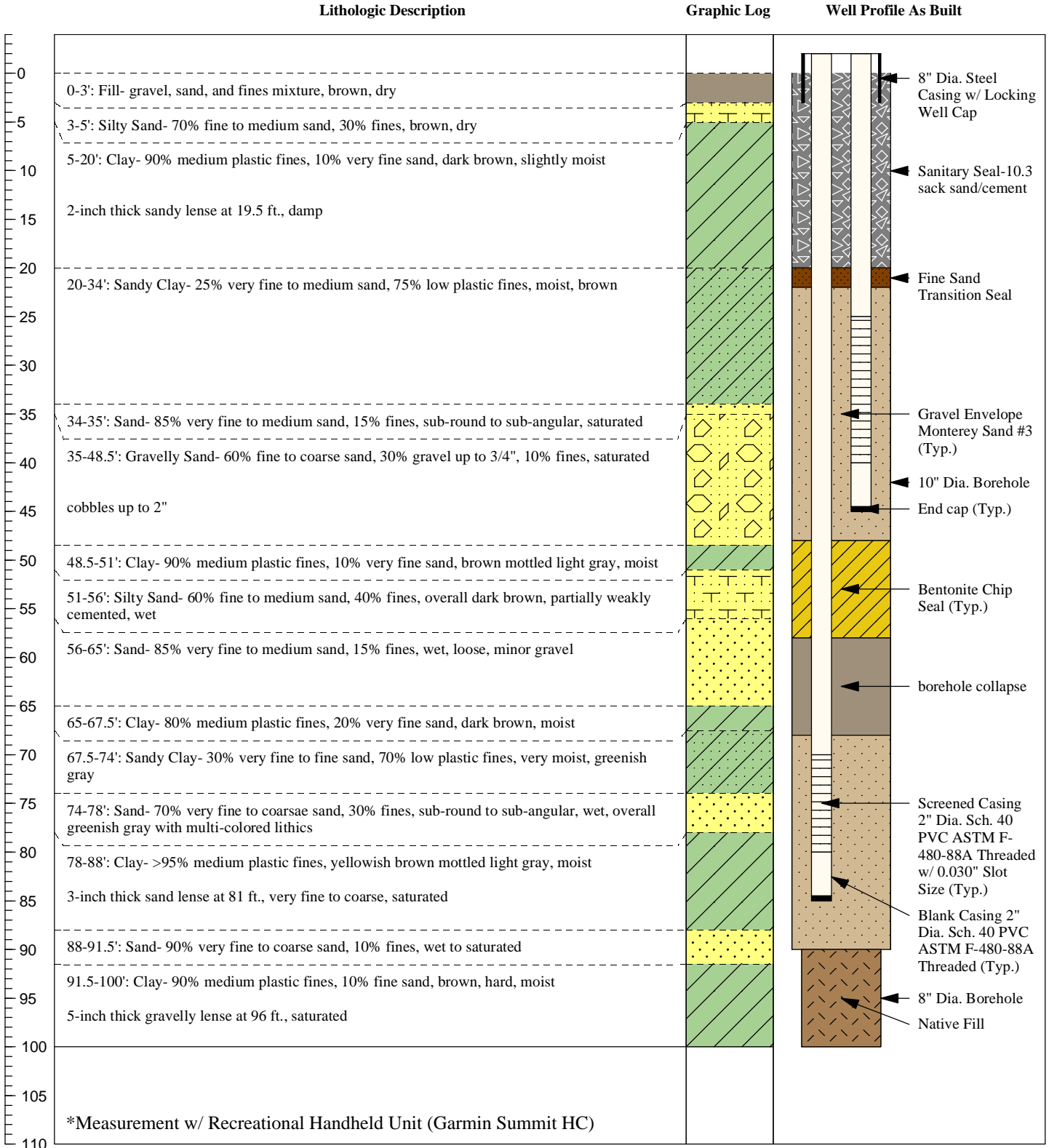


FIGURE 2.14



**FIGURE 2.15**  
**Site Map**  
**Site 5: Napa River at Pope St**



LSCE Project No. 12-1-071

Site: Site #5- Napa River at Pope Street

Well Name: Napa County-222s-swgw5

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.510898/-122.456426

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/15/14 - 9/16/14 Well Depth (ft): 40

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 25-35

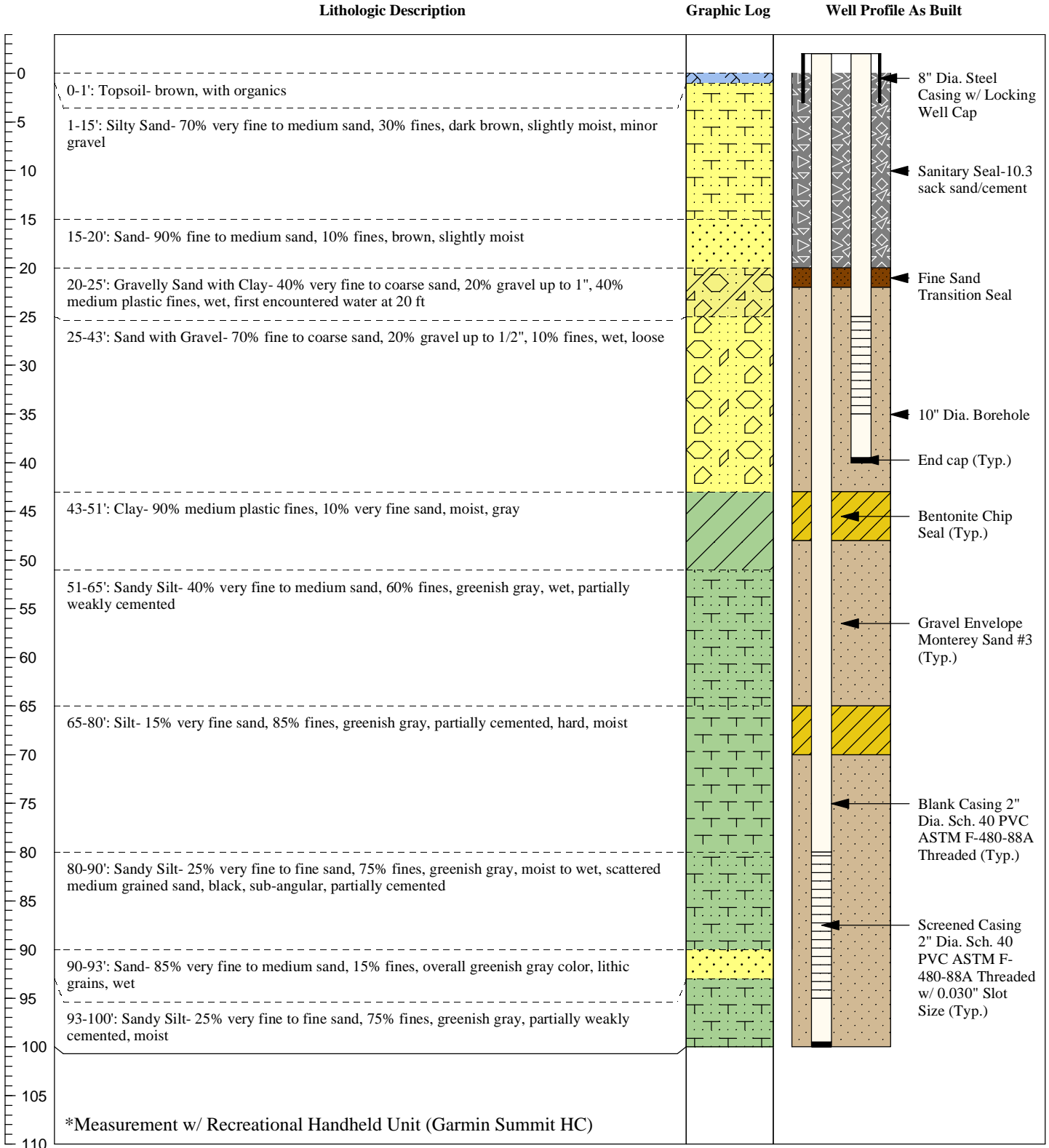


FIGURE 2.16

LSCE Project No. 12-1-071

Site: Site #5- Napa River at Pope Street

Well Name: Napa County-223d-swgw5

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.510898/-122.456426

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/15/14 - 9/16/14 Well Depth (ft): 100

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 80-95

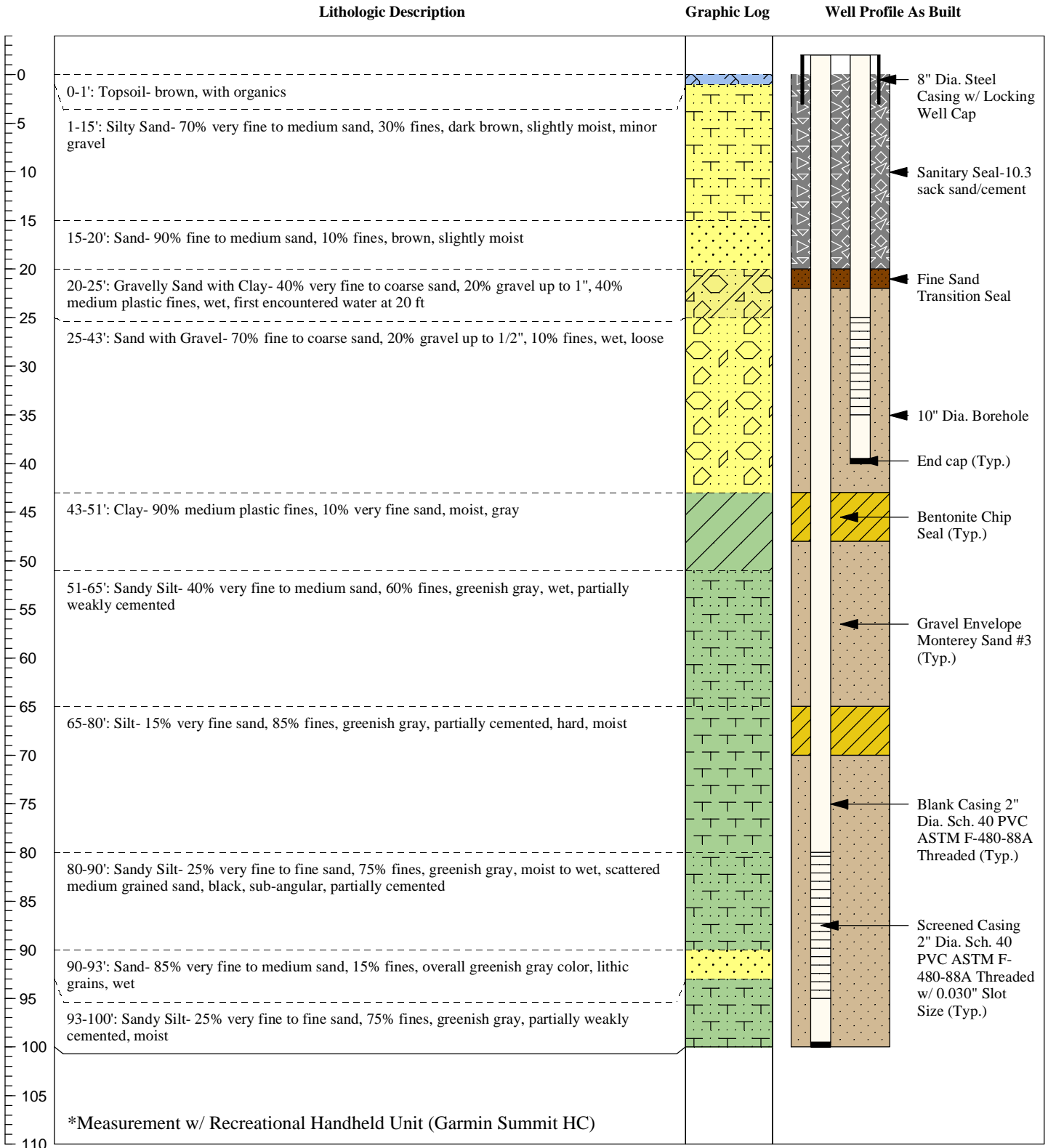
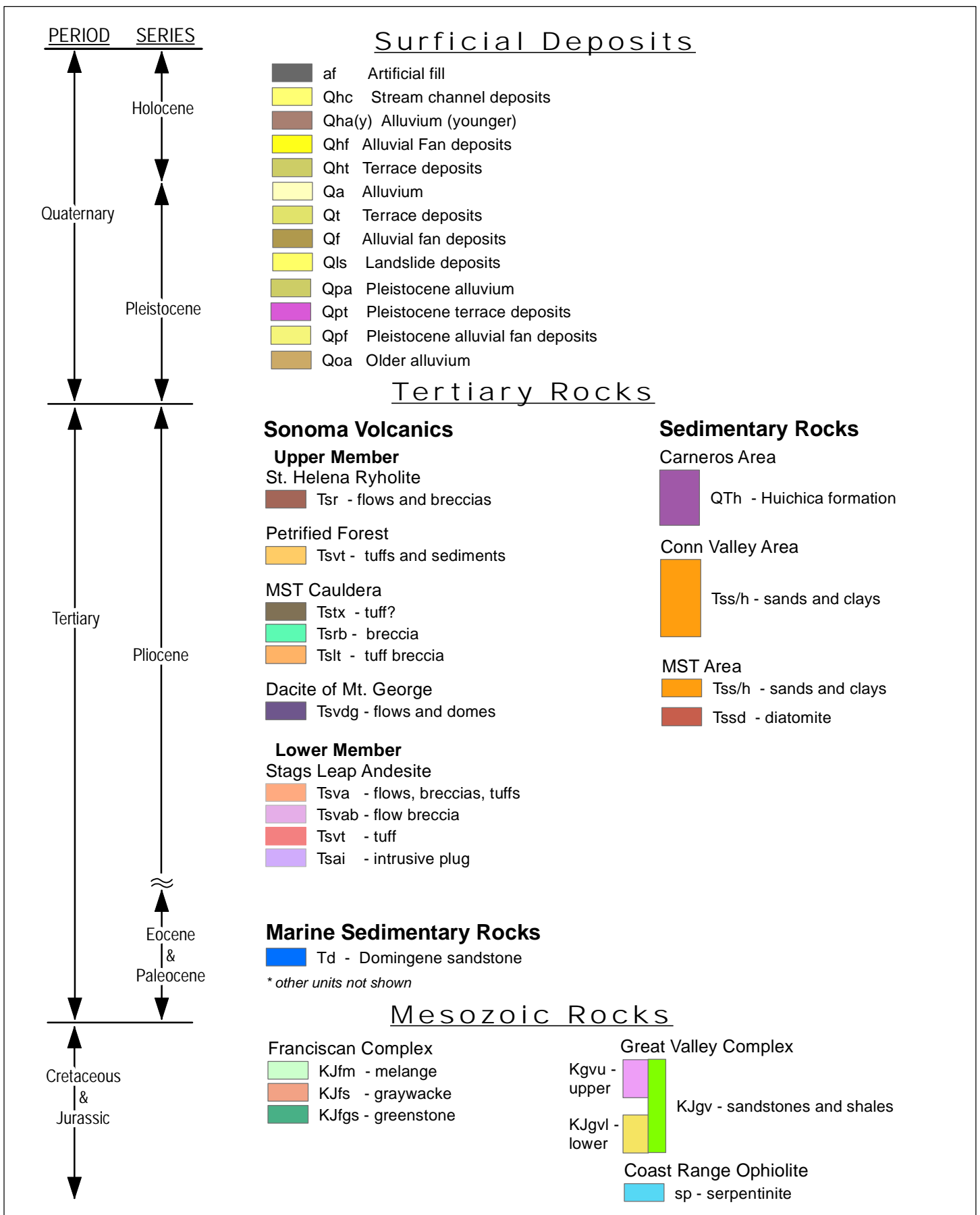
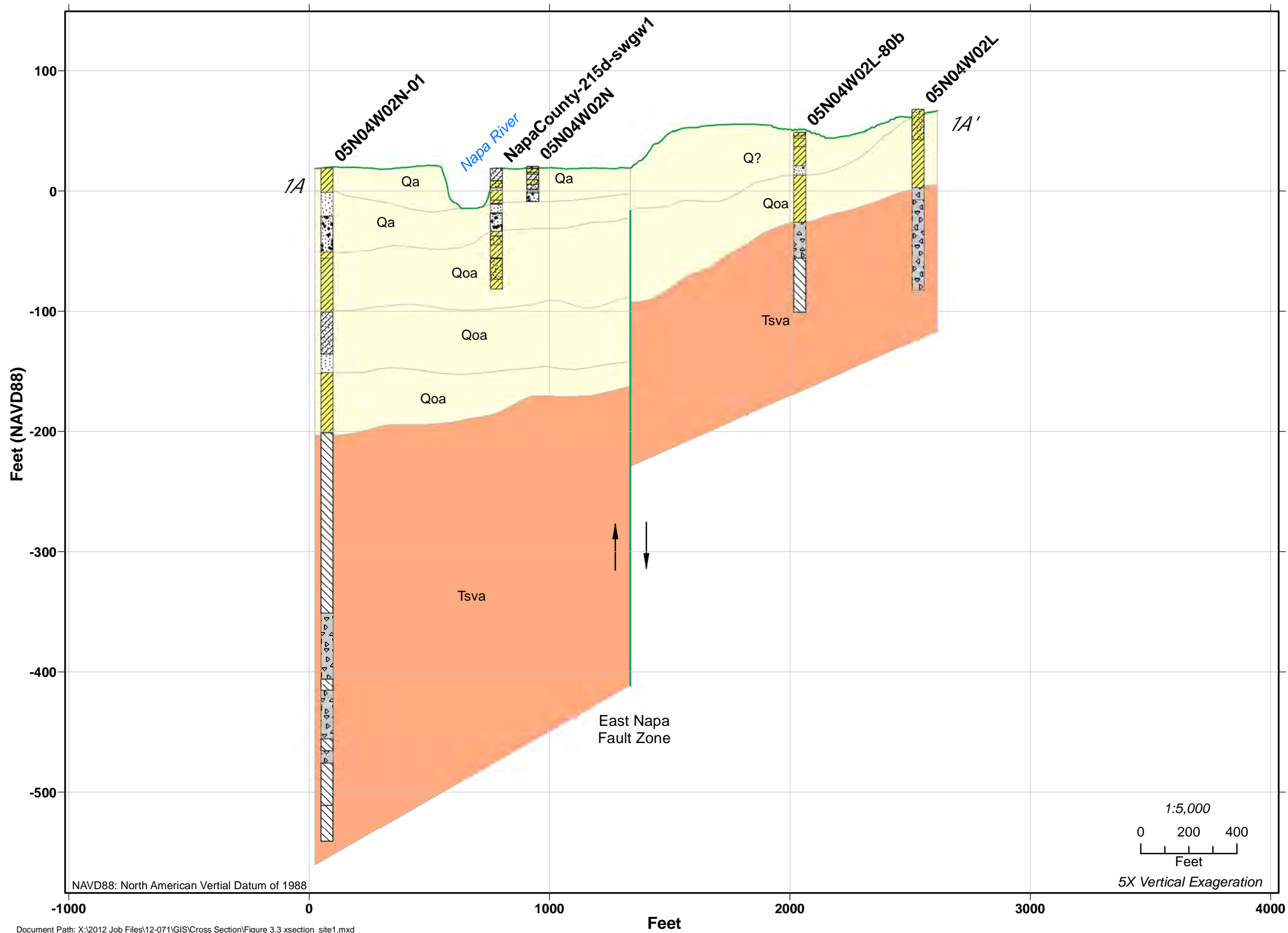


FIGURE 2.17



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**Legend**

- Fault

**Borehole Lithology**

- Gravel
- Sand (or Sandstone) and Gravel
- Sand
- Sand and Clay
- Clay
- Clay and Sand (or Sandstone)
- Clay, Sand, and Gravel
- Volcanic Rock (Basalt, Andesite, Rhyolite, etc.)
- Tuff or Ash

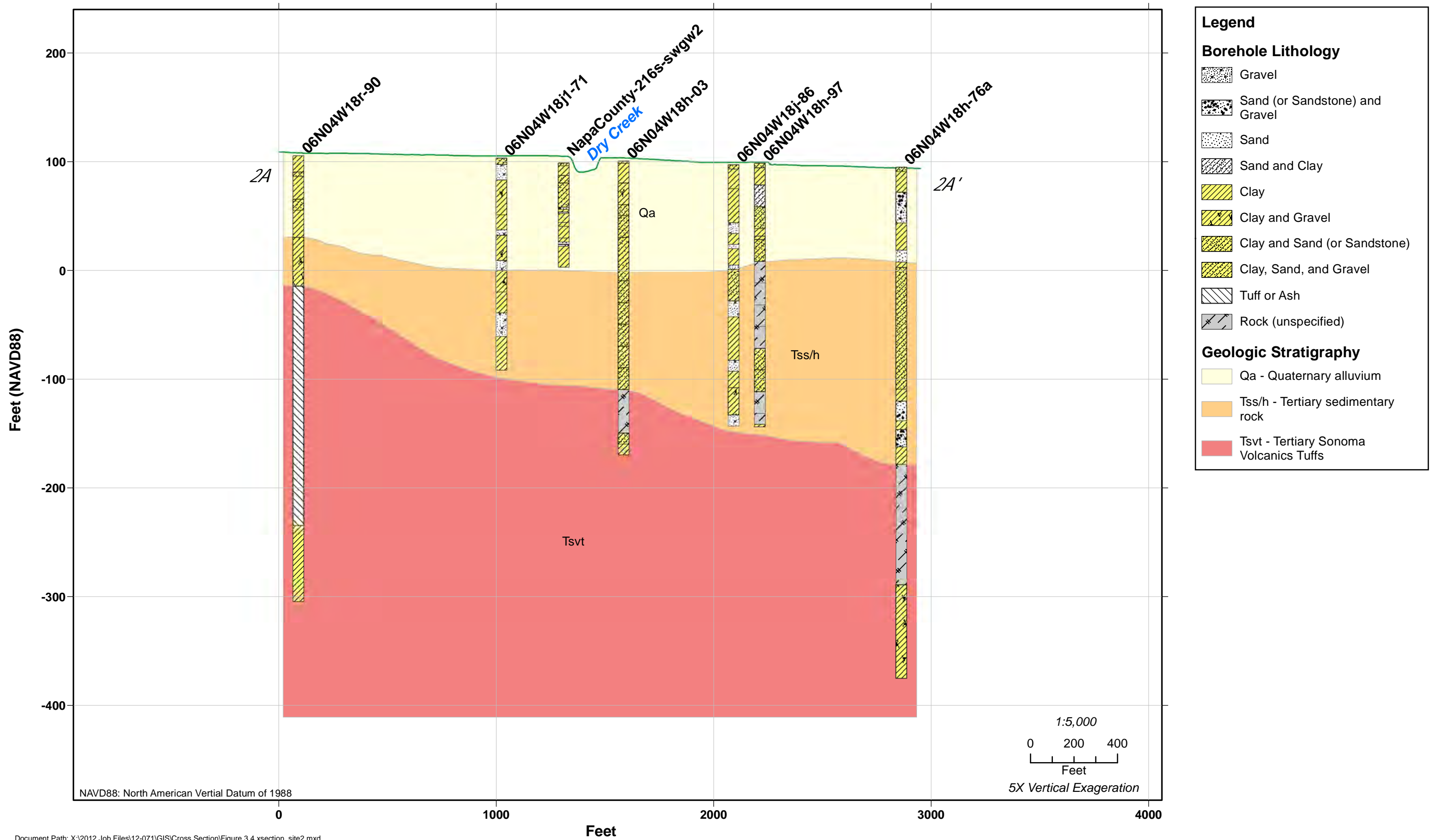
**Geologic Stratigraphy**

- Qa - Quaternary alluvium, younger; Qoa - Quaternary alluvium, older; Q? - Quaternary, undifferentiated
- Tsva - Tertiary Sonoma Volcanics - Andesite flows and breccias

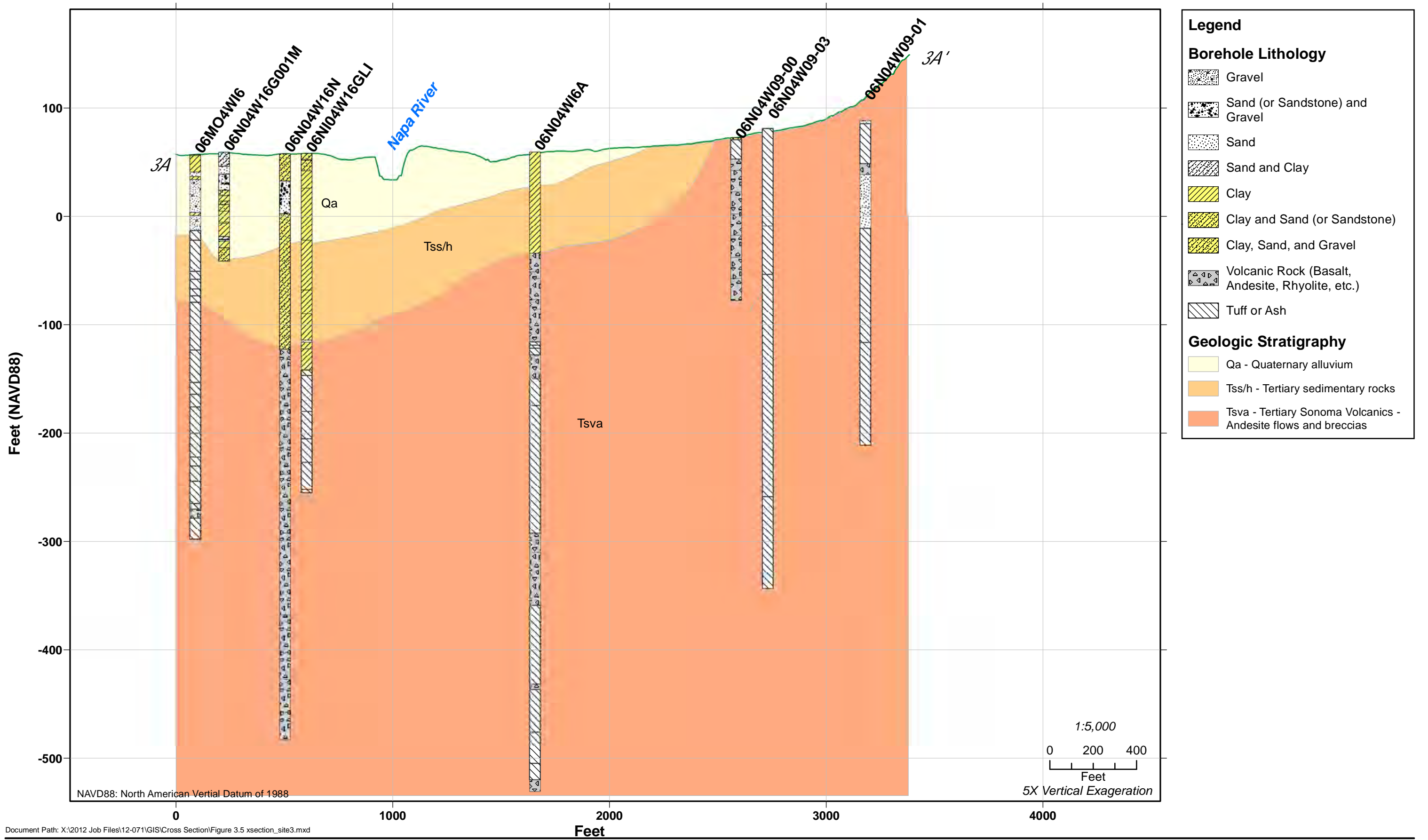
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**Figure 3.3**  
**Geologic Cross Section**  
**Site 1 - Napa River at First Street**  
 Napa County Groundwater/Surface Water Monitoring Facilities  
 Report, DWR LGA Grant Program

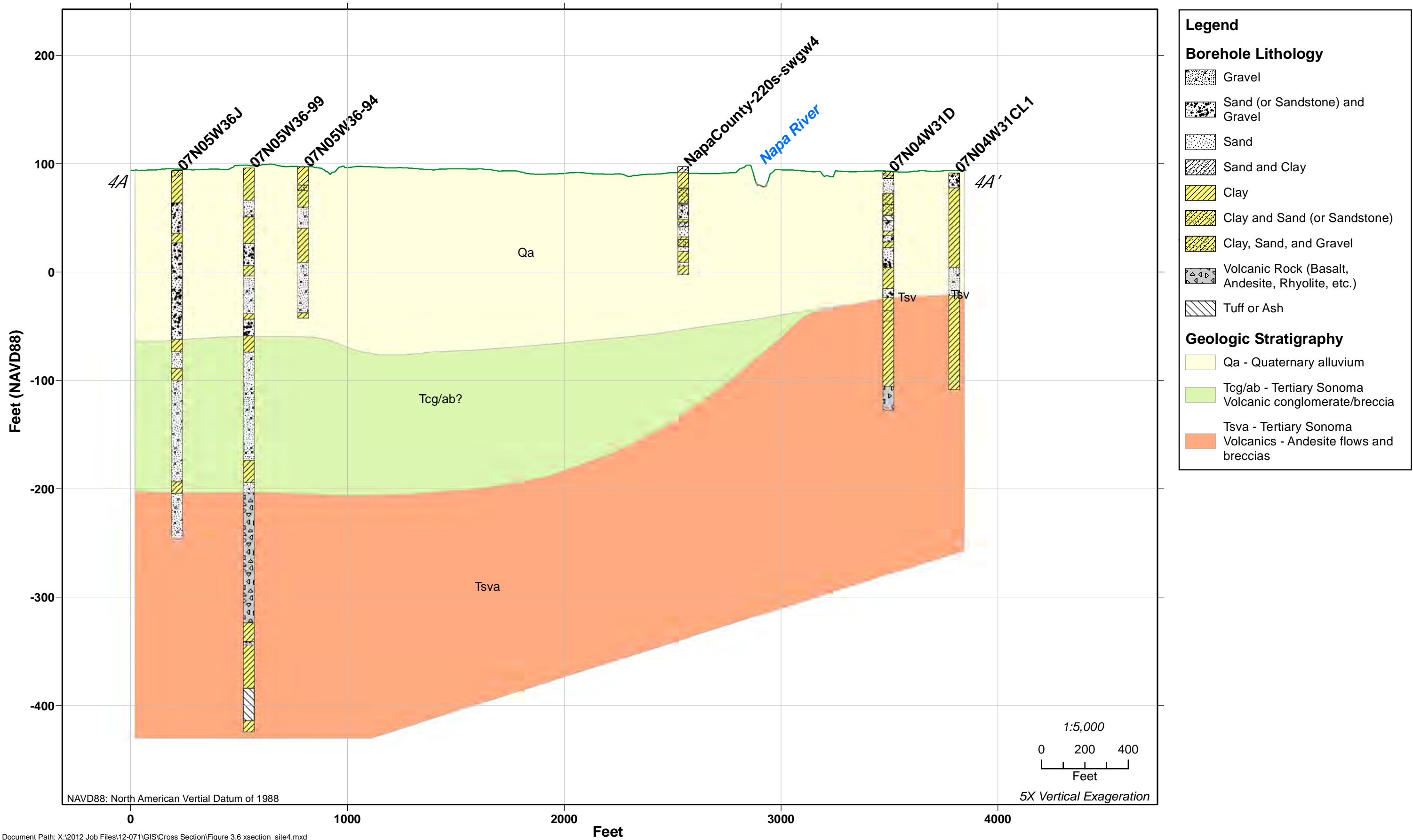


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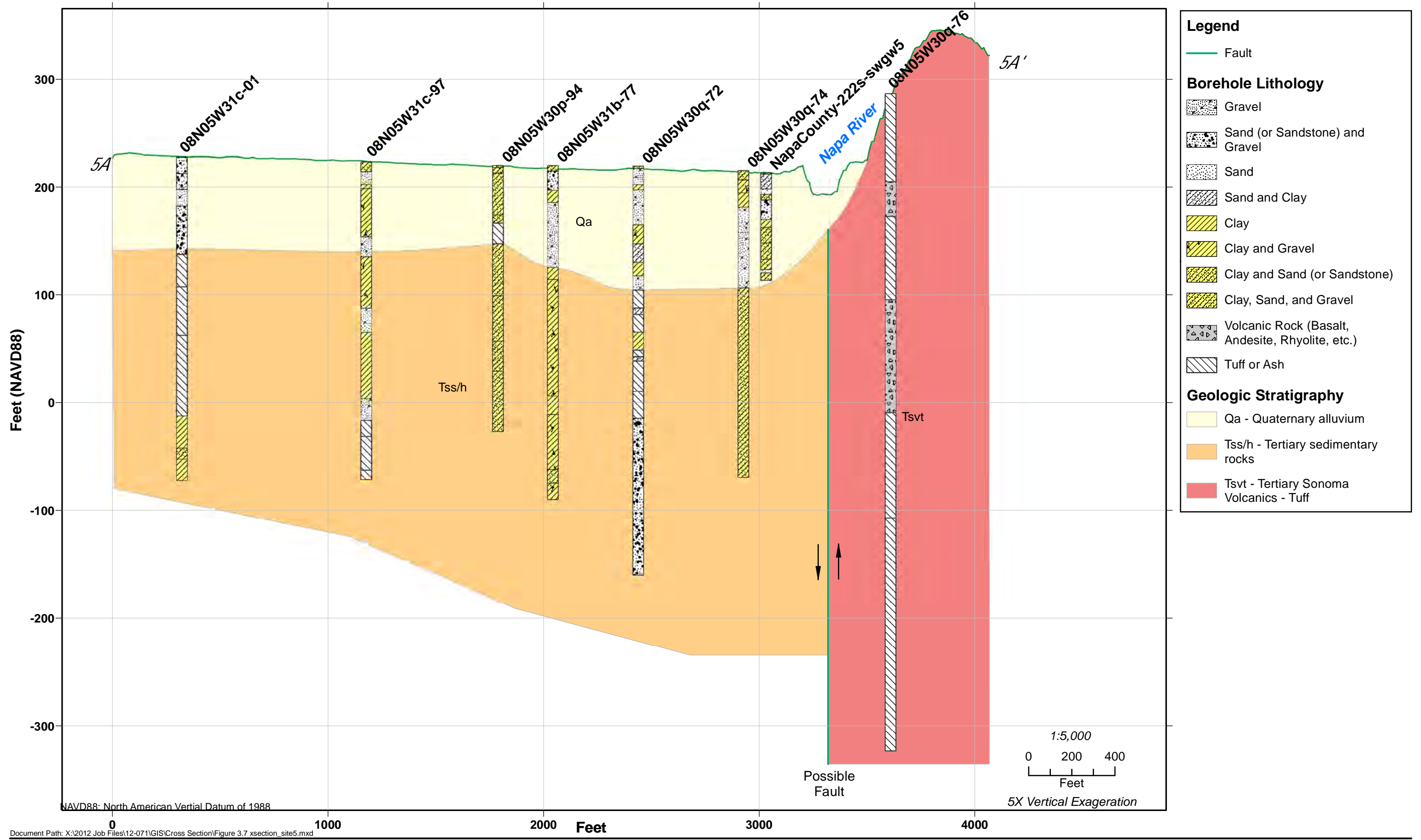


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**Figure 3.5**  
**Geologic Cross Section**  
**Site 3 - Napa River at Oak Knoll Avenue**



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**Legend**

- Fault

**Borehole Lithology**

- Gravel
- Sand (or Sandstone) and Gravel
- Sand
- Sand and Clay
- Clay
- Clay and Gravel
- Clay and Sand (or Sandstone)
- Clay, Sand, and Gravel
- Volcanic Rock (Basalt, Andesite, Rhyolite, etc.)
- Tuff or Ash

**Geologic Stratigraphy**

- Qa - Quaternary alluvium
- Tss/h - Tertiary sedimentary rocks
- Tsvt - Tertiary Sonoma Volcanics - Tuff

NAVD88: North American Vertical Datum of 1988

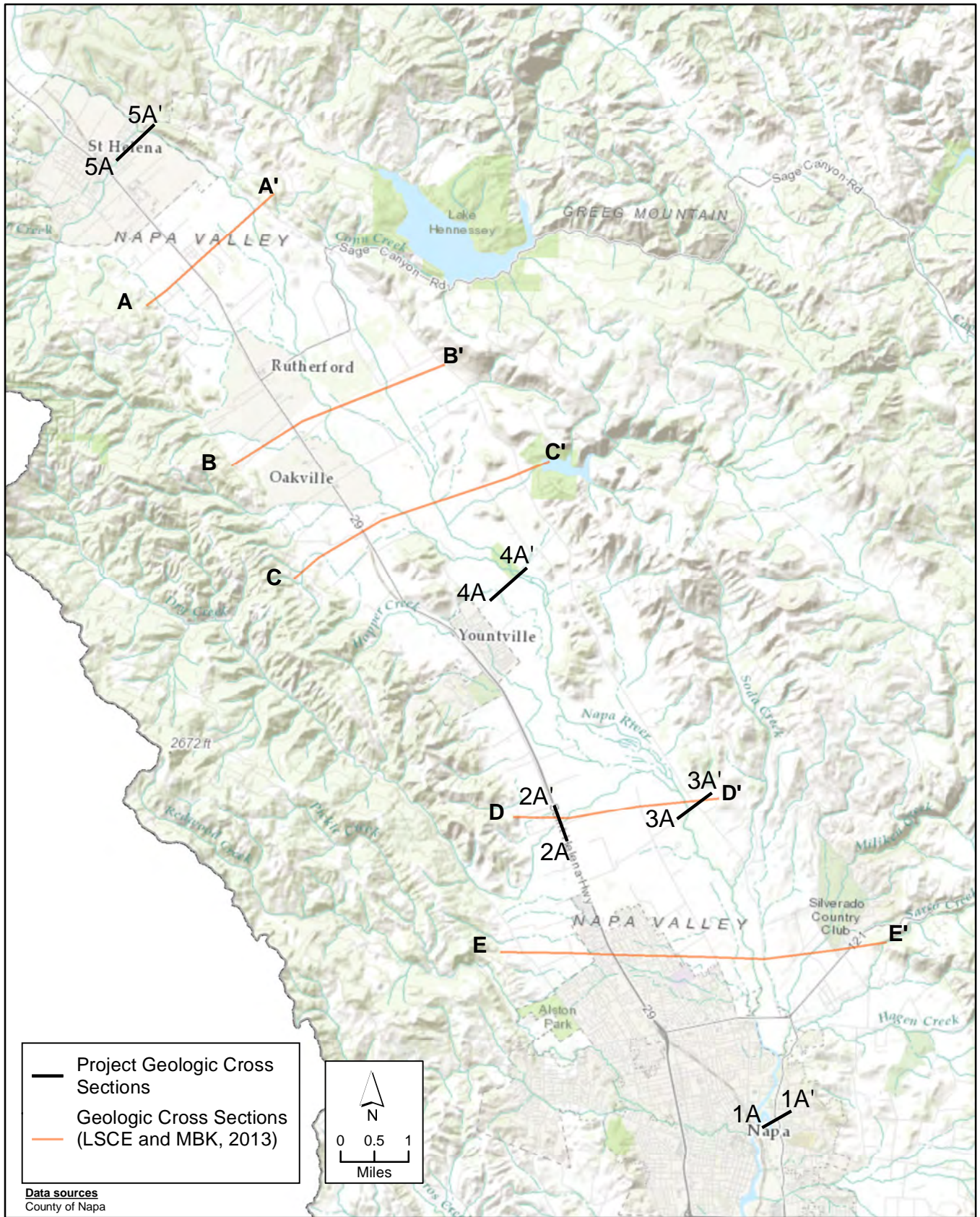
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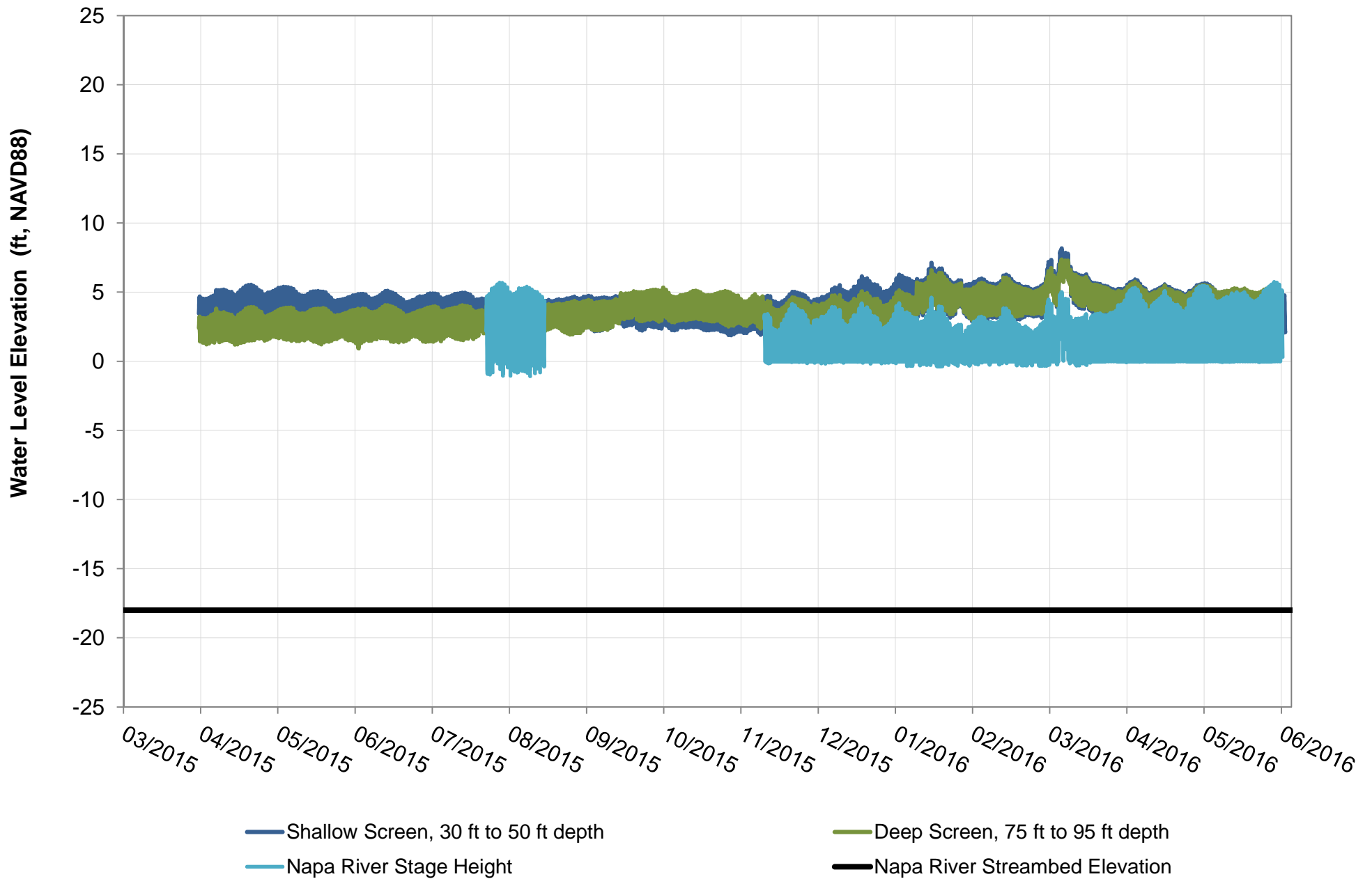
**Figure 3.7**  
**Geologic Cross Section**  
**Site 5 - Napa River at Pope Street**

Napa County Groundwater/Surface Water Monitoring  
 Facilities Report, DWR LGA Grant Program

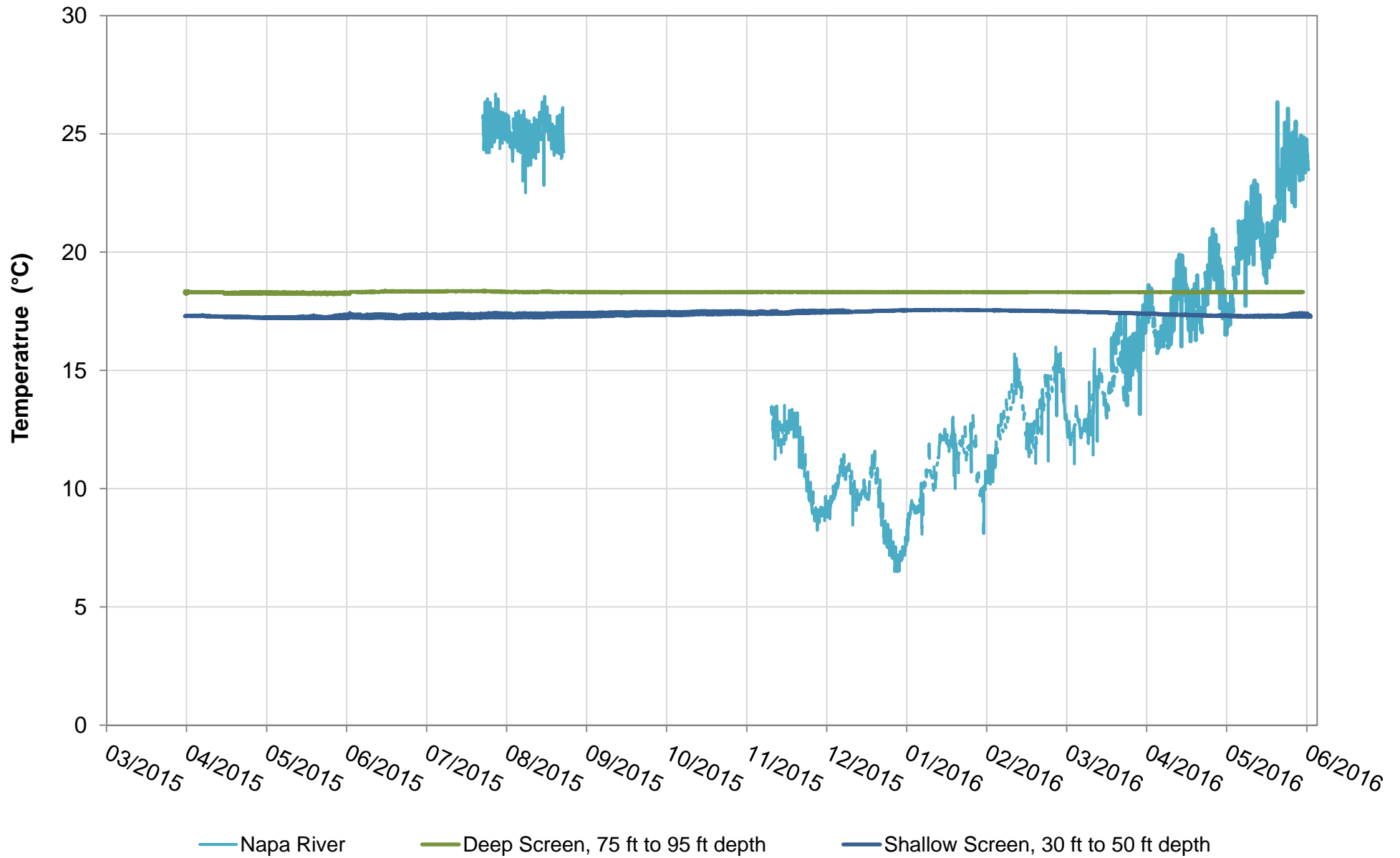




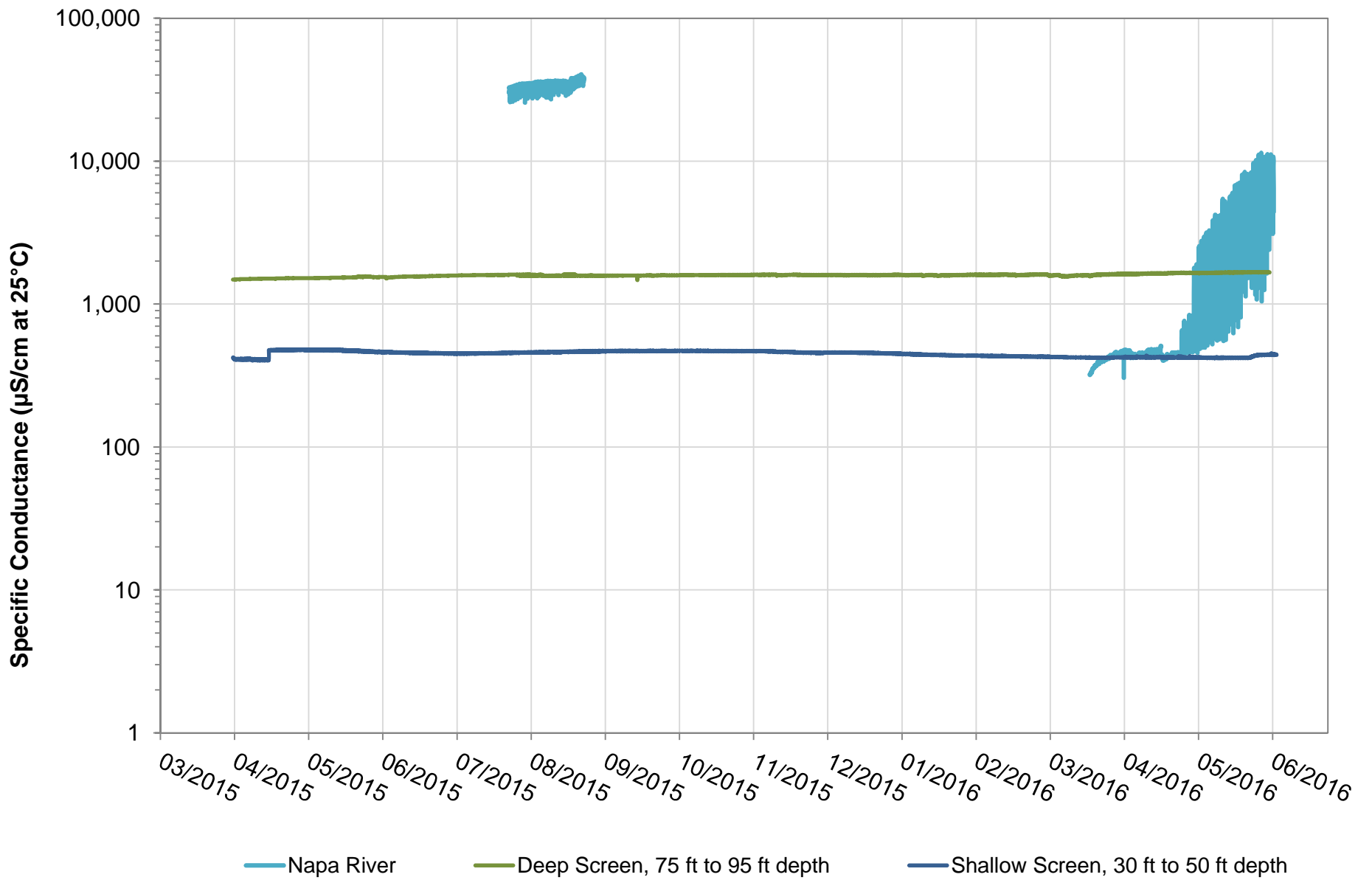
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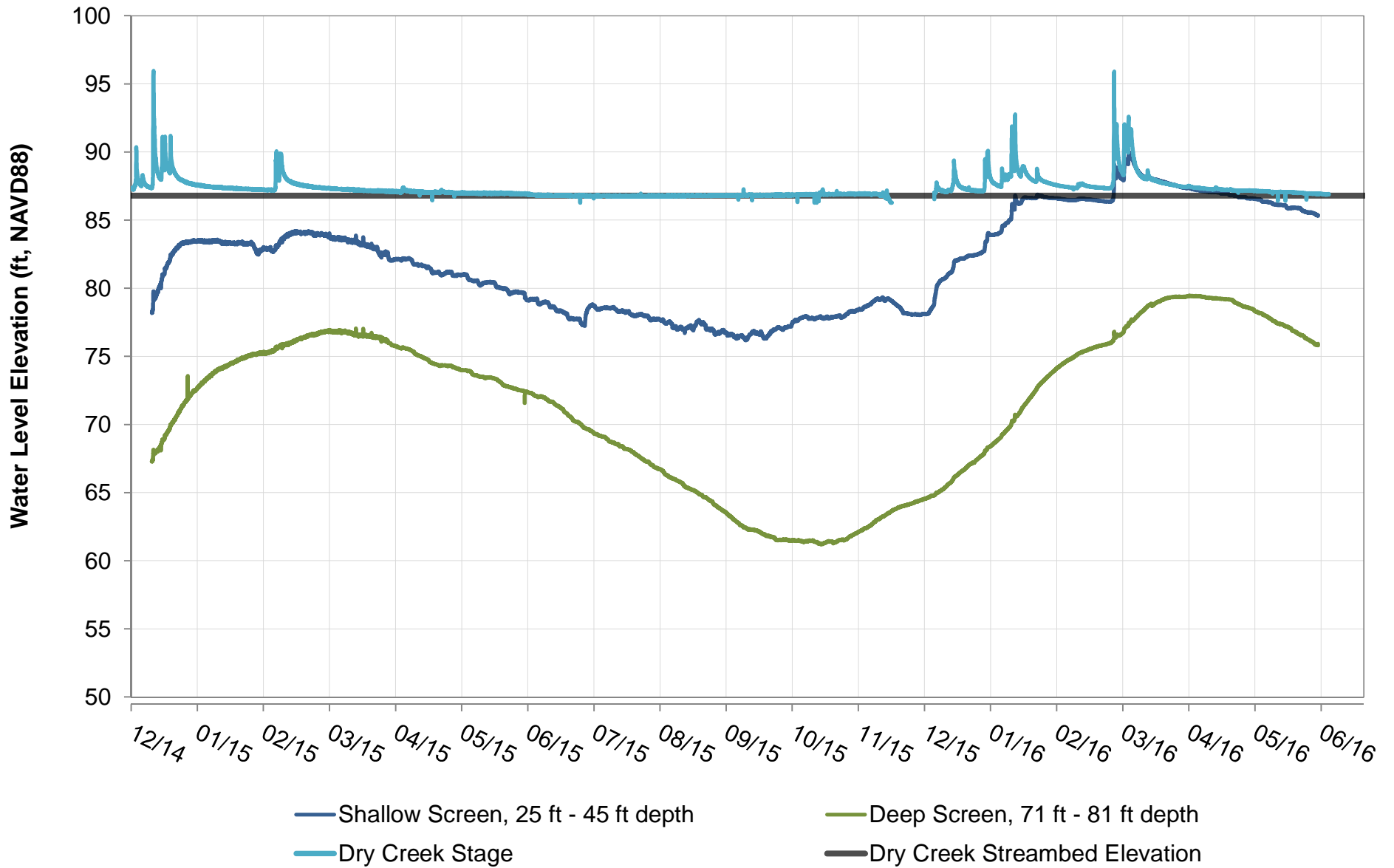
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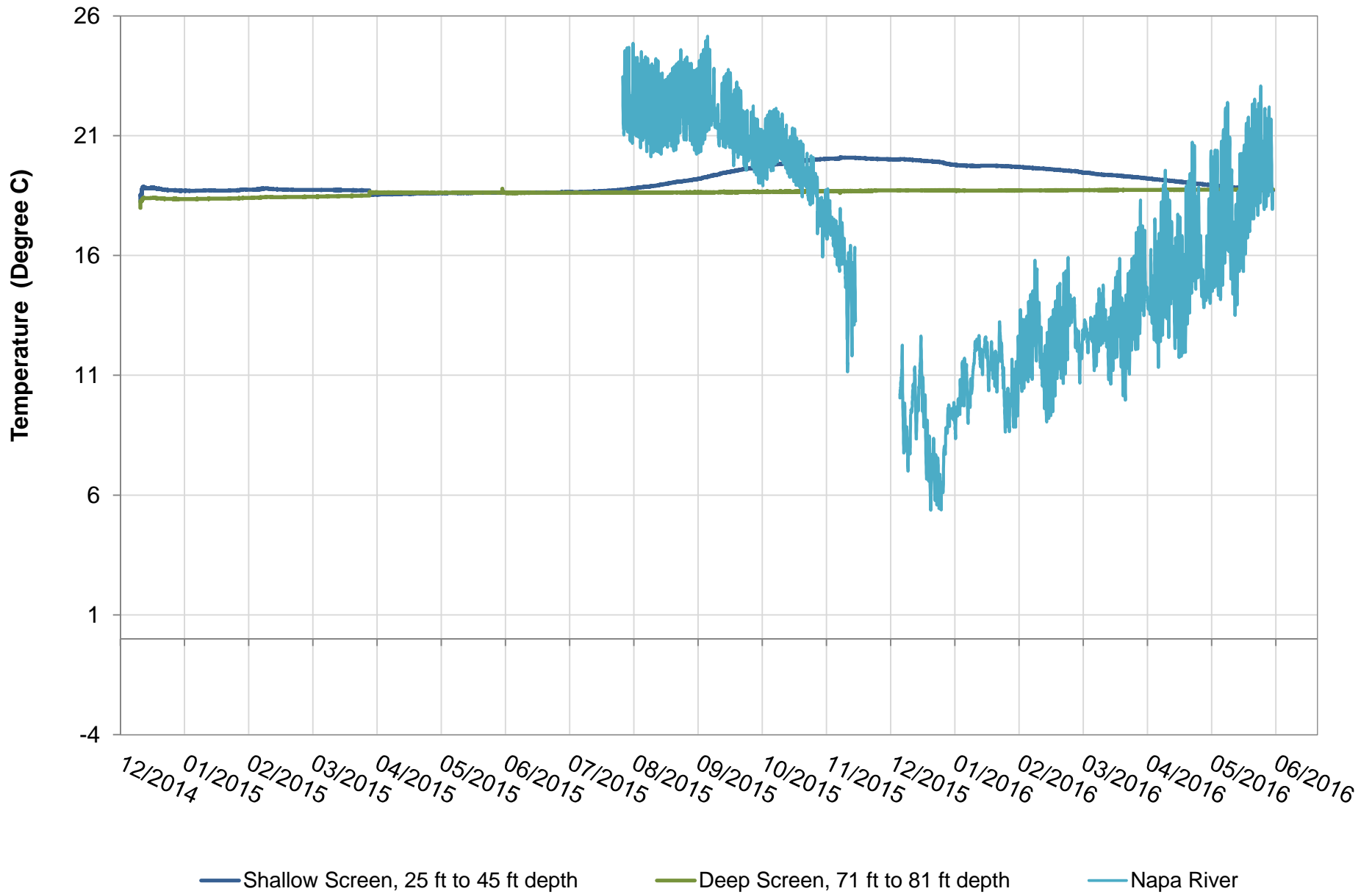
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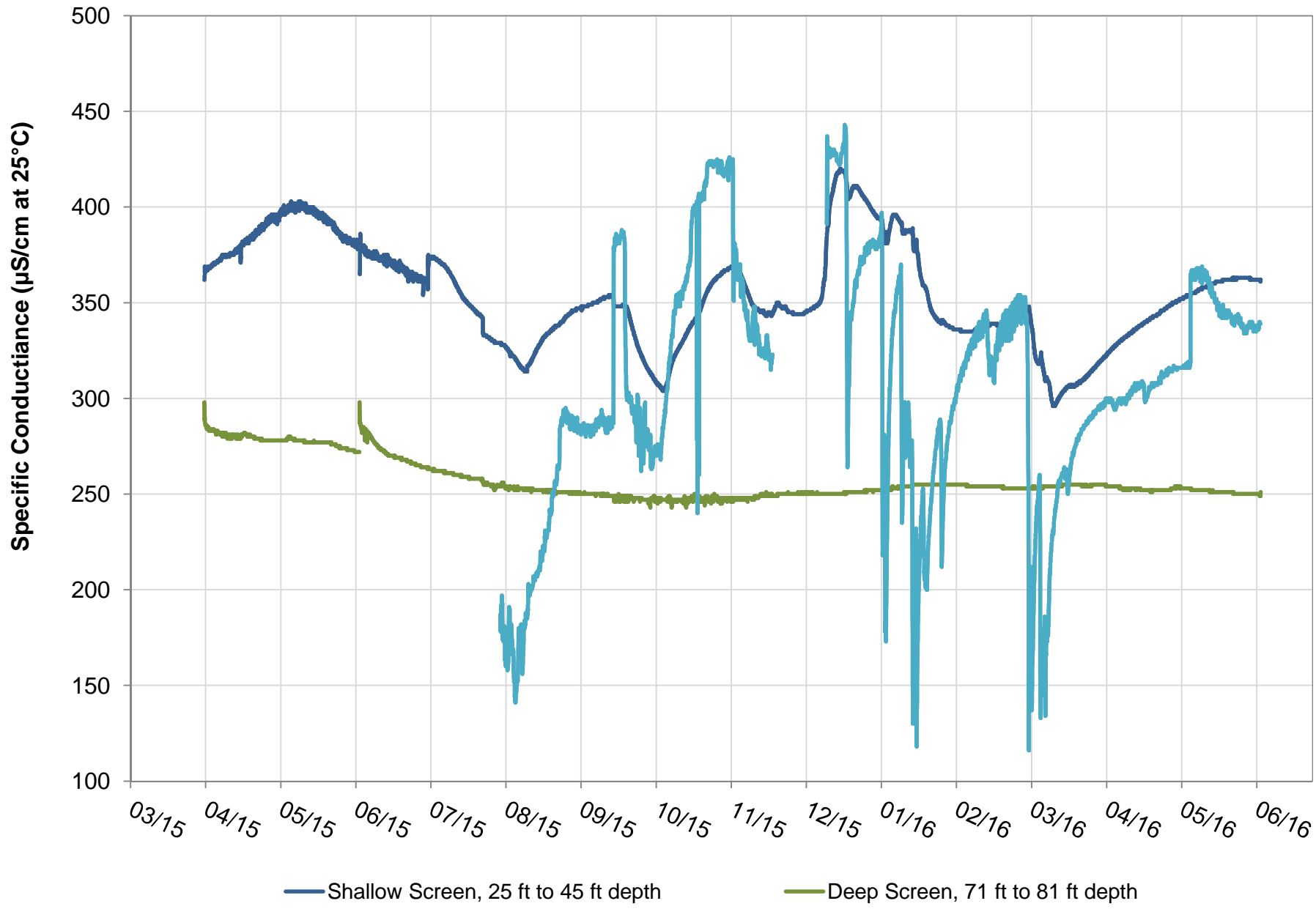
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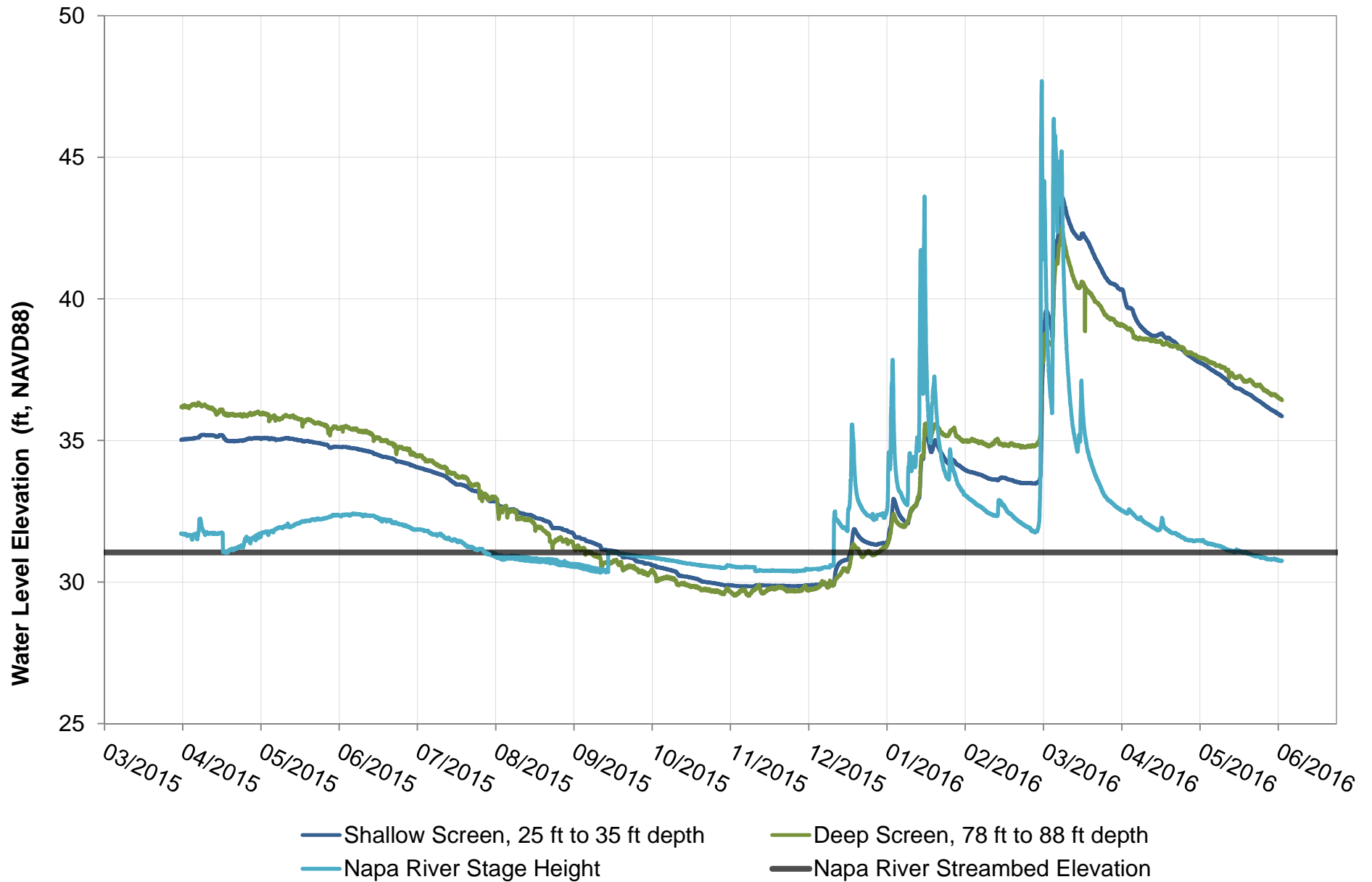
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X:\2012 Job Files\12-071\Data\\_Current Project Data Charts\DatabaseCharts.xlsm\Site 2 Charts Chart 3



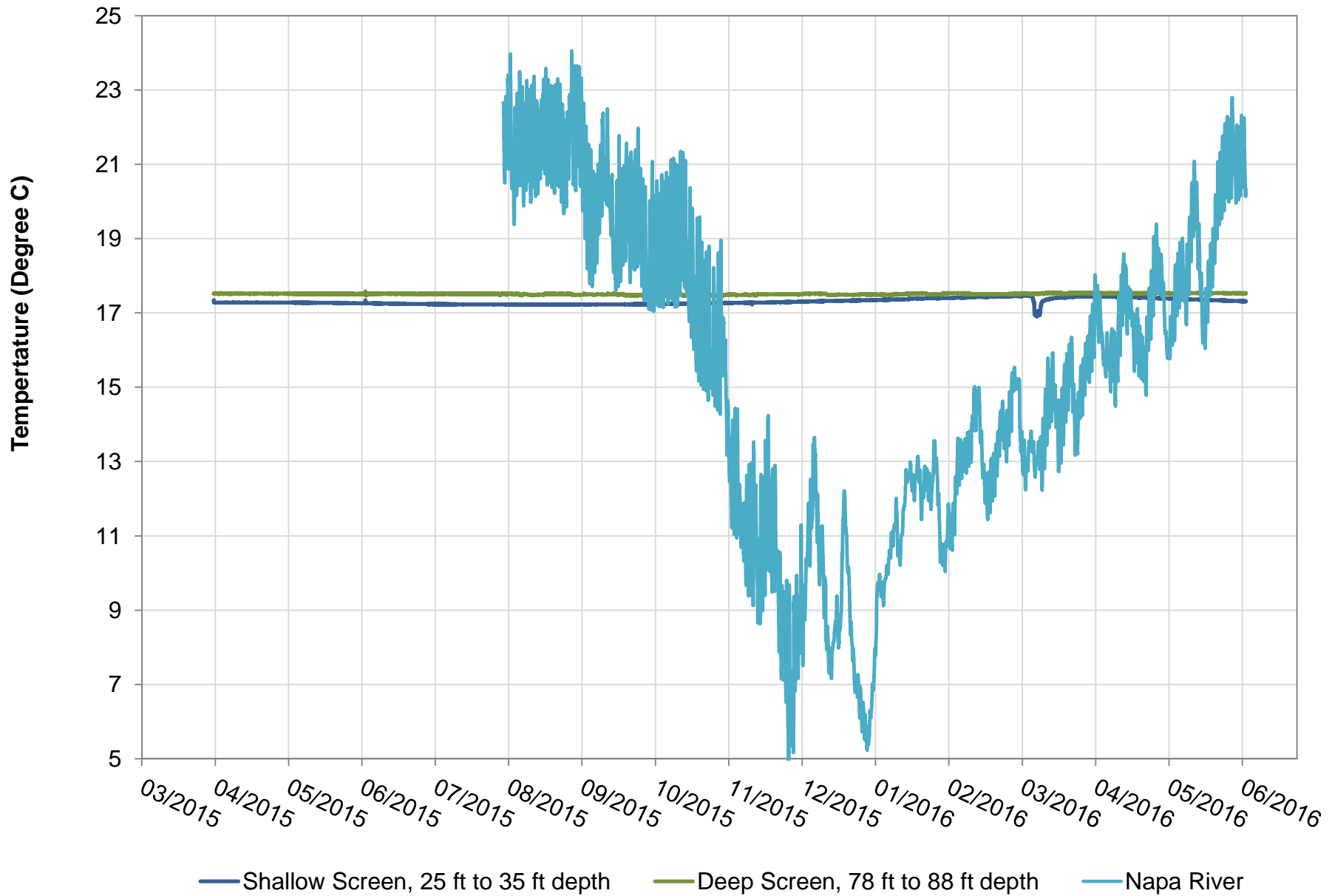
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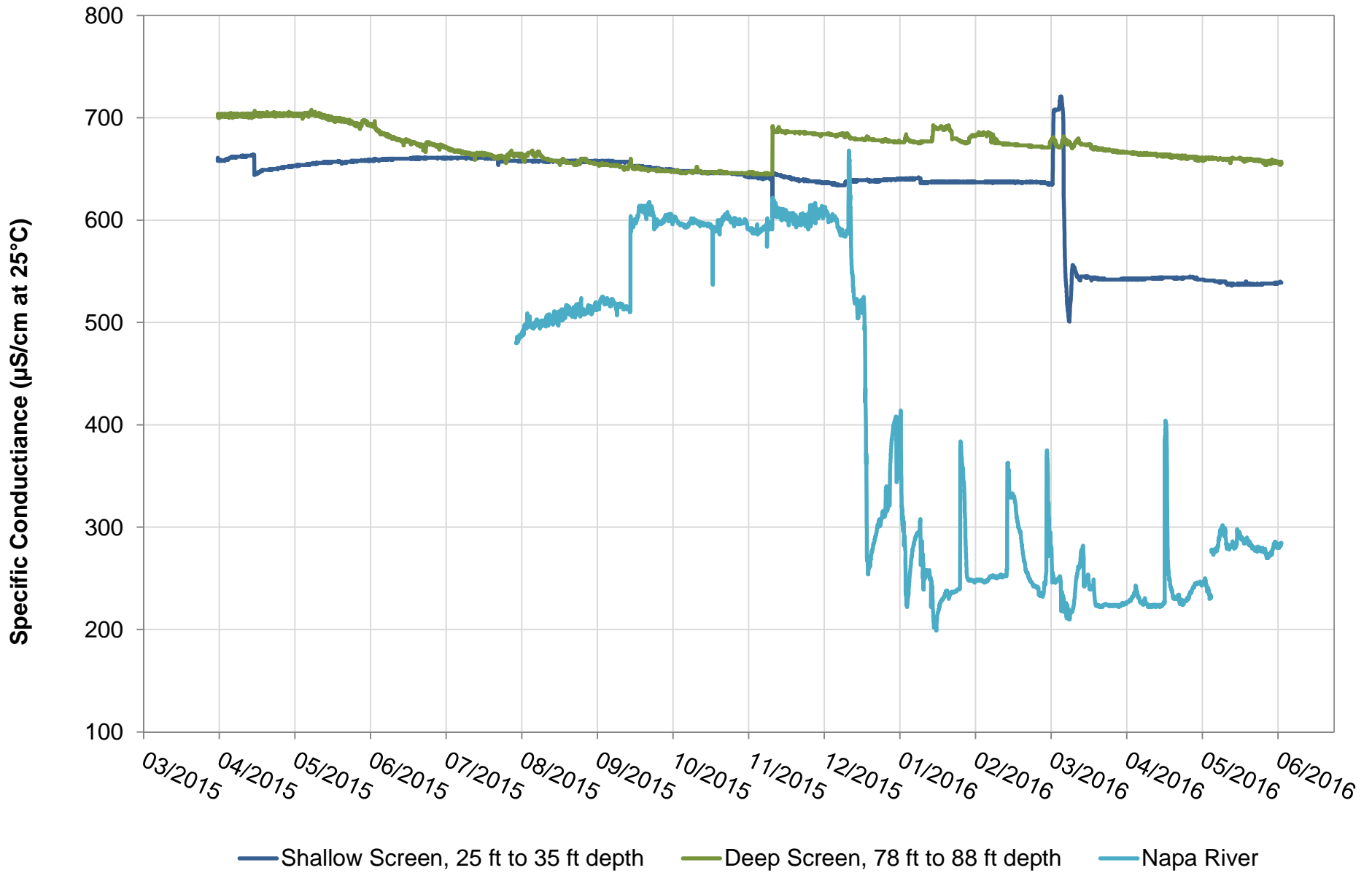
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**Figure 4.7**  
**Water Level Hydrograph**  
**Site 3: Napa River at Oak Knoll Avenue**  
*Napa County Groundwater/Surface Water Monitoring  
 Facilities Report, DWR LGA Grant Program*

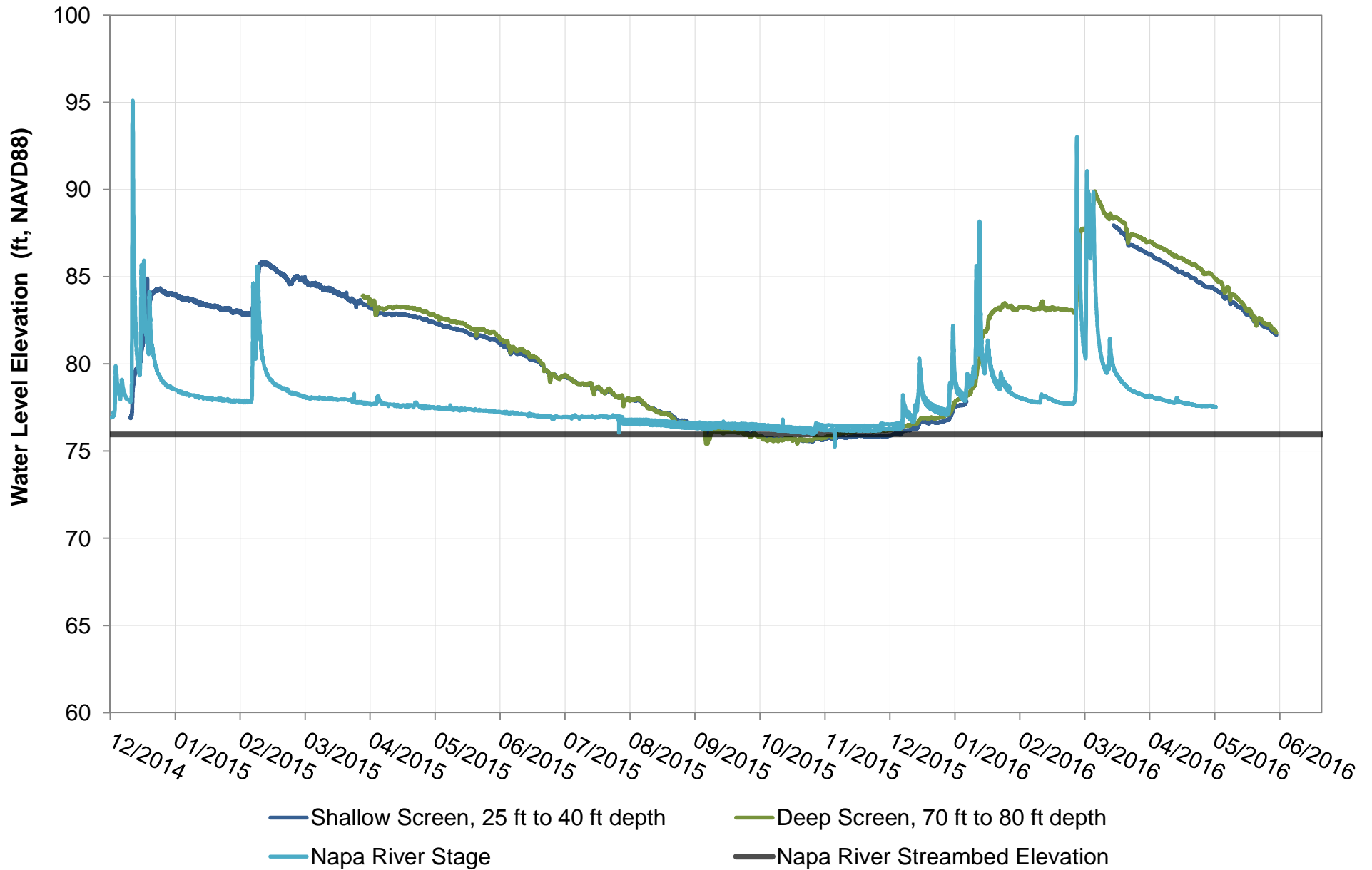




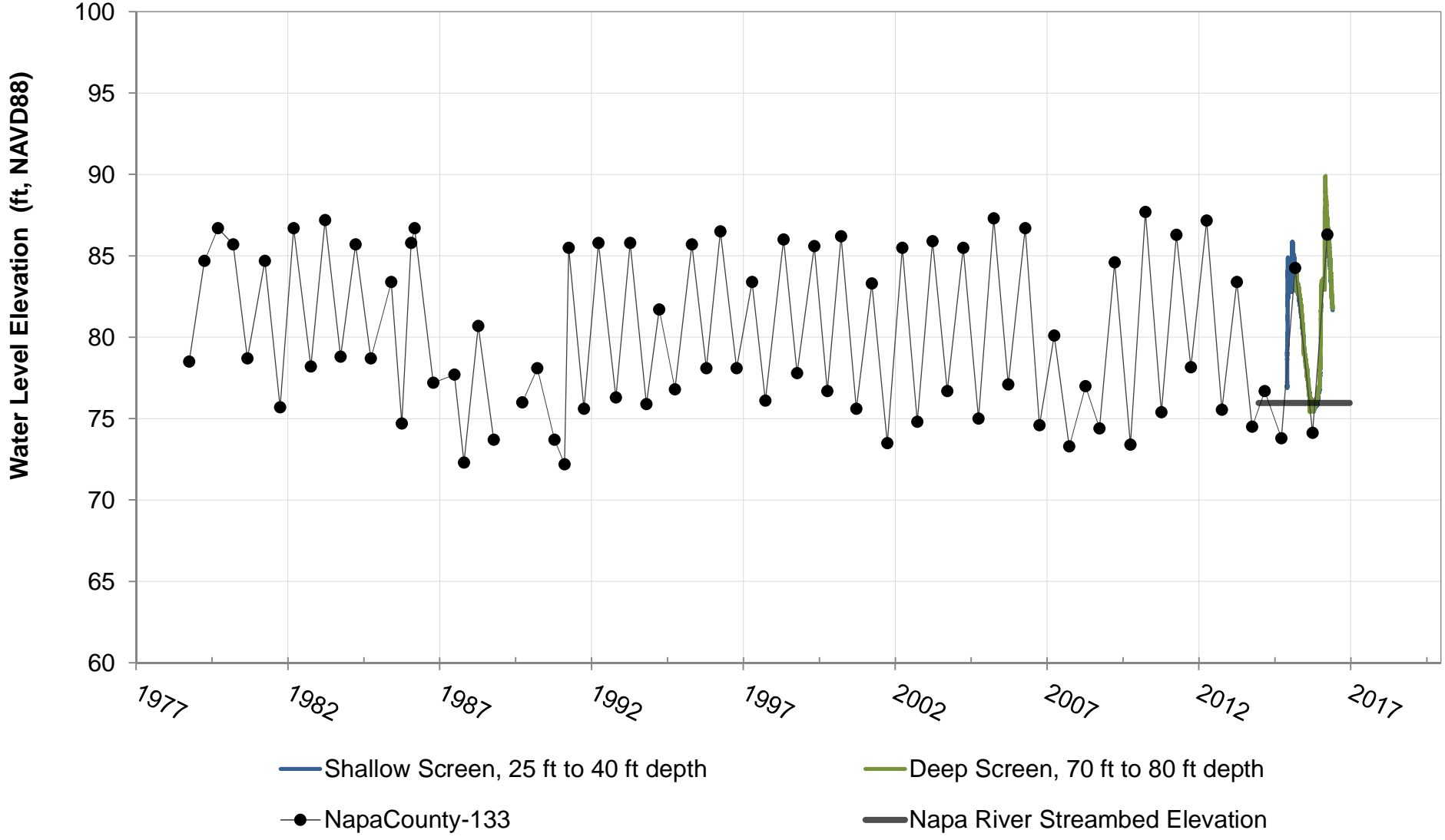
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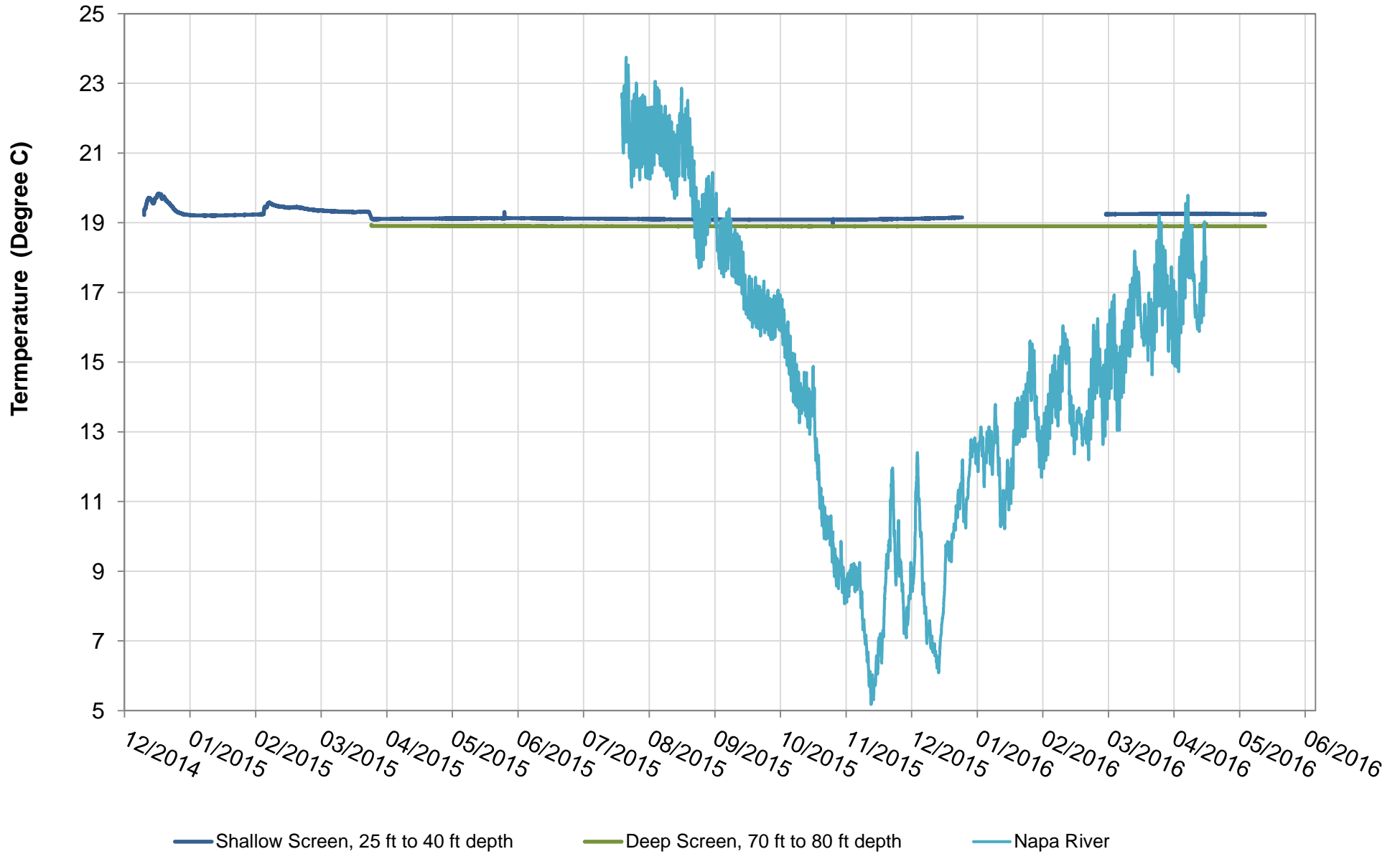
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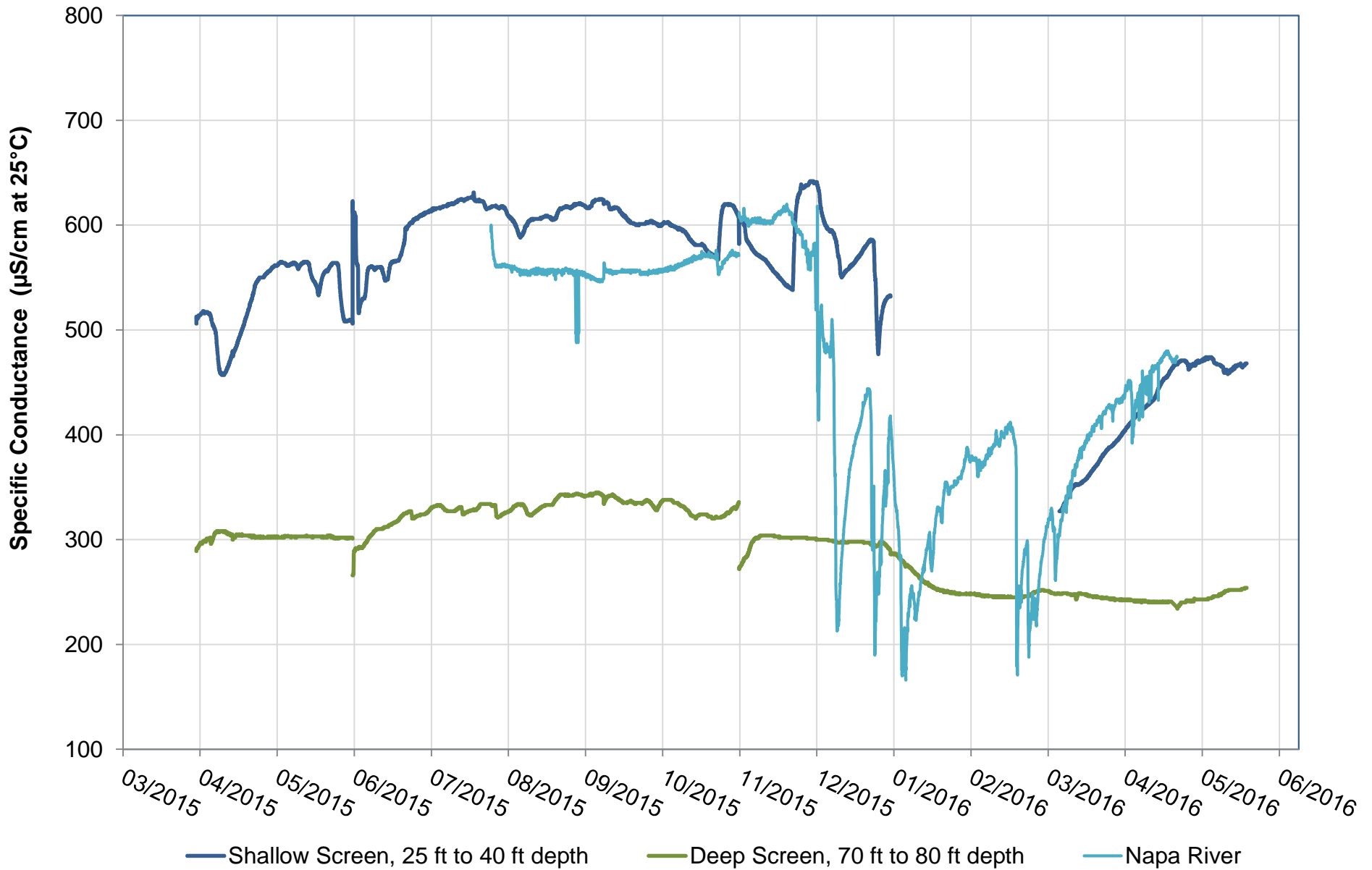
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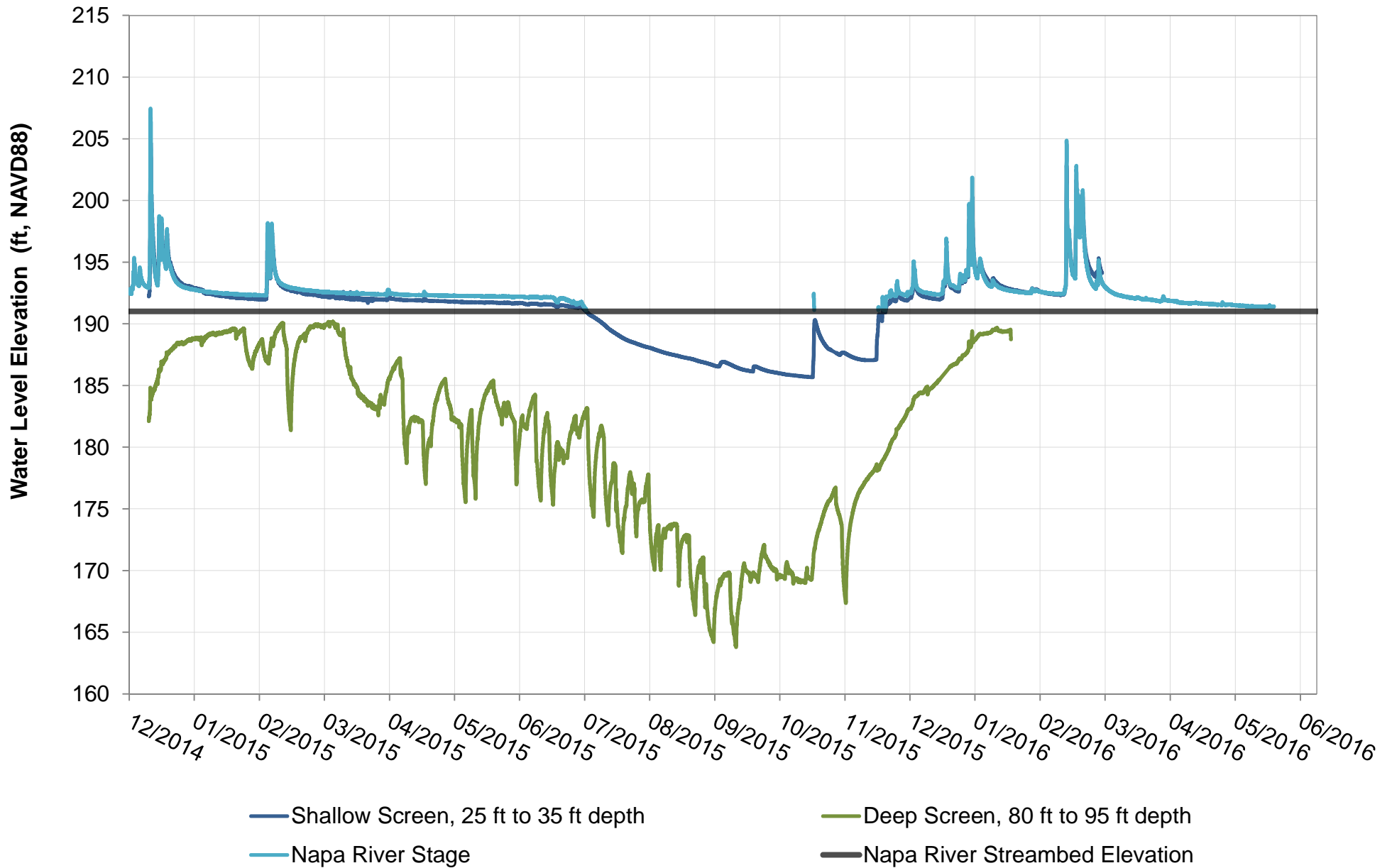
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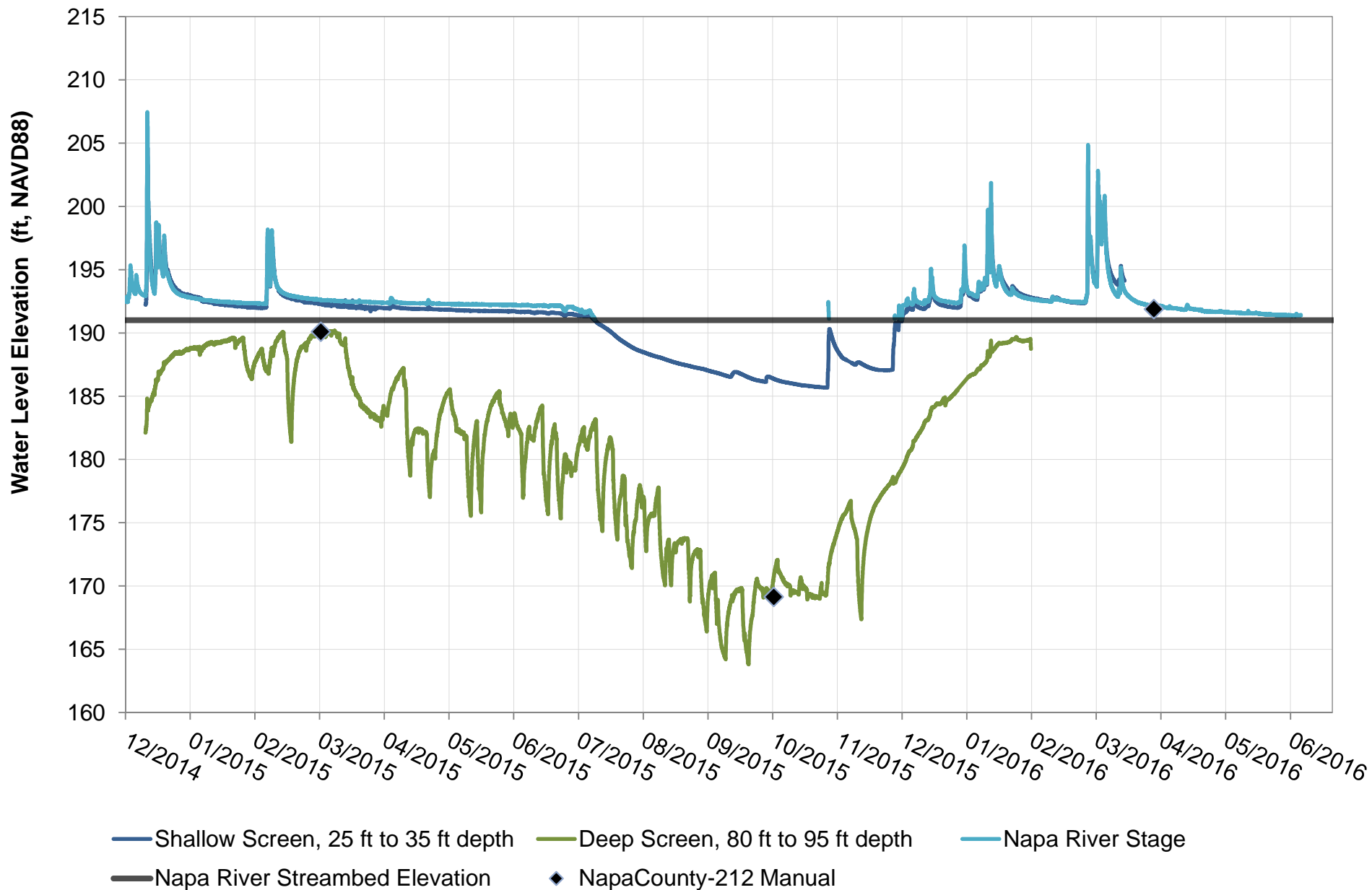
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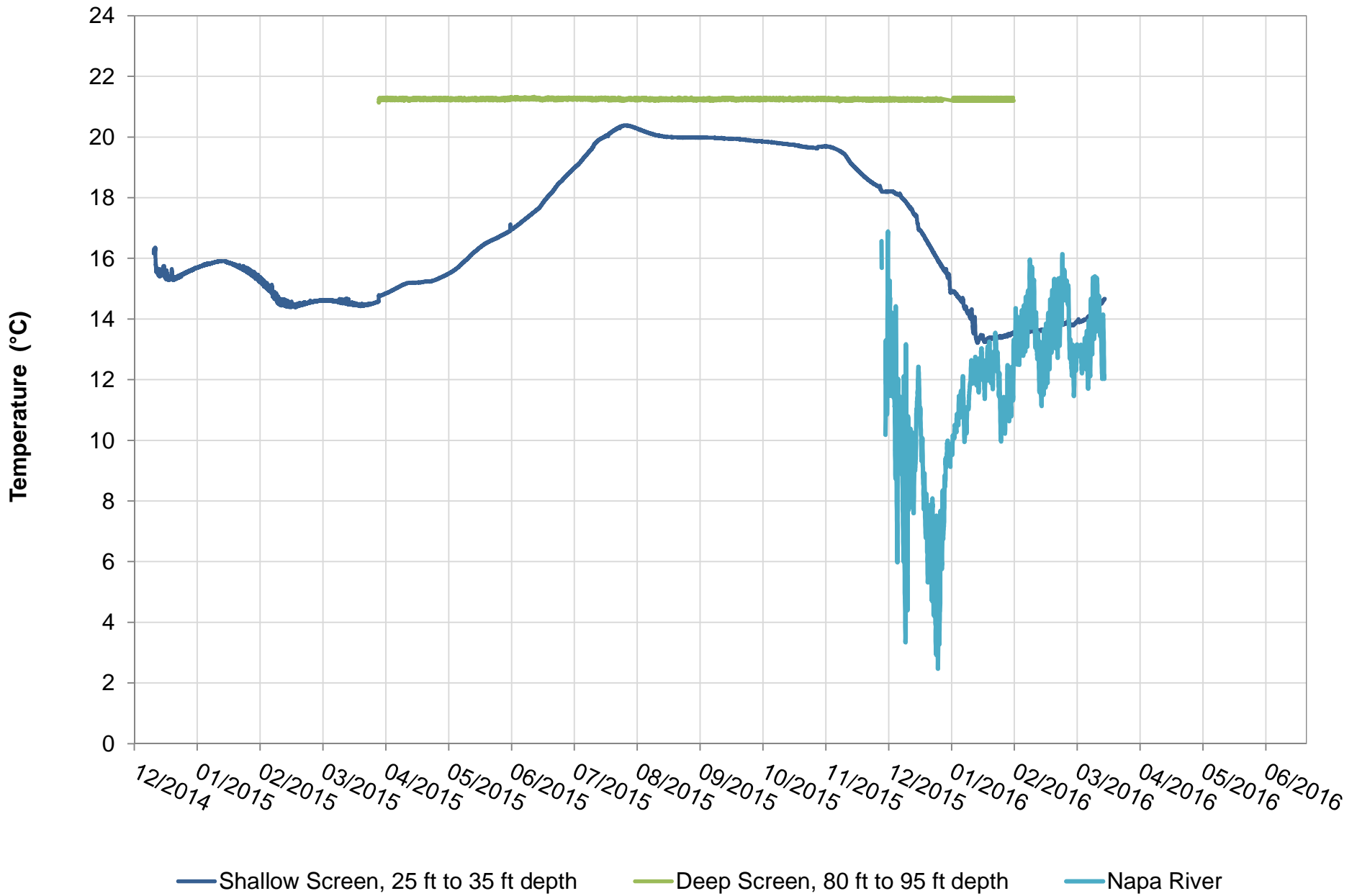


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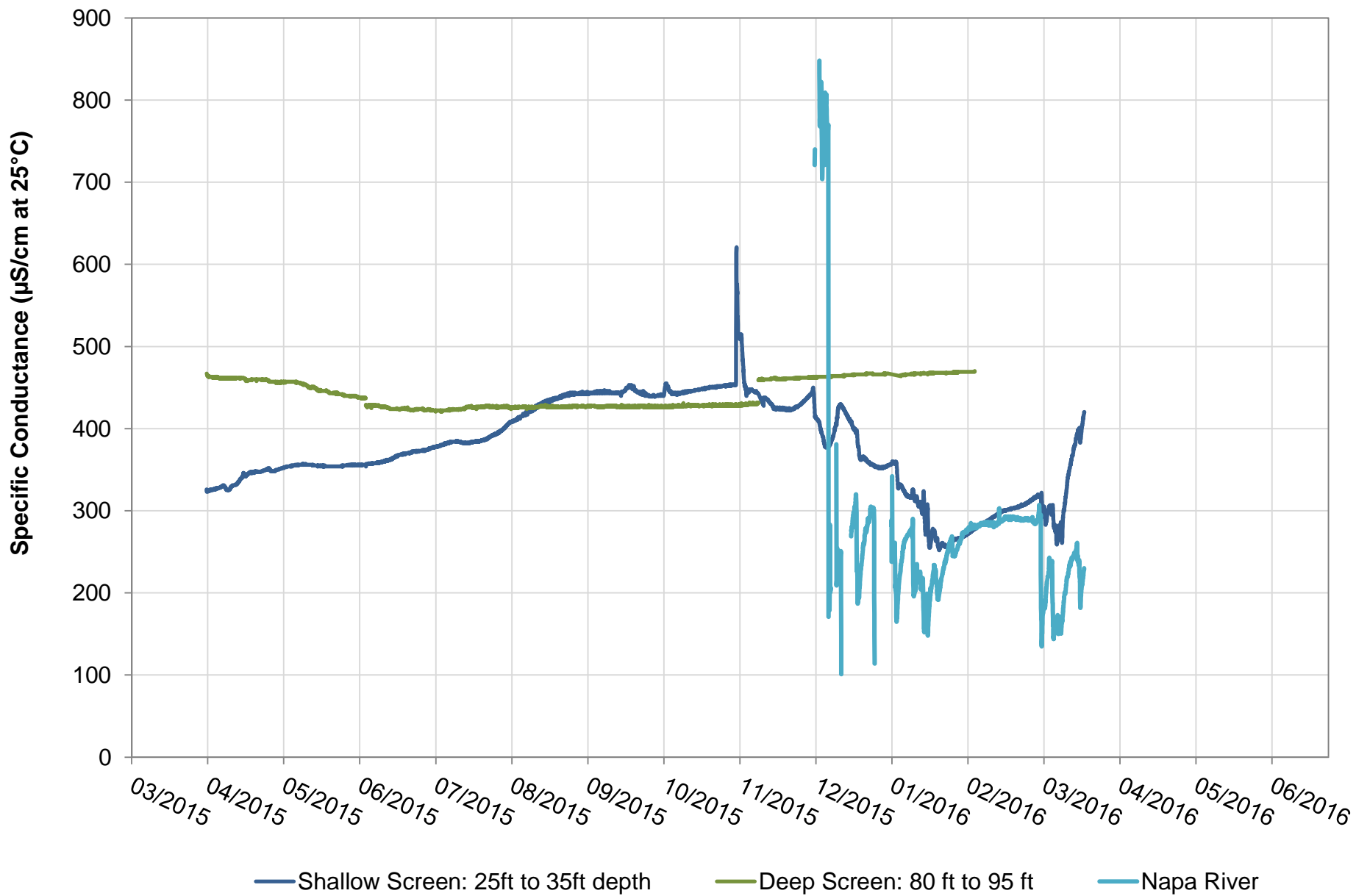


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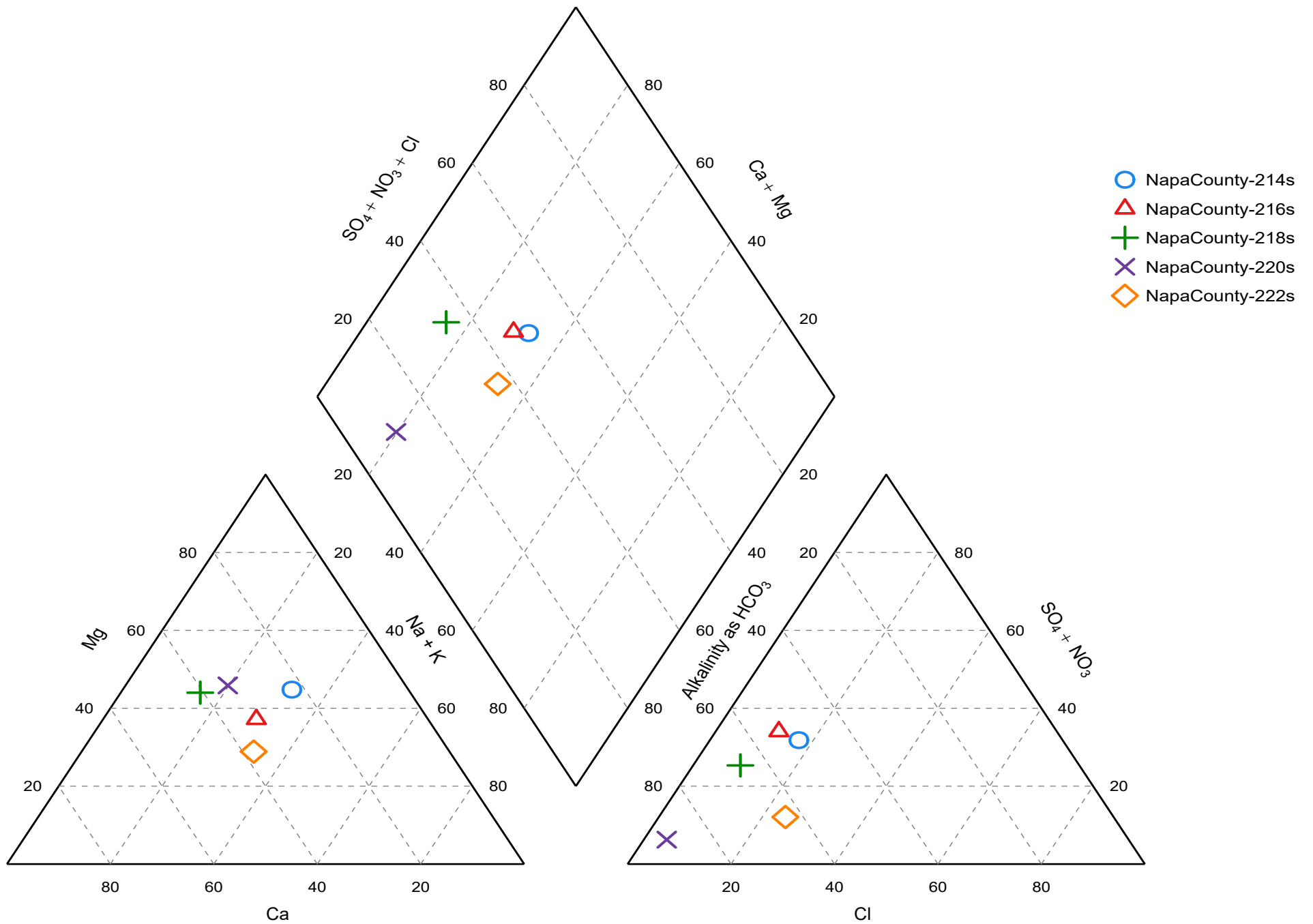


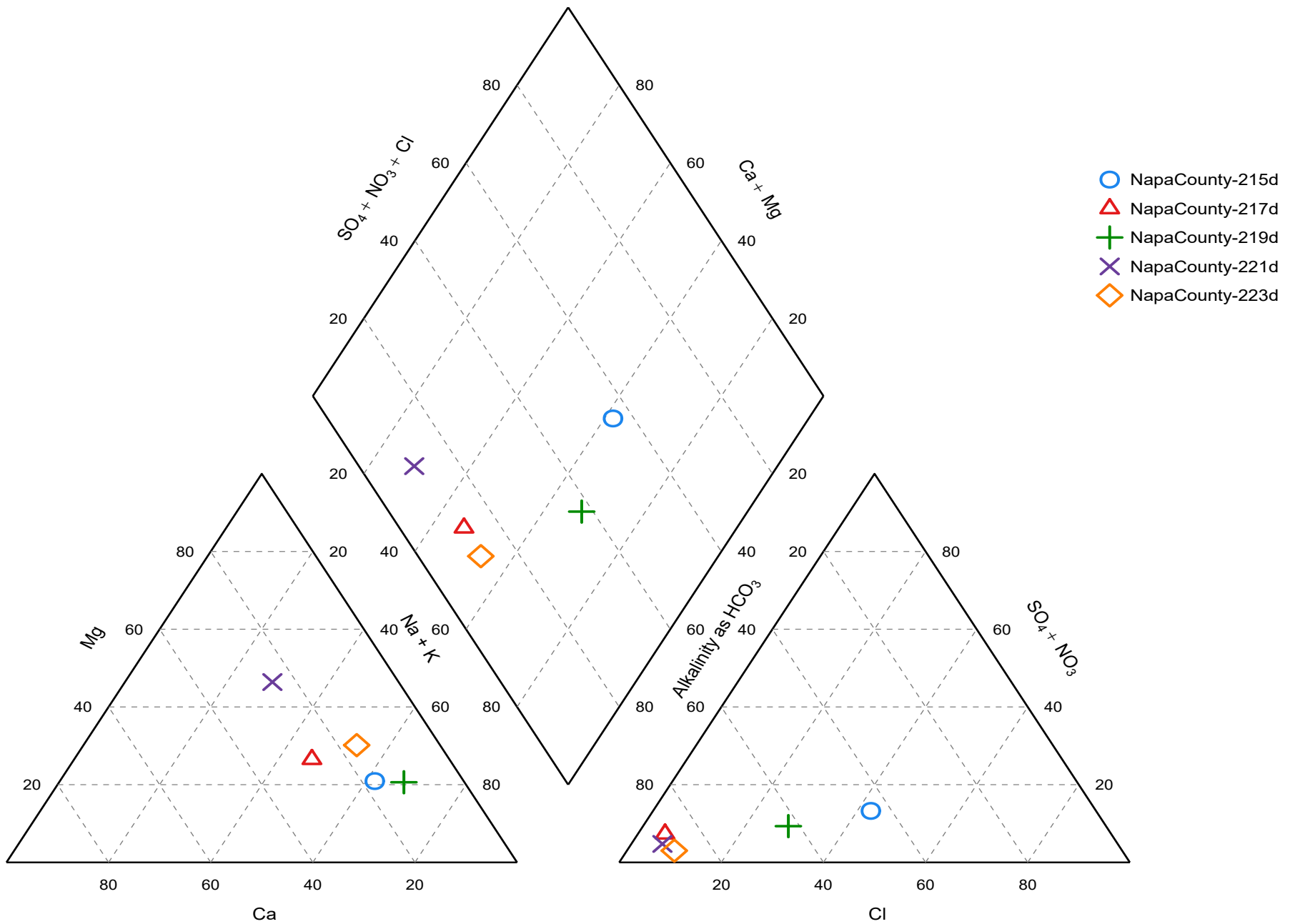


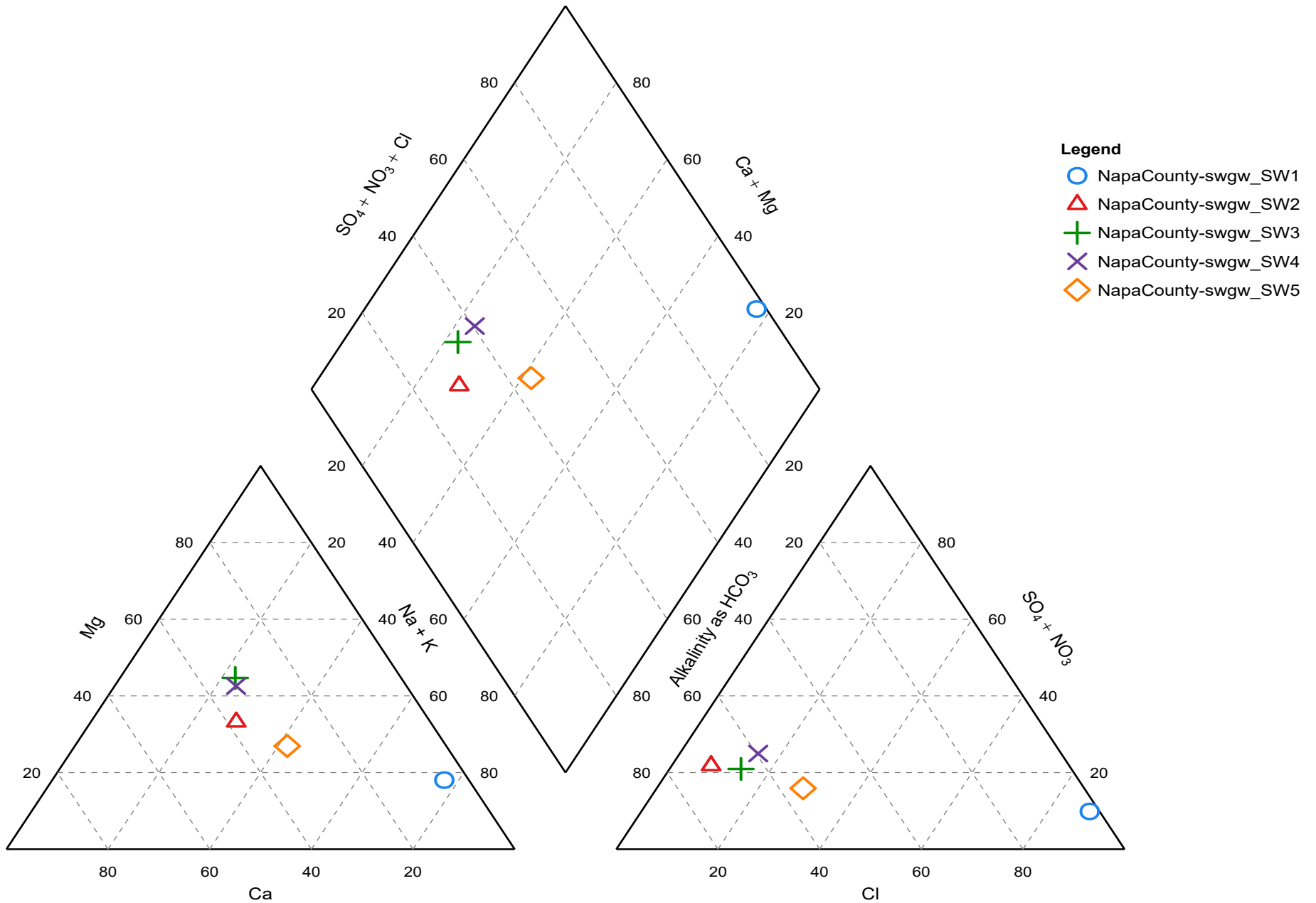
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# APPENDIX A

File Original with DWR

Page 1 of 3 State of California
Well Completion Report
Owner's Well Number NapaCounty-214s-swgw1 No. e0236840
Date Work Began 09/02/2014 Date Work Ended 9/4/2014
Local Permit Agency Napa County Department of Environmental Management
Permit Number E14-00666 Permit Date 8/20/14

DWR Use Only - Do Not Fill In
0.5 N 0.4 W 0.2 N 0.0 2 W
38 18 08 N 122 16 42 W
APNTRS/Other

Geologic Log
Orientation [X] Vertical [ ] Horizontal [ ] Angle Specify
Drilling Method Hollow stem augers Drilling Fluid No
Depth from Surface Description
SEE ATTACHED WELL LOG
NOTE: NapaCounty-214s-swgw1 well and NapaCounty-215d-swgw1 well are in the same borehole.
Total Depth of Boring 100 Feet
Total Depth of Completed Well 53 Feet

Well Owner
Name County of Napa
Mailing Address 804 First Street
City Napa State CA Zip 94559

Well Location
Address Site #1- Napa River at First Street
City Napa County Napa
Latitude N Longitude W
Datum Dec. Lat. 38.30223 Dec. Long. 122.27845
APN Book Page Parcel
Township Range Section

Location Sketch
(Sketch must be drawn by hand after form is printed.)
North
SEE ATTACHED
SITE LOCATION
South
Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

Activity
[X] New Well
[ ] Modification/Repair
[ ] Deepen
[ ] Other
[ ] Destroy
Planned Uses
[ ] Water Supply
[ ] Domestic [ ] Public
[ ] Irrigation [ ] Industrial
[ ] Cathodic Protection
[ ] Dewatering
[ ] Heat Exchange
[ ] Injection
[X] Monitoring
[ ] Remediation
[ ] Sparging
[ ] Test Well
[ ] Vapor Extraction
[ ] Other

Water Level and Yield of Completed Well
Depth to first water 16 (Feet below surface)
Depth to Static
Water Level (Feet) Date Measured
Estimated Yield \* (GPM) Test Type
Test Length (Hours) Total Drawdown (Feet)
\*May not be representative of a well's long term yield.

Table with 8 columns: Depth from Surface, Borehole Diameter, Type, Material, Wall Thickness, Outside Diameter, Screen Type, Slot Size. Contains data for 0, 30, and 50 feet depths.

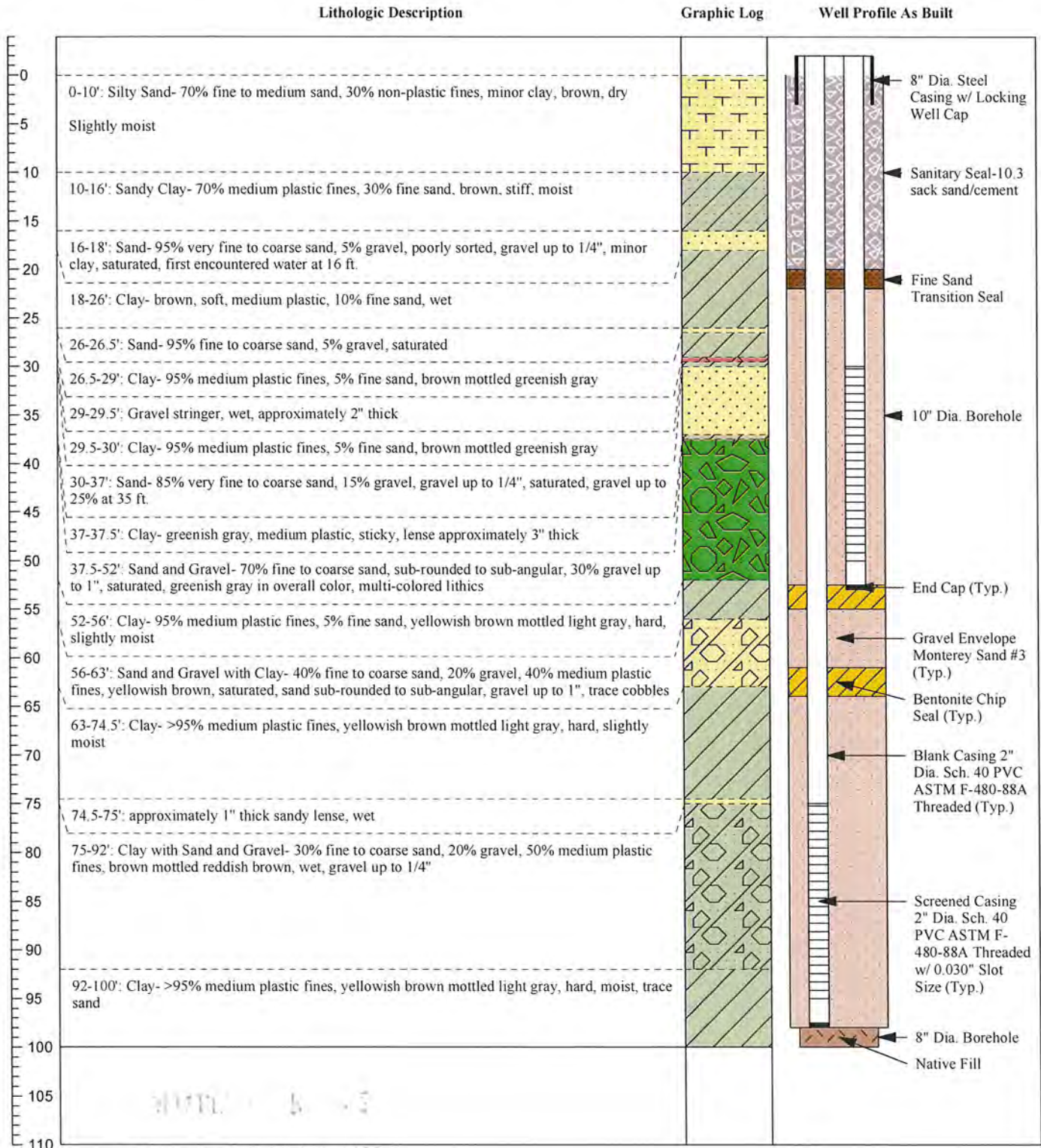
Table with 4 columns: Depth from Surface, Fill, Description. Contains data for 0-20 feet (Cement) and 20-53 feet (Filter Pack).

Attachments
[X] Geologic Log
[ ] Well Construction Diagram
[ ] Geophysical Log(s)
[ ] Soil/Water Chemical Analyses
[X] Other Site Location

Certification Statement
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief
Name CLEAR HEART DRILLING, INC.
Person, Firm or Corporation
555 W. College Ave. Ste. B Santa Rosa CA 95401
Signed [Signature] Date Signed 10/15/2014 C-57 License Number 780357

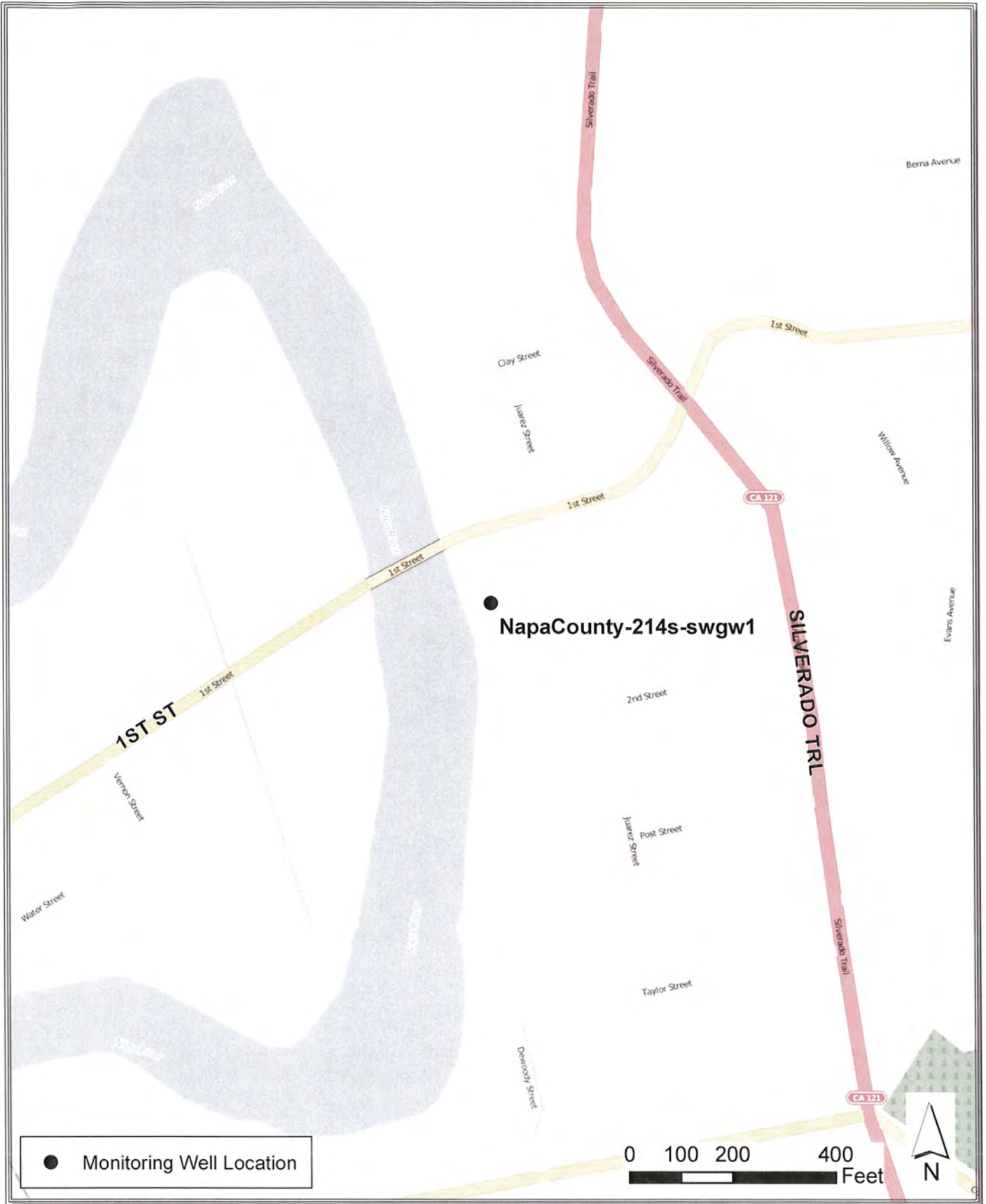
e0236840

LSCE Project No. 12-1-071 Site: Site #1- Napa River at Napa  
 Well Name: Napa County-214s-swgw1 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
 Lat./Long.: 38.30223/-122.27845 reamed hole 10"-diameter  
 Drilled By: Clear Heart Drilling Sampling Method: Core Sample Barrel  
 Driller: Rick Schneider Drilling/Installation Date: 9/2/14 - 9/4/14 Well Depth (ft): 53  
 Site Geologist: Charlie Jenkins, P.G. Boring Depth (ft): 100 Well Screen (ft): 30-50





e0236840



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State of California

### Well Completion Report

Refer to Instruction Pamphlet

No. **e0236873**

Page 1 of 3

Owner's Well Number NapaCounty-215d-swgw1

Date Work Began 09/02/2014

Date Work Ended 9/4/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00666

Permit Date 8/20/14

DWR Use Only - Do Not Fill In	
015N 04W 02N 0101M	
State Well Number/Site Number	
38 18 08 N	122 16 42 W
Latitude	Longitude
APN/TRS/Other	

#### Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_

Drilling Method Hollow stem augers Drilling Fluid No

Depth from Surface Description  
Feet to Feet Describe material, grain size, color, etc

SEE ATTACHED WELL LOG

NOTE: NapaCounty-214s-swgw1 well and NapaCounty-215d-swgw1 well are in the same borehole.

#### Well Owner

Name County of Napa

Mailing Address 804 First Street

City Napa State CA Zip 94559

#### Well Location

Address Site #1- Napa River at First Street

City Napa County Napa

Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Deg. Min. Sec. Deg. Min. Sec.

Datum \_\_\_\_\_ Dec. Lat. 38.30223 Dec. Long. -122.27845

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

#### Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

SEE ATTACHED

West SITE LOCATION East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

#### Activity

- New Well
- Modification/Repair
  - Deepen
  - Other \_\_\_\_\_
- Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

#### Planned Uses

- Water Supply
  - Domestic  Public
  - Irrigation  Industrial
- Cathodic Protection
- Dewatering
- Heat Exchange
- Injection
- Monitoring
- Remediation
- Sparging
- Test Well
- Vapor Extraction
- Other \_\_\_\_\_

#### Water Level and Yield of Completed Well

Depth to first water 16 (Feet below surface)

Depth to Static \_\_\_\_\_

Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_

Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_

Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)

\*May not be representative of a well's long term yield.

#### Casings

Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	75	10	Blank	PVC Sch. 40	.308	2.375	
75	95	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots 0.030
95	98	10	Blank	PVC Sch. 40	.308	2.375	

#### Annular Material

Depth from Surface Feet to Feet	Fill	Description	
0	20	Cement	10.3 sack mix
20	53	Filter Pack	#3 sand
53	55	Bentonite	
55	61	Filter Pack	#3 sand
61	64	Bentonite	
64	100	Filter Pack	#3 sand

#### Attachments

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other Site Location

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 CLEAR HEART DRILLING, INC.

Person, Firm or Corporation

555 W. College Ave. Ste.B

Santa Rosa

CA 95401

Signed [Signature]

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

C-57 Licensed Water Well Contractor

Date Signed 10/15/2014

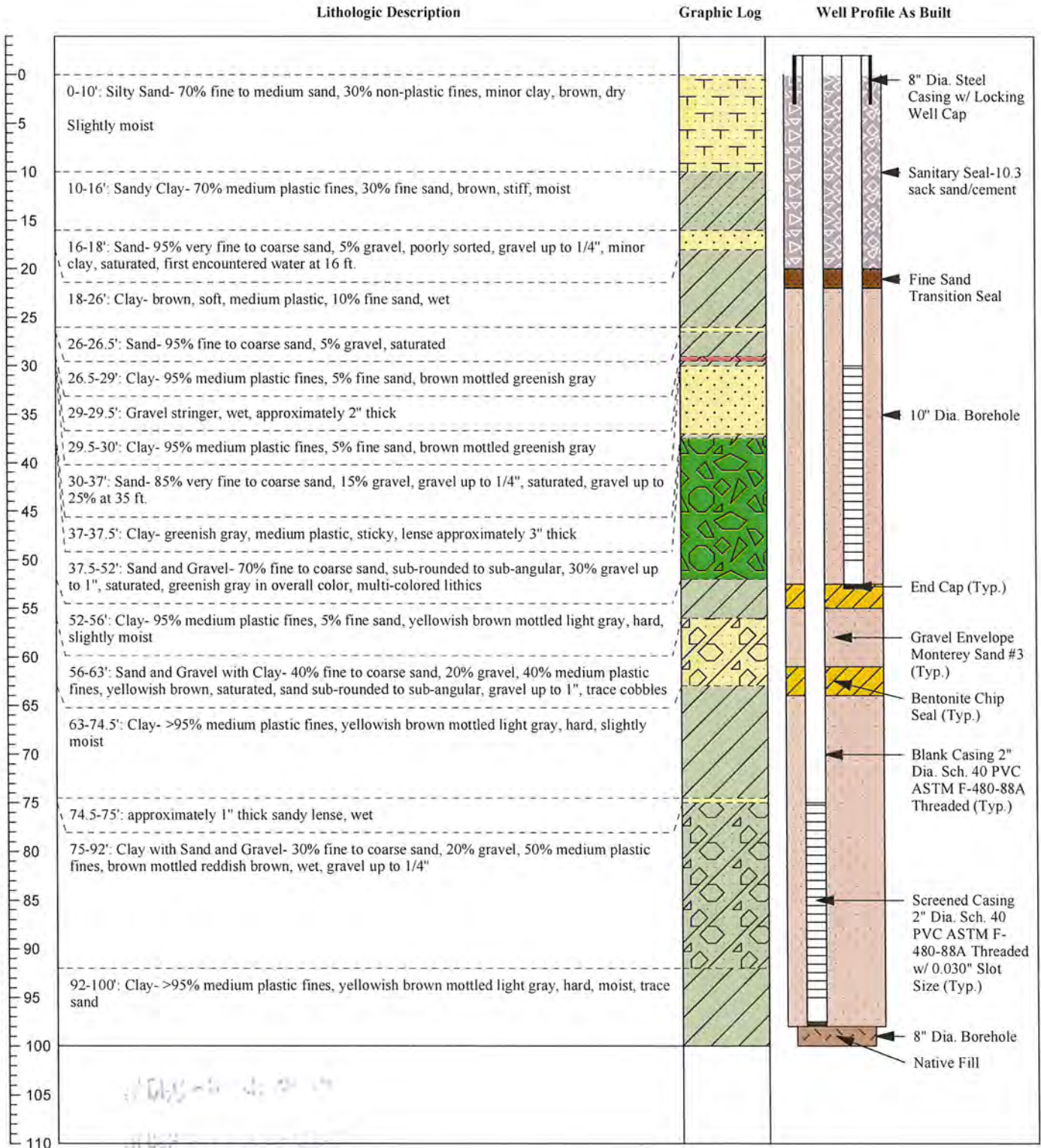
780357

C-57 License Number

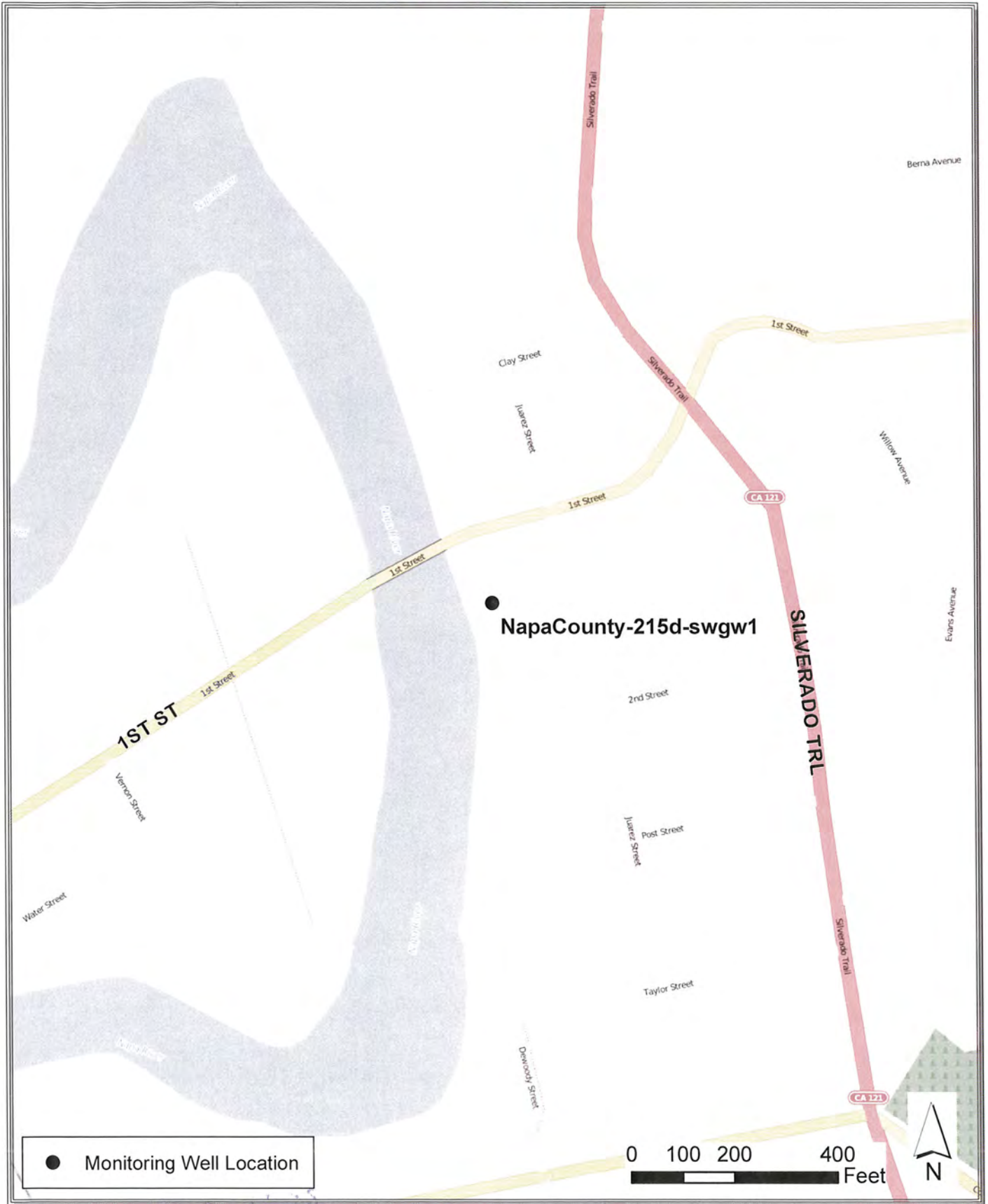
e0236873

LSCE Project No. 12-1-071  
 Well Name: Napa County-215d-swgw1  
 Lat./Long.: 38.30223/-122.27845  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #1- Napa River at Napa  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/2/14 - 9/4/14 Well Depth (ft): 98  
 Boring Depth (ft): 100 Well Screen (ft): 75-95



e0236873



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\*The free Adobe Reader may be used to view and complete this form. However, software must be purchased to complete, save, and reuse a saved form.

File Original with DWR

State of California

### Well Completion Report

DWR Use Only - Do Not Fill In

06N04W18J003M  
State Well Number/Site Number

382155N 1222015W  
Latitude Longitude

APN/TRS/Other

Page 1 of 3

Owner's Well Number NapaCounty-216s-swgw2

Refer to Instruction Pamphlet  
**e0236731**

Date Work Began 09/22/2014

Date Work Ended 9/24/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00667

Permit Date 8/20/14

#### Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_

Drilling Method Hollow-stem augers Drilling Fluid no

Depth from Surface	Description
Feet to Feet	Describe material, grain size, color, etc
	SEE ATTACHED WELL LOG
NOTE: NapaCounty-216s-swgw2 well and NapaCounty-217d-swgw2 well are in the same borehole.	

Total Depth of Boring 100 Feet

Total Depth of Completed Well 50 Feet

#### Well Owner

Name County of Napa

Mailing Address 804 First Street

City Napa State CA Zip 94559

#### Well Location

Address Site #2-Dry Creek at Washington Street

City Napa County Napa

Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W

Datum \_\_\_\_\_ Dec. Lat. 38.365231 Dec. Long. -122.337532

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

#### Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

SEE ATTACHED SITE LOCATION

West East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

#### Activity

New Well  
 Modification/Repair  
 Deepen  
 Other \_\_\_\_\_  
 Destroy

Describe procedures and materials under "GEOLOGIC LOG"

#### Planned Uses

Water Supply  
 Domestic  Public  
 Irrigation  Industrial

Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

#### Water Level and Yield of Completed Well

Depth to first water 23 (Feet below surface)

Depth to Static \_\_\_\_\_

Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_

Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_

Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)

\*May not be representative of a well's long term yield.

#### Casings

Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size
Feet to Feet	(Inches)			(Inches)	(Inches)		If Any (Inches)
0 - 25	10	Blank	PVC Sch. 40	.308	2.375		
25 - 45	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots	0.030
45 - 50	10	Blank	PVC Sch. 40	.308	2.375		

#### Annular Material

Depth from Surface	Fill	Description
Feet to Feet		
0 - 20	Cement	10.3 sack mix
20 - 51	Filter Pack	#3 sand

#### Attachments

Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Location

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 CLEAR HEART DRILLING, INC.

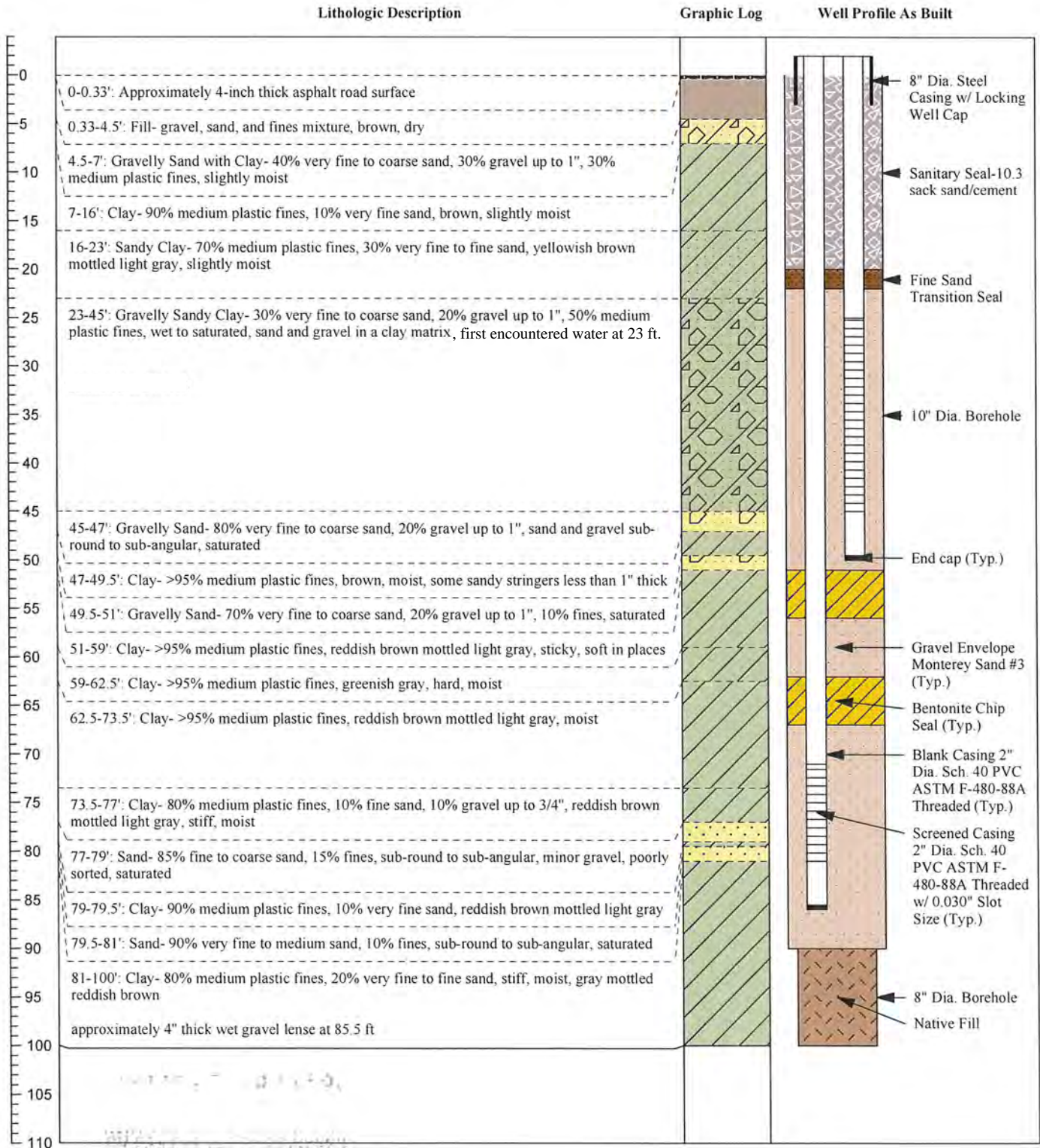
Person, Firm or Corporation  
555 W. College Ave. Ste. B Santa Rosa CA 95401  
Address City State Zip

Signed [Signature] Date Signed 10/15/2014 780357  
C-57 Licensed Water Well Contractor C-57 License Number

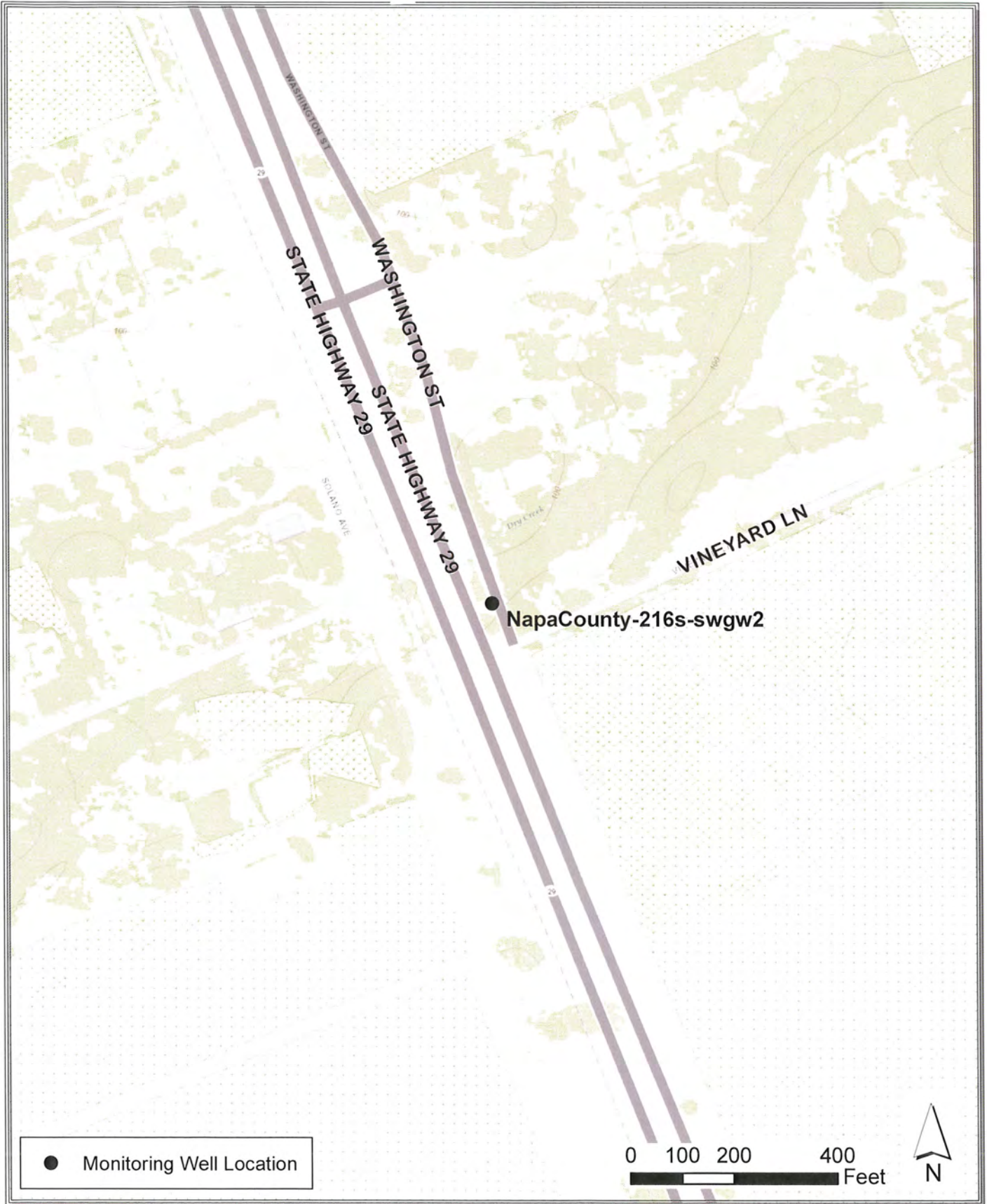
e0236731

LSCE Project No. 12-1-071  
 Well Name: Napa County-216s-swgw2  
 Lat./Long.: 38.365231/-122.337532  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #2- Dry Creek at Washington Street  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/22/14 - 9/23/14 Well Depth (ft): 50  
 Boring Depth (ft): 100 Well Screen (ft): 25-45



e0236731



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# Well Completion Report

State of California

Refer to Instruction Pamphlet No. e0236740

Page 1 of 3

Owner's Well Number NapaCounty-217d-swgw2

Date Work Began 09/22/2014 Date Work Ended 9/24/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00667 Permit Date 8/20/14

DWR Use Only – Do Not Fill In

016N04W18S0104N  
State Well Number/Site Number

382155 N 1222015 W  
Latitude Longitude

APN/TRS/Other \_\_\_\_\_

### Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_  
Drilling Method Hollow stem augers Drilling Fluid No

Depth from Surface Feet to Feet	Description Describe material, grain size, color, etc
	SEE ATTACHED WELL LOG
NOTE: NapaCounty-216s-swgw2 well and NapaCounty-217d-swgw2 are in the same borehole.	

Total Depth of Boring 100 Feet  
Total Depth of Completed Well 86 Feet

### Well Owner

Name County of Napa  
Mailing Address 804 First St.  
City Napa State CA Zip 94559

### Well Location

Address Site #2- Dry Creek at Washington Street  
City Napa County Napa  
Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Datum \_\_\_\_\_ Dec. Lat. 38.365231 Dec. Long. 122.337532  
APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

### Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

SEE ATTACHED

West SITE LOCATION East

South

- ### Activity
- New Well
  - Modification/Repair
    - Deepen
    - Other \_\_\_\_\_
  - Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

- ### Planned Uses
- Water Supply
    - Domestic  Public
    - Irrigation  Industrial
  - Cathodic Protection
  - Dewatering
  - Heat Exchange
  - Injection
  - Monitoring
  - Remediation
  - Sparging
  - Test Well
  - Vapor Extraction
  - Other \_\_\_\_\_

### Water Level and Yield of Completed Well

Depth to first water 23 (Feet below surface)  
Depth to Static \_\_\_\_\_  
Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_  
Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_  
Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)  
\*May not be representative of a well's long term yield.

Casings							Annular Material				
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	71	10	Blank	PVC Sch. 40	.308	2.375		0	20	Cement	10.3 sack mix
71	81	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots	0.030	20	Filter Pack	#3 sand
81	86	10	Blank	PVC Sch. 40	.308	2.375			51	Bentonite	
									56	Filter Pack	#3 sand
									62	Bentonite	
									67	Filter Pack	#3 sand

### Attachments

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other Site Location

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 CLEAR HEART DRILLING, INC.  
Person, Firm or Corporation  
555 W. College Ave. Ste. B Santa Rosa CA 95401  
Address City State Zip

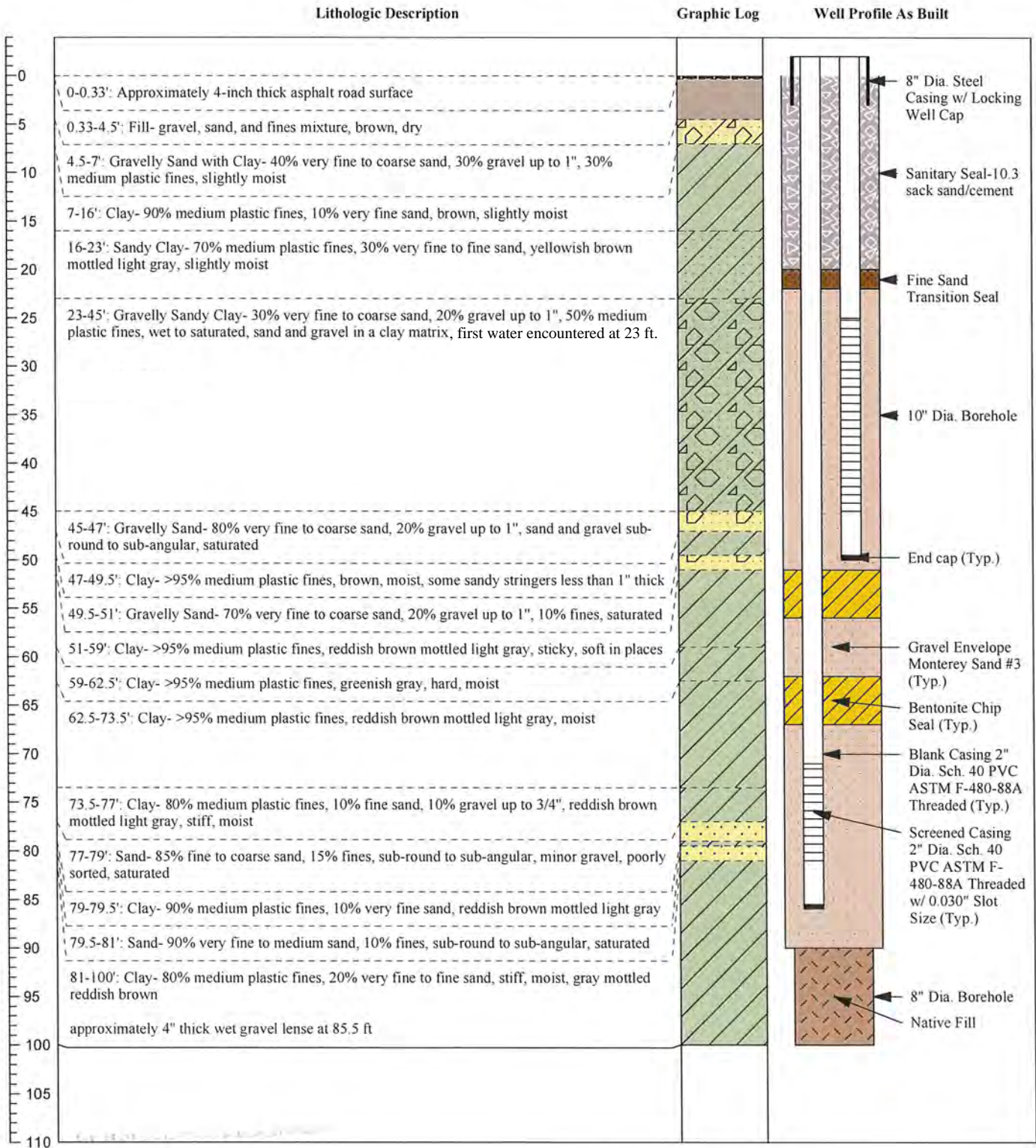
Signed [Signature] 10/15/2014 780357  
C-57 Licensed Water Well Contractor Date Signed C-57 License Number



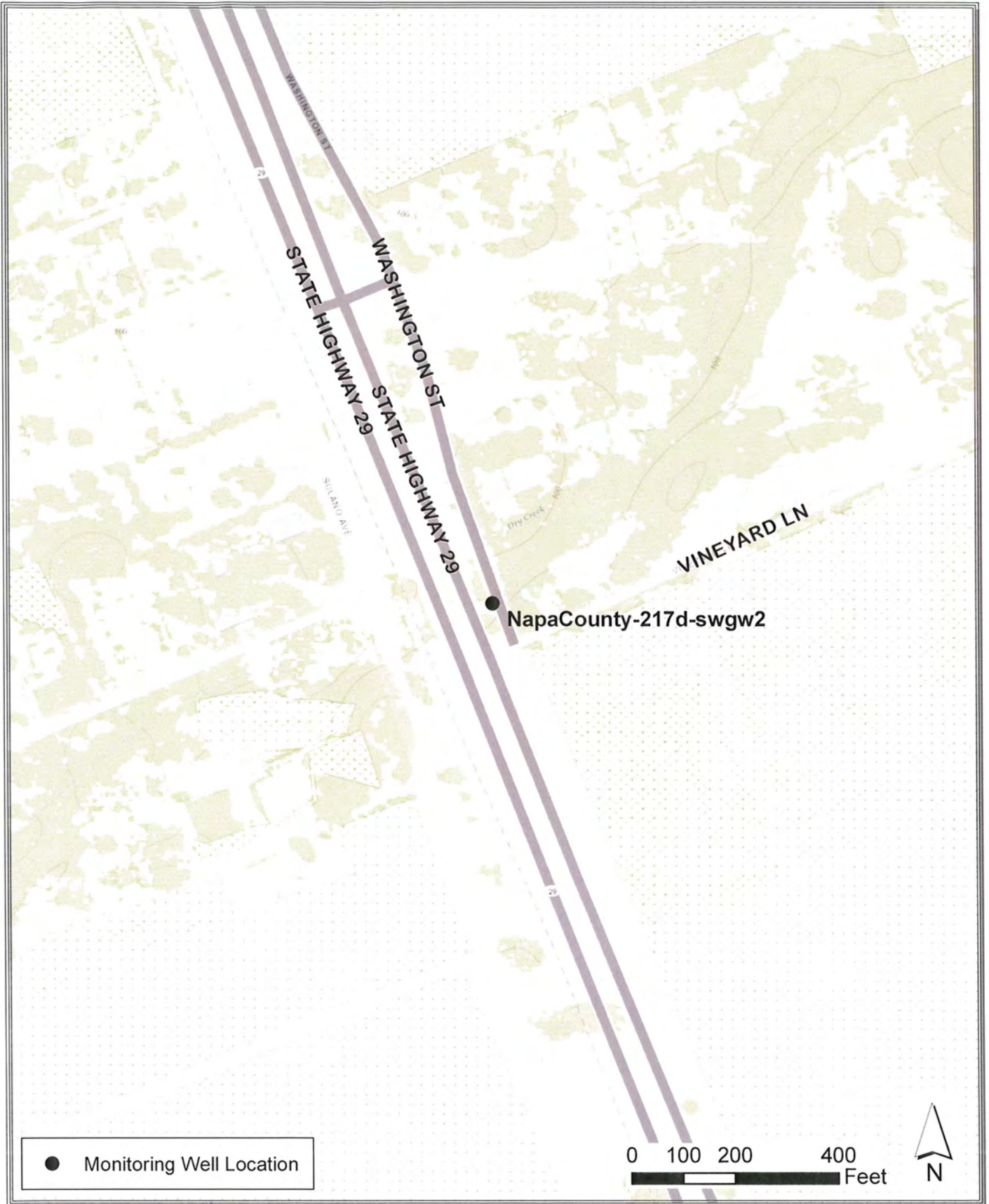
0236740

LSCE Project No. 12-1-071  
 Well Name: Napa County-217d-swgw2  
 Lat./Long.: 38.365231/-122.337532  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #2- Dry Creek at Washington Street  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/22/14 - 9/23/14 Well Depth (ft): 86  
 Boring Depth (ft): 100 Well Screen (ft): 71-81



e0236740



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File Original with DWR

State of California

# Well Completion Report

Refer to Instruction Pamphlet

No. **e0236894**

Page 1 of 3

Owner's Well Number NapaCounty-218s-swgw3

Date Work Began 09/08/2014

Date Work Ended 9/10/2014

Local Permit Agency Napa County Department of Environmental Health

Permit Number E14-00668

Permit Date 8/20/14

DWR Use Only - Do Not Fill In

06 N 04 W 16 G 010 1 M  
 State Well Number/Site Number  
38 22 02 N 122 18 18 W  
 Latitude Longitude  
 APN/TRS/Other

### Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_

Drilling Method Hollow stem augers Drilling Fluid No

Depth from Surface

Description

Feet to Feet Describe material, grain size, color, etc

SEE ATTACHED WELL LOG

NOTE: NapaCounty-218s-swgw3 well and NapaCounty-219d-swgw3 well are in the same borehole.

Total Depth of Boring 100 Feet

Total Depth of Completed Well 40 Feet

### Well Owner

Name County of Napa

Mailing Address 804 First Street

City Napa State CA Zip 94559

### Well Location

Address Site #3- Napa River at Oak Knoll Boulevard

City Napa County Napa

Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
 Deg. Min. Sec. Deg. Min. Sec.

Datum \_\_\_\_\_ Dec. Lat. 38.367255 Dec. Long. 122.304954

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

### Location Sketch

(Sketch must be drawn by hand after form is printed.)

North



South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

### Activity

- New Well
- Modification/Repair
  - Deepen
  - Other \_\_\_\_\_
- Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

### Planned Uses

- Water Supply
  - Domestic  Public
  - Irrigation  Industrial
- Cathodic Protection
- Dewatering
- Heat Exchange
- Injection
- Monitoring
- Remediation
- Sparging
- Test Well
- Vapor Extraction
- Other \_\_\_\_\_

### Water Level and Yield of Completed Well

Depth to first water 29 (Feet below surface)

Depth to Static \_\_\_\_\_

Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_

Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_

Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)

\*May not be representative of a well's long term yield.

### Casings

Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)
0 - 25	10	Blank	PVC Sch. 40	.308	2.375		
25 - 35	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots	0.030
35 - 40	10	Blank	PVC Sch. 40	.308	2.375		

### Annular Material

Depth from Surface Feet to Feet	Fill	Description
0 - 20	Cement	10.3 sack mix
20 - 40	Filter Pack	#3 sand

### Attachments

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other Site Location

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 CLEAR HEART DRILLING, INC.

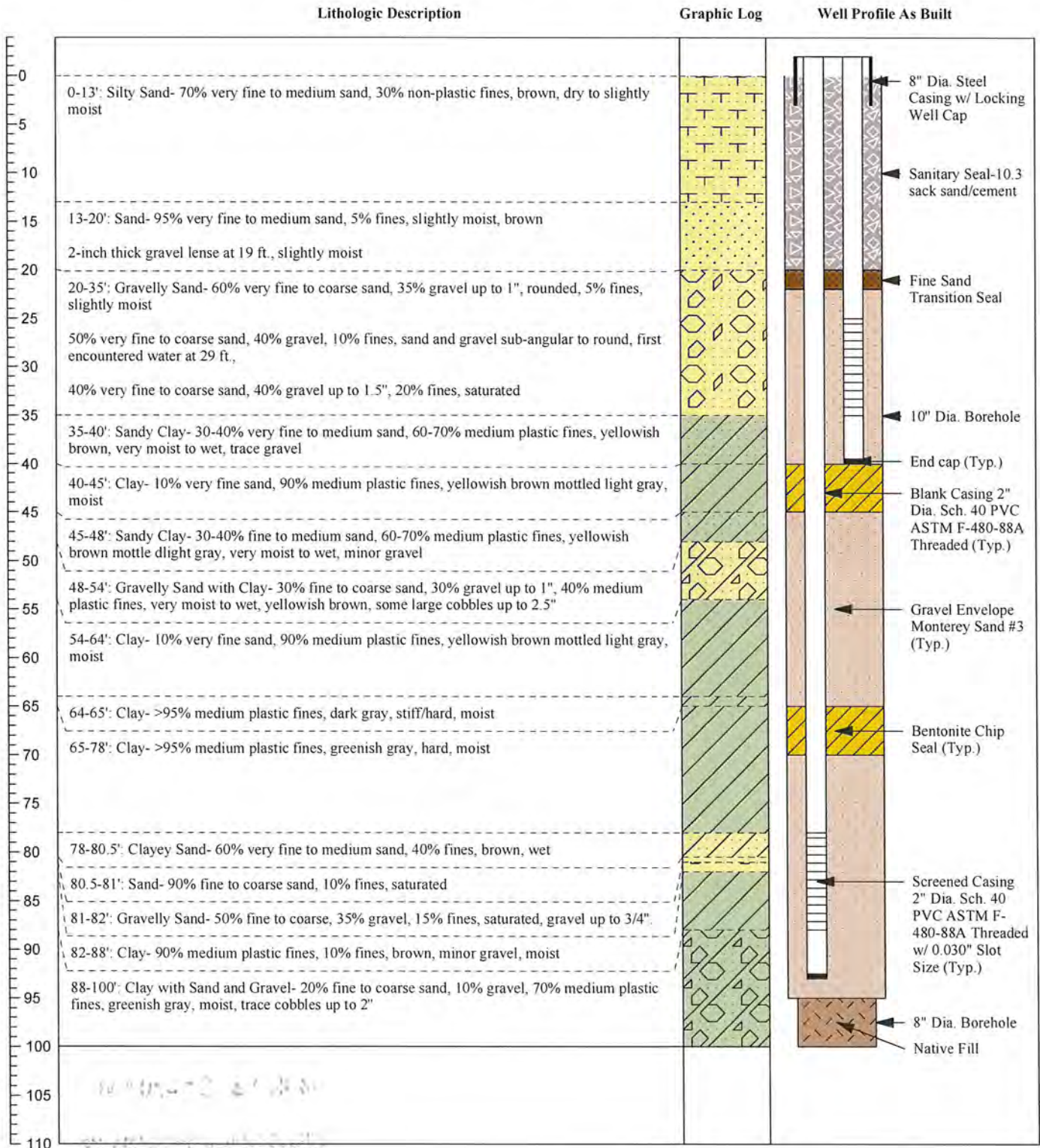
Person, Firm or Corporation  
555 W. Colfege Ave. Ste. B Santa Rosa CA 95401  
 Address City State Zip

Signed [Signature] 10/15/2014 780357  
 C-57 Licensed Water Well Contractor Date Signed C-57 License Number

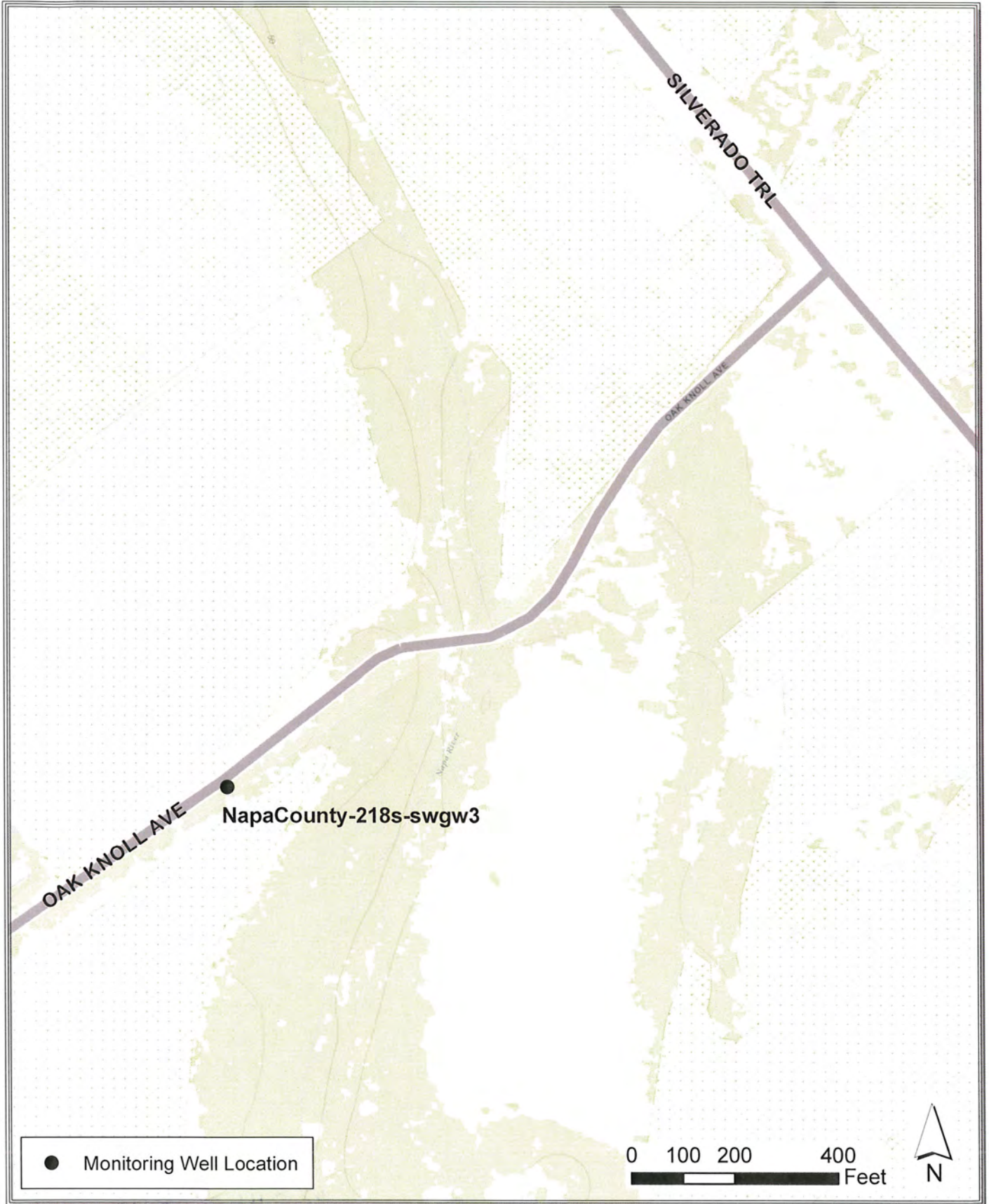
e0236894

LSCE Project No. 12-1-071  
 Well Name: Napa County-218s-swgw3  
 Lat./Long.: 38.367255/-122.304954  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #3- Napa River at Oak Knoll Boulevard  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/8/14 - 9/9/14 Well Depth (ft): 40  
 Boring Depth (ft): 100 Well Screen (ft): 25-35



e0236894



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Page 1 of 3

Owner's Well Number NapaCounty-219d-swgw3

Date Work Began 09/08/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00668

State of California

### Well Completion Report

Refer to Instruction Pamphlet  
No. **e0236902**

Date Work Ended 9/10/2014

Permit Date 8/20/14

DWR Use Only - Do Not Fill In

016N 014W 16 G 00 2M

State Well Number/Site Number

38 22 02 N 122 18 18 W

Latitude

Longitude

APN/TRS/Other

#### Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_  
Drilling Method Hollow stem augers Drilling Fluid No

Depth from Surface Description  
Feet to Feet Describe material, grain size, color, etc

SEE ATTACHED WELL LOG

NOTE: NapaCounty-218s-swgw3 well and NapaCounty-219d-swgw3 well are not in the borehole.

Total Depth of Boring 100 Feet

Total Depth of Completed Well 93 Feet

#### Well Owner

Name County of Napa

Mailing Address 804 First Street

City Napa State CA Zip 94559

#### Well Location

Address Site #3- Napa River at Oak Knoll Boulevard

City Napa County Napa

Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Deg. Min. Sec. Deg. Min. Sec.

Datum \_\_\_\_\_ Dec. Lat. 38.367255 Dec. Long. 122.304954

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

#### Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

SEE ATTACHED

West SITE LOCATION East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

#### Activity

- New Well  
 Modification/Repair  
 Deepen  
 Other \_\_\_\_\_  
 Destroy

Describe procedures and materials under "GEOLOGIC LOG"

#### Planned Uses

- Water Supply  
 Domestic  Public  
 Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

#### Water Level and Yield of Completed Well

Depth to first water 29 (Feet below surface)

Depth to Static \_\_\_\_\_

Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_

Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_

Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)

\*May not be representative of a well's long term yield.

#### Casings

Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	78	10	Blank	PVC Sch. 40	.308	2.375	
78	88	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots 0.030
88	93	10	Blank	PVC Sch. 40	.308	2.375	

#### Annular Material

Depth from Surface Feet to Feet	Fill	Description
0	20	Cement 10.3 sack mix
20	40	Filter Pack #3 sand
40	45	Bentonite
45	65	Filter Pack #3 sand
65	70	Bentonite
70	100	Filter Pack #3 sand

#### Attachments

- Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Location

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 CLEAR HEART DRILLING, INC.

Person, Firm or Corporation

555 W. College Ave. Ste.B

Santa Rosa

CA

95401

Signed \_\_\_\_\_

Address

City

State

Zip

10/15/2014

780357

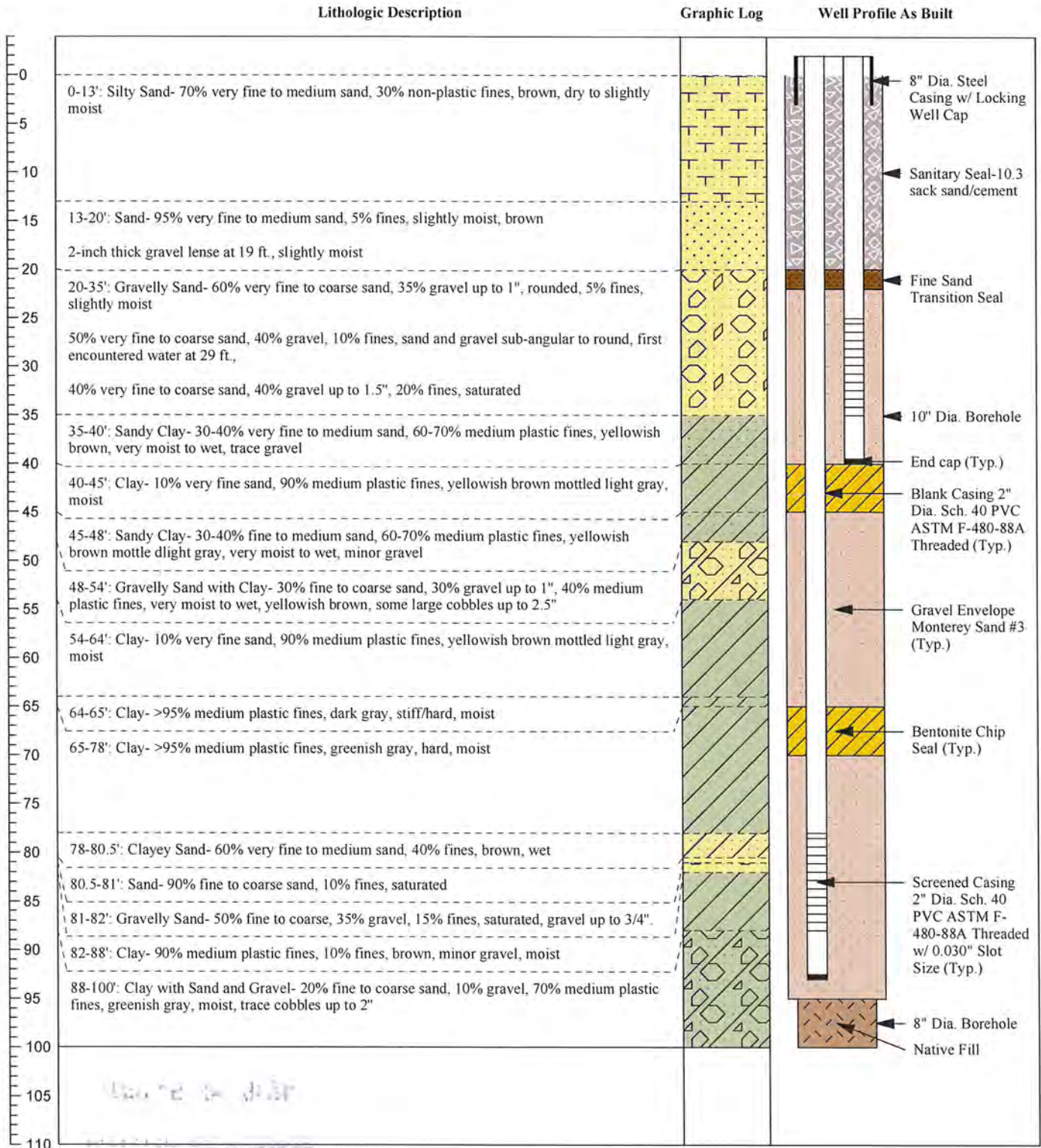
C-57 Licensed Water Well Contractor

Date Signed C-57 License Number

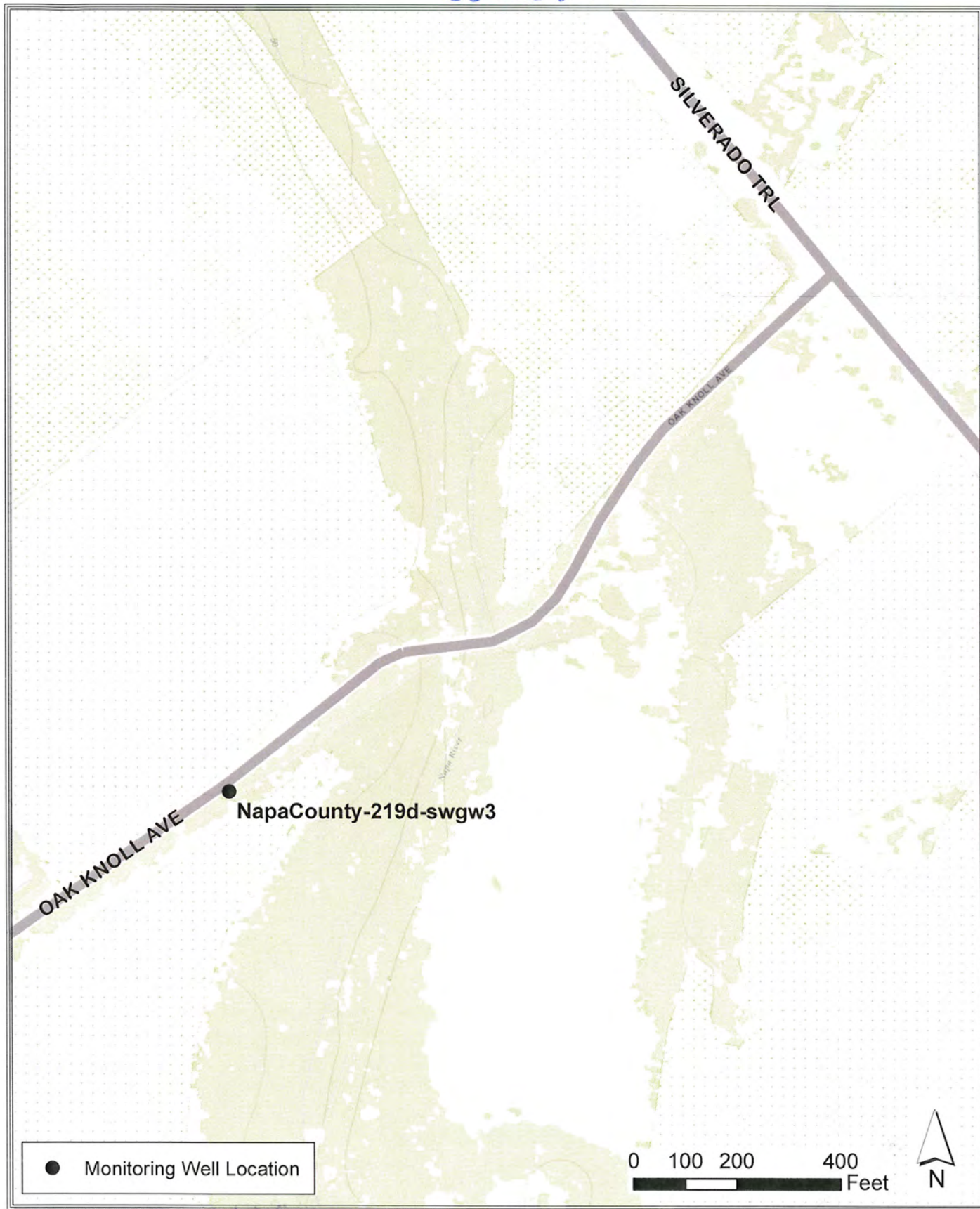
e0236902

LSCE Project No. 12-1-071  
 Well Name: Napa County-219d-swgw3  
 Lat./Long.: 38.367255/-122.304954  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #3- Napa River at Oak Knoll Boulevard  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/8/14 - 9/9/14 Well Depth (ft): 93  
 Boring Depth (ft): 100 Well Screen (ft): 78-88



e0236902



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Page 1 of 3

Owner's Well Number NapaCounty-220s-swgw4

Date Work Began 09/10/2014

Date Work Ended 9/12/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00669

Permit Date 8/20/14

State of California

## Well Completion Report

Refer to Instruction Pamphlet

No. **e0236741**

DWR Use Only - Do Not Fill In			
<u>07</u>	<u>N</u>	<u>04</u>	<u>N</u>
<u>31</u>	<u>0</u>	<u>0</u>	<u>1</u>
State Well Number/Site Number			
<u>38</u>	<u>25</u>	<u>03</u>	<u>N</u>
Latitude		<u>122</u>	<u>21</u>
		<u>10</u>	<u>W</u>
		Longitude	
APN/TRS/Other			

Geologic Log		Description	
Depth from Surface	Feet	Feet	Describe material, grain size, color, etc
SEE ATTACHED WELL LOG			
NOTE: NapaCounty-220s-swgw4 well and NapaCounty-221d-swgw4 well are in the same borehole.			
Total Depth of Boring		<u>100</u>	Feet
Total Depth of Completed Well		<u>45</u>	Feet

Well Owner			
Name	<u>County of Napa</u>		
Mailing Address	<u>804 First Street</u>		
City	<u>Napa</u>	State	<u>CA</u>
		Zip	<u>94559</u>

Well Location			
Address	<u>Site #4- Napa River at Younville Cross Road</u>		
City	<u>Yountville</u>	County	<u>Napa</u>
Latitude	Deg. Min. Sec. N	Longitude	Deg. Min. Sec. W
Datum	Dec. Lat. <u>38.417573</u>	Dec. Long.	<u>122.352665</u>
APN Book	Page	Parcel	
Township	Range	Section	

Location Sketch	
(Sketch must be drawn by hand after form is printed.)	
North	
<u>SEE ATTACHED</u>	
<u>SITE LOCATION</u>	
South	
<small>Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.</small>	

Activity
<input checked="" type="radio"/> New Well <input type="radio"/> Modification/Repair <input type="radio"/> Deepen <input type="radio"/> Other <input type="radio"/> Destroy <small>Describe procedures and materials under "GEOLOGIC LOG"</small>

Planned Uses
<input type="radio"/> Water Supply <input type="checkbox"/> Domestic <input type="checkbox"/> Public <input type="checkbox"/> Irrigation <input type="checkbox"/> Industrial <input type="radio"/> Cathodic Protection <input type="radio"/> Dewatering <input type="radio"/> Heat Exchange <input type="radio"/> Injection <input checked="" type="radio"/> Monitoring <input type="radio"/> Remediation <input type="radio"/> Sparging <input type="radio"/> Test Well <input type="radio"/> Vapor Extraction <input type="radio"/> Other

Water Level and Yield of Completed Well	
Depth to first water	<u>34</u> (Feet below surface)
Depth to Static	
Water Level	(Feet) Date Measured
Estimated Yield *	(GPM) Test Type
Test Length	(Hours) Total Drawdown (Feet)
<small>*May not be representative of a well's long term yield.</small>	

Casings							
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size if Any
Feet to Feet	(Inches)			(Inches)	(Inches)		(Inches)
0	25	10	Blank	PVC Sch. 40	.308	2.375	
25	40	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots 0.030
40	45	10	Blank	PVC Sch. 40	.308	2.375	

Annular Material			
Depth from Surface	Fill	Description	
Feet to Feet			
0	20	Cement	10.3 sack mix
20	48	Filter Pack	#3 sand

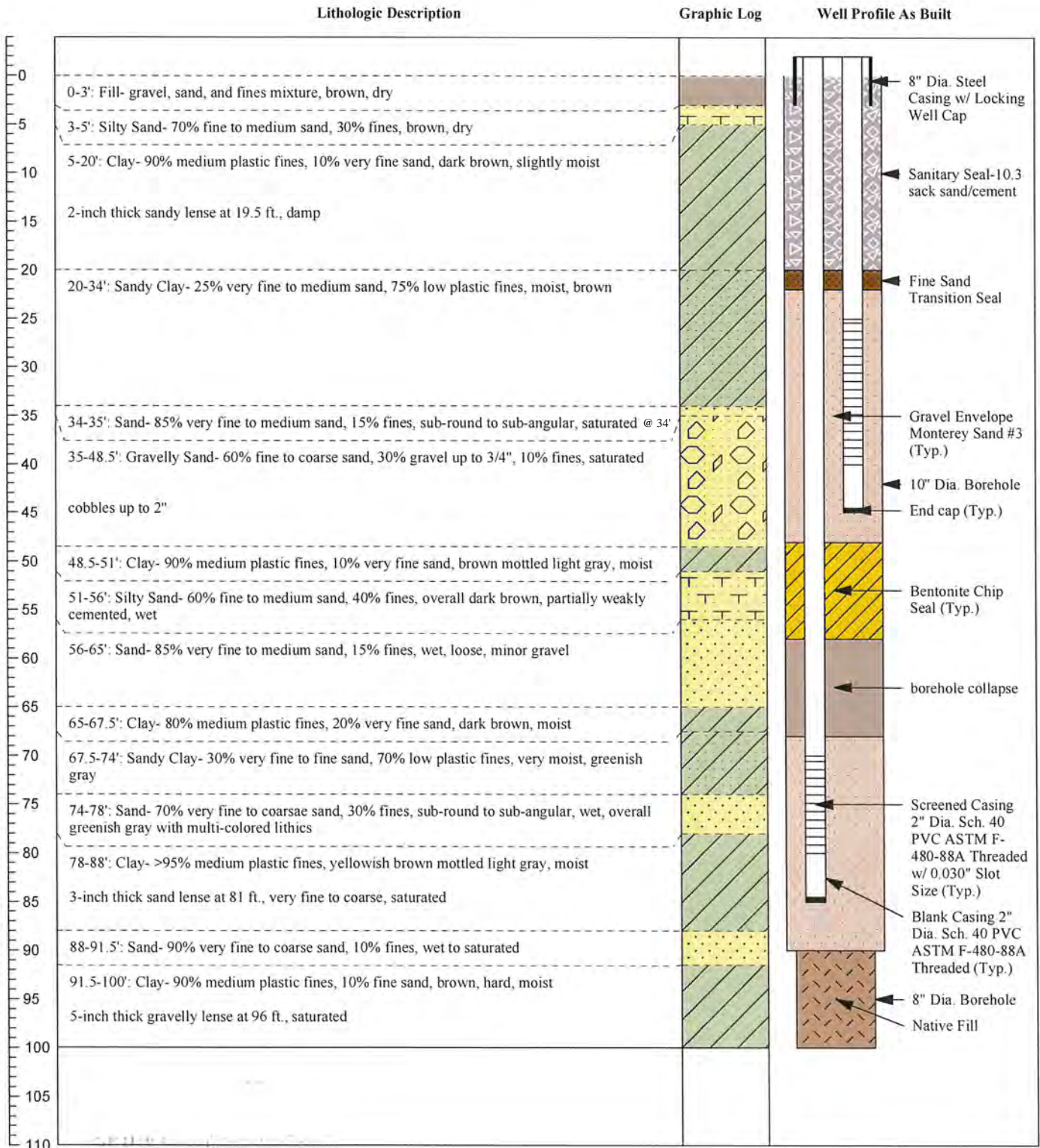
Attachments
<input checked="" type="checkbox"/> Geologic Log <input type="checkbox"/> Well Construction Diagram <input type="checkbox"/> Geophysical Log(s) <input type="checkbox"/> Soil/Water Chemical Analyses <input checked="" type="checkbox"/> Other <u>Site Location</u>
<small>Attach additional information, if it exists.</small>

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name <u>CLEAR HEART DRILLING, INC.</u>			
<small>Person, Firm or Corporation</small>			
<u>555 W. College Ave. Ste. B</u>	<u>Santa Rosa</u>	<u>CA</u>	<u>95401</u>
<small>Address</small>		<small>City</small>	<small>State Zip</small>
Signed <u>[Signature]</u>	<u>10/14/2014</u>	<u>780357</u>	
<small>C-57 Licensed Water Well Contractor</small>		<small>Date Signed</small>	<small>C-57 License Number</small>

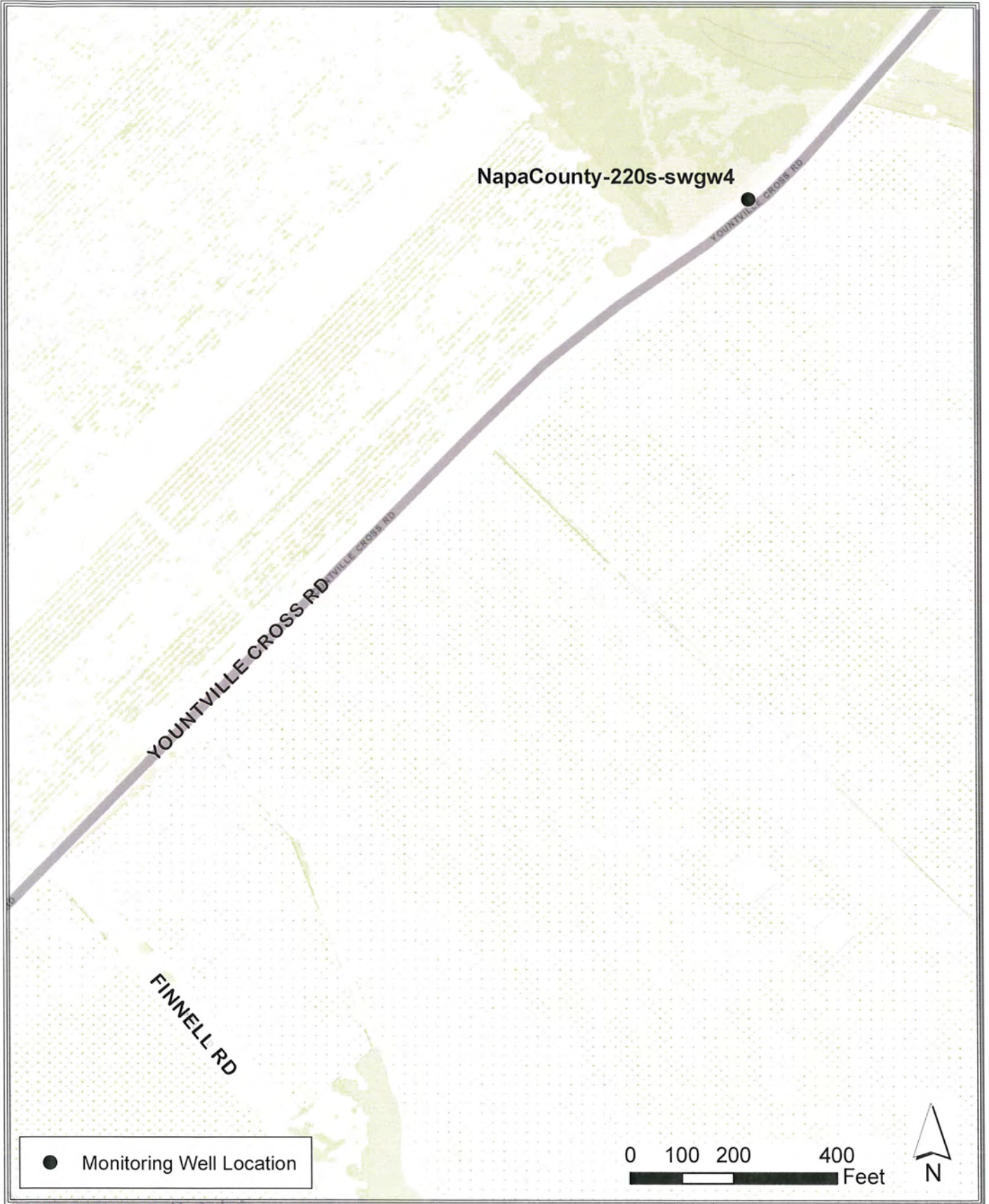
20236741

LSCE Project No. 12-1-071  
 Well Name: Napa County-220s-swgw4  
 Lat./Long.: 38.417573/-122.352665  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #4- Napa River at Yountville Cross Road  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/10/14 - 9/11/14 Well Depth (ft): 45  
 Boring Depth (ft): 100 Well Screen (ft): 25-40



20236741



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State of California

# Well Completion Report

Refer to Instruction Pamphlet  
No. e0236743

Page 1 of 3

Owner's Well Number NapaCounty-221d-swgw4

Date Work Began 09/10/2014 Date Work Ended 9/12/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00669 Permit Date 8/20/14

DWR Use Only - Do Not Fill In

07 N 04 W 31 00 02 M

State Well Number/Site Number

38 25 03 N 122 21 10 W

Latitude

Longitude

APN/TRS/Other

## Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_  
Drilling Method Hollow stem augers Drilling Fluid No

Depth from Surface Description  
Feet to Feet Describe material, grain size, color, etc

SEE ATTACHED WELL LOG

NOTE: NapaCounty-220s-swgw4 well and NapaCounty-221d-swgw4 well are in the same borehole.

## Well Owner

Name County of Napa  
Mailing Address 804 First Street  
City Napa State CA Zip 94559

## Well Location

Address Site #4- Napa River at Yountville Cross Road  
City Yountville County Napa  
Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Deg. Min. Sec. Deg. Min. Sec.  
Datum \_\_\_\_\_ Dec. Lat. 38.417573 Dec. Long. 122.352665  
APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_  
Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

## Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

SEE ATTACHED

West SITE LOCATION East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

## Activity

- New Well  
 Modification/Repair  
 Deepen  
 Other \_\_\_\_\_  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

## Planned Uses

- Water Supply  
 Domestic  Public  
 Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

Total Depth of Boring 100 Feet  
Total Depth of Completed Well 85 Feet

## Water Level and Yield of Completed Well

Depth to first water 34 (Feet below surface)  
Depth to Static \_\_\_\_\_  
Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_  
Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_  
Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)  
\*May not be representative of a well's long term yield.

## Casings

Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)
0	70	10	Blank	PVC Sch. 40	.308	2.375	
70	80	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots 0.030
80	85	10	Blank	PVC Sch. 40	.308	2.375	

## Annular Material

Depth from Surface Feet to Feet	Fill	Description
0	20	Cement
20	48	Filter Pack
48	58	Bentonite
58	68	Fill
68	90	Filter Pack
		#3 sand

## Attachments

- Geologic Log  
 Well Construction Diagram  
 Geophysical Log(s)  
 Soil/Water Chemical Analyses  
 Other Site Location

Attach additional information, if it exists.

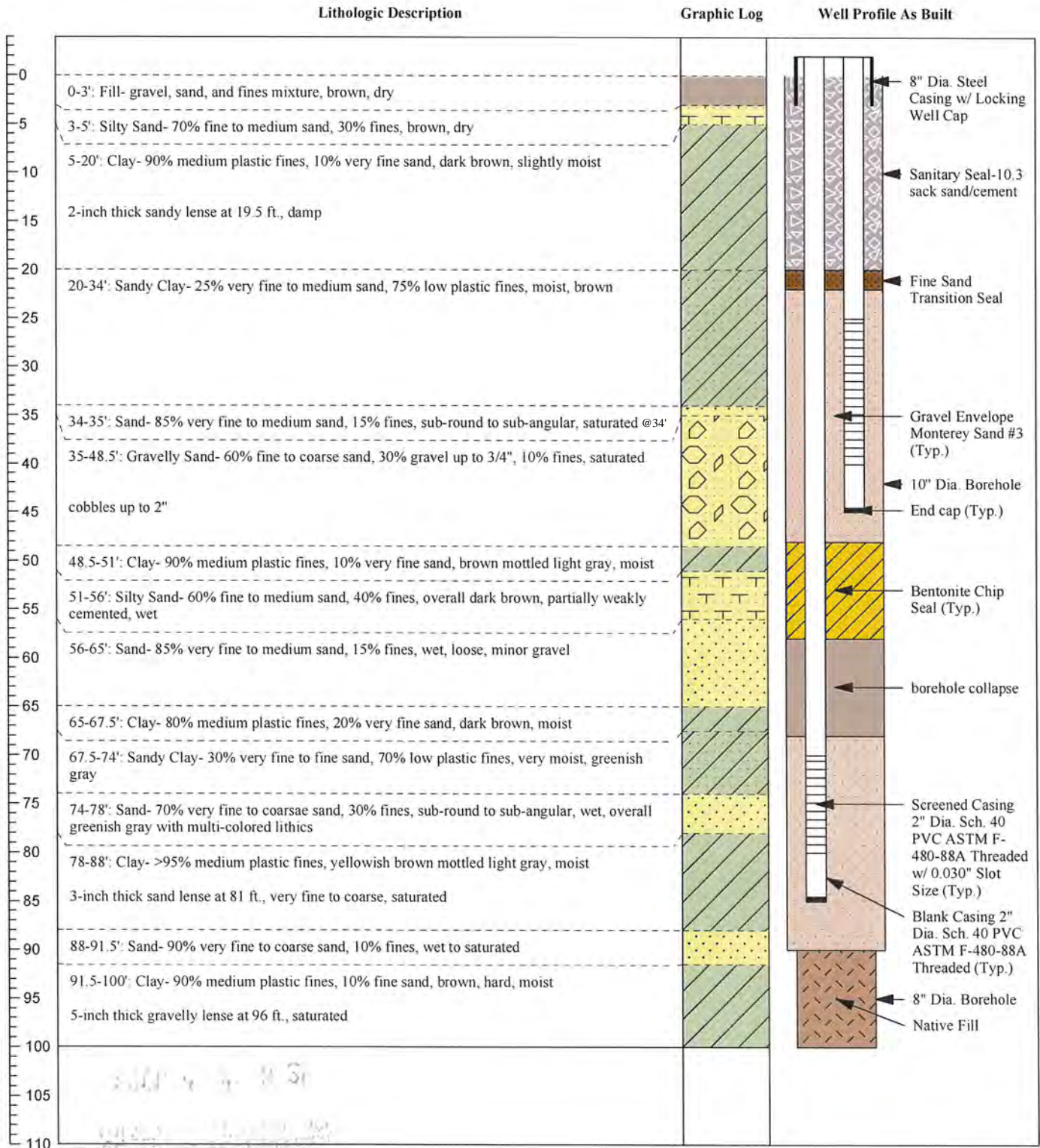
## Certification Statement

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief  
Name CLEAR HEART DRILLING, INC.  
Person, Firm or Corporation  
555 W. College Ave. Ste. B Santa Rosa CA 95401  
Address City State Zip  
Signed [Signature] 10/14/2014 780357  
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

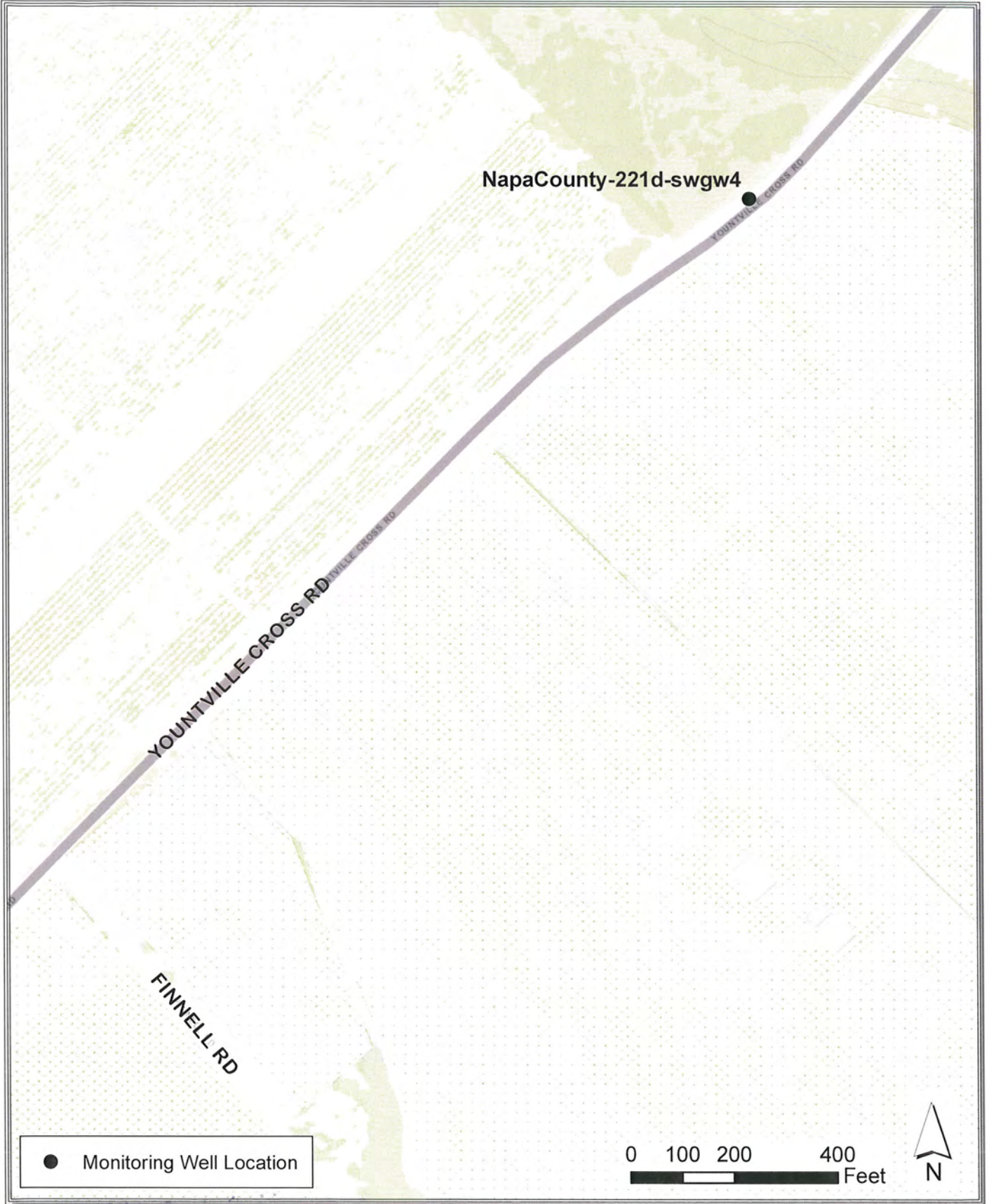
e0236743

LSCE Project No. 12-1-071  
 Well Name: Napa County-221d-swgw4  
 Lat./Long.: 38.417573/-122.352665  
 Drilled By: Clear Heart Drilling  
 Driller: Rick Schneider  
 Site Geologist: Charlie Jenkins, P.G.

Site: Site #4- Napa River at Yountville Cross Road  
 Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter  
reamed hole 10"-diameter  
 Sampling Method: Core Sample Barrel  
 Drilling/Installation Date: 9/10/14 - 9/11/14 Well Depth (ft): 85  
 Boring Depth (ft): 100 Well Screen (ft): 70-80



e0236743



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e02 36824

LSCE Project No. 12-1-071

Site: Site #5- Napa River at Stonebridge Park

Well Name: Napa County-222s-swgw5

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.510898/-122.456426

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

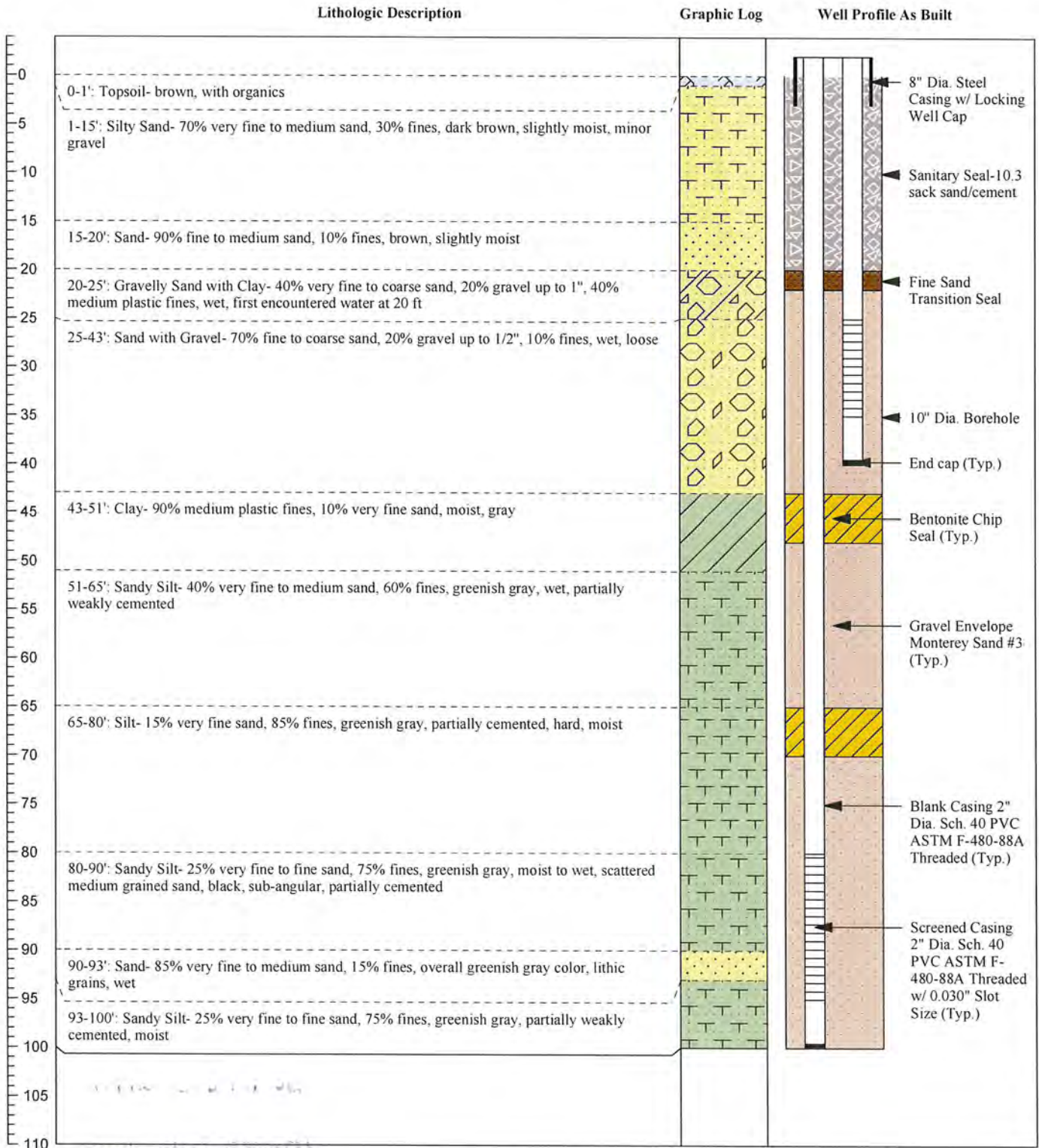
Sampling Method: Core Sample Barrel

Driller: Rick Schneider

Drilling/Installation Date: 9/15/14 - 9/16/14 Well Depth (ft): 40

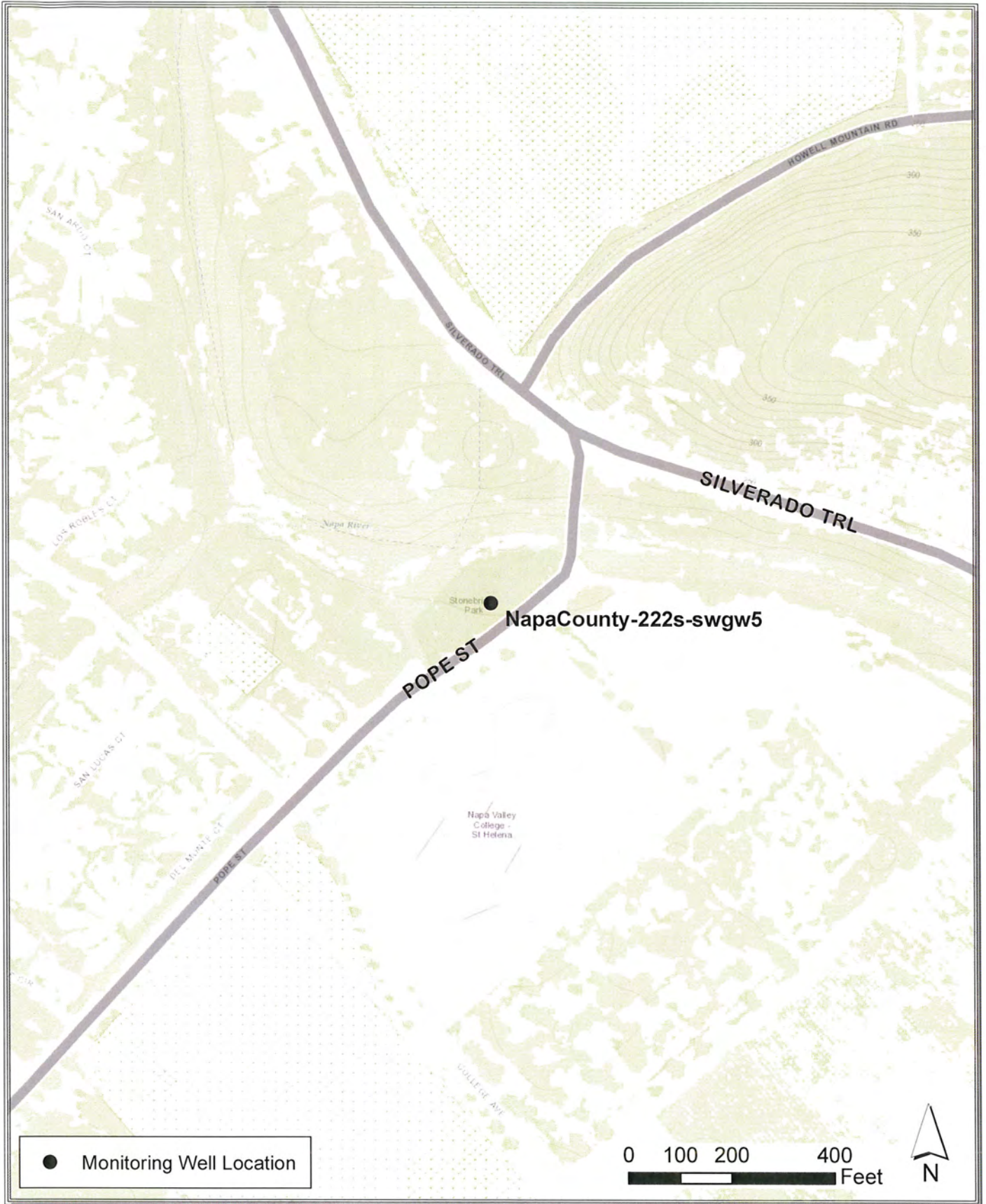
Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 25-35





20236824



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State of California

# Well Completion Report

Refer to Instruction Pamphlet

20230830

DWR Use Only - Do Not Fill In

08 N 05 W 30 Q 10 2 M

State Well Number/Site Number

38 30 39 N 122 27 23 W

Latitude

Longitude

APN/TRS/Other

Page 1 of 3

Owner's Well Number NapaCounty-223d-swgw5

Date Work Began 09/15/2014

Date Work Ended 9/18/2014

Local Permit Agency Napa County Department of Environmental Management

Permit Number E14-00670

Permit Date 8/20/14

## Geologic Log

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_

Drilling Method Hollow-stem augers Drilling Fluid no

Depth from Surface Description  
Feet to Feet Describe material, grain size, color, etc

SEE ATTACHED WELL LOG

NOTE: NapaCounty-222s-swgw5 well and NapaCounty-223d-swgw5 well are in the same borehole.

## Well Owner

Name County of Napa

Mailing Address 804 First Street

City Napa State CA Zip 94559

## Well Location

Address Site #5-Napa River at Stonebridge Park

City St. Helena County Napa

Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W  
Deg. Min. Sec. Deg. Min. Sec.

Datum \_\_\_\_\_ Dec. Lat. 38.510898 Dec. Long. 122.456426

APN Book \_\_\_\_\_ Page \_\_\_\_\_ Parcel \_\_\_\_\_

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

## Location Sketch

(Sketch must be drawn by hand after form is printed.)

North

SEE ATTACHED

West SITE LOCATION East

South

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

## Activity

- New Well
- Modification/Repair
  - Deepen
  - Other \_\_\_\_\_
- Destroy

Describe procedures and materials under "GEOLOGIC LOG"

## Planned Uses

- Water Supply
  - Domestic  Public
  - Irrigation  Industrial
- Cathodic Protection
- Dewatering
- Heat Exchange
- Injection
- Monitoring
- Remediation
- Sparging
- Test Well
- Vapor Extraction
- Other \_\_\_\_\_

Total Depth of Boring 100 Feet

Total Depth of Completed Well 100 Feet

## Water Level and Yield of Completed Well

Depth to first water 20 (Feet below surface)

Depth to Static Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_

Estimated Yield \* \_\_\_\_\_ (GPM) Test Type \_\_\_\_\_

Test Length \_\_\_\_\_ (Hours) Total Drawdown \_\_\_\_\_ (Feet)

\*May not be representative of a well's long term yield.

## Casings

Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)
0	80	10	Blank	PVC Sch. 40	.308	2.375	
80	95	10	Screen	PVC Sch. 40	.308	2.375	Milled Slots 0.030
95	100	10	Blank	PVC Sch. 40	.308	2.375	

## Annular Material

Depth from Surface Feet to Feet	Fill	Description
0	20	Cement
20	43	Filter Pack
43	48	Bentonite
48	65	Filter Pack
65	70	Bentonite
70	100	Filter Pack

## Attachments

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other Site Location

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 CLEAR HEART DRILLING, INC

Person, Firm or Corporation

555 W. College Ave. Ste. B

Santa Rosa

CA 95401

Signed Judy M. Lal

10/15/2014

780357

C-57 Licensed Water Well Contractor

Date Signed C-57 License Number

20230830

LSCE Project No. 12-1-071

Site: Site #5- Napa River at Stonebridge Park

Well Name: Napa County-223d-swgw5

Drilling Method: Hollow Stem Auger; pilot hole 8"-diameter

Lat./Long.: 38.510898/-122.456426

reamed hole 10"-diameter

Drilled By: Clear Heart Drilling

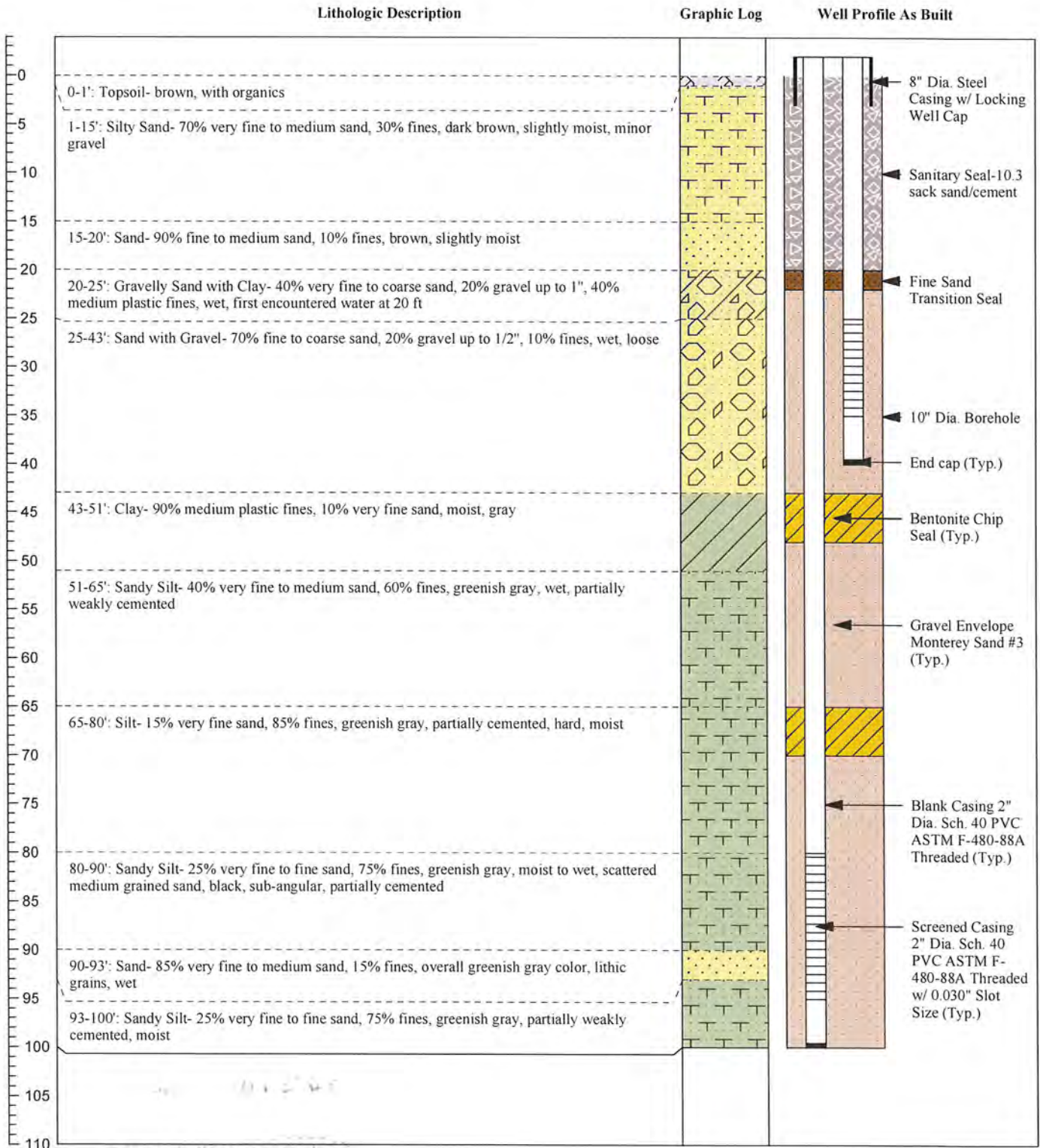
Sampling Method: Core Sample Barrel

Driller: Rick Schneider

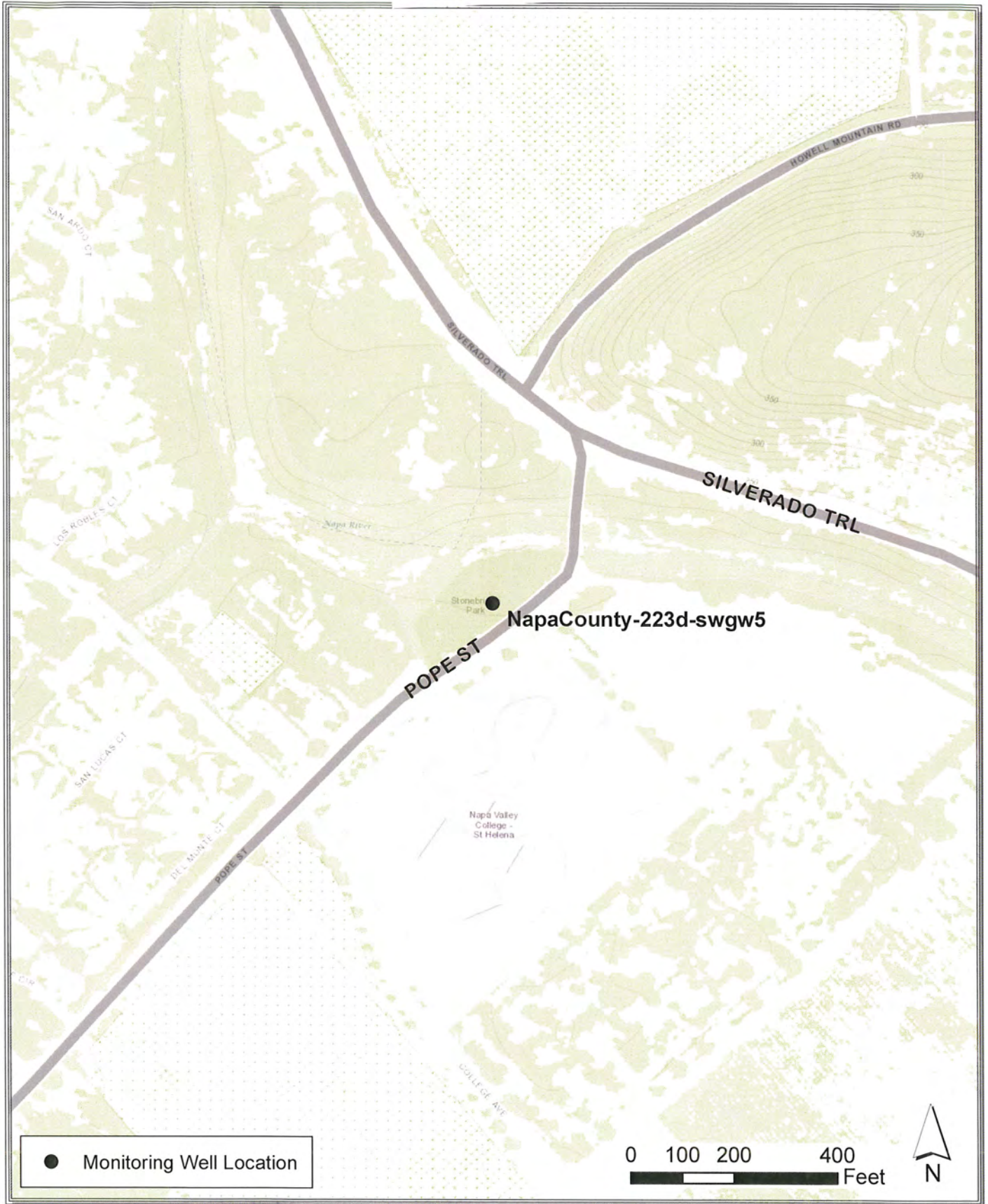
Drilling/Installation Date: 9/15/14 - 9/16/14 Well Depth (ft): 100

Site Geologist: Charlie Jenkins, P.G.

Boring Depth (ft): 100 Well Screen (ft): 80-95



20236836



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## APPENDIX B

**Appendix B: Summary of Wells Used for Hydrogeologic Site Characterization**

Site	Well Completion Report	Approx. Distance from Site (miles)	Borehole Total Depth (ft, bgs)	Approx. Bottom of Alluvium/Unconsolidated material (ft, bgs)	First Sand/Gravel (ft, bgs)	Second Sand/Gravel (ft, bgs)	Third Sand/Gravel (ft, bgs)	Fourth Sand/Gravel (ft, bgs)	Fifth Sand/Gravel (ft, bgs)	Sand/Gravel Description	Drilling method
Site 1	769450	0.15	560	75	20-40	40-70	155-170	-	-	black sands, brown sands and gravel, black sand	Rotary
	475430	0.5	26	unk	22-26			-	-	brown sand	Auger
	49958	0.2	150	36	28-36	-	-	-	-	gravel	Rotary
	342791 - 342792 (2 MWs)	0.05	30	unk	19.2-20.7	22-29.2	-	-	-	sand medium to coarse grained, sands and gravels	Auger
Site 2	774352	0.3	200	???	30-45	-	-	-	-	boulders & gravel	Rotary
	121101	0.3	470	92	23-51	76-87	215-233	-	-	Small gravel and sand, coarse sand, sand and gravel	Rotary
	323987	0.2	242	90	-	-	-	-	-	sand stringers noted from 20' to 60'	Rotary
	818722	0.05	270	110-130	-	-	-	-	-	imbedded gravel noted at 20' to 40' and again at 50' to 70'	Rotary
Site 3	482277	0.05	355	70	16-20	23-53	56-70	-	-	sand, gravel and clay, gravel	
	119532		590	93	unk	unk	unk	-	-	unk	
	11077	0.1	313	>180	32-80	80-126	172-174	-	-	clay and gravel, clay and gravel, gravel	
	15236	0.25	328	321	23-28	38-51	51-70	-	-	loose sand and gravel, loose gravel and rocks, gravel and clay, loose gravel, loose sand and gravel	

**Appendix B: Summary of Wells Used for Hydrogeologic Site Characterization**

Site	Well Completion Report	Approx. Distance from Site (miles)	Borehole Total Depth (ft, bgs)	Approx. Bottom of Alluvium/Unconsolidated material (ft, bgs)	First Sand/Gravel (ft, bgs)	Second Sand/Gravel (ft, bgs)	Third Sand/Gravel (ft, bgs)	Fourth Sand/Gravel (ft, bgs)	Fifth Sand/Gravel (ft, bgs)	Sand/Gravel Description	Drilling method
	119576	0.06	540	180	25-55	-	-	-	-	gravel and sand	
Site 4	437070	.	520	300	30-45	70-90	100-135	140-155	170-270	1/4" pea gravel, sand and 1/2" gravel, 1/2" pea gravel, sand and 1/4" gravel, 1/4" gravel	Rotary
	121202	0.45	340	167	30-58	67-156	-			sand and gravel, small gravel and sand	Rotary
	281504	0.5	280	240	22-40	80-140	160-190	190-220	240-280	gravel, gravel, gravel, gravel and coarse sand, gravel	Rotary
	462631	0.35	140	n/a	37-57	88-135	-	-	-	gravel and boulders, gravel and boulders	Rotary
Site 5	110119	0.05	285	21	-	-	-	-	-		Rotary
	482209	0.3	300	34	-	-	-	-	-		Rotary
	427004	0.2	247	54	-	-	-	-	-		Rotary
	72914	0.05	380	22	2-17	-	-	-	-	gravel	Rotary
	151102	0.25	256	80	25-80	-	-	-	-	sand and gravel with clay stringers	Rotary

## APPENDIX C



Site	Sample ID	Sample Date	Total Alkalinity mg/L as CaCO3 Std Method 2320 B [1]*	Dissolved Aluminum mg/L EPA 200.8 (D) [1]*	Dissolved Antimony mg/L EPA 200.8 (D) [1]*	Dissolved Arsenic mg/L EPA 200.8 (D) [1]*	Dissolved Barium mg/L EPA 200.8 (D) [1]*	Dissolved Beryllium mg/L EPA 200.8 (D) [1]*	Dissolved Bicarbonate (HCO3-) mg/L as CaCO3 Std Method 4500- CO2 D [1]*	Dissolved Boron mg/L EPA 200.7 (D) [1]*	Dissolved Bromide mg/L EPA 300.0 28d Hold [1]*	Dissolved Cadmium mg/L EPA 200.8 (D) [1]*	Dissolved Calcium mg/L EPA 200.7 (D) [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	117	<0.01	<0.001	<0.001	0.081	<0.001	117	0.2	0.07	<0.001	19
Site 1	NapaCounty-215d	6/3/2015 7:16	258	<0.01	<0.001	0.007	0.103	<0.001	258	1.4	0.63	<0.001	41
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	145	0.02	<0.001	0.015	0.136	<0.001	144	1.4	15.9	<0.001	145
Site 2	NapaCounty-216s	6/3/2015 13:03	93	0.089	<0.001	<0.001	0.046	<0.001	93	<0.1	0.12	<0.001	22
Site 2	NapaCounty-217d	6/3/2015 12:23	116	0.432	<0.001	0.001	0.027	<0.001	116	<0.1	0.06	<0.001	15
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	154	0.029	<0.001	<0.001	0.059	<0.001	153	0.1	0.02	<0.001	34
Site 3	NapaCounty-218s	6/3/2015 11:02	192	<0.01	<0.001	<0.001	0.091	<0.001	192	0.1	0.13	<0.001	47
Site 3	NapaCounty-219d	6/3/2015 10:04	225	<0.01	<0.001	0.046	0.088	<0.001	224	9.1	0.33	<0.001	17
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	176	0.012	<0.001	0.003	0.073	<0.001	175	0.5	0.2	<0.001	36
Site 4	NapaCounty-220s	6/4/2015 8:19	199	<0.01	<0.001	0.003	0.078	<0.001	199	0.1	0.1	<0.001	32
Site 4	NapaCounty-221d	6/4/2015 7:52	124	<0.01	<0.001	0.004	0.05	<0.001	124	<0.1	0.03	<0.001	14
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	98	<0.01	<0.001	0.001	0.042	<0.001	98	<0.1	0.08	<0.001	22
Site 5	NapaCounty-222s	6/4/2015 11:29	117	<0.01	<0.001	0.003	0.041	<0.001	117	0.6	0.12	<0.001	28
Site 5	NapaCounty-223d	6/4/2015 10:56	213	<0.01	<0.001	0.002	0.104,0.105**	<0.001	213	0.5	0.07	<0.001	16
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	92,93**	<0.01	<0.001	0.004	0.039	<0.001	93	0.8	0.12	<0.001	21
Site	Sample ID	Sample Date	Dissolved Carbonate (CO3--) mg/L as CaCO3 Std Method 4500- CO2 D [1]*	Dissolved Chloride mg/L EPA 300.0 28d Hold [1]*	Dissolved Chromium mg/L EPA 200.8 (D) [1]*	Dissolved Cobalt mg/L EPA 200.8 (D) [1]*	Conductance (EC) µS/cm Std Method 2510-B [1]*	Dissolved Copper mg/L EPA 200.8 (D) [1]*	Dissolved Fluoride mg/L EPA 300.0 28d Hold [1]*	Dissolved Hardness mg/L as CaCO3 Std Method 2340 B [1]*	Dissolved Hydroxide (OH- ) mg/L as CaCO3 Std Method 4500- CO2 D [1]*	Dissolved Iron mg/L EPA 200.8 (D) [1]*	Dissolved Lead mg/L EPA 200.8 (D) [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	<1	28	<0.001	<0.005	416	<0.001	0.2	144	<1	0.009	<0.001
Site 1	NapaCounty-215d	6/3/2015 7:16	1	177	<0.001	<0.005	1174	0.001	0.2	226	<1	0.042	<0.001
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	1	4699	0.002	<0.005	14319	0.006	<0.1	1717	<1	0.025	<0.001
Site 2	NapaCounty-216s	6/3/2015 13:03	<1	15	0.001	<0.005	317	0.003	0.2	116	<1	0.066	<0.001
Site 2	NapaCounty-217d	6/3/2015 12:23	<1	5	0.001	<0.005	255	0.001	0.6	74	<1	0.331	<0.001
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	1	12	0.005	<0.005	411	0.006	0.2	159	<1	0.091	<0.001
Site 3	NapaCounty-218s	6/3/2015 11:02	<1	19	0.001	<0.005	536	<0.001	<0.1	247	<1	0.008	<0.001
Site 3	NapaCounty-219d	6/3/2015 10:04	1	73	<0.001	<0.005	712	0.005	0.3	116	<1	0.021	<0.001
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	1	27	<0.001	<0.005	515	0.001	0.2	215	<1	0.022	<0.001
Site 4	NapaCounty-220s	6/4/2015 8:19	<1	7	<0.001	<0.005	429	<0.001	0.2	190	<1	<0.005	<0.001
Site 4	NapaCounty-221d	6/4/2015 7:52	<1	6	<0.001	<0.005	263	<0.001	0.2	100	<1	0.009	<0.001
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	<1	18	<0.001	<0.005	328	0.001	0.1	128	<1	0.046	<0.001
Site 5	NapaCounty-222s	6/4/2015 11:29	<1	32	<0.001	<0.005	372	<0.001	0.3	123	<1	0.014	<0.001
Site 5	NapaCounty-223d	6/4/2015 10:56	<1	16	0.001	<0.005	453	<0.001	0.3	113	<1	0.473,0.476**	<0.001
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	<1	34	<0.001	<0.005	346	0.002	0.4	100	<1	0.019	<0.001

\*Codes in brackets ([ ]) following the analyte name refer to the Method Comparability Code. For more information, please refer to [http://www.water.ca.gov/waterdatalibrary/includes/mtc\\_code.cfm](http://www.water.ca.gov/waterdatalibrary/includes/mtc_code.cfm).

\*\*More than one analysis was made for this sample

Site	Sample ID	Sample Date	Dissolved Lithium mg/L EPA 200.8 (D) [1]*	Dissolved Magnesium mg/L EPA 200.7 (D) [1]*	Dissolved Manganese mg/L EPA 200.8 (D) [1]*	Dissolved Mercury mg/L EPA 200.8 (Hg Dissolved) [1]*	Dissolved Molybdenum mg/L EPA 200.8 (D) [1]*	Dissolved Nickel mg/L EPA 200.8 (D) [1]*	Dissolved Nitrate mg/L as N EPA 300.0 28d Hold [1]*	Dissolved Nitrite mg/L as N Std Method 4500-NO2 B (48Hr) [1]*	Dissolved Potassium mg/L EPA 200.7 (D) [1]*	Dissolved Selenium mg/L EPA 200.8 (D) [1]*	Dissolved Silver mg/L EPA 200.8 (D) [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	0.011	23	2.53	<0.0002	<0.005	0.003	7.3	0.02	1.1	<0.001	<0.001
Site 1	NapaCounty-215d	6/3/2015 7:16	0.059	30	1.13	<0.0002	<0.005	0.002	<0.1	<0.01	4.5	0.002	<0.001
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	0.067	329	0.076	<0.0002	<0.005	0.007	12.6	<0.01	106.5	0.046	<0.001
Site 2	NapaCounty-216s	6/3/2015 13:03	0.012	15	0.041	<0.0002	<0.005	0.002	5.4	0.01	0.9	<0.001	<0.001
Site 2	NapaCounty-217d	6/3/2015 12:23	0.014	9	0.643	<0.0002	0.005	0.002	<0.1	<0.01	1.3	<0.001	<0.001
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	0.008	18	0.024	<0.0002	<0.005	0.013	0.5	<0.01	2.1	<0.001	<0.001
Site 3	NapaCounty-218s	6/3/2015 11:02	0.01	31	<0.005	<0.0002	<0.005	0.003	1.8	<0.01	0.7	<0.001	<0.001
Site 3	NapaCounty-219d	6/3/2015 10:04	0.037,0.038**	18	0.241,0.242**	<0.0002	0.013,0.014**	0.001	<0.1	<0.01	5.2	<0.001	<0.001
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	0.046	30	0.038	<0.0002	<0.005	0.004	<0.1	<0.01	2.9	<0.001	<0.001
Site 4	NapaCounty-220s	6/4/2015 8:19	<0.005	26	0.568	<0.0002	<0.005	0.005	0.7	0.03	3.6	<0.001	<0.001
Site 4	NapaCounty-221d	6/4/2015 7:52	<0.005	16	0.728	<0.0002	<0.005	0.002	<0.1	<0.01	4.7	<0.001	<0.001
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	<0.005	17	0.041	<0.0002	<0.005	0.003	<0.1	<0.01	1.7	<0.001	<0.001
Site 5	NapaCounty-222s	6/4/2015 11:29	0.063	13	0.641	<0.0002	<0.005	0.01	<0.1	<0.01	3.8	<0.001	<0.001
Site 5	NapaCounty-223d	6/4/2015 10:56	0.075,0.076**	18	0.219,0.223**	<0.0002	<0.005	0.002	0.3	<0.01	7.1	<0.001	<0.001
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	0.095	11	0.048	<0.0002	<0.005	0.003	<0.1	<0.01	3.7	<0.001	<0.001

Site	Sample ID	Sample Date	Dissolved Sodium mg/L EPA 200.7 (D) [1]*	Total Dissolved Solids mg/L Std Method 2540 C [1]*	Dissolved Strontium mg/L EPA 200.8 (D) [1]*	Dissolved Sulfate mg/L EPA 300.0 28d Hold [1]*	Dissolved Thallium mg/L EPA 200.8 (D) [1]*	Turbidity N.T.U. EPA 180.1 [D-2]*	Dissolved Vanadium mg/L EPA 200.8 (D) [1]*	Dissolved Zinc mg/L EPA 200.8 (D) [1]*	pH pH Units Std Method 2320 B [1]*
Site 1	NapaCounty-214s	6/3/2015 8:09	31	268	0.144	45	<0.001	1.21	<0.005	<0.005	6.9
Site 1	NapaCounty-215d	6/3/2015 7:16	164	683	0.32	74	<0.001	2.75	<0.005	<0.005	7.3
Site 1	NapaCounty-swgw_SW1	6/4/2015 13:39	2590	8830	2.19	667	<0.001	20.6	0.018	0.012	7.8
Site 2	NapaCounty-216s	6/3/2015 13:03	22	208	0.169	38	<0.001	77.4	<0.005	<0.005	6.8
Site 2	NapaCounty-217d	6/3/2015 12:23	29	164	0.107	9	<0.001	7.29	<0.005	<0.005	7.4
Site 2	NapaCounty-swgw_SW2	6/3/2015 13:15	28	255	0.269	44	<0.001	1.37	<0.005	0.027	7.6
Site 3	NapaCounty-218s	6/3/2015 11:02	20	324	0.357	65	<0.001	5.06	<0.005	<0.005	6.7
Site 3	NapaCounty-219d	6/3/2015 10:04	108	452	0.125,0.126**	32	<0.001	1.16	<0.005	0.006	7.4
Site 3	NapaCounty-swgw_SW3	6/4/2015 12:46	27	313	0.248	54	<0.001	7.48	<0.005	<0.005	7.8
Site 4	NapaCounty-220s	6/4/2015 8:19	19	292	0.199	11	<0.001	3.29	<0.005	<0.005	6.7
Site 4	NapaCounty-221d	6/4/2015 7:52	16	204	0.079	6	<0.001	7.11	<0.005	<0.005	7.1
Site 4	NapaCounty-swgw_SW4	6/4/2015 8:50	17	250	0.131	39	<0.001	3.4	<0.005	<0.005	7.3
Site 5	NapaCounty-222s	6/4/2015 11:29	26	241	0.155	21	<0.001	1.33,1.48**	<0.005	<0.005	7.1
Site 5	NapaCounty-223d	6/4/2015 10:56	56	343	0.104,0.105**	6	<0.001	18.8	<0.005	<0.005	7.2
Site 5	NapaCounty-swgw_SW5	6/4/2015 11:56	30	220	0.111	25	<0.001	1.68	<0.005	0.006	7.4

\*Codes in brackets ([ ]) following the analyte name refer to the Method Comparability Code. For more information, please refer to [http://www.water.ca.gov/waterdatalibrary/includes/mtc\\_code.cfm](http://www.water.ca.gov/waterdatalibrary/includes/mtc_code.cfm).

\*\*More than one analysis was made for this sample



# DWR Bryte Analytical Lab

1450 Riverbank Road, West Sacramento, CA 95605

## Report of Analytical Results

22-Jun-15

**Submission Name: Napa L&S 2015**

**Submission ID: CH0615B0001**

*These results are also available to DWR staff in electronic form via the DWR Water Data Library (WDL) <http://wdl.water.ca.gov>. Contact Kelley Pepper ([kelly.pepper@water.ca.gov](mailto:kelly.pepper@water.ca.gov)) to set up access.*

**(First) Collection Date:** 6/3/2015

**Received Date:** 6/3/2015 3:50:00 PM

**Report to:**

Bill Brewster  
DWR North Central Region Office

**Priority:** 5  
**Submitted By:** John MacDougall  
**Received By:** Carroll, Marilyn

, CA

**Instructions to Lab:**

**Samples:**

CH0615B0001	CH0615B0002	CH0615B0003	CH0615B0004	CH0615B0005	CH0615B0006
CH0615B0013	CH0615B0016	CH0615B0017			

**Analyst Summary:**

16 - Carroll, Marilyn	20 - Chan, Elaine	5 - Hernandez, Richard	9 - Pineda, Maritza	10 - Quiambao, Josie
13 - Thind, Pritam				

**Submission Review Notes From Lab:**

### *Sample and Analyte Flag Summary*

<u>Flag</u>	<u>Flag Description</u>
R4	Analyte Reporting Limit raised due to high analyte level.

## Report of Field Results

<u>Sample Number</u> <b>CH0615B0001</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
05N04W02N990M	NapaCounty-214s	Water, Natural	L10583900000	6/03/2015 8:09 AM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0002</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
05N04W02N991M	NapaCounty-215d	Water, Natural	L10583900000	6/03/2015 7:16 AM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0003</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
06N04W18J992M	NapaCounty-216s	Water, Natural	L10583900000	6/03/2015 1:03 PM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0004</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
06N04W18J993M	NapaCounty-217d	Water, Natural	L10583900000	6/03/2015 12:23 PM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0005</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
06N04W16G994M	NapaCounty-218s	Water, Natural	L10583900000	6/03/2015 11:02 AM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		

Sample Number		Field Results	
CH0615B0005			
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0006			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
06N04W16G995M	NapaCounty-219d	Water, Natural	L10583900000      6/03/2015 10:04 AM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
Dissolved Oxygen (Electrode)	Dissolved Oxygen	mg/L	
pH (Field)	pH		
Oxidation-Reduction Potential	Redox Potential	10 mV	
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0013			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
E3012234	NapaCounty-swgw_SW2	Water, Natural	L10583900000      6/03/2015 1:15 PM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
Dissolved Oxygen (Electrode)	Dissolved Oxygen	mg/L	
pH (Field)	pH		
Oxidation-Reduction Potential	Redox Potential	10 mV	
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0016			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
06N04W18J993M	NapaCounty-217d	Water, Natural	L10583900000      6/03/2015 12:23 PM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
Dissolved Oxygen (Electrode)	Dissolved Oxygen	mg/L	
pH (Field)	pH		
Oxidation-Reduction Potential	Redox Potential	10 mV	
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0017			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
Blank; Field	Blank; Field	Water, Purified	L10583900000      6/03/2015 1:06 PM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
pH (Field)	pH		
Temperature, Water (Field)	Water Temperature	°C	

## Report of Inorganic Analytical Results

Including Misc Physical Measurements

Sample Number		Inorganic Analytical Results	
CH0615B0001			
<b>CH0615B0001</b>	<i>Sample Type(Purpose):</i> Normal Sample	<i>Depth:</i> 1 m	<i>Collection Date:</i> 6/3/2015 8:09:00 AM
<i>StationNumber:</i> 05N04W02N990M	<i>StationName:</i> NapaCounty-214s	<i>Matrix:</i> Water, Natural	<i>Cost Code:</i> L10583900000
<i>Sample Condition:</i> 2.0 °C when received. Iced.			
Method	Analyte	Result	Units
Std Method 2510-B	Conductance (EC)	416	µS/cm
		R.L.	Dilution ChemID Analysis Date Flags and Notes:
		1.	1. 20 6/4/2015

Sample Number	CH0615B0001	Inorganic Analytical Results					
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Barium	0.081	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	117	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.7 (D)	Dissolved Boron	0.1853	mg/L	0.1	1.	10	6/11/2015
EPA 300.0 28d Hold	Dissolved Bromide	0.07	mg/L	0.01	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Calcium	19.02	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	28	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.17	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	144	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.009	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.011	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	23.39	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	2.53	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.003	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	7.33	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	0.02	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	1.064	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	31.35	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.144	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	45.29	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	6.9		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	117	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	268	mg/L	1.	1.	20	6/5/2015
Std Method 2540 C	Total Dissolved Solids	268	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	1.21	N.T.U.	1.	1.	16	6/4/2015

Dup-CH0615B0001

Sample Number	CH0615B0002	Inorganic Analytical Results					
<b>CH0615B0002</b>	<i>Sample Type(Purpose):</i> Normal Sample	<i>Depth:</i> 1 m	<i>Collection Date:</i> 6/3/2015 7:16:00 AM				
<i>StationNumber:</i> 05N04W02N991M	<i>StationName:</i> NapaCounty-215d	<i>Matrix:</i> Water, Natural	<i>Cost Code:</i> L1058390000				
<i>Sample Condition:</i> 2.0 °C when received. Iced.							

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	1174	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.007	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.103	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0002		Inorganic Analytical Results			
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	258 mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.7 (D)	Dissolved Boron	1.416 mg/L	0.1	1.	10	6/11/2015
EPA 300.0 28d Hold	Dissolved Bromide	0.63 mg/L	0.01	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Cadmium	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Calcium	40.57 mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	1 mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	177 mg/L	10.	10.	9	6/9/2015 R4 Dil-CH0615B0002
EPA 200.8 (D)	Dissolved Chromium	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.001 mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.18 mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	226 mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1 mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.042 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.059 mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	30.24 mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	1.13 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002 mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.002 mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1 mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01 mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	4.505 mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	0.002 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	163.5 mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.32 mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	74 mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005 mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.3	0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	258 mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	683 mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	2.75 N.T.U.	1.	1.	16	6/4/2015

Sample Number	CH0615B0003		Inorganic Analytical Results					
<b>CH0615B0003</b>	<i>Sample Type(Purpose):</i> Normal Sample		<i>Depth:</i> 1 m		<i>Collection Date:</i> 6/3/2015 1:03:00 PM			
<i>StationNumber:</i> 06N04W18J992M		<i>StationName:</i> NapaCounty-216s		<i>Matrix:</i> Water, Natural		<i>Cost Code:</i> L1058390000		
<i>Sample Condition:</i> 2.0 °C when received. Iced.								
Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	317	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.089	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.046	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	93	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	Measured: 0.0927
EPA 300.0 28d Hold	Dissolved Bromide	0.12	mg/L	0.01	1.	9	6/9/2015	Dup-CH0615B0003
EPA 300.0 28d Hold	Dissolved Bromide	0.12	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0003	Inorganic Analytical Results						
EPA 200.7 (D)	Dissolved Calcium	22.26	mg/L	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 300.0 28d Hold	Dissolved Chloride	15.34	mg/L	1.	1.	9	6/9/2015	
EPA 300.0 28d Hold	Dissolved Chloride	15.33	mg/L	1.	1.	9	6/9/2015	Dup-CH0615B0003
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Copper	0.003	mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Fluoride	0.16	mg/L	0.1	1.	9	6/9/2015	Dup-CH0615B0003
EPA 300.0 28d Hold	Dissolved Fluoride	0.16	mg/L	0.1	1.	9	6/9/2015	
Std Method 2340 B	Dissolved Hardness	116	mg/L as CaCO3	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Iron	0.066	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lithium	0.012	mg/L	0.005	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Magnesium	14.61	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Manganese	0.041	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015	
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.002	mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Nitrate	5.4	mg/L	0.1	1.	9	6/9/2015	Dup-CH0615B0003
EPA 300.0 28d Hold	Dissolved Nitrate	5.4	mg/L	0.1	1.	9	6/9/2015	
Std Method 4500-NO2 B (48	Dissolved Nitrite	0.01	mg/L as N	0.01	1.	5	6/4/2015	
EPA 200.7 (D)	Dissolved Potassium	0.8767	mg/L	0.5	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Sodium	21.55	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Strontium	0.169	mg/L	0.005	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Sulfate	38.3	mg/L	1.	1.	9	6/9/2015	
EPA 300.0 28d Hold	Dissolved Sulfate	38.3	mg/L	1.	1.	9	6/9/2015	Dup-CH0615B0003
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015	
Std Method 2320 B	pH	6.8		0.1	1.	20	6/4/2015	
Std Method 2320 B	Total Alkalinity	93	mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 2540 C	Total Dissolved Solids	208	mg/L	1.	1.	20	6/5/2015	
EPA 180.1	Turbidity	77.4	N.T.U.	3.	3.	16	6/4/2015	R4

**Sample Number** CH0615B0004 **Inorganic Analytical Results**  
**CH0615B0004** *Sample Type(Purpose):* Normal Sample *Depth:* 1 m *Collection Date:* 6/3/2015 12:23:00 PM  
*StationNumber:* 06N04W18J993M *StationName:* NapaCounty-217d *Matrix:* Water, Natural *Cost Code:* L1058390000  
*Sample Condition:* 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	255	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.432	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.027	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	116	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	Measured: 0.0798
EPA 300.0 28d Hold	Dissolved Bromide	0.06	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Calcium	15.21	mg/L	1.	1.	10	6/11/2015	



Sample Number	CH0615B0004	Inorganic Analytical Results					
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	5	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.56	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	74	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.331	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.014	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	8.758	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	0.643	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.002	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	1.309	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	28.53	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.107	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	9.31	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	116	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	164	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	7.29	N.T.U.	1.	1.	16	6/4/2015

**Sample Number** CH0615B0005 **Inorganic Analytical Results**  
**CH0615B0005** *Sample Type(Purpose):* Normal Sample *Depth:* 1 m *Collection Date:* 6/3/2015 11:02:00 AM  
*StationNumber:* 06N04W16G994M *StationName:* NapaCounty-218s *Matrix:* Water, Natural *Cost Code:* L1058390000  
*Sample Condition:* 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	536	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.091	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	192	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	0.1072	mg/L	0.1	1.	10	6/11/2015	
EPA 300.0 28d Hold	Dissolved Bromide	0.13	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Calcium	47.39	mg/L	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 300.0 28d Hold	Dissolved Chloride	19	mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Copper	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0005		Inorganic Analytical Results				
EPA 300.0 28d Hold	Dissolved Fluoride	< 0.1 mg/L	0.1	1.	9	6/9/2015	
Std Method 2340 B	Dissolved Hardness	247 mg/L as CaCO3	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1 mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Iron	0.008 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lead	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lithium	0.01 mg/L	0.005	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Magnesium	31.18 mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Manganese	< 0.005 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002 mg/L	0.0002	1.	13	6/18/2015	
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.003 mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Nitrate	1.8 mg/L	0.1	1.	9	6/9/2015	
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01 mg/L as N	0.01	1.	5	6/4/2015	
EPA 200.7 (D)	Dissolved Potassium	0.7058 mg/L	0.5	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Silver	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Sodium	20.11 mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Strontium	0.357 mg/L	0.005	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Sulfate	65.1 mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Thallium	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Zinc	< 0.005 mg/L	0.005	1.	13	6/4/2015	
Std Method 2320 B	pH	6.7	0.1	1.	20	6/4/2015	
Std Method 2320 B	Total Alkalinity	192 mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 2540 C	Total Dissolved Solids	324 mg/L	1.	1.	20	6/5/2015	
EPA 180.1	Turbidity	5.06 N.T.U.	1.	1.	16	6/4/2015	

Sample Number	CH0615B0006		Inorganic Analytical Results					
<b>CH0615B0006</b>	Sample Type(Purpose): Normal Sample		Depth: 1 m		Collection Date: 6/3/2015 10:04:00 AM			
StationNumber: 06N04W16G995M			StationName: NapaCounty-219d		Matrix: Water, Natural		Cost Code: L1058390000	
Sample Condition: 2.0 °C when received. Iced.								
Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	712	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Arsenic	0.046	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.046	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Barium	0.088	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.088	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	224	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	9.063	mg/L	0.1	1.	10	6/11/2015	
EPA 300.0 28d Hold	Dissolved Bromide	0.33	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.7 (D)	Dissolved Calcium	16.74	mg/L	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 300.0 28d Hold	Dissolved Chloride	73	mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	

Sample Number	CH0615B0006	Inorganic Analytical Results						
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Copper	0.005	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Copper	0.005	mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Fluoride	0.25	mg/L	0.1	1.	9	6/9/2015	
Std Method 2340 B	Dissolved Hardness	116	mg/L as CaCO3	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Iron	0.021	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Iron	0.021	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lithium	0.038	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Lithium	0.037	mg/L	0.005	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Magnesium	17.9	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Manganese	0.242	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Manganese	0.241	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015	
EPA 200.8 (D)	Dissolved Molybdenum	0.014	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Molybdenum	0.013	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015	
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015	Dup-CH0615B0006
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015	
EPA 200.7 (D)	Dissolved Potassium	5.163	mg/L	0.5	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Sodium	107.9	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Strontium	0.125	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Strontium	0.126	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 300.0 28d Hold	Dissolved Sulfate	32	mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Zinc	0.006	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Zinc	0.006	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015	
Std Method 2320 B	Total Alkalinity	225	mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 2540 C	Total Dissolved Solids	452	mg/L	1.	1.	20	6/5/2015	
EPA 180.1	Turbidity	1.16	N.T.U.	1.	1.	16	6/4/2015	

Sample Number	CH0615B0013	Inorganic Analytical Results						
<b>CH0615B0013</b>	Sample Type(Purpose): Normal Sample	Depth: 1 m	Collection Date: 6/3/2015 1:15:00 PM					
StationNumber: E3012234	StationName: NapaCounty-swgw_SW2	Matrix: Water, Natural	Cost Code: L1058390000					
Sample Condition: 2.0 °C when received. Iced.								

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	411	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.029	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.059	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	153	mg/L as CaCO3	1.	1.	20	6/4/2015	

Sample Number	CH0615B0013	Inorganic Analytical Results					
EPA 200.7 (D)	Dissolved Boron	0.1329	mg/L	0.1	1.	10	6/11/2015
EPA 300.0 28d Hold	Dissolved Bromide	0.02	mg/L	0.01	1.	9	6/8/2015
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Calcium	33.74	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	12.13	mg/L	1.	1.	9	6/8/2015
EPA 200.8 (D)	Dissolved Chromium	0.005	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.006	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.17	mg/L	0.1	1.	9	6/8/2015
Std Method 2340 B	Dissolved Hardness	159	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.091	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.008	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	18.05	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	0.024	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.013	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	0.5	mg/L	0.1	1.	9	6/8/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	2.142	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	28.27	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.269	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	44.13	mg/L	1.	1.	9	6/8/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	0.027	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.6		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	154	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	255	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	1.37	N.T.U.	1.	1.	16	6/4/2015

Measured: 0.001

Sample Number	CH0615B0016	Inorganic Analytical Results						
<b>CH0615B0016</b>	<b>Sample Type(Purpose):</b> Duplicate Sample	CH0615B0004	<b>Depth:</b> 1 m	<b>Collection Date:</b> 6/3/2015 12:23:00 PM				
<b>StationNumber:</b> 06N04W18J993M	<b>StationName:</b> NapaCounty-217d	<b>Matrix:</b> Water, Natural	<b>Cost Code:</b> L1058390000					
<b>Sample Condition:</b> 2.0 °C when received. Iced.								
Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	256	µS/cm	1.	1.	20	6/4/2015	Dup-CH0615B0016
Std Method 2510-B	Conductance (EC)	256	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.422	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.027	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	118	mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	118	mg/L as CaCO3	1.	1.	20	6/4/2015	Dup-CH0615B0016
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	Measured: 0.0808
EPA 300.0 28d Hold	Dissolved Bromide	0.06	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0016	Inorganic Analytical Results					
EPA 200.7 (D)	Dissolved Calcium	15.05	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015 Dup-CH0615B0016
EPA 300.0 28d Hold	Dissolved Chloride	5	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.549	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	74	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015 Dup-CH0615B0016
EPA 200.8 (D)	Dissolved Iron	0.331	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.014	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	8.798	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	0.635	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.002	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	1.349	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	28.53	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.109	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	9.2	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015 Dup-CH0615B0016
Std Method 2320 B	Total Alkalinity	118	mg/L as CaCO3	1.	1.	20	6/4/2015 Dup-CH0615B0016
Std Method 2320 B	Total Alkalinity	118	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	165	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	6.68	N.T.U.	1.	1.	16	6/4/2015 Dup-CH0615B0016
EPA 180.1	Turbidity	6.23	N.T.U.	1.	1.	16	6/4/2015

**Sample Number** CH0615B0017 **Inorganic Analytical Results**  
**CH0615B0017** *Sample Type(Purpose):* Blank; Field *Depth:* 0 m *Collection Date:* 6/3/2015 1:06:00 PM  
*StationNumber:* Blank; Field *StationName:* Blank; Field *Matrix:* Water, Purified *Cost Code:* L1058390000  
*Sample Condition:* 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	< 1	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	2	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	
EPA 300.0 28d Hold	Dissolved Bromide	< 0.01	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0017	Inorganic Analytical Results					
EPA 200.7 (D)	Dissolved Calcium	< 1	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	< 1	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	< 1	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	< 1	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	< 0.5	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	< 1	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	< 1	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	5.2		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	2	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	< 1	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	< 1	N.T.U.	1.	1.	16	6/4/2015

Measured: 0.09



# DWR Bryte Analytical Lab

1450 Riverbank Road, West Sacramento, CA 95605

## Report of Analytical Results

22-Jun-15

**Submission Name: Napa L&S 2015**

**Submission ID: CH0615B0001**

*These results are also available to DWR staff in electronic form via the DWR Water Data Library (WDL) <http://wdl.water.ca.gov>. Contact Kelley Pepper ([kelly.pepper@water.ca.gov](mailto:kelly.pepper@water.ca.gov)) to set up access.*

**(First) Collection Date:** 6/3/2015

**Received Date:** 6/3/2015 3:50:00 PM

**Report to:**

Bill Brewster  
DWR North Central Region Office

**Priority:** 5  
**Submitted By:** John MacDougall  
**Received By:** Carroll, Marilyn

, CA

**Instructions to Lab:**

**Samples:**

CH0615B0001	CH0615B0002	CH0615B0003	CH0615B0004	CH0615B0005	CH0615B0006
CH0615B0013	CH0615B0016	CH0615B0017			

**Analyst Summary:**

16 - Carroll, Marilyn	20 - Chan, Elaine	5 - Hernandez, Richard	9 - Pineda, Maritza	10 - Quiambao, Josie
13 - Thind, Pritam				

**Submission Review Notes From Lab:**

### *Sample and Analyte Flag Summary*

<u>Flag</u>	<u>Flag Description</u>
R4	Analyte Reporting Limit raised due to high analyte level.

## Report of Field Results

<u>Sample Number</u> <b>CH0615B0001</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
05N04W02N990M	NapaCounty-214s	Water, Natural	L10583900000	6/03/2015 8:09 AM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0002</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
05N04W02N991M	NapaCounty-215d	Water, Natural	L10583900000	6/03/2015 7:16 AM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0003</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
06N04W18J992M	NapaCounty-216s	Water, Natural	L10583900000	6/03/2015 1:03 PM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0004</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
06N04W18J993M	NapaCounty-217d	Water, Natural	L10583900000	6/03/2015 12:23 PM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		
Turbidity, Nephelometry (Fiel	Turbidity			1 N.T.U.		
Temperature, Water (Field)	Water Temperature (w/time)			°C		
<u>Sample Number</u> <b>CH0615B0005</b>		<i>Field Results</i>				
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u>	<u>Collection Date</u>		
06N04W16G994M	NapaCounty-218s	Water, Natural	L10583900000	6/03/2015 11:02 AM		
<u>Method</u>	<u>Analyte</u>	<u>Result</u>	<u>Rpt.Lmt.</u>	<u>Units</u>	<u>Time</u>	<u>Footnotes</u>
Specific Conductance	Conductance (EC)			1 µS/cm		
Dissolved Oxygen (Electrode)	Dissolved Oxygen			mg/L		
pH (Field)	pH					
Oxidation-Reduction Potential	Redox Potential			10 mV		



Sample Number		Field Results	
CH0615B0005			
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0006			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
06N04W16G995M	NapaCounty-219d	Water, Natural	L10583900000      6/03/2015 10:04 AM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
Dissolved Oxygen (Electrode)	Dissolved Oxygen	mg/L	
pH (Field)	pH		
Oxidation-Reduction Potential	Redox Potential	10 mV	
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0013			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
E3012234	NapaCounty-swgw_SW2	Water, Natural	L10583900000      6/03/2015 1:15 PM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
Dissolved Oxygen (Electrode)	Dissolved Oxygen	mg/L	
pH (Field)	pH		
Oxidation-Reduction Potential	Redox Potential	10 mV	
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0016			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
06N04W18J993M	NapaCounty-217d	Water, Natural	L10583900000      6/03/2015 12:23 PM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
Dissolved Oxygen (Electrode)	Dissolved Oxygen	mg/L	
pH (Field)	pH		
Oxidation-Reduction Potential	Redox Potential	10 mV	
Turbidity, Nephelometry (Field)	Turbidity	1 N.T.U.	
Temperature, Water (Field)	Water Temperature (w/time)	°C	
Sample Number		Field Results	
CH0615B0017			
<u>StationNumber:</u>	<u>StationName</u>	<u>Matrix</u>	<u>Cost Code:</u> <u>Collection Date</u>
Blank; Field	Blank; Field	Water, Purified	L10583900000      6/03/2015 1:06 PM
Method	Analyte	Result	Rpt.Lmt. Units
Specific Conductance	Conductance (EC)	1 µS/cm	
pH (Field)	pH		
Temperature, Water (Field)	Water Temperature	°C	

## Report of Inorganic Analytical Results

Including Misc Physical Measurements

Sample Number		Inorganic Analytical Results	
CH0615B0001			
<b>CH0615B0001</b>	<i>Sample Type(Purpose):</i> Normal Sample	<i>Depth:</i> 1 m	<i>Collection Date:</i> 6/3/2015 8:09:00 AM
<i>StationNumber:</i> 05N04W02N990M	<i>StationName:</i> NapaCounty-214s	<i>Matrix:</i> Water, Natural	<i>Cost Code:</i> L10583900000
<i>Sample Condition:</i> 2.0 °C when received. Iced.			
Method	Analyte	Result	Units
Std Method 2510-B	Conductance (EC)	416	µS/cm
		R.L.	Dilution ChemID
		1.	1. 20
			Analysis Date
			6/4/2015
			Flags and Notes:

Sample Number	CH0615B0001	Inorganic Analytical Results					
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Barium	0.081	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	117	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.7 (D)	Dissolved Boron	0.1853	mg/L	0.1	1.	10	6/11/2015
EPA 300.0 28d Hold	Dissolved Bromide	0.07	mg/L	0.01	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Calcium	19.02	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	28	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.17	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	144	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.009	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.011	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	23.39	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	2.53	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.003	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	7.33	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	0.02	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	1.064	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	31.35	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.144	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	45.29	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	6.9		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	117	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	268	mg/L	1.	1.	20	6/5/2015
Std Method 2540 C	Total Dissolved Solids	268	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	1.21	N.T.U.	1.	1.	16	6/4/2015

Dup-CH0615B0001

Sample Number	CH0615B0002	Inorganic Analytical Results					
<b>CH0615B0002</b>	<i>Sample Type(Purpose):</i> Normal Sample	<i>Depth:</i> 1 m	<i>Collection Date:</i> 6/3/2015 7:16:00 AM				
<i>StationNumber:</i> 05N04W02N991M	<i>StationName:</i> NapaCounty-215d	<i>Matrix:</i> Water, Natural	<i>Cost Code:</i> L1058390000				
<i>Sample Condition:</i> 2.0 °C when received. Iced.							

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	1174	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.007	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.103	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0002		Inorganic Analytical Results			
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	258 mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.7 (D)	Dissolved Boron	1.416 mg/L	0.1	1.	10	6/11/2015
EPA 300.0 28d Hold	Dissolved Bromide	0.63 mg/L	0.01	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Cadmium	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Calcium	40.57 mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	1 mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	177 mg/L	10.	10.	9	6/9/2015 R4 Dil-CH0615B0002
EPA 200.8 (D)	Dissolved Chromium	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.001 mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.18 mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	226 mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1 mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.042 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.059 mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	30.24 mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	1.13 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002 mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.002 mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1 mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01 mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	4.505 mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	0.002 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	163.5 mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.32 mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	74 mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001 mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005 mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005 mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.3	0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	258 mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	683 mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	2.75 N.T.U.	1.	1.	16	6/4/2015

Sample Number	CH0615B0003		Inorganic Analytical Results					
<b>CH0615B0003</b>	<i>Sample Type(Purpose):</i> Normal Sample		<i>Depth:</i> 1 m		<i>Collection Date:</i> 6/3/2015 1:03:00 PM			
<i>StationNumber:</i> 06N04W18J992M		<i>StationName:</i> NapaCounty-216s		<i>Matrix:</i> Water, Natural		<i>Cost Code:</i> L1058390000		
<i>Sample Condition:</i> 2.0 °C when received. Iced.								
Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	317	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.089	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.046	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	93	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	Measured: 0.0927
EPA 300.0 28d Hold	Dissolved Bromide	0.12	mg/L	0.01	1.	9	6/9/2015	Dup-CH0615B0003
EPA 300.0 28d Hold	Dissolved Bromide	0.12	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0003	Inorganic Analytical Results						
EPA 200.7 (D)	Dissolved Calcium	22.26	mg/L	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 300.0 28d Hold	Dissolved Chloride	15.34	mg/L	1.	1.	9	6/9/2015	
EPA 300.0 28d Hold	Dissolved Chloride	15.33	mg/L	1.	1.	9	6/9/2015	Dup-CH0615B0003
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Copper	0.003	mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Fluoride	0.16	mg/L	0.1	1.	9	6/9/2015	Dup-CH0615B0003
EPA 300.0 28d Hold	Dissolved Fluoride	0.16	mg/L	0.1	1.	9	6/9/2015	
Std Method 2340 B	Dissolved Hardness	116	mg/L as CaCO3	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Iron	0.066	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lithium	0.012	mg/L	0.005	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Magnesium	14.61	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Manganese	0.041	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015	
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.002	mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Nitrate	5.4	mg/L	0.1	1.	9	6/9/2015	Dup-CH0615B0003
EPA 300.0 28d Hold	Dissolved Nitrate	5.4	mg/L	0.1	1.	9	6/9/2015	
Std Method 4500-NO2 B (48	Dissolved Nitrite	0.01	mg/L as N	0.01	1.	5	6/4/2015	
EPA 200.7 (D)	Dissolved Potassium	0.8767	mg/L	0.5	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Sodium	21.55	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Strontium	0.169	mg/L	0.005	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Sulfate	38.3	mg/L	1.	1.	9	6/9/2015	
EPA 300.0 28d Hold	Dissolved Sulfate	38.3	mg/L	1.	1.	9	6/9/2015	Dup-CH0615B0003
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015	
Std Method 2320 B	pH	6.8		0.1	1.	20	6/4/2015	
Std Method 2320 B	Total Alkalinity	93	mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 2540 C	Total Dissolved Solids	208	mg/L	1.	1.	20	6/5/2015	
EPA 180.1	Turbidity	77.4	N.T.U.	3.	3.	16	6/4/2015	R4

**Sample Number** CH0615B0004 **Inorganic Analytical Results**  
**CH0615B0004** *Sample Type(Purpose):* Normal Sample *Depth:* 1 m *Collection Date:* 6/3/2015 12:23:00 PM  
*StationNumber:* 06N04W18J993M *StationName:* NapaCounty-217d *Matrix:* Water, Natural *Cost Code:* L1058390000  
*Sample Condition:* 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	255	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.432	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.027	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	116	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	Measured: 0.0798
EPA 300.0 28d Hold	Dissolved Bromide	0.06	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Calcium	15.21	mg/L	1.	1.	10	6/11/2015	

Sample Number	CH0615B0004	Inorganic Analytical Results					
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	5	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.56	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	74	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.331	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.014	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	8.758	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	0.643	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.002	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	1.309	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	28.53	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.107	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	9.31	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	116	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	164	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	7.29	N.T.U.	1.	1.	16	6/4/2015

**Sample Number** CH0615B0005 **Inorganic Analytical Results**  
**CH0615B0005** *Sample Type(Purpose):* Normal Sample *Depth:* 1 m *Collection Date:* 6/3/2015 11:02:00 AM  
*StationNumber:* 06N04W16G994M *StationName:* NapaCounty-218s *Matrix:* Water, Natural *Cost Code:* L1058390000  
*Sample Condition:* 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	536	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.091	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	192	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	0.1072	mg/L	0.1	1.	10	6/11/2015	
EPA 300.0 28d Hold	Dissolved Bromide	0.13	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Calcium	47.39	mg/L	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 300.0 28d Hold	Dissolved Chloride	19	mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Copper	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0005		Inorganic Analytical Results				
EPA 300.0 28d Hold	Dissolved Fluoride	< 0.1 mg/L	0.1	1.	9	6/9/2015	
Std Method 2340 B	Dissolved Hardness	247 mg/L as CaCO <sub>3</sub>	1.	1.	10	6/11/2015	
Std Method 4500-CO <sub>2</sub> D	Dissolved Hydroxide (OH-)	< 1 mg/L as CaCO <sub>3</sub>	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Iron	0.008 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lead	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lithium	0.01 mg/L	0.005	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Magnesium	31.18 mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Manganese	< 0.005 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002 mg/L	0.0002	1.	13	6/18/2015	
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.003 mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Nitrate	1.8 mg/L	0.1	1.	9	6/9/2015	
Std Method 4500-NO <sub>2</sub> B (48	Dissolved Nitrite	< 0.01 mg/L as N	0.01	1.	5	6/4/2015	
EPA 200.7 (D)	Dissolved Potassium	0.7058 mg/L	0.5	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Silver	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Sodium	20.11 mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Strontium	0.357 mg/L	0.005	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Sulfate	65.1 mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Thallium	< 0.001 mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005 mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Zinc	< 0.005 mg/L	0.005	1.	13	6/4/2015	
Std Method 2320 B	pH	6.7	0.1	1.	20	6/4/2015	
Std Method 2320 B	Total Alkalinity	192 mg/L as CaCO <sub>3</sub>	1.	1.	20	6/4/2015	
Std Method 2540 C	Total Dissolved Solids	324 mg/L	1.	1.	20	6/5/2015	
EPA 180.1	Turbidity	5.06 N.T.U.	1.	1.	16	6/4/2015	

Sample Number	CH0615B0006		Inorganic Analytical Results					
<b>CH0615B0006</b>	Sample Type(Purpose): Normal Sample		Depth: 1 m		Collection Date: 6/3/2015 10:04:00 AM			
StationNumber: 06N04W16G995M		StationName: NapaCounty-219d		Matrix: Water, Natural		Cost Code: L1058390000		
Sample Condition: 2.0 °C when received. Iced.								
Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	712	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Arsenic	0.046	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.046	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Barium	0.088	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.088	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
Std Method 4500-CO <sub>2</sub> D	Dissolved Bicarbonate (HCO <sub>3</sub> -)	224	mg/L as CaCO <sub>3</sub>	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	9.063	mg/L	0.1	1.	10	6/11/2015	
EPA 300.0 28d Hold	Dissolved Bromide	0.33	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.7 (D)	Dissolved Calcium	16.74	mg/L	1.	1.	10	6/11/2015	
Std Method 4500-CO <sub>2</sub> D	Dissolved Carbonate (CO <sub>3</sub> --)	1	mg/L as CaCO <sub>3</sub>	1.	1.	20	6/4/2015	
EPA 300.0 28d Hold	Dissolved Chloride	73	mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	

Sample Number	CH0615B0006	Inorganic Analytical Results						
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Copper	0.005	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Copper	0.005	mg/L	0.001	1.	13	6/4/2015	
EPA 300.0 28d Hold	Dissolved Fluoride	0.25	mg/L	0.1	1.	9	6/9/2015	
Std Method 2340 B	Dissolved Hardness	116	mg/L as CaCO3	1.	1.	10	6/11/2015	
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Iron	0.021	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Iron	0.021	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Lithium	0.038	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Lithium	0.037	mg/L	0.005	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Magnesium	17.9	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Manganese	0.242	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Manganese	0.241	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015	
EPA 200.8 (D)	Dissolved Molybdenum	0.014	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Molybdenum	0.013	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Nickel	0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015	
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015	Dup-CH0615B0006
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015	
EPA 200.7 (D)	Dissolved Potassium	5.163	mg/L	0.5	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.7 (D)	Dissolved Sodium	107.9	mg/L	1.	1.	10	6/11/2015	
EPA 200.8 (D)	Dissolved Strontium	0.125	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Strontium	0.126	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 300.0 28d Hold	Dissolved Sulfate	32	mg/L	1.	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
EPA 200.8 (D)	Dissolved Zinc	0.006	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Zinc	0.006	mg/L	0.005	1.	13	6/4/2015	Dup-CH0615B0006
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015	
Std Method 2320 B	Total Alkalinity	225	mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 2540 C	Total Dissolved Solids	452	mg/L	1.	1.	20	6/5/2015	
EPA 180.1	Turbidity	1.16	N.T.U.	1.	1.	16	6/4/2015	

Sample Number **CH0615B0013** Inorganic Analytical Results  
**CH0615B0013** Sample Type(Purpose): Normal Sample Depth: 1 m Collection Date: 6/3/2015 1:15:00 PM  
StationNumber: E3012234 StationName: NapaCounty-swgw\_SW2 Matrix: Water, Natural Cost Code: L1058390000  
Sample Condition: 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	411	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.029	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.059	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	153	mg/L as CaCO3	1.	1.	20	6/4/2015	

Sample Number	CH0615B0013	Inorganic Analytical Results					
EPA 200.7 (D)	Dissolved Boron	0.1329	mg/L	0.1	1.	10	6/11/2015
EPA 300.0 28d Hold	Dissolved Bromide	0.02	mg/L	0.01	1.	9	6/8/2015
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Calcium	33.74	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	12.13	mg/L	1.	1.	9	6/8/2015
EPA 200.8 (D)	Dissolved Chromium	0.005	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.006	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.17	mg/L	0.1	1.	9	6/8/2015
Std Method 2340 B	Dissolved Hardness	159	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	0.091	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.008	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	18.05	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	0.024	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.013	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	0.5	mg/L	0.1	1.	9	6/8/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	2.142	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	28.27	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.269	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	44.13	mg/L	1.	1.	9	6/8/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	0.027	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.6		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	154	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	255	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	1.37	N.T.U.	1.	1.	16	6/4/2015

Measured: 0.001

Sample Number	CH0615B0016	Inorganic Analytical Results						
<b>CH0615B0016</b>	<b>Sample Type(Purpose):</b> Duplicate Sample	CH0615B0004	<b>Depth:</b> 1 m	<b>Collection Date:</b> 6/3/2015 12:23:00 PM				
<b>StationNumber:</b> 06N04W18J993M	<b>StationName:</b> NapaCounty-217d	<b>Matrix:</b> Water, Natural	<b>Cost Code:</b> L1058390000					
<b>Sample Condition:</b> 2.0 °C when received. Iced.								
Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	256	µS/cm	1.	1.	20	6/4/2015	Dup-CH0615B0016
Std Method 2510-B	Conductance (EC)	256	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	0.422	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	0.027	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	118	mg/L as CaCO3	1.	1.	20	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	118	mg/L as CaCO3	1.	1.	20	6/4/2015	Dup-CH0615B0016
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	Measured: 0.0808
EPA 300.0 28d Hold	Dissolved Bromide	0.06	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	



Sample Number	CH0615B0016	Inorganic Analytical Results					
EPA 200.7 (D)	Dissolved Calcium	15.05	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015 Dup-CH0615B0016
EPA 300.0 28d Hold	Dissolved Chloride	5	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	0.549	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	74	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015 Dup-CH0615B0016
EPA 200.8 (D)	Dissolved Iron	0.331	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	0.014	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	8.798	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	0.635	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	0.002	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	1.349	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	28.53	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	0.109	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	9.2	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015
Std Method 2320 B	pH	7.4		0.1	1.	20	6/4/2015 Dup-CH0615B0016
Std Method 2320 B	Total Alkalinity	118	mg/L as CaCO3	1.	1.	20	6/4/2015 Dup-CH0615B0016
Std Method 2320 B	Total Alkalinity	118	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	165	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	6.68	N.T.U.	1.	1.	16	6/4/2015 Dup-CH0615B0016
EPA 180.1	Turbidity	6.23	N.T.U.	1.	1.	16	6/4/2015

**Sample Number** CH0615B0017 **Inorganic Analytical Results**  
**CH0615B0017** *Sample Type(Purpose):* Blank; Field *Depth:* 0 m *Collection Date:* 6/3/2015 1:06:00 PM  
*StationNumber:* Blank; Field *StationName:* Blank; Field *Matrix:* Water, Purified *Cost Code:* L1058390000  
*Sample Condition:* 2.0 °C when received. Iced.

Method	Analyte	Result	Units	R.L.	Dilution	ChemID	Analysis Date	Flags and Notes:
Std Method 2510-B	Conductance (EC)	< 1	µS/cm	1.	1.	20	6/4/2015	
EPA 200.8 (D)	Dissolved Aluminum	< 0.01	mg/L	0.01	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Antimony	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Arsenic	< 0.001	mg/L	0.001	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Barium	< 0.005	mg/L	0.005	1.	13	6/4/2015	
EPA 200.8 (D)	Dissolved Beryllium	< 0.001	mg/L	0.001	1.	13	6/4/2015	
Std Method 4500-CO2 D	Dissolved Bicarbonate (HCO3-)	2	mg/L as CaCO3	1.	1.	20	6/4/2015	
EPA 200.7 (D)	Dissolved Boron	< 0.1	mg/L	0.1	1.	10	6/11/2015	
EPA 300.0 28d Hold	Dissolved Bromide	< 0.01	mg/L	0.01	1.	9	6/9/2015	
EPA 200.8 (D)	Dissolved Cadmium	< 0.001	mg/L	0.001	1.	13	6/4/2015	

Sample Number	CH0615B0017	Inorganic Analytical Results					
EPA 200.7 (D)	Dissolved Calcium	< 1	mg/L	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Carbonate (CO3--)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 300.0 28d Hold	Dissolved Chloride	< 1	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Chromium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Cobalt	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Copper	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Fluoride	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 2340 B	Dissolved Hardness	< 1	mg/L as CaCO3	1.	1.	10	6/11/2015
Std Method 4500-CO2 D	Dissolved Hydroxide (OH-)	< 1	mg/L as CaCO3	1.	1.	20	6/4/2015
EPA 200.8 (D)	Dissolved Iron	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lead	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Lithium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Magnesium	< 1	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Manganese	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (Hg Dissolved)	Dissolved Mercury	< 0.0002	mg/L	0.0002	1.	13	6/18/2015
EPA 200.8 (D)	Dissolved Molybdenum	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Nickel	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Nitrate	< 0.1	mg/L	0.1	1.	9	6/9/2015
Std Method 4500-NO2 B (48	Dissolved Nitrite	< 0.01	mg/L as N	0.01	1.	5	6/4/2015
EPA 200.7 (D)	Dissolved Potassium	< 0.5	mg/L	0.5	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Selenium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Silver	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.7 (D)	Dissolved Sodium	< 1	mg/L	1.	1.	10	6/11/2015
EPA 200.8 (D)	Dissolved Strontium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 300.0 28d Hold	Dissolved Sulfate	< 1	mg/L	1.	1.	9	6/9/2015
EPA 200.8 (D)	Dissolved Thallium	< 0.001	mg/L	0.001	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Vanadium	< 0.005	mg/L	0.005	1.	13	6/4/2015
EPA 200.8 (D)	Dissolved Zinc	< 0.005	mg/L	0.005	1.	13	6/4/2015
Std Method 2320 B	pH	5.2		0.1	1.	20	6/4/2015
Std Method 2320 B	Total Alkalinity	2	mg/L as CaCO3	1.	1.	20	6/4/2015
Std Method 2540 C	Total Dissolved Solids	< 1	mg/L	1.	1.	20	6/5/2015
EPA 180.1	Turbidity	< 1	N.T.U.	1.	1.	16	6/4/2015

Measured: 0.09

**Bryte Chemical Laboratory Chain of Custody**

Submittal ID & Run/Submittal Name: CH0615B0001 - Napa L&S 2015

Send Report To: Bill Brewster  
DWR North Central Region Office

Container Summary

Polyethylene, 1 Pint, HNO3, pH <2, Filt	19	9
Polyethylene, 1 Pint	19	9
Polyethylene, 1 Quart, Filt	19	9
Polyethylene, 1/2 Pint, Filt	19	9
Polyethylene, 1/2 Pint, HNO3, pH <2, Filt	19	9
Bottle Check: Lab Initials: <u>MC</u> Field Initials: <u>JM</u> Total:	95	45

Activity Unit: 6200

CA

Sampler(s): John MacDougall

Instructions to Lab:

Notice: Please deliver samples to the lab as soon as possible. Allow time for lab handling and preparation after delivery. The lab is not responsible for missed holding times due to late delivery. SEE YOUR LAB ANALYSIS GROUPS FOR MINIMUM SAMPLE HOLD TIME. Samples must be transported in accordance with method and handling requirements, on ice and arrive below 6°C if transported overnight.

Submitted By: Signature: [Signature] Date Relinquished: 6-3-15  
Print Name: John MacDougall Phone Number: 530-908-4200

Received By: Signature: [Signature] Print Name: Manilyn Carroll  
Date and Time Received: 6/3/15 15:50 Condition When Received: 2 °C Iced? Yes  No

Submittal ID: CH0615B0001

DWR Sample Number: **CH0615B0001** Collection Date: 6/3/2015 Collection Time: 08:09 EC: 483 µS/cm  
Station No.: 05N04W02N990M Station Name: NapaCounty-214s Matrix: Water, Natural

Add'l Note:

Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0002** Collection Date 6/3/2015 Collection Time: 07:16 EC: 1217 µS/cm  
 Station No.: 05N04W02N991M Station Name: NapaCounty-215d Matrix: Water, Natural  
 Add'l Note: Cost Code: L1058390000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0003** Collection Date 6/3/2015 Collection Time: ~~07:16~~ 13:03 EC: 347 µS/cm  
 Station No.: 06N04W18J992M Station Name: NapaCounty-216s Matrix: Water, Natural  
 Add'l Note: Cost Code: L1058390000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0004** Collection Date 6/3/2015 Collection Time: 12: 23 EC: 293 µS/cm  
 Station No.: 06N04W18J993M Station Name: NapaCounty-217d Matrix: Water, Natural

Add'l Note: Cost Code: L1058390000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0005** Collection Date 6/3/2015 Collection Time: 11 : 02 EC: 554 µS/cm  
 Station No.: 06N04W16G994M Station Name: NapaCounty-218s Matrix: Water, Natural

Add'l Note: Cost Code: L1058390000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0006** Collection Date 6/3/2015 Collection Time: 10:04 EC: 704 µS/cm  
 Station No.: 06N04W16G995M Station Name: NapaCounty-219d Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0007** Collection Date 6/3/2015 Collection Time: : EC: µS/cm  
 Station No.: 07N04W31D996M Station Name: NapaCounty-220s Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0008** Collection Date 6/3/2015 Collection Time: : EC:   $\mu\text{S/cm}$   
 Station No.: 07N04W31D997M Station Name: NapaCounty-221d Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0009** Collection Date 6/3/2015 Collection Time: : EC:   $\mu\text{S/cm}$   
 Station No.: 08N05W30Q998M Station Name: NapaCounty-222s Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0010** Collection Date 6/3/2015 Collection Time: : EC:   $\mu\text{S/cm}$   
 Station No.: 08N05W30Q999M Station Name: NapaCounty-223d Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0011** Collection Date 6/3/2015 Collection Time: : EC:   $\mu\text{S/cm}$   
 Station No.: E3012228 Station Name: NapaCounty-swgw\_SW1 Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			



DWR Sample Number **CH0615B0012** Collection Date 6/3/2015 Collection Time: : EC:   $\mu\text{S/cm}$   
 Station No.: E3012230 Station Name: E3012230 Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0013** Collection Date 6/3/2015 Collection Time: 13:15 EC:   $\mu\text{S/cm}$   
 Station No.: E3012234 Station Name: NapaCounty-swgw\_SW2 Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0014** Collection Date 6/3/2015 Station No.: E3012235 Collection Time: : Station Name: E3012235 EC:   $\mu\text{S/cm}$  Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0015** Collection Date 6/3/2015 Station No.: E3012246 Collection Time: : Station Name: NapaCounty-swgw\_SW5 EC:   $\mu\text{S/cm}$  Matrix: Water, Natural  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0016** Collection Date 6/3/2015 Collection Time: 12:23 EC: 293 µS/cm  
 Station No.: (NONE) Station Name: (None) Matrix: Water, Natural  
 Add'l Note: *DUP of Napa County - 217 d (CH0615B0004)* Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0017** Collection Date 6/3/2015 Collection Time: 13:06 EC: — µS/cm  
 Station No.: Blank; Field Station Name: Blank; Field Matrix: Water, Purified  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

*THIS WAS RECEIVED! 6/3/2015*

DWR Sample Number **CH0615B0018** Collection Date 6/3/2015 Collection Time: ~~13:00~~ EC:   $\mu\text{S/cm}$   
 Station No.: Blank; Field Station Name: Blank; Field Matrix: Water, Purified  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

DWR Sample Number **CH0615B0019** Collection Date 6/3/2015 Collection Time: : EC:   $\mu\text{S/cm}$   
 Station No.: Blank; Field Station Name: Blank; Field Matrix: Water, Purified  
 Add'l Note: Cost Code: L10583900000

Alkalinity	Fld Filtered	Carbonate by Calculation	Fld Filtered
Electrical Conductivity (EC)		Dissolved Boron	Fld Filtered
Dissolved Calcium	Fld Filtered	Dissolved Magnesium	Fld Filtered
Dissolved Potassium	Fld Filtered	Dissolved Sodium	Fld Filtered
Dissolved Aluminum	Fld Filtered	Dissolved Antimony	Fld Filtered
Dissolved Arsenic	Fld Filtered	Dissolved Barium	Fld Filtered
Dissolved Beryllium	Fld Filtered	Dissolved Cadmium	Fld Filtered
Dissolved Chromium	Fld Filtered	Dissolved Cobalt	Fld Filtered
Dissolved Copper	Fld Filtered	Dissolved Iron	Fld Filtered
Dissolved Lead	Fld Filtered	Dissolved Lithium	Fld Filtered
Dissolved Manganese	Fld Filtered	Dissolved Molybdenum	Fld Filtered
Dissolved Nickel	Fld Filtered	Dissolved Selenium	Fld Filtered
Dissolved Silver	Fld Filtered	Dissolved Strontium	Fld Filtered
Dissolved Thallium	Fld Filtered	Dissolved Vanadium	Fld Filtered
Dissolved Zinc	Fld Filtered	Dissolved Bromide	Fld Filtered
Dissolved Chloride	Fld Filtered	Dissolved Fluoride	Fld Filtered
Dissolved Nitrate	Fld Filtered	Dissolved Sulfate	Fld Filtered
Dissolved Mercury	Fld Filtered	Dissolved Nitrite	Fld Filtered
Total Dissolved Solids (TDS)	Fld Filtered	Total Hardness By Calculation	Fld Filtered
Turbidity			

Checklist for Sample Submittal by Field Personnel

- Correct collection dates and times are on the COC.
- An EC result per collection event has been written on the COC.
- The number of containers being submitted matches the container count on the COC.
- \* Please correct the count if it is not the same and initial the appropriate area to confirm.
- Container label's DWR Sample Number matches what is on the COC .
- Samples/stations/collection events not collected are crossed out and clearly marked as not sampled "N.S." with your initials.
- \*If the N.S. reason needs to go to the WDL please write the reason on the COC or make sure it is entered in FLIMS on the canceled collection event with the "Reason Going to WDL" checkbox checked.
- Volumes for chlorophyll samples are written on either the label or the packet.
- The "Send Report To:" contact on the COC is correct.
- The "Submitted By:" signature, printed name and phone number are on the COC.
- Sample submittal date and time are on the COC.

Checklist for Bryte Lab Sample Receiving Personnel

- The DWR Sample Number on the container labels matches the COC.
- Collection dates and times are on the COC for every sample.
- The EC for each collection event is written on the COC.
- The Priority Code for the submittal/samples is 5. If it is >5 alert Bryte management prior to field personnel leaving.
- The volume for chlorophyll samples are written on the packet or label.
- The container count matches COC.
- The container count has been initialed on COC by both parties to confirm.
- UNFROZEN sample temperature is written on the COC.
- Note on the COC either "frozen", "will be frozen within required time" or "not frozen" for samples that should be frozen.
- Sites that are not collected are crossed out and clearly marked as not sampled "N.S." with field personnel initials. *Not sampled will be collected tomorrow*
- If the "N.S." reason needs to go to the Water Data Library (WDL) the reason is written on the COC.
- CHECKLIST FOR SAMPLE RECEIVING IN FLIMS (LAB INTERNAL USE ONLY) --
- All EC's are in FLIMS before the project is submitted. Please do not enter any other field data (including pH) besides EC per Sid Fong and Allan W. Wong.
- The collection date and time in FLIMS matches the COC.
- The N.S. stations/collection events have been canceled.
- If there is a N.S. reason written on the COC it is in FLIMS and "Reason Going to WDL" box is checked.

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa County

Date: 6-3-15

Project: 2115

Project No.: 12-1-071

Well ID: 2143

Measured By: John MacPougall

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
53	2" <del>PVC</del> / Steel		16.32
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
36.68		6.34	19.7

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F/°C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
0749	0	200	1	0	16.32	62.68	6.93	532	150	3.21	360.9	turbid
0754	5	200	1	5		63.14	6.62	490	26.6	0.19	387.4	Clear
0759	10	200	1	10		63.33	6.55	484	8.60	0.14	405.6	clear
0804	15	200	1	15		62.84	6.52	483	4.84	0.13	418.1	Clear
0809	20	200	1	20		62.92	6.51	483	3.66	0.12	411.3	Clear

Water Sample Collection (number of bottles and sample I.D.)  
 Trans Pilled 0740 In 0820

# FIELD PURGE DATA

## Monitoring Wells

Client: Dupa Date: 6-3-15  
 Project: \_\_\_\_\_ Project No.: 12-1-071  
 Well ID: 215d Measured By: JM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
98ft	2 PVC/Steel		16.28
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
81.72		13.89	41.68

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F/°C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
0635	0	200	1	0	16.28	63.62	7.27	1396	4.30	0.28	414.8	Sulfur smell
0648	13	240	1.5	13	-	64.11	7.27	1350	11.47	0.66	360.9	clear smell
0655	20	240	1	20	-	64.48	7.19	1330	8.51	0.23	387	clear
0705	30	240	1	30	-	64.50	7.13	1291	7.31	0.14	410.9	clear
0716	41	240	1	41	30.78	64.46	7.08	1217	5.31	0.11	420.7	clear

Water Sample Collection (number of bottles and sample I.D.)  
 Transducer Pulled at 0540 Trans Back 0739  
 Cant fit 5- under with pump in well

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa Date: 6-3-15  
 Project: \_\_\_\_\_ Project No.: 12-1-071  
 Well ID: 2165 Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
50	2" PVC / Steel	0	23.47
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
26.53		4.5	13.53

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
1248	0	240	1	0	23.47	67.84	7.21	383	355	3.3	311	Turbid
1253	5	240	1	5	26.53	67.81	6.63	361	68.9	1.92	471	"
1258	10	240	1	10	26.90	67.86	6.62	349	66.5	1.46	452	"
1303	15	240	1	15		67.88	6.62	347	63.0	1.11	399	"

Water Sample Collection (number of bottles and sample I.D.)

Trans out 1243 Back ~~1245~~ 1315

Pump at 40"



# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-3-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: 217d

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
86	2" PVC / Steel	0	30.63
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
55.37		9.42	28.23

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
1158	<del>300</del>	300	2	0	30.63	68.02	7.2	306	107	0.63	339.1	Turbid
1203	5	300	2	10	35.69	69.23	7.33	307	29.4	0.19	363.1	Turbid
1208	10	300	2	20	36.56	68.17	7.34	301	13.70	0.13	426	
1213	15	300	2	30	37.53	68.28	7.31	297	13.61	0.11	404	
1218	20	300	2	40	37.92	68.09	7.28	294	8.35	0.10	439	clear
1223	25	300	2	50		68.09	7.27	293	4.76	0.09	449	clear

Water Sample Collection (number of bottles and sample I.D.)

Trans Pooled 1150 Back in 1242

Duffe

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-3-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: 2185

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
<u>40</u>	PVC / Steel	<u>0</u>	<u>21.23</u>
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
<u>18.77</u>		<u>3.19</u>	<u>9.5</u>

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F/°C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
<u>10:44</u>	<u>0</u>	<u>251</u>	<u>1</u>	<u>0</u>	<u>21.23</u>	<u>64.52</u>	<u>6.62</u>	<u>5.76</u>	<u>24.7</u>	<u>5.58</u>	<u>374</u>	
<u>10:49</u>	<u>5</u>	<u>251</u>	<u>1</u>	<u>5</u>		<u>64.54</u>	<u>6.51</u>	<u>5.60</u>	<u>19.86</u>	<u>2.27</u>	<u>374.1</u>	
<u>10:51</u>	<u>7</u>	<u>251</u>	<u>1</u>	<u>7</u>		<u>64.47</u>	<u>6.46</u>	<u>556</u>	<u>13.15</u>	<u>2.20</u>	<u>396.1</u>	
<u>10:53</u>	<u>9</u>	<u>251</u>	<u>1</u>	<u>9</u>		<u>64.50</u>	<u>6.43</u>	<u>555</u>	<u>12.03</u>	<u>2.17</u>	<u>406</u>	
<u>10:55</u>	<u>11</u>	<u>251</u>	<u>1</u>	<u>11</u>	<u>21.69</u>	<u>64.52</u>	<u>6.42</u>	<u>555</u>	<u>6.22</u>	<u>2.13</u>	<u>411</u>	
<u>10:59</u>	<u>15</u>	<u>251</u>	<u>1</u>	<u>15</u>	<u>21.73</u>	<u>64.50</u>	<u>6.41</u>	<u>554</u>	<u>6.03</u>	<u>2.15</u>	<u>434.1</u>	
<u>11:02</u>	<u>18</u>	<u>251</u>	<u>1</u>	<u>18</u>		<u>64.52</u>	<u>6.41</u>	<u>554</u>	<u>6.30</u>	<u>2.18</u>	<u>435</u>	

Water Sample Collection (number of bottles and sample I.D.)  
Pulled Trans 1027 Returned 11:15  
pump 35

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 0-3-19

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: 219d

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
93	PVC / Steel	0	20.69
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.97 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
72.31		12.29	36.87

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
941	0	240	1	0	20.69	62.99	7.38	692	60.7	1.88	319.4	Turbid
946	5	240	1	5		63.22	7.30	696	6.98	0.80	255.3	Clear
951	10	240	1.2	11		63.41	7.26	702	1.68	0.41	169.7	Clear
956	15	240	1.2	17		63.53	7.25	702	1.48	0.3	163	Clear
1001	20	240	1.2	23		63.66	7.24	703	0.39	0.26	247.1	Clear
1006	25	240	1.2	29		63.76	7.23	704	0	0.21	295.4	Clear
1012	30	240	1.2	35		63.94	7.23	704	0	0.26	345.2	Clear
1014	32	240	1.2	37.5		63.90	7.23	704	0	0.20	346.7	Clear

Water Sample Collection (number of bottles and sample I.D.)

Trans Removed 0920      Back in 1027

006

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa County

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 121-071

Well ID: 220s

Measured By: JJA

TOTAL WELL DEPTH (ft) <u>45</u>	CASING DIAMETER (in) <u>2" PVC/Steel</u>	STICKUP (ft) <u>0</u>	STATIC WATER LEVEL (ft) <u>16.94 @ 0700</u>
STANDING WATER COLUMN (ft) <u>28.06</u>	<small>0.17 (for 2" casing); 0.37 (for 3" casing)                  0.65 (for 4" casing); 1.0 (for 5" casing)                  1.47 (for 6" casing); 2.61 (for 8" casing)                  4.08 (for 10" casing); 5.88 (for 12" casing)                  10.45 (for 16" casing); 16.32 (for 20" casing)</small>	WET CASING VOLUME, Vc (gal) <u>4.77</u>	3 Vc (gal) <u>14.31</u>

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
8:09	0	200			16.94	65.90	7.03	450	69.1	0.36	353	Turbid
8:11	2	200	1.5	3	21.12	66.40	6.88	452	14.41	0.14	363	cloudy
8:13	4	200	1.5	4.5	21.29	66.89	6.80	443	8.45	0.10	394	clear
8:16	7	200	1.5	10.5		67.02	6.76	440	5.35	0.09	398	clear
8:19	10	200	1.5	15	21.69	67.00	6.74	440	3.73	0.08	413	clear

Water Sample Collection (number of bottles and sample I.D.)

Trans out @ 8:05 Back @ 8:30

07

Pump @ 410'

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa Co

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: ZZ1d

Measured By: JM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
85	2" <u>PVC/Steel</u>	<u>0</u>	16.73 @ 0702
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
68.27		11.6	34.81

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F/°C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
7:24	0	250	1.25	0	16.73	64.12	7.87	319	9.68	3.21	328.9	Turbid
7:28	4	250	1.25	5	27.46	66.07	7.37	310	363	0.27	354	Turbid
7:32	8	250	1.25	10	28.02	66.21	7.36	298	45.9	0.16	381.9	
7:36	12	250	1.25	15	28.16	66.38	7.34	296	32.0	0.13	362.0	Sandy
7:40	16	250	1.25	20	28.29	66.60	7.30	295	12.27	0.1	344.9	
7:44	20	250	1.25	25	28.33	66.21	7.26	293	6.90	0.09	383.4	clear
7:48	24	250	1.25	30	28.38	66.78	7.22	293	9.51	0.08	392.1	
7:52	28	250	1.25	35	28.32	66.69	7.21	293	5.77	0.08	360.1	

Water Sample Collection (number of bottles and sample I.D.)

trans out 7:11 In 8:04

OK Pump at 70'

# FIELD PURGE DATA

## Monitoring Wells

Client: Nofa  
 Project: Ng  
 Well ID: 2225

Date: 6-4-15  
 Project No.: 12-1-071  
 Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
40	2" <del>PVC</del> / Steel	5.4'	25.30 @ 10:30
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
20.1		3.42	10.25

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
11:19	0	225	1	0	25.30	65.73	7.15	405	101	2.25	390.0	Turbid
11:24	5	225	1	5		64.77	7.03	380	13.03	0.20	449.0	
11:29	10	225	1	10		64.68	7.01	380	2.55	0.12	486.0	Clear ✓

Water Sample Collection (number of bottles and sample I.D.)  
 Trans out @ 11:12    Back @ 11:45  
 Pump @ 35                      4

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: 223d

Measured By: JM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
100	2" <del>PVC</del> / Steel	5.4	34.82 @ 1030
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
70.58		11.9	35.99

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
1041	0	300	1.25	0	34.82	65.10	7.44	457	4.22	2.11	361.9	Clear
1046	5	300	1.25	6.25		66.87	7.18	457	30.3	0.33	430.3	Turbid
1051	10	300	11.25	11.25	74.22	Well De watered						
						Well De watered at 1 casing						
1056		300	1.25	13		66.92	7.25	453	48.2	0.27	501	Clear

Water Sample Collection (number of bottles and sample I.D.)

Trans out @ 10:30 Beckin @ 11:12

10



# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: SW-1

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
	PVC / Steel		
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
x	=		

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
1339	—	—	—	—	—	72.35	7.61	12967	25.0	5.0	441	

Water Sample Collection (number of bottles and sample I.D.)

011

Black 198



# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-3-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: SW-2

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
	PVC / Steel		
STANDING WATER COLUMN (ft)	x <small>0.17 (for 2" casing); 0.37 (for 3" casing)                  0.65 (for 4" casing); 1.0 (for 5" casing)                  1.47 (for 6" casing); 2.61 (for 8" casing)                  4.08 (for 10" casing); 5.88 (for 12" casing)                  10.45 (for 16" casing); 16.32 (for 20" casing)</small>	=	WET CASING VOLUME, Vc (gal)
			=

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
1315	<del>0</del>	<del>0</del>	<del>0</del>	<del>0</del>	<del>0</del>	65.14	6.96	426	2.43	5.24	477.6	clear

Water Sample Collection (number of bottles and sample I.D.)

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: SW-3

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
	PVC / Steel		
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing) 0.65 (for 4" casing); 1.0 (for 5" casing) 1.47 (for 6" casing); 2.61 (for 8" casing) 4.08 (for 10" casing); 5.88 (for 12" casing) 10.45 (for 16" casing); 16.32 (for 20" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
	x	=	

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
<u>1246</u>						<u>68.26</u>		<u>503</u>	<u>0.57</u>	<u>5.85</u>	<u>430</u>	
							<u>7.74</u>					

Water Sample Collection (number of bottles and sample I.D.) 012

# FIELD PURGE DATA

## Monitoring Wells

Client: Napa

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: SW-4

Measured By: JSM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
PVC / Steel			
STANDING WATER COLUMN (ft)	0.17 (for 2" casing); 0.37 (for 3" casing)	WET CASING VOLUME, Vc (gal)	3 Vc (gal)
	0.65 (for 4" casing); 1.0 (for 5" casing)		
x	1.47 (for 6" casing); 2.61 (for 8" casing)		
	4.08 (for 10" casing); 5.88 (for 12" casing)		
	10.45 (for 16" casing); 16.32 (for 20" casing)		

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
<u>0850</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>60.9</u>	<u>7.96</u>	<u>336</u>	<u>1.78</u>	<u>7.16</u>	<u>263.6</u>	

Water Sample Collection (number of bottles and sample I.D.)

14

# FIELD PURGE DATA Monitoring Wells

Client: Nafa

Date: 6-4-15

Project: \_\_\_\_\_

Project No.: 12-1-071

Well ID: SW-5

Measured By: JJM

TOTAL WELL DEPTH (ft)	CASING DIAMETER (in)	STICKUP (ft)	STATIC WATER LEVEL (ft)
	PVC / Steel		
STANDING WATER COLUMN (ft)	<small>0.17 (for 2" casing); 0.37 (for 3" casing)                  0.65 (for 4" casing); 1.0 (for 5" casing)                  1.47 (for 6" casing); 2.61 (for 8" casing)                  4.08 (for 10" casing); 5.88 (for 12" casing)                  10.45 (for 16" casing); 16.32 (for 20" casing)</small>	WET CASING VOLUME, Vc (gal)	3 Vc (gal)

Clock Time	Pumping Time (min)	Pump Rate (Hz)	Flow Rate (gpm)	Cumulative Flow (gals)	DTW (ft)	Temp (°F / °C)	pH	Sp. Cond. at 25°C (µs/cm)	Turbidity (NTU)	DO (mg/L)	ORP (milliVolt)	Observations (redox, color, odor, etc.)
1156	<del>_____</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>	<del>_____</del>	70.90	7.83	353	2.57	5.34	265	Clear

Water Sample Collection (number of bottles and sample I.D.)

15

**NAPA VALLEY  
GROUNDWATER  
SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

**APPENDIX F:**

**Groundwater Monitoring Protocols**

## Appendix F

### NAPA COUNTY PROCEDURE FOR MEASURING THE DEPTH TO WATER IN MONITORING AND PRODUCTION WELLS

#### Purpose

To obtain an accurate dated and timed measurement of the static depth to water in a well that can be converted into a water level elevation in reference to a commonly used reference datum (e.g., NAVD 1988). In this context, static means that the water level in the well is not influenced by pumping of the well. For comparability, measurements should be obtained according to an established schedule designed to capture times of both highest and lowest seasonal water level elevations. Also for comparability, measurements during a particular field campaign should be obtained consecutively and without delay within the shortest reasonable time.

#### Measurement Procedure

- If a well is being pumped, do not measure; return later, but not sooner than 60 minutes and preferably after 24 hours (see below “Special Circumstances” for additional instructions).
- Turn on water level indicator signaling device and check battery by hitting the test button.
- Remove access plug or well cap from the well cover and lower probe (electric sounder) into the well.
- When probe hits water a loud “beep” will sound and signal light will turn red.
- Retract slightly until the tone stops.
- Slowly lower the probe until the tone sounds.
- Note depth measurement at rim (i.e., the surveyed reference point for water level readings) of well to the nearest 0.01 foot and rewind probe completely out of well.
- Remove excess water and lower probe once again into well and measure again.
- If difference is within  $\pm 0.02$  foot of first measurement, record measurement.
- If difference is greater repeat the same procedure until three consecutive measurements are recorded within  $\pm 0.02$  foot.
- Rewind and remove probe from well and replace the access plug or well cap in the well cover.
- Clean and dry the measuring device/probe and continue to next well.

#### Special Circumstances

##### Oil Encountered in Well

If oil is detected in the well structure, the depth to the air-oil interface is measured. To obtain such a measurement, the electric sounder is used similar to the way chalked steel tapes were traditionally used for depth-to-water measurements.

1. Lower the cleaned probe well below the air-oil interface (e.g., 1 foot). Read and record the depth at the reference point (since this depth is chosen somewhat arbitrarily by the field

technician, an even number can be chosen, e.g., 37.00 feet). This measurement is the length of cable lowered into the well and corresponds to a line that the oil leaves on the probe or cable (i.e., the oil inundation line). Above this line, smudges of oil may appear on the cable. Below this line, the cable/probe is completely covered with oil. If the probe is lowered too far, completely penetrates the oil, and is far submerged in the water below the oil, parts of the probe/cable below the oil inundation line may also appear smudgy.

2. Retrieve probe, identify and record the oil inundation line on the cable (e.g., 2.72 feet). This measurement does not reflect the thickness of the oil. It reflects the length of the cable below the air-oil interface.
3. Compute the depth to oil by subtracting the length of line below the air-oil interface from the corresponding measurement at the reference point:  $\text{Depth to oil} = 37.00 \text{ feet} - 2.72 \text{ feet} = 34.28 \text{ feet}$ .

Since oil has a slightly smaller density than water, a depth-to-oil measurement will always be smaller than a corresponding depth-to-water measurement in the same well if oil were not present. Depth-to-oil measurements yield a reasonable approximation to depth-to-water measurements unless the oil thickness is great. For each foot of oil in the well casing, the depth- to-oil measurement will be approximately 0.12 foot smaller than a corresponding depth-to-water measurement if oil were not present.

### Pumping Water Level on Arrival

If well is being pumped, do not measure. Return later when the water level has stabilized. Using past field notes, the field technician will use his/her experience to determine the appropriate duration necessary for static measurements. Upon returning to the well site (at a location where pumping was previously noted on the same day), the technician will measure the water level. The technician will have available historical water level data to determine whether the measurement is consistent with past measurements. If the initial measurement appears anomalous, the technician will measure water levels every 10 minutes over a period of 30 minutes.<sup>18</sup> If measurements vary significantly from past measurements (taking into account seasonal variations), the technician will note the circumstances (i.e., the date and time when the well was first visited, total time it was pumping (if known), when it was shutoff, when the technician returned, and subsequent water level measurements [on the same day, or as the case may be based on experience, the day immediately following]). Subsequent consideration of pumping effects at a site-specific well location will be addressed as necessary.

### Recordation

1. Name of field technician
2. Unique identification of well
3. Weather and site conditions (e.g., clear, sunny, strong north wind, intense dust blowing over wellhead from nearby plowed field; dry ground, easy access)
4. Condition of well structure (e.g., well cap cracked – replaced with new one; wasp hive between well casing and well housing; no action, discuss with project manager)

---

<sup>1</sup> During this period, if the groundwater level difference is greater [than +/- 0.02 feet], repeat the same procedure until three consecutive measurements are recorded within +/- 0.02 foot.

5. Time and date of depth-to-water reading
6. Any other pertinent comments (e.g., sounder hangs up at 33 feet, thus no measurement; or: fifth measurement of ~55.68 feet in a row...residual water in end cap?; or: oil in well...measurement is depth to oil; or: intense sulfur odor upon opening well cap; or: nearby (west ~100 feet) irrigation well pump)

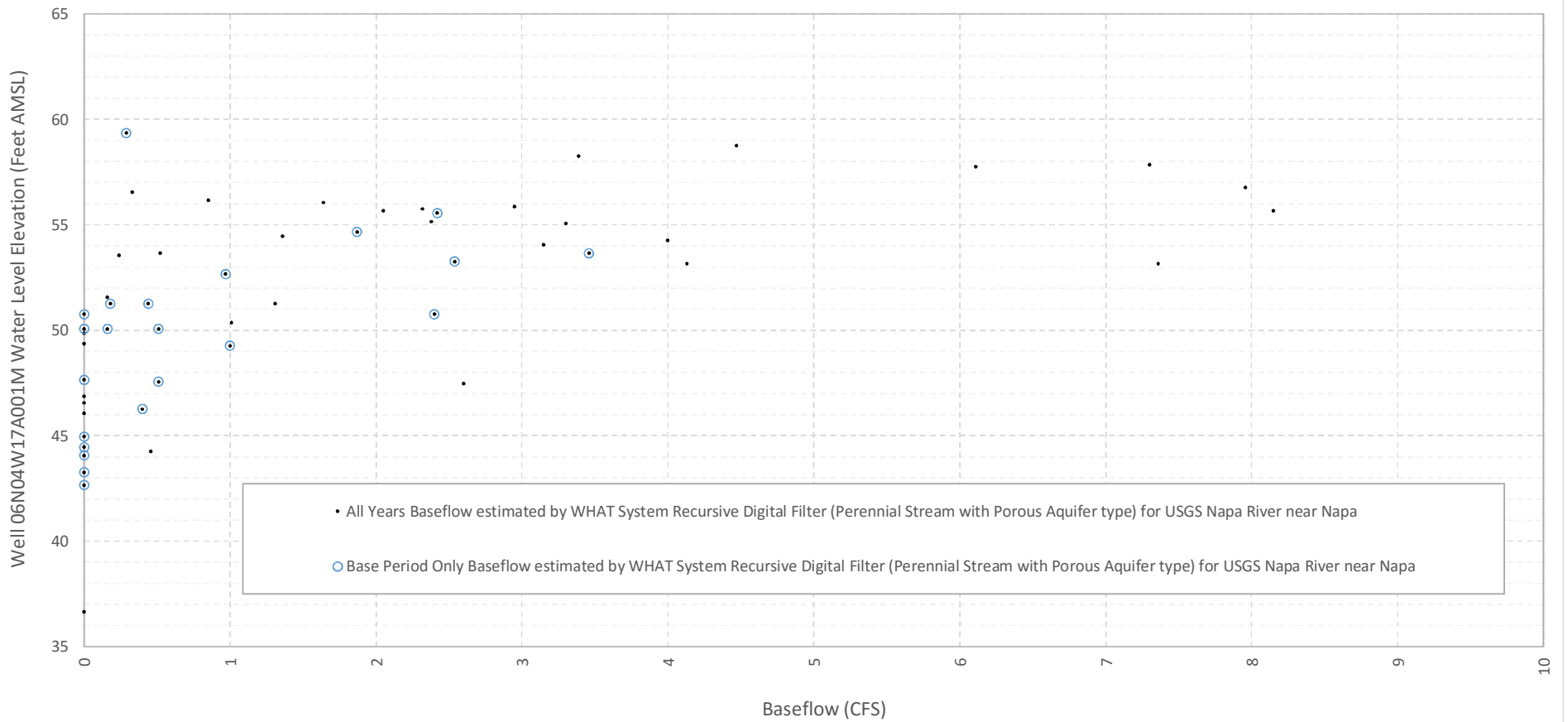


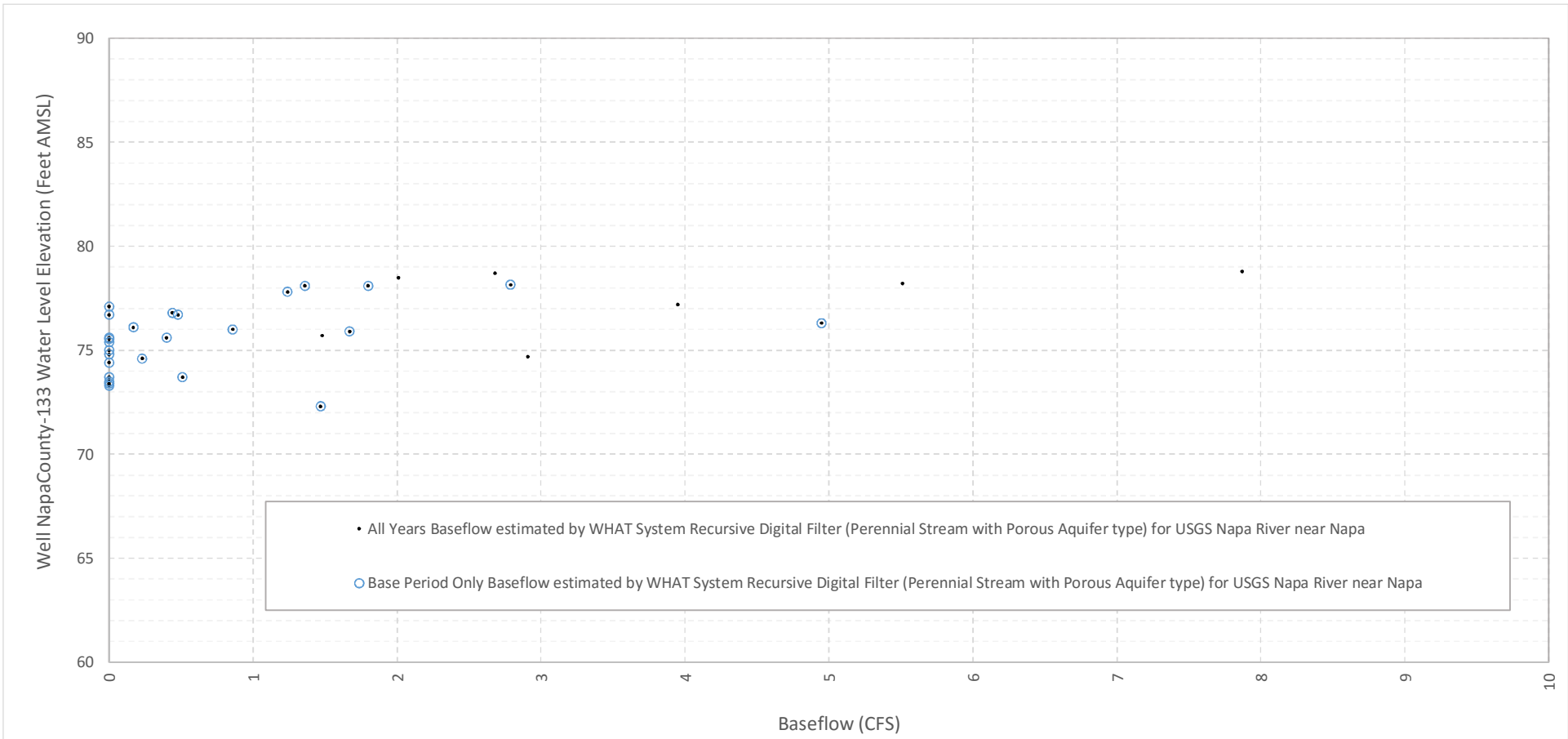
**NAPA VALLEY  
GROUNDWATER  
SUSTAINABILITY:**

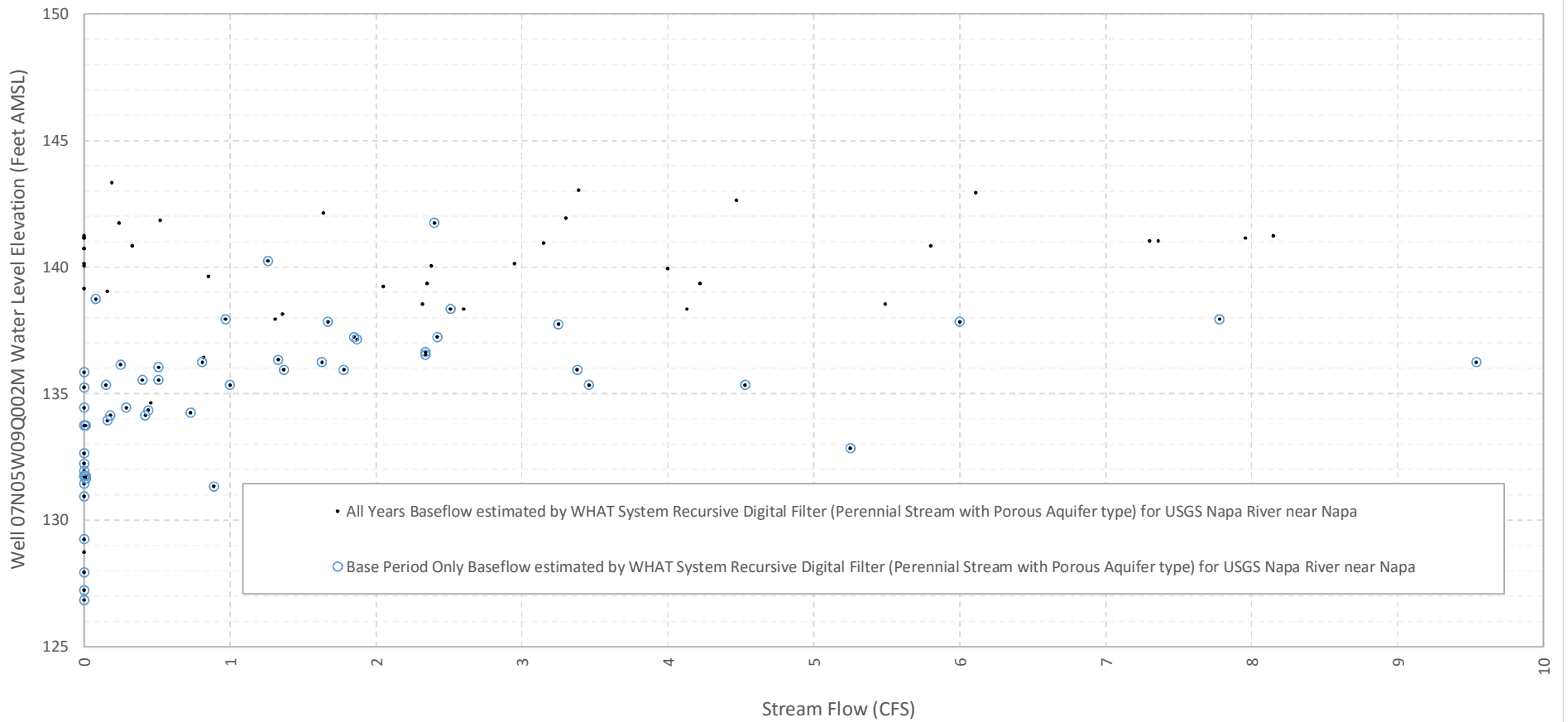
**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

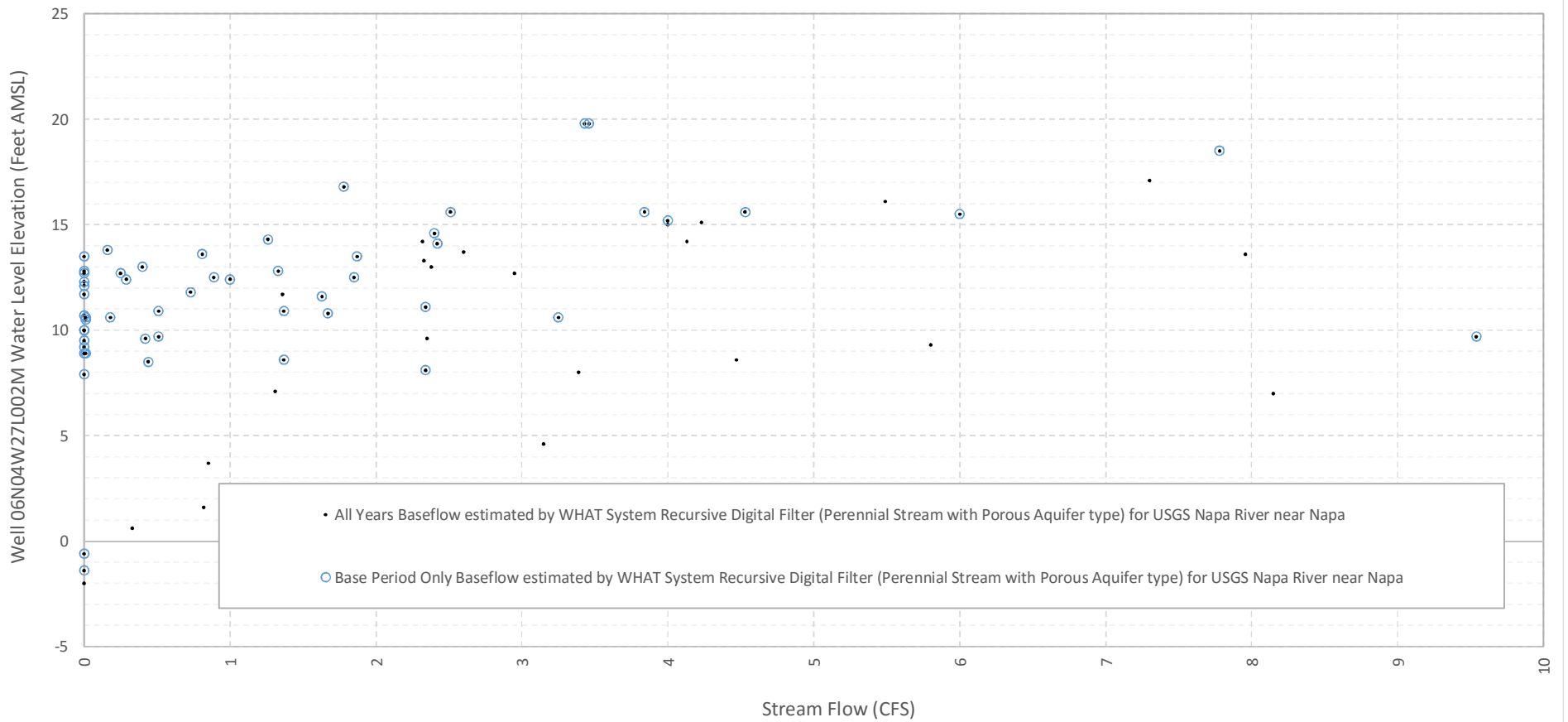
**APPENDIX G:**

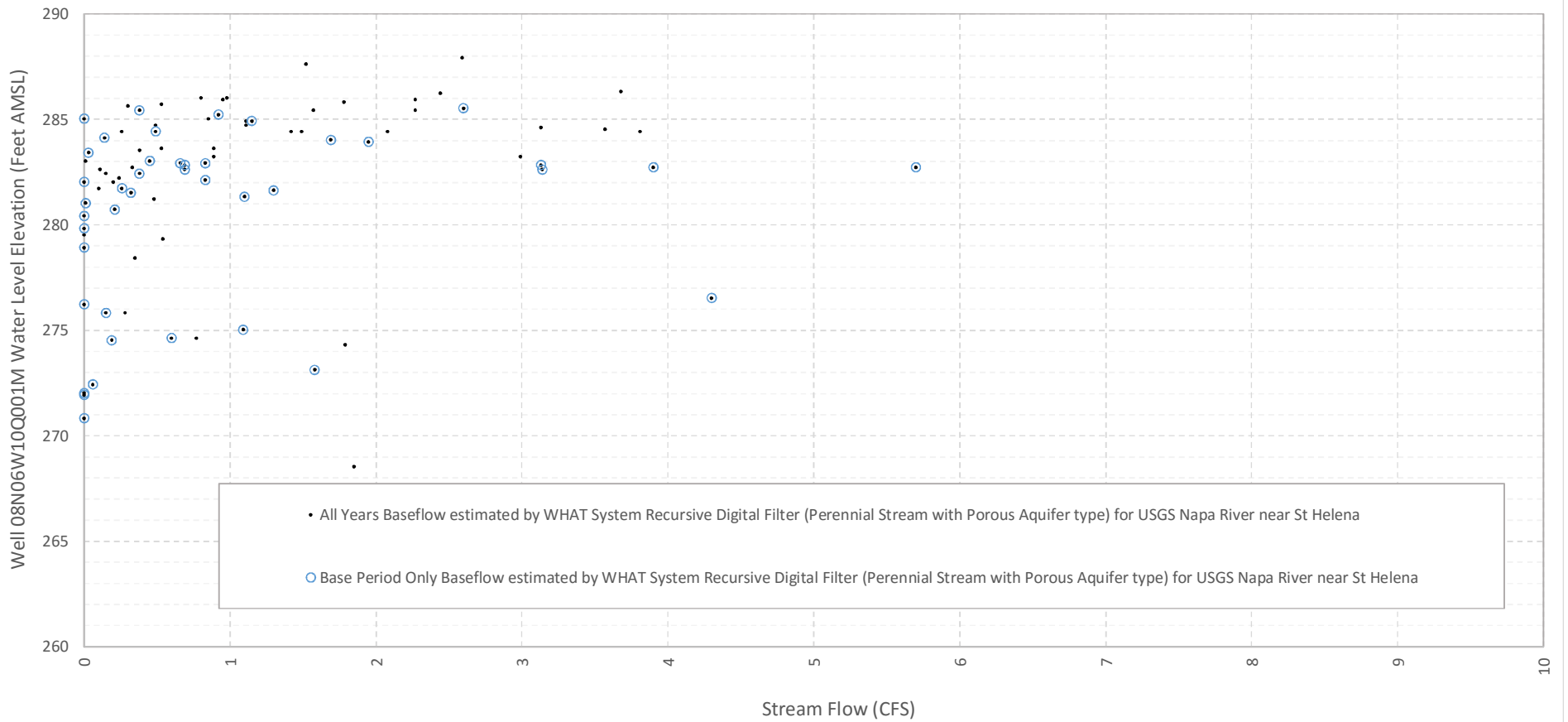
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Representative Station Pairs**

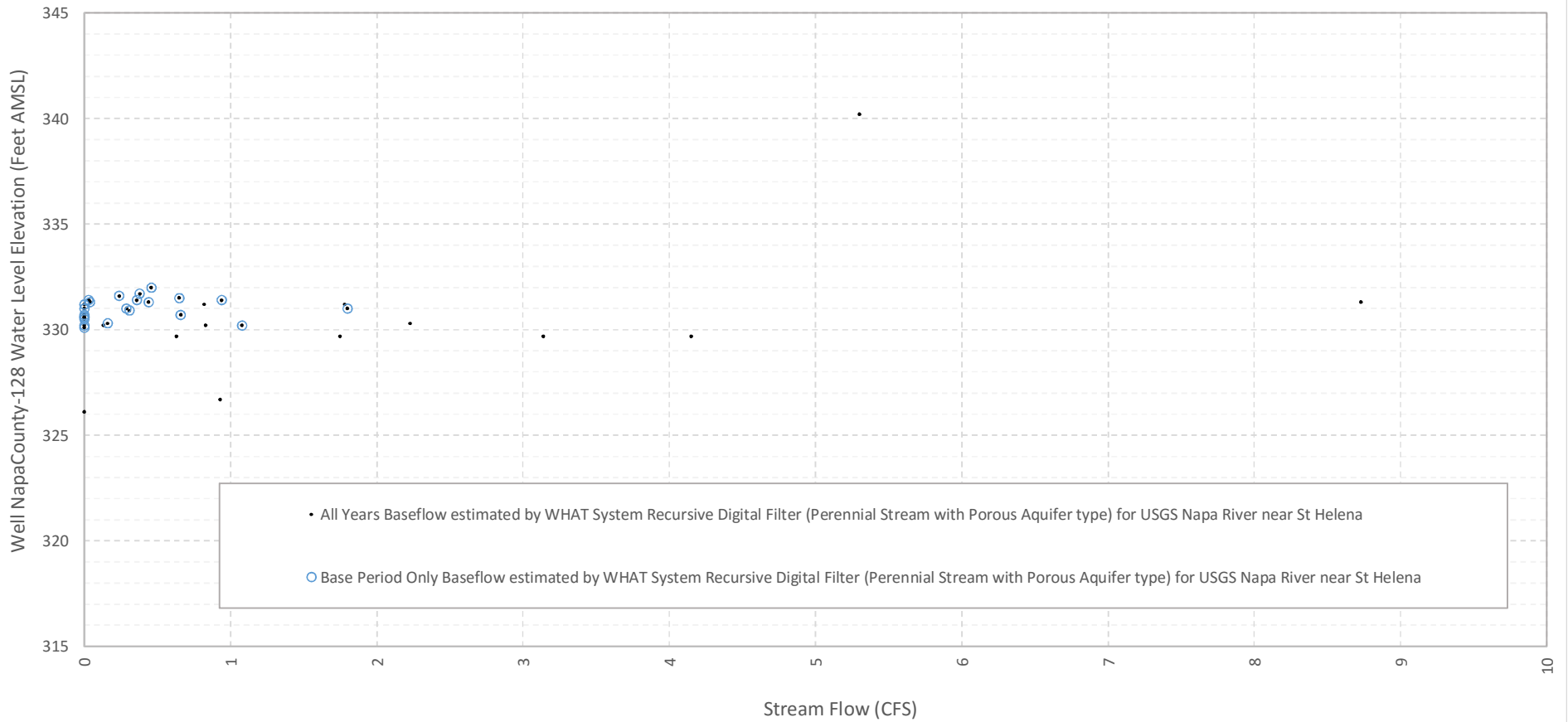


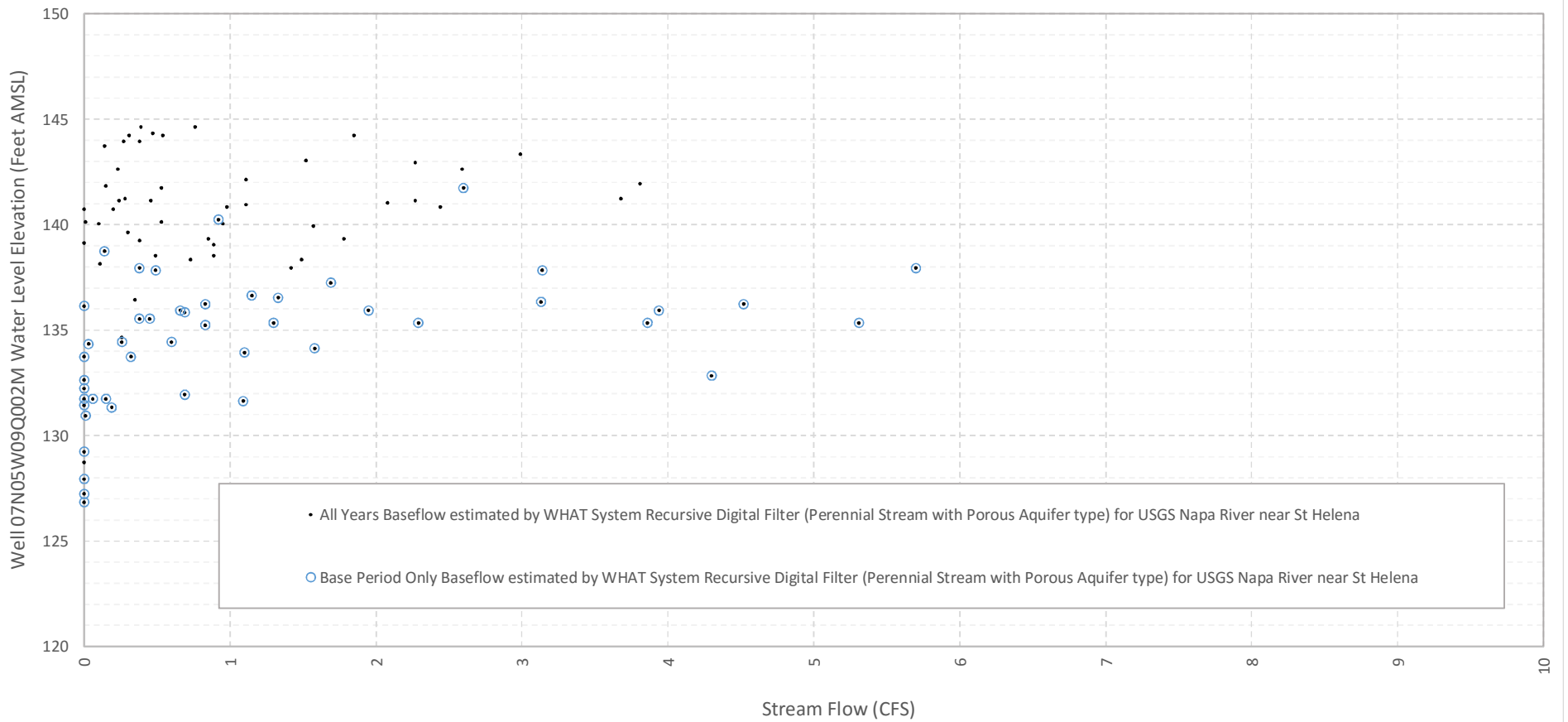














# **NAPA VALLEY GROUNDWATER SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR  
THE NAPA VALLEY SUBBASIN**

## **APPENDIX H:**

**Napa County's Voluntary Groundwater  
Level Monitoring, Data Management  
and Disclosure**



# Napa County's Voluntary Groundwater Level Monitoring

## Data Management and Disclosure

The Voluntary Groundwater Level Monitoring Program has two participation levels; each having different levels of data management and disclosure. The County will make every effort to keep the data it collects confidential. However, the County cannot guarantee that all data provided will be kept confidential if a Public Records Act request is filed.

California Water Code §13752 was amended in 2015 to allow public access to Well Completion Reports. However, the law requires the Department of Water Resource to comply with The Information Practices Act of 1977, redacting personal information from the Well Completion Reports before making them public. Please see: [http://www.water.ca.gov/groundwater/wells/well\\_completion\\_reports.cfm](http://www.water.ca.gov/groundwater/wells/well_completion_reports.cfm) for more information.

### 1) **Napa County Program**

- Groundwater level measurements are collected twice a year (spring and fall) and reported to the well owner if requested.
- Well construction details, well location, reference and ground surface elevations and water elevation data will be kept confidential as permitted by law and will not be made available to the public (see disclosure statement above). The water elevation data collected will be used internally by the County to gain a better understanding of general groundwater level conditions across the County's groundwater basins.
- Groundwater quality testing (if applicable) is conducted twice a year (spring and fall) and reported to the well owner.
- Level of Disclosure: **Low**
  - \* Well construction detail, location, ground surface elevation, and water elevation data NOT made available to the public. Data collected will be used internally by the county to understand general groundwater level fluctuations across the larger basin. Groundwater quality testing (if applicable) conducted twice annually in April and October and reported to the well owner.

### 2) **California Statewide Groundwater Elevation Monitoring (CASGEM) Program**

- Groundwater level measurements are collected twice a year (spring and fall) and reported to the well owner if requested.
- Well construction detail (including completion type, total depth, construction data, screen intervals [if available], whether or not a well completion report available [y/n], report # [if available], well location, reference and ground surface elevations, and water elevation data) will be made available to the public via websites (State and/or County) or through other means. Data is available on the CASGEM website at: <http://www.water.ca.gov/groundwater/casgem/>.
- All information provided to CASGEM should be assumed to be available to the public.
- Level of Disclosure: **High**
  - \* Well construction detail, completion type, total depth, construction data, screen intervals (if available), whether or not a well completion report is available (y/n), report # (if available), well location, ground surface elevation, and water elevation data are made available to the public via websites (State and/or County) or through other means. Data Currently available on: <http://www.water.ca.gov/groundwater/casgem/>



# Napa County's Voluntary Groundwater Level Monitoring

## Frequently Asked Questions for Well Owners

### **What is the Voluntary Groundwater Level Monitoring Program and why is it important?**

The Voluntary Groundwater Level Monitoring Program provides the opportunity to measure the depth to groundwater in wells throughout the County twice per year. Monitoring groundwater elevation helps assess the overall status of Napa County aquifers. The expanding network of privately owned volunteer wells augments County data from publicly monitored wells.

### **What is required to participate?**

Participating well owners must sign an agreement allowing (1) the release of depth-to-groundwater data and (2) access to the property, allowing Napa County Department of Public Works or its contractor to access the well to measure the groundwater elevations twice per year.

### **Who collects the well measurements and how often are measurements taken?**

Groundwater measurements are taken by the Napa County Department of Public Works or its contractor. Measurements generally take place twice per year in the spring and fall.

### **How will the collected information be used?**

The information will be used to monitor and track groundwater levels, understand the relationship between surface water and groundwater, maintain a central database of monitoring results, and improve the accuracy and reliability of relevant water resource models.

### **What does participation mean to well owners?**

Volunteers will (1) receive accurate groundwater level readings twice per year (spring and fall), (2) be able to see seasonal and long-term groundwater level trends of their well, (3) receive water quality data if testing is agreed to and conducted, and (4) gain improved understanding of our groundwater resources countywide.

### **Will the County measure how much water I use?**

No. The amount of groundwater used is not measured. The only measurement taken is the depth to groundwater in the well (water level). If water quality testing is available and agreed to, a sample of well water will be collected and sent to an independent testing laboratory for analysis.

### **Will someone try to curtail my groundwater use if I participate in the program?**

No. The Voluntary Groundwater Level Monitoring Program is a non-regulatory, volunteer program that only measures the groundwater elevation/level (and quality if testing is available and agreed to) in volunteer wells. Groundwater use is not being measured or monitored as part of this program.

### **Will my well information be kept confidential?**

Napa County will make every effort to maintain the confidentiality of a well owner's information. However, such information could be accessed through a public records request. In such a case the County will notify the owner.



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list serve

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**NAPA VALLEY  
GROUNDWATER  
SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

**APPENDIX I:**

**Water Availability Analysis  
(guidance document)**

# WATER AVAILABILITY ANALYSIS (WAA)

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*Adopted May 12, 2015*

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## Introduction and Purpose

The County is required by the California Environmental Quality Act (CEQA) (Public Resources Code 21000–21177) and the CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387) to conduct an environmental analysis of all discretionary permits submitted for approval. CEQA requires analysis of literally dozens of environmental aspects, including the following:

“Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?”

The purpose of this document, the Water Availability Analysis (WAA), is to provide guidance and a procedure to assist county staff, decision makers, applicants, neighbors, and other interested parties to gather the information necessary to adequately answer that question. The WAA is not an ordinance, is not prescriptive, and project specific conditions may require more, less, or different analysis in order to meet the requirements of CEQA. However, the WAA is used procedurally as the baseline to commence analysis of any given discretionary project.

A Water Availability Analysis is required for any discretionary project that may utilize groundwater or will increase the intensity of groundwater use of any parcel through an existing, improved, or new water supply system<sup>1</sup>. As such, it will most commonly be used for discretionary development applications using groundwater such as wineries and commercial uses. Since CEQA does not apply to non-discretionary (“ministerial”) projects, it does not apply to projects such as building permits, single family homes, track II replants, etc. While discretionary vineyard projects are welcome to borrow from the WAA, such vineyard projects, due to their size and scope, generally receive a much more exhaustive analysis under longstanding processes managed by the Conservation Division of the Planning Building & Environmental Services (PBES) Department.

The WAA may also apply when a discretionary Groundwater Permit is required by the Groundwater Conservation Ordinance, Section 13.15.010 of the Napa County Code. The ordinance’s provisions are summarized below. (Should there be any conflict between the summary below and the Ordinance, the Ordinance shall prevail).

### Outside of Designated Groundwater Deficient Areas

Most non-discretionary development in any area of the county, except for designated groundwater deficient areas, is exempt from the need to secure any type of groundwater permit. This includes projects to develop an on-site or off-site water source serving agriculture, projects to construct or develop rainwater harvesting or graywater recycling systems and minor and convenience water supply system improvements (see definitions in 13.15.010). Other

---

<sup>1</sup> The Groundwater Conservation Ordinance (Section 13.15.010) defines a water supply system as “any system including the water source the purpose of which is to extract and distribute groundwater”.

exemptions outside groundwater deficient areas include projects such as building permits, well and septic permits, lot line adjustments, track II replants, etc. The following, however, are not exempt:

- Projects to develop or improve a water supply to serve *more* than a single contiguous parcel (agricultural development for multiple contiguous parcels is eligible for an exemption under certain conditions) or
- Projects that can be served by a public water supply.

### **Within Designated Groundwater Deficient Areas**

Most any type of development in groundwater deficient areas (as defined in Napa County Code, Section 13.15.010.C) will trigger the need for a discretionary groundwater permit unless specifically exempted or unless eligible for a ministerial groundwater permit (see 13.15.030C). Ministerial groundwater permits are specifically for (1) a single family residence with associated well and landscaping when no other uses exist on the property, or (2) for agricultural re-plants. Specific exemptions include applications to construct or develop rainwater harvesting or graywater recycling systems and minor and convenience improvements (see definitions in 13.15.010) which include:

- Changes to existing water supply systems for the purposes of repair or rendering a system more efficient or to add to or improve existing legal uses on a property such as swimming pools (if provided with a cover and initially filled with trucked in water),
- Replacement dwellings (when an existing legal dwelling unit had previously existed on the property),
- Additional potential bedrooms whether or not attached to the single-family dwelling, and replacement of a site's existing well (provided the old well is destroyed and the new well is drilled to the same or smaller diameter as the existing well) are all exempt.

### **WAA Procedure**

The Water Availability Analysis (WAA) uses a screening process for discretionary permit applications (both for new projects and for project modifications that change groundwater use) and determines if a proposal may have an adverse impact on the groundwater basin as a whole or on the water levels of neighboring non-project wells or on surface waters.<sup>2</sup> The WAA also provides procedures for further analysis when screening criteria are exceeded. An important sidelight to the process is public education and awareness. The WAA is based on an application which requires the applicant to gather information about existing non-project groundwater wells and water uses at the applicant's site, to describe planned project well operations, to document existing uses of groundwater on the property, and to estimate future water

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<sup>2</sup> For the purposes of this procedure, surface waters are defined to include only those surface waters known or likely to support special status species or surface waters with an associated water right; however, as with all of the procedures in this WAA, there may be unique circumstances that require additional site-specific analysis to adequately evaluate a project's potential impacts on surface water bodies.



demands associated with the proposed project. In addition, other information relating to the geology, proximity to surface water bodies (e.g., river, creeks, etc.), and the location and construction of existing non-project wells located near the applicant's property or project well(s) will also be important to evaluate, as warranted, for the potential for well interference and effects on surface water. County staff can provide assistance to the applicant in obtaining and reviewing the latter information as part of the application data collection process.

## **WAA Application Procedure**

A WAA groundwater permit application may be prepared by the applicant or their agent.

(NOTE TO PUBLIC: PBES WILL CREATE/UPDATE AN APPLICATION FORM BASED ON THIS DOCUMENT ONCE APPROVED). **It must be signed by the applicant. If prepared by the applicant's agent, it must contain the letterhead of the agent, the name of the agent, and the agent's signature.** The WAA application contains the following information:

1. The name and contact information of the property owner and the person preparing the application.
2. Site map of the project parcel and adjoining parcels. The map should include: Assessor's Parcel Number (APN), parcel size in acres, location of existing or proposed project well(s) and other water sources, general layout of structures on the subject parcel, location of agricultural development and general location within the county. Approximate locations of existing non-project wells on other parcels within 500 feet of the existing or proposed project well(s) should also be identified based on the applicant's knowledge and available public information. All surface waters within 1500 feet of the existing or proposed project well(s) should also be identified, based on the applicant's knowledge and available public information. County staff can provide assistance to the applicant in obtaining adjacent well location, APNs and parcel size information.
3. A narrative on the nature of the proposed project, including all land uses on the subject parcel, projected future water uses in normal and dry years, details of current and proposed operations related to water use, description of interconnecting plumbing between the various water sources and any other pertinent information.
4. Tabulation of existing water use compared to projected water use for all land uses current and proposed on the parcel. Should the water use extend to other parcels, they should be included in the analysis (see Appendix E for additional information on determining water use screening criteria when multiple parcels are involved). **These estimates should reflect the specific requirements of the applicant's operations.** Guidelines attached in **Appendix B** are an example of one way to calculate projected water demand. The applicant shall use these, other publicly available guidelines, other guidelines that may be provided by the Department of Planning, Building, and Environmental Services (PBES), or project specific estimates, whichever best approximate the proposed water use for the specific project and account for all other existing water uses at the subject parcel(s).

PBES and Public Works (PW) staff will review the application for completeness and reasonableness, review the County's groundwater data management system for additional information about the characteristics of the areas/basin and nearby wells, compare the analysis to the screening criteria, and determine if additional analysis is required. In reviewing available information, County staff will consider:

1. The characteristics of the groundwater area or basin (such as confined or unconfined aquifer system; alluvial or hard rock geological setting) and related aquifer properties; and,
2. The location and present use of all existing non-project wells that are within 500 feet of the project well(s), identifying well depths and construction information for existing wells, if known; and,
3. The distance to surface waters within 500 feet of any Very Low pumping capacity project well(s) or 1500 feet of project well(s) with a capacity greater than 10 gallons per minute (gpm).<sup>3</sup>

## Screening Criteria

Applications will be evaluated based on project information, to be provided by the applicant, and available geologic and hydrologic information, to be provided by County staff. As shown in **Table 1**, projects on the Napa Valley Floor and the Milliken-Sarco-Tulucay (MST) that meet the Tier 1 criteria (water use) will generally not be subject to second tier criteria evaluation, unless substantial evidence<sup>4</sup> in the record indicates the need to do so. Parcels in all other areas will generally be required to conduct a Tier 2 evaluation. Projects will be subject to Tier 3 criteria and analysis only when substantial evidence in the record determines the need for such analysis. All criteria are based on information outlined in this procedure, as well as a detailed conceptualization of hydrogeologic conditions in the Napa Valley and substantial evidence in the form of monitoring and hydrologic data, past studies, and well drillers' logs. Procedures for three tiers of screening criteria will be used on each project as designated herein and as needed for projects with unique issues:

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<sup>3</sup> For the purposes of this WAA, "very low pumping capacity wells" are defined as wells with a casing diameter of six inches or less and an installed pump capable of producing less than 10 gallons per minute (gpm). Pumping capacities referenced throughout this WAA were developed as part of a separate analysis of potential streamflow depletion in unconsolidated alluvial settings. Details of this analysis are provided in a separate Technical Memorandum (LSCE, 2013).

<sup>4</sup> Substantial evidence is defined by case law as evidence that is of ponderable legal significance, reasonable in nature, credible and of solid value. The following constitute substantial evidence: facts, reasonable assumptions predicated on facts; and expert opinions supported by facts. Argument, speculation, unsubstantiated opinion or narrative, or clearly inaccurate or erroneous information do not constitute substantial evidence.

**Table 1:** Project Screening Criteria Applicability

Tier	Criteria Type	Napa Valley Floor	MST	All Other Areas
1	Water Use	Yes	Yes	Yes
2	Well and Spring Interference	No <sup>1</sup>	No <sup>1</sup>	Yes
3	Groundwater/Surface Water Interaction	No <sup>1</sup>	No <sup>1</sup>	No <sup>1</sup>

1. Further analysis may be required under CEQA if substantial evidence, in the record, indicates a potentially significant impact may occur from the project.

The three tiers of screening criteria are discussed below. **Appendices B-F** provide additional detail.

**Tier 1--Water Use Criteria**

For projects on the Napa Valley Floor and in the MST, water use criteria will be compared to the water use estimate provided by the applicant in the WAA application. Water use criteria vary according to the location of the project parcel(s). As such, projects must meet the applicable water use criterion, through project revisions or water use estimate refinements, if necessary and reasonable, in order to be considered in compliance with this criterion.

**Table 2A** presents the water use criteria. Napa Valley Floor areas include all locations that are within the Napa Valley except for areas specified as groundwater deficient areas. Groundwater deficient areas are areas that have been so designated by the Board of Supervisors. PBES staff can assist the applicant with determining which area a project is located in.

Currently the only designated groundwater deficient area in Napa County is the MST Subarea. Areas of the county not within the Napa Valley Floor or the MST Groundwater Deficient Area are classified as All Other Areas. Public Works can assist applicants in determining the correct classification for project parcel(s). **Appendix B** contains a discussion of the origins of these water use criteria.

**Table 2A:** Water Use Criteria

Project parcel location	Water Use Criteria (acre-feet per acre per year)
Napa Valley Floor	1.0
MST Groundwater Deficient Area	0.3 or no net increase, whichever is less <sup>1</sup>
All Other Areas	Parcel Specific <sup>2</sup>
1. Does not apply to the Ministerial Exemption as outlined in the Groundwater Conservation Ordinance 2. Water use criteria for project shall be considered in relation to the average annual recharge available to project property, as calculated by the applicant or their consultant.	

In general, the acceptable water use screening criterion for parcels located on the Napa Valley Floor is 1 acre-foot per acre of land per year (an acre-foot of water is the amount of water it takes to cover one acre of land to a depth of one foot, or 325,851 gallons). Therefore, a 40-acre parcel will meet this criterion if the projected groundwater use would not exceed 40 acre-feet per year.

Areas designated as groundwater deficient areas as defined in the Groundwater Conservation Ordinance will have criteria established for that specific area. For example, the MST Subarea screening criterion is 0.3 acre-feet per acre per year or “no net increase” over existing conditions, whichever is less (see **Appendices B and C**).

### **Water Use Criterion including Estimated Recharge**

The water use criterion for parcels termed All Other Areas (i.e. not located in the Napa Valley Floor or a groundwater deficient area), will be determined on a parcel specific basis. No single criterion can be established for “All Other Areas” due to the uncertainty of the geology, and the increasingly fractured rock aquifer systems in the mountainous and non-Napa Valley areas, including Carneros, Pope Valley, Wooden Valley, and Capell Valley. The project applicant will need to estimate the average annual recharge occurring on the project parcel(s) and consider the amount of recharge relative to the estimation of project water use (e.g., all current and projected water demands for the property on which the planned project is located). The estimate of average annual recharge can be made by various methods including water balance methods. The selected method should be based on data from the parcel or watershed where the proposed project is located. The estimated project water use, including existing and proposed uses of water on the project parcel(s), shall include estimates for normal and dry water years. If an alternative water source will be used for dry years (e.g. trucked in water for non-potable uses), that information shall be provided by the applicant along with the alternate source location and estimated water volume.

Projects on the Napa Valley Floor and in the MST that meet the Tier 1 screening criteria are considered to be in compliance with the standards of the WAA, unless other substantial evidence in the record indicates the need for further evaluation. Projects in “All Other Areas” shall complete Tier 1, and then proceed to Tier 2.

#### **Tier 2--Well and Spring Interference Criterion**

When applicable (see **Table 1**), the Tier 2 well interference criterion is presumptively met if there are no non-project wells located within 500 feet<sup>5</sup> of the existing or proposed project well(s). For those projects with neighboring wells located within 500 feet of the project well(s), additional evaluation will be required to assess the potential drawdown in those existing wells resulting from project well operation relative to the Tier 2 criterion described below. Though highly recommended, if the neighboring well is located on a parcel that is also owned by the applicant, the Tier 2 evaluation for that well may be waived, however certain safeguards must be in place to ensure that the water allotment and transfer between parcels is clearly documented and

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<sup>5</sup> Distance is measured horizontally from the well.

recorded, especially in cases where the water from more than one parcel will ultimately serve a use on a single parcel (see **Appendix E**).

The potential interference will be determined based on data including the distance between the project well(s) and the neighboring non-project well(s), the hydrogeologic setting, and well construction information and operational configurations for the project well(s). Well construction information and operational configurations provided by the applicant will include:

- the planned pumping rate of well(s)<sup>6</sup>,
- well depth(s),
- well screen intervals and
- well seal locations.

**Table 2B** presents default well interference criteria that the County may apply in the determination of significant adverse effects. The minimum significant drawdown values presented in **Table 2B** are intended for use in cases where information about existing non-project wells is limited or non-existent. However, when the status and configuration of an existing non-project well are known, for example the depths of screen intervals, locations of any annular seals, and/or water levels in the well and the pump depth setting, then site-specific measures of significance should be used. Site-specific measures of significance should also account for known seasonal variations<sup>7</sup> in groundwater elevations in the vicinity of the proposed project and mutual well interference (i.e., interference between the planned project well usage (new and/or existing) and one or more neighboring wells. County staff shall inform the applicant of the site-specific Tier 2 well interference criteria that will be applied in the evaluation of a project before the applicant conducts a site-specific analysis.

**Table 2B.** Default Well Interference Criteria

<b>Type of wells within 500 ft. screened within the same aquifer as project well</b>	<b>Estimated Drawdown at Neighboring Non-Project Wells</b>
Wells with a casing diameter of six inches or less	10 feet
Wells with a casing diameter greater than six inches	15 feet

<sup>6</sup> Estimates of well yield shown on driller’s logs are not sufficient for this purpose. The planned pumping rate should be determined based on the pump and related equipment installed, or planned to be installed, in the well and, if available, constant rate aquifer test data for tests conducted for a minimum of 8 hours.

<sup>7</sup> As used here, seasonal variations refer to typical changes over the course of a year.

Low pumping capacity project wells in unconfined aquifers will typically require a minimum amount of information due to the limited drawdown that they induce.<sup>8</sup>

## Springs

Napa County enjoys the occurrence of many natural springs, and the potential for planned projects to affect spring flow has been considered. A spring is defined as: “A place where groundwater flows naturally from a rock or the soil onto the land surface or into a body of surface water. Its occurrence depends on the nature and relationship of rocks, esp. permeable and impermeable strata, on the position of the water table, and on the topography” (Jackson, J. 1997. *Glossary of Geology*. American Geological Institute). Springs can be formed by multiple causes, including the interception of groundwater by the land surface; permeability differences that can cause groundwater to emerge; flow from faults or fractures; and drainage from landslides. Springs are ephemeral geologic features which may cease to flow due to natural causes such as changes to flow paths, water level declines, porosity lost by mineral precipitation, or sediment plugging.

Because springs originate as groundwater, springs are eligible for WAA Tier 2 analysis. It is required that any proposed project wells within 1,500 feet<sup>9</sup> of natural springs that are being used for domestic or agricultural purposes be evaluated to assess potential connectivity between the part of the aquifer system from which groundwater is planned to be produced and the spring(s). Springs exist in complex hydrogeologic environments. Other substantial evidence in the record may result in the need for such an analysis even though the spring(s) is located a greater distance from the planned well site. Where evaluation of potential connectivity between the project well(s) and springs is required, site-specific spring interference criteria will be established as appropriate for the springs(s) under consideration.

Although the Tier 2 analyses described above relate to mutual well interference and the avoidance of significant interference, potential pumping effects on springs may result in spring flow depletion. Springs are also commonly observed in locations where little to no quantitative records have been kept relating to the spatial occurrence or temporal variability of spring flow. Therefore, projects located in the vicinity of springs, where potential impacts of pumping are possible but unknown, may require monitoring and further analysis.

### Tier 3--Groundwater/Surface Water Interaction Criteria

Tier 3 analysis is only conducted when substantial evidence in the record determines the need for such an analysis.

The groundwater/surface water criteria are presumptively met if the distance standards and project well construction assumptions are met (see **Tables 3, 4, and 5**). The distance standards vary according to groundwater pumping capacity, well construction information and operational

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<sup>8</sup> For the purposes of this WAA, low pumping capacity wells are defined as wells with a casing diameter of six inches or less and an installed pump capable of producing between 10 gpm up to 30 gpm. As shown in Appendix F, Table F-6, a well pumping 30 gpm continuously for one day in an unconfined aquifer, even in an aquifer with a low hydraulic conductivity, is expected to induce a drawdown of two feet or less at radial distances as small as 25 feet.

<sup>9</sup> Distance is measured horizontally from the well.

configurations for the project well(s), and aquifer properties as described in **Appendix F**. The criteria are also based on a 140-day period to account for the effect of groundwater withdrawal on surface waters throughout the dry season (typically late May through early October).

The distance standards and construction assumptions in **Tables 3, 4, and 5** are provided as examples of conditions that, if applicable, would be expected to preclude any significant adverse effects on surface waters. The distance standards and construction assumptions in **Tables 3, 4, and 5** were developed as part of a separate analysis of streamflow depletion for surface waters and wells in unconsolidated alluvial geologic settings (LSCE, 2013). Project wells located in other geologic settings, particularly consolidated formations more common in locations deemed All Other Areas, will be subject to other distance standards based on site-specific aquifer conditions. Distance standards for project wells completed in consolidated formations will generally be no more restrictive than those shown in **Tables 3, 4, and 5** for hydraulic conductivity values of 0.5 ft/day.

The distance standards and construction assumptions in **Tables 3, 4, and 5** are not intended to serve as absolute setback criteria. Instead, if the proposed project is located in an equivalent geologic setting but does not meet the distance standards and conform to the associated well construction assumptions (See **Tables 3, 4, and 5**), then additional analysis will be required to determine project impacts relative to site-specific criteria. The site-specific groundwater/surface water interaction criteria will be established as appropriate for the surface water(s) under consideration<sup>10</sup> (see **Appendix F**).

Additional evaluation will be required to identify the potential for impacts of very low pumping capacity wells within 500 feet<sup>11</sup> of surface waters, low pumping capacity wells within 1000 feet of surface waters, and moderate to high pumping capacity wells within 1500 feet of surface waters, as described in **Appendix F**.<sup>12</sup> The potential impacts will be determined based on data including distance(s) between the project well(s) and the surface water features of concern, the hydrogeologic setting, the streambed (or equivalent feature) hydraulic properties, and well construction information and operational configurations for the proposed project wells. Well construction information and operational configurations provided by the applicant will include:

- the planned pumping rate of well(s)<sup>13</sup>,
- well depth(s),
- well screen intervals and
- well seal locations.

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<sup>10</sup> Site-specific criteria will be developed to address project impacts on beneficial uses of affected surface waters.

<sup>11</sup> Distance is measured horizontally from the well.

<sup>12</sup> For the purposes of this WAA, moderate to high pumping capacity wells are defined as wells with a casing diameter greater than six inches and an installed pump capable of producing more than 30 gpm

<sup>13</sup> Estimates of well yield shown on driller's logs are not sufficient for this purpose. The planned pumping rate should be determined based on the pump and related equipment installed, or planned to be installed, in the well and, if available, constant rate aquifer test data for tests conducted for a minimum of 8 hours.

Very low pumping capacity wells in unconfined aquifers will typically require a minimum amount of information due to the limited potential for surface water flow depletion. Other well types located at distances of 1500 feet or greater from surface waters will also likely require a minimum amount of information, particularly when it can be shown that the project well targets aquifer units not hydraulically connected to surface water.

**Table 3.** Well Distance Standards and Construction Assumptions; Very low capacity pumping rates (i.e., less than 10 gpm), constructed in unconsolidated deposits in the upper part of the aquifer system (unconfined aquifer conditions).

Aquifer Hydraulic Conductivity (ft/day)	Acceptable Distance from Surface Water Channel			Minimum Surface Seal Depth (feet)	Depth of Uppermost Perforations (feet)
	500 feet	1000 feet	1500 feet		
80	✓			50	100
50	✓			50	100
30	✓			50	100
0.5	✓			50	100

**Table 4.** Well Distance Standards and Construction Assumptions; Low capacity pumping rates (i.e., between 10 gpm and 30 gpm), constructed in unconsolidated deposits in the upper part of the aquifer system (unconfined aquifer conditions).

Aquifer Hydraulic Conductivity (ft/day)	Acceptable Distance from Surface Water Channel			Minimum Surface Seal Depth (feet)	Depth of Uppermost Perforations (feet)
	500 feet	1000 feet	1500 feet		
80			✓	50	150
50			✓	50	150
30			✓	50	100
0.5		✓		50	100



**Table 5.** Well Distance Standards and Construction Assumptions; Moderate to high capacity pumping rates (i.e., greater than 30 gpm), constructed in unconsolidated deposits in the upper part of the aquifer system (unconfined aquifer conditions).

Aquifer Hydraulic Conductivity (ft/day)	Acceptable Distance from Surface Water Channel			Minimum Surface Seal Depth (feet)	Depth of Uppermost Perforations (feet)
	500 feet	1000 feet	1500 feet		
80			✓	50	150
50			✓	50	150
30			✓	50	100
0.5			✓	50	100

If distance standards and construction criteria in **Tables 3, 4, and 5** above are not met, project approval may still be possible pending additional analysis (see below).

If the minimum surface seal depth is not met, and if available information does not indicate a hydraulic separation provided by geologic conditions at the site, then these cases would require additional analysis by the applicant. Shorter seals can allow for significant flow into the well from shallow portions of an aquifer, even if the screens are at greater depths.

### Additional Analysis Required

If the proposed project exceeds one or more of the screening criteria and the applicant is unable to modify the project (i.e., different location, well construction, water usage, or operations) to meet the screening criteria, then further analysis will be required (see **Appendix F**). Additional analysis will also be required if insufficient information exists in the project application to evaluate conformance with the criteria.

The applicant or the applicant's agent should consult with County staff regarding the required scope of the analysis, which is likely to include consultation with a professional hydrologist, geologist, or engineer, and may include field testing. Projects requiring additional analysis regarding Tier 2 or Tier 3 criteria may be subject to state requirements for preparation by a California registered professional geologist or professional engineer. **Appendix F** describes the additional analyses that will be required if the project screening criteria are applicable and are not met or if substantial evidence in the record indicates that a potentially significant impact may result from the project.

The geology of many areas of Napa County is very complex (LSCE and MBK, 2013). Accurate determination of hydrologic parameters (See **Appendix F**) is important to the additional analyses that may be necessary to evaluate potential well interference or impacts on surface

water. Several approaches may be considered. One approach, applicable in areas with unconsolidated aquifer materials, is to estimate aquifer hydraulic conductivity values, based on evaluation and interpretation of lithologic data reported for wells drilled in the vicinity of project or well(s) and published hydraulic conductivity values for similar aquifer materials. This method may be applicable in areas of the Napa Valley Floor where the unconsolidated aquifer system has been previously characterized (LSCE and MBK, 2013). This method is not applicable in areas with consolidated or hard rock aquifer materials, including the MST subarea and All Other Areas, due to the increased likelihood of significant variations in aquifer characteristics over relatively small distances.

The County's preferred method for determining the aquifer hydraulic conductivity or other parameters is by conducting an aquifer test and analyzing aquifer test data. In some cases, pump test data may be recorded by a well driller at the time of well construction and included as part of the Well Completion Report submitted to the California Department of Water Resources. However, these tests are not always conducted to standards that result in meaningful aquifer parameters (i.e., the pumping rate may not be constant, the pumping rate may not be large enough to analyze aquifer parameters, the test may be of too short a duration, and groundwater level measurements may not have been made during the test in the pumped well and one or more observation wells, etc.). If adequate aquifer test data are not available, and there is substantial evidence in the record that the project (including the proposed location, construction and operation of any project wells) regarding potential impacts on neighboring non-project wells or nearby surface waters, then an aquifer test may be required of the applicant's project well(s). A constant rate aquifer test is generally required for projects in All Other Areas, if acceptable test data are not already available. Interpretation of pump test data provided in driller's logs is not intended for consolidated aquifers. Pending the proposed project details, the County may also require installation of a monitoring well or monitoring of a nearby existing non-project well.

As described in the Groundwater Conservation Ordinance, the County may require applicants in groundwater deficient areas to install a water meter to verify actual groundwater usage. In addition to the above screening criteria, if the actual usage exceeds the projected use, or the screening criteria, the applicant may be required to reduce groundwater consumption and/or find alternate water sources (See **Appendix D**).

### **WAA Application Submittals**

WAA applications for all use permits and parcel divisions, as well as for all Groundwater Conservation Ordinance permits must be submitted to the Department of Planning, Building and Environmental Services (PBES), which will consult with the Department of Public Works, and be the conduit for communication between the County and the applicant. All subsequent communication should likewise pass through PBES. Any mitigation measures identified via the additional analysis will become either project modifications to, or conditions of approval for, the proposed project. Details of the use permit, land division, or groundwater ordinance can be obtained from PBES, along with mapping of groundwater deficient areas.

## Conclusions

The Napa County Board of Supervisors has long been committed to the preservation of groundwater for agriculture and rural residential uses within the County. It is their belief that through proper management, the excellent groundwater resources found within the County can be sustained for future generations. Several conclusions can be drawn from application of the Water Availability Analysis process to date:

- In the process of conducting the analysis, applicants develop a greater awareness of water use by their project, providing a higher level of awareness and potentially leading to more efficient use of the resource.
- Information submitted by applicants has led to a broader database for future study and management.
- Groundwater use can vary widely depending upon its availability, local hydrogeologic constraints, and periodic hydrologic constraints which may affect the recharge and replenishment of the aquifer system.
- On the Napa Valley Floor and in the MST, the practice of evaluating an applicant's WAA by using screening criteria is an accepted method for making groundwater determinations. Based on the significant information available on Napa County groundwater basins, the screening criteria present a reasonable approach to the process. Because of the variability in parcel conditions in "All Other Areas", these parcels warrant a site-specific analysis, as discussed elsewhere in this document.
- The Water Availability Analysis is based upon the basic premise that each landowner has equal right to the groundwater resource below his or her property, so long as it doesn't significantly impact others. Furthermore, the WAA provides sufficient information and supporting documentation to enable the County to determine whether a proposed project may significantly affect groundwater resources and the reasonable and beneficial uses in the proposed area. By implementing policies to prevent wasteful or harmful use of groundwater, it is intended that sufficient groundwater will be available for both current and future property owners. Ensuring wells are located and constructed so as to avoid impacts on neighboring wells and surface water bodies will minimize neighbor disputes and avoid significant environmental impacts. In summary, this WAA implements a process that recognizes:
  - The current understanding of the occurrence and availability of the County's groundwater resources,
  - The hydrogeologic constraints that can locally affect the utilization of those resources, and
  - The periodic hydrologic constraints that may also affect the utilization of the resource and replenishment of the aquifer system.



## **Appendix A: Water Availability Analysis Background**

At the height of the 1990 drought in Napa County, the Napa County Board of Supervisors and the Napa County Planning Commission became very concerned with the approval of use permits and parcel divisions that would cause an increased demand on groundwater supplies within Napa County. During several Commission hearings, conflicting testimony was entered as to the impact of such groundwater extraction on water levels in neighboring wells. The Commission asked the Department of Public Works to evaluate what potential impact an approval might have on neighboring wells and on the groundwater system as a whole. In order to simplify a very complex analysis, the Department developed a three phase Water Availability Analysis to provide a cost-effective answer to the question.

On March 6, 1991 an interim policy report, prepared by County staff, was presented to and approved by the Commission requiring use permit and parcel division applicants to submit a Water Availability Analysis with their application. The staff policy report provided a procedure by which applicants could achieve compliance with the Commission policy. Oversight of groundwater development within the County's jurisdiction was later refined by the Board of Supervisors approval of Napa County Ordinance No.1162 (Groundwater Conservation Ordinance) on August 3, 1999. A revised staff policy report was subsequently adopted by the Board of Supervisors in August 2007. The 2007 Policy Report updated the Water Availability Analysis procedure and restated the purpose and functionality of the analysis relative to the Groundwater Conservation Ordinance.

In January 2011, as part of the County's Comprehensive Groundwater Monitoring Program initiated in 2009, the County's technical consultant, Luhdorff & Scalmanini, Consulting Engineers, completed a review of the County's Groundwater Conservation Ordinance and procedures, and recommended updating the staff policy report and Water Availability Analysis procedure. The consultant's review found that the initial "phase one" analysis was valuable as a screening process, but that the pump test envisioned in "phase two" was not the best way to assess whether projects exceeding the screening criteria would have detrimental groundwater impacts.

On September 11, 2011, the Board of Supervisors appointed a Groundwater Resources Advisory Committee (GRAC) to assist with development of a groundwater monitoring program, and to recommend updates to the Groundwater Conservation Ordinance, as needed. As part of their work, the GRAC also reviewed changes to this Water Availability Analysis policy report in late 2013.

## Appendix B: Estimated Water Use for Specified Land Use

Each project applicant is responsible for determining estimated water usage for their proposed project. While some guidelines are provided below, other industry standards exist, PBES may be able to provide data based on previous applications, and each project has its own unique characteristics. The most appropriate data should be used by the applicant to estimate water use for their specific project.

### Guidelines for Estimating Residential Water Use:

The typical water use associated with residential buildings is as follows:

Primary Residence	0.5 to 0.75 acre-feet per year (includes minor to moderate landscaping)
Secondary Residence or Farm Labor Dwelling	0.20 to 0.50 acre-feet per year

### Additional Usage to Be Added

1. Add an additional 0.1 acre-feet of water for each additional 1000 square feet of drought tolerant lawn or 2000 square feet of non-xeriscape landscaping above the first 1000 square feet.
2. Add an additional 0.05 acre-feet of water for a pool with a pool cover.
3. Add an additional 0.1 acre-feet of water for a pool without a cover.

Residential water use can be estimated using the typical water uses above. All typical uses are dependent on the type of fixtures and appliances, the amount and type of landscaping, and the number of people living onsite. If a residence uses low-flow fixtures and has appliances installed, is using xeriscape landscaping, and is occupied by two people, the water use estimates will be on the low side of the ranges listed above.

### Examples of Residential Water Usage:

Residential water use can vary dramatically from house to house depending on the number of occupants, the number and type of appliances and water fixtures, the amount and types of lawn and landscaping. Two homes sitting side by side on the same block can consume dramatically different quantities of water.

### Example 1:

Home #1 is 2500 square feet. Outside the house there is an extensive bluegrass lawn, a lot of water loving landscaping, and a swimming pool with no pool cover. Inside the house all the

appliances and fixtures, including toilets and shower-heads, are old and have not been upgraded or replaced by water saving types. The owners wash their cars weekly but they don't have nozzles or sprayers on the hose. They do not shut off the water while they are soaping up the vehicles, allowing the water to run across the ground instead. Water is commonly used as a broom to wash off the driveways, walkways, patio, and other areas. The estimated water usage for Home #1 is 1.2 acre-feet of water per year

Example 2:

Home #2 is also 2500 square feet. Outside of the house there is a small lawn of drought tolerant turf, extensive usage of xeriscape landscaping, and no swimming pool. Inside the house all of the appliances and fixtures, including toilets and showerheads, are of the low flow water saving types. The owners wash their cars weekly, but have nozzles or sprayers on the hose to shut off the water while they are soaping up the vehicles. Driveways, walkways, patios, and other areas are swept with brooms instead of washed down with water. Estimated water usage for Home #2 is 0.5 acre-feet of water per year.

The above are only examples of unique situations. The estimated water use for each project will vary depending on existing parcel conditions.

**Guidelines For Estimating Non-Residential Water Usage:**

Agricultural:

Vineyards	
Irrigation Only	0.2 to 0.5 acre-feet per acre per year
Heat Protection	0.25 acre-feet per acre per year
Frost Protection	0.25 acre-feet per acre per year
Irrigated Pastures	4.0 acre-feet per acre per year
Orchards	4.0 acre-feet per acre per year
Livestock (sheep or cows)	0.01 acre-feet per acre per year

Winery:

Process Water	2.15 acre-feet per 100,000 gal. of wine
Domestic and Landscaping	0.50 acre-feet per 100,000 gal. of wine
Employees	15 gallons per shift
Tasting Room Visitation	3 gallons per visitor
Events and Marketing, with on-site catering	15 gallons per visitor

Industrial:

Food Processing	31.0 acre-feet per employee per year
Printing/Publishing	0.60 acre-feet per employee per year

Commercial:

Office Space	0.01 acre-feet per employee per year
Warehouse	0.05 acre-feet per employee per year

Estimates of water use for other categories are available in the technical literature from sources such as the American Water Works Association’s Water Distribution Systems Handbook (Mays, 2000).

**Parcel Location Factors:**

The water use screening criterion for each parcel is based on the location of the parcel. There are three different location classifications: Napa Valley Floor, MST Groundwater Deficient Area, and All Other Areas. Napa Valley Floor areas include all locations that are within the Napa Valley excluding areas designated as groundwater deficient areas. Groundwater deficient areas are areas determined by the Department of Public Works as having a history of insufficient or declining groundwater availability or quality. At present the only designated groundwater deficient area in Napa County is the MST Subarea. Areas of the County not within the Napa Valley Floor and MST Groundwater Deficient Area are classified as All Other Areas. Public Works can assist applicants in determining the appropriate classification for project parcel(s).

Project Parcel Location	Water Use Criteria
Napa Valley Floor	1.0 acre feet per acre per year
MST Groundwater Deficient Area	0.3 acre feet per acre per year or no net increase, whichever is less*
All Other Areas	Parcel Specific
* Does not apply to the Ministerial Exemption as outlined in the Groundwater Conservation Ordinance	

The criterion for the Napa Valley Floor Area was agreed to 1991 by the Board of Supervisors. The criterion of 0.3 acre feet per acre per year for the MST Groundwater Deficient Area was determined using data from the 1977 USGS report on the Hydrology of the MST Subarea (Johnson, 1977). The value is calculated by dividing the “safe annual yield,” as determined by the USGS (Johnson, 1977), by the total acreage of the affected area (10,000 acres). The addition of the “no net increase” standard reflects the County’s obligation to assess potential cumulative impacts under CEQA. In a groundwater deficient area, any discretionary project that increases groundwater use may contribute to the declining groundwater levels in the aquifer.

No single criterion can be established for “All Other Areas” due to the uncertainty of the geology, and the increased complexity of the fractured rock aquifer systems in the mountainous and non-Napa Valley areas, including Carneros, Pope Valley, Wooden Valley, and Capell Valley. The project applicant will need to estimate the average annual recharge occurring in the project area and consider the amount of recharge relative to the estimation of project water use (e.g., all current and projected water demands for the property on which the planned project is located). The estimated project water use shall include estimates for normal and dry water years for both current and proposed water uses. If an alternative water source will be used for dry years (e.g.



trucked-in water for non-potable uses), that information shall be provided by the applicant including the source and estimated water volume.

The criteria above were reviewed by the County's groundwater consultants in 2011-2013 and are considered to be reasonable indicators on a watershed scale of the levels below which significant environmental impacts would be unlikely to occur. The review was based on existing monitoring data and an updated hydrogeologic conceptualization of the Napa Valley aquifer system (LSCE and MBK, 2013) and is consistent with the County's experience since establishment of the water use criteria in 1991. In addition, these criteria have been successfully applied as part of the WAA procedure since their establishment.

## Appendix C: Guidance for MST Subarea Permit Applications

Historical data collected from the monitoring of wells within the MST Subarea over many decades indicate that it may be in overdraft, leading to the conclusion that the existing water users within the basin historically pumped more water from the ground than is being naturally replaced each winter season. To offset the overdraft trend, a recycled water pipeline is being installed, and once operating, its beneficial effects will be measured. However, as no other reasonable water resources currently exist in the MST, to avoid a ban on all new construction, the County has permitted each property owner to develop their property with the uses involving ministerial approvals under Section 13.15.030(C) of the groundwater ordinance, which are limited to a “reasonable” level of water use that may reduce the rate at which the groundwater levels are being lowered.

**Single Family Dwellings on Small Parcels In the MST Subarea:** The average, single family dwelling will likely use between 0.5 and 0.75 acre-feet of groundwater per year. Using a criterion of 0.3 acre-ft/year/acre, the minimum parcel size able to support the above range is between 1.5 to 2.5 acres. However, in order to ensure that all property owners have viable use of their land, applications for the construction of a single family home in these instances can be approved ministerially if the owner agrees to the conditions outlined in the Groundwater Ordinance. If the conditions are not agreed upon, or if the project involves a secondary dwelling or other groundwater uses not consistent with a single family dwelling, then the project would be subject to the analysis outlined in the WAA report. The County cannot approve the groundwater permit unless the proposed use is off-set by reductions elsewhere, such that the “no net increase” and “fair share”<sup>14</sup> water use screening criterion is met.

**Agricultural Development In the MST Subarea:** Agriculture in the MST Subarea is not exempt from the groundwater permit process. In these cases, such development will require an application for a groundwater permit and a WAA detailing the existing and proposed water use(s) on the project parcel(s). All new agricultural development in the MST will be required to meter all wells supplying water to the property with periodic reports to the County. The County cannot approve the groundwater permit unless the proposed use is off-set by reductions elsewhere, such that the “no net increase” and “fair share” water use screening criterion is met.

**Existing Vineyard, New Primary or Secondary Residence In the MST Subarea:** On an application related to a new residence on a parcel with an existing vineyard or residence, the WAA shall include all water use on the property, both existing and proposed. Projects on parcels with an established vineyard will be required to meter all wells supplying water to the property with periodic reports to the County. The County cannot approve the groundwater permit unless the proposed use is off-set by reductions elsewhere, such that the “no net increase” and “fair share” water use screening criterion is met.

**Wineries and Other Use Permits In the MST Subarea:** On a use permit application, the applicant is required to provide a WAA. Should the application be approved, a specific condition

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<sup>14</sup> The “fair share” allotment for water use is based on the parcel(s) location in the Napa Valley Floor, MST Groundwater Deficient Area or All Other Areas (see additional information in Appendix B).

of approval will be required to meter all wells supplying groundwater to the property with periodic reports to the County. It is also possible that water conservation measures will be a condition of approval. All new use permits must meet the criterion for water use for the project parcel. The County cannot approve the groundwater permit unless the proposed use is off-set by reductions elsewhere, such that the “no net increase” and “fair share” water use screening criterion is met.

### **Appendix D: Water Meters (in Groundwater Deficient Areas Only)**

If required, water meters shall measure all groundwater used on the parcel. Additional meters may also be required for monitoring the water use of individual facilities or operations, such as a winery, residence, or vineyard located on the same parcel. If a meter(s) is installed, the applicant shall read the meter(s) and provide the readings to the County Engineer at a frequency determined by the County Engineer. The applicant shall also convey to the County Engineer, or his designated representative, the right to access and verify the operation and reading of the meter(s) at any time.

If the meters indicate that the water consumption of a parcel in the MST Subarea exceeds the fair share amount, the applicant will be required to submit a plan which will be approved by the Director of Public Works to reduce water usage. The applicant may be required to find additional sources of water to reduce their groundwater usage. Additional sources may include using water provided by the City of Napa, the installation of water tanks which are filled by water trucks, or other means which will ensure that the groundwater usage will not exceed the fair share amounts.

The readings from water meters may also be used to assist the County in determining trends in groundwater usage, adjusting baseline water use estimates, and estimating overall groundwater usage in the MST Subarea.

### **Appendix E: Determining water use numbers with multiple parcels**

The Water Availability Analysis is based on the premise that each landowner has equal right to the groundwater resource below his or her property. There will be cases where one person or entity owns multiple contiguous parcels and requests that the total water allotment below all of his or her parcels be considered in the Water Availability Analysis. Determining the total water demand based on multiple contiguous parcels is acceptable; however, to protect future property owners, certain safeguards must be in place to ensure that the water allotment and transfer between parcels is clearly documented and recorded, especially in cases where the water from more than one parcel will ultimately serve a use on a single parcel.

When multiple parcels are involved, the parcels for which the total water usage is being based on must be contiguous and clearly identified on a site plan with the Assessor's parcel numbers noted. The transfer of water from these parcels to the parcel on which the requested use is located must be documented using the form provided by the Department of Public Works. The form must be approved by the County and subsequently recorded by the applicant prior to commencement of any activity authorized by the groundwater permit or other county permit or approval. A condition requiring such will be placed on the use permit, groundwater permit or other permit for approval.

Alternatively, if the method above is not feasible, the applicant may provide an additional analysis for each project parcel, with the understanding that the water use on each individual parcel must not exceed the water use screening criterion for that parcel (see additional information in Appendix B).

## **Appendix F: Water Availability Analysis Tiers 2 & 3 Screening Criteria & Additional Analysis**

County staff will conduct, or require the applicant to conduct, additional analysis of the proposed project according to any screening criteria that are not met. Additional analysis is required for projects that are not located on the Napa Valley Floor or in the MST (i.e. “All Other Areas”). Additional analysis will also be required if insufficient information exists in the project application to judge conformance with one or more of the criteria.

### **Water Use Evaluation (Tier 1)**

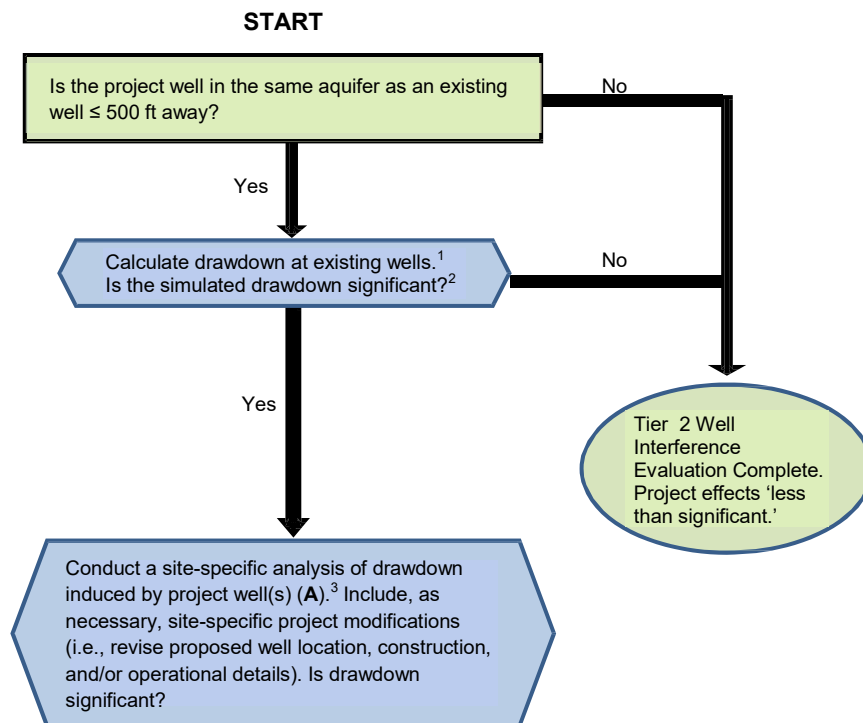
When the proposed project’s estimated water demand does not meet the applicable water use criterion, the applicant will be encouraged to first revise the project and/or refine the water use estimate based on project details not adequately reflected in the water use screening criterion. County staff will then review the revised estimate and determine if the acceptable water use criterion has been met.

### **Well and Spring Interference Evaluation (Tier 2)**

The Tier 2 well interference criterion is presumptively met if there are no non- project wells located within 500 feet of the existing or proposed project well(s). When a project well is within 500 feet of a neighboring non-project well(s) additional analysis of well interference will be required (see **Figure F-1**) for projects located in “All Other Areas”. It may also be required for the Napa Valley Floor and the MST when substantial evidence in the record indicates the need to do so under CEQA. The analysis will first determine whether the existing or proposed project and non-project wells are, or are proposed to be, screened in the same aquifer unit and, if so, whether any drawdown induced in the non-project well(s) may constitute a significant adverse effect. **Table F-1** provides standard well interference criteria for induced drawdown in a non-project well that will be used in the absence of site-specific information regarding the susceptibility of existing non-project wells to drawdown induced by project well(s). Site-specific susceptibility information would include the pump depth setting and construction of project and non-project wells.

The Tier 2 spring interference criterion is presumptively met if no natural springs in use for domestic or agricultural purposes are located within 1,500 feet of any proposed project wells. When a project well is within 1,500 feet of a natural spring additional analysis of connectivity between the part of the aquifer system from which groundwater is planned to be produced and spring(s). When additional analysis is required, site-specific spring interference criteria will be established as appropriate for the springs(s) under consideration.

**FIGURE F-1.** WAA Additional Analysis Decision Tree (as shown, for well interference evaluation), where designated A = applicant responsibility, C = County staff responsibility



<sup>1</sup> Drawdown to be calculated using industry standard method(s) appropriate to the aquifer under consideration, such methods include the Theis Equation applicable for confined or unconfined aquifers (A or C).

<sup>2</sup> See Table F-1 or similar, superseding criteria provided by County staff (C).

<sup>3</sup> This site-specific analysis may include an aquifer test or an alternative study at the proposed well site to refine aquifer properties used in drawdown calculations and must include details of the project well(s) construction and operation relative to the site hydrogeology and any known information concerning the construction of any existing non-project wells under consideration (A).

The additional analysis will consider site-specific information including:

- the distance between the project well(s) and any existing non-project wells within 500 feet or natural springs within 1,500 feet;
- depth, screen intervals, and pump design flow rate for project well(s);
- depth, screen intervals, and pumping capacity/well type for the existing non- project well(s) or elevation and historical records of spring production;
- site hydrogeology (including aquifer units accessed by the project well and by existing non-project well(s) or natural springs and aquifer hydraulic properties (see **Tables F-2 and F-3**).

Data collected for the analysis will initially come from the WAA application, including information about existing non-project wells and site hydrogeology provided by County staff. These data will be used to calculate drawdown at any existing non-project wells, completed in the same aquifer unit, resulting from planned operation of the project well(s). Drawdown will be calculated using industry standard methods appropriate to the aquifer unit under consideration; such methods include the Theis Equation applicable for confined or unconfined aquifers (Theis, 1935).

If the initial calculated drawdown exceeds the Tier 2 well interference criteria, the applicant shall be required to submit a site-specific analysis prepared by a qualified professional demonstrating that the proposed project will not have an adverse effect (direct, indirect, or cumulative), on groundwater resources or neighboring non-project wells. This site-specific analysis may include an aquifer test or an alternative study at the proposed well site to refine aquifer properties used in drawdown calculations. The site-specific analysis may also demonstrate less than significant impacts by proposing modifications to the location, construction, or operation of project well(s).

If available data indicate a possible hydraulic connection between the project well(s) and any identified springs, an analysis of the hydraulic connection induced by the project well(s) will be conducted. Potential spring flow depletion induced by the project well(s) will be compared to site-specific spring interference criteria to determine if they constitute a significant adverse effect. The site-specific spring interference criteria will be established as appropriate for the spring(s) under consideration. Depending on site-specific concerns, more or less restrictive criteria may be required.

**Table F-1** presents well interference criteria that the County may apply in the determination of significant adverse effects. The minimum significant drawdown values presented in **Table F-1** are intended for use in cases where information about existing non-project wells is limited or nonexistent. However, when the status and configuration of an existing non-project well are known, for example the depths of screen intervals, locations of any annular seals, and/or water levels in the well and the pump depth setting, then site-specific measures of significance should be used. Site-specific measures of significance should also account for known seasonal variations<sup>15</sup> in groundwater elevations in the vicinity of the proposed project and mutual well interference (i.e., interference between the planned project well usage (new and/or existing) and one or more neighboring wells). County staff shall inform the applicant of the site-specific Tier 2 well interference criteria that will be applied in the evaluation of a project before the applicant conducts a site-specific analysis.

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<sup>15</sup> As used here, seasonal variations refer to typical changes over the course of a year.



<b>Table F-1. Default Well Interference Criteria</b>	
<b>Type of wells within 500 ft. screened within the same aquifer as project well</b>	<b>Estimated Drawdown at Neighboring Non-Project Wells</b>
Wells with a casing diameter of six inches or less	10 feet
Wells with a casing diameter greater than six inches	15 feet

### **Groundwater/Surface Water Interaction Evaluation (Tier 3)**

When Tier 3 analysis is required<sup>16</sup>, it shall be conducted as described below. The analysis will first determine whether the project well(s) are, or are proposed to be, screened in an aquifer unit hydraulically connected to the surface water(s) within the applicable distance specified by **Tables 3, 4, and 5** for unconsolidated aquifers (see also Figure F-2). If a hydraulic connection does exist, even one of limited temporal extent, then an analysis of the streamflow or surface water depletion induced by the project well(s) will be conducted. The streamflow depletion induced by the project well(s) will be compared to site-specific groundwater/surface water interaction criteria to determine if they constitute a significant adverse effect. The site-specific groundwater/surface water interaction criteria will be established as appropriate for the surface water(s) under consideration. Depending on the temporal extent of hydraulic connection and the special status species and/or surface water rights under consideration, more or less restrictive criteria may be required, up to and including no measurable streamflow depletion.

The additional analysis will consider site-specific information including:

- the distance between the proposed well and naturally-present surface water bodies within 1500 feet;
- depth, screened intervals, seal depths, and pumping capacity of applicant's well(s);
- site hydrogeology (including aquifer zones accessed by proposed well and existing wells and aquifer hydraulic properties (see **Tables F-2, F-3 and F-4**); and
- streambed (or equivalent feature) hydraulic properties.

Data collected for the analysis will initially come from the WAA application, including information about existing non-project wells and site hydrogeology provided by County staff. The evaluation will include calculation of streamflow depletion due to planned operation of the project well(s). Streamflow depletion will be calculated using industry standard methods appropriate to the

<sup>16</sup> Tier 3 analysis may be required under CEQA if substantial evidence, in the record, indicates a potentially significant impact may occur from the project.

aquifer under consideration; such methods include the Hantush Equation applicable for aquifers hydraulically connected with surface waters (Hantush, 1965).<sup>17</sup> If the initial calculated streamflow depletion exceeds the groundwater/surface water interaction criteria, the applicant shall be required to submit a site-specific analysis prepared by a qualified professional demonstrating that the proposed project will not have an adverse effect (direct, indirect, or cumulative), on surface water resources. This site-specific analysis may include an aquifer test or an alternative study at the proposed well site to refine aquifer properties used in streamflow depletion calculations. The site-specific analysis may also demonstrate less than significant impacts by proposing modifications to the location, construction, or operation of project well(s).

Modifications to the proposed project will be considered acceptable in satisfying the criteria where project well(s) can be shown to have a sufficient geologic or hydraulic separation from the surface water(s) that would prevent the well from causing streamflow depletion at least as much as would be expected at the minimum distance specified by the WAA Tables 3, 4, and 5. The California Department of Water Resources (DWR) and U.S. Bureau of Reclamation (USBR) allow for similar exemptions when considering the potential effect on surface water flows of groundwater pumping proposed for water transfers involving groundwater substitution pumping in the Sacramento Valley. Some example circumstances for exception to the stated criteria (based on DWR and USBR, 2013) include:

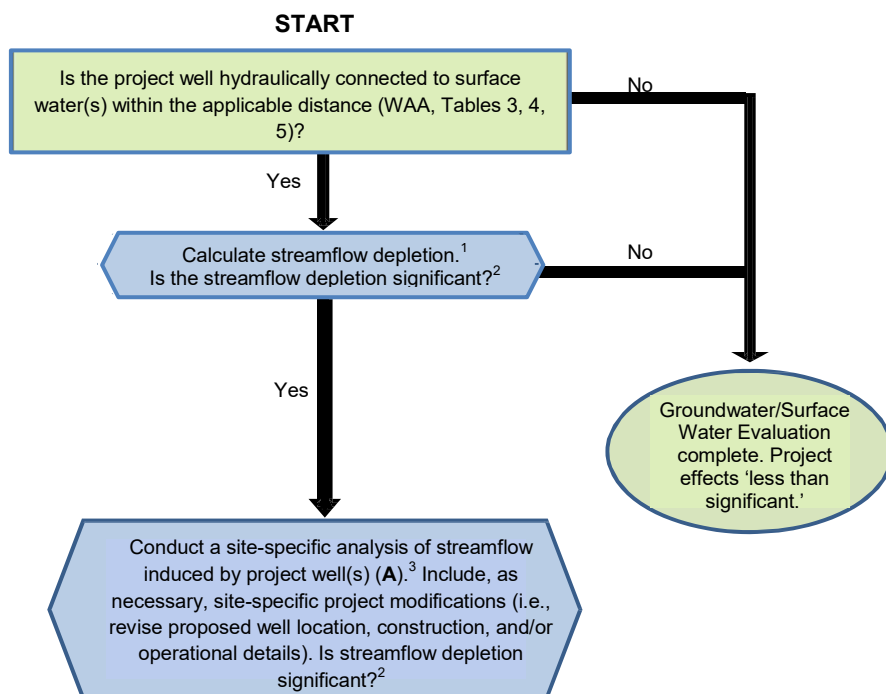
- Sufficient information, including site-specific geologic or hydrologic data, is provided to demonstrate that the well does not have significant hydraulic connection to the surface water system;
- The well's uppermost perforations are planned to be deeper than recommended (see **Tables 3, 4, 5**) and there is demonstration of low permeability deposits overlying the zone from which extraction is proposed to occur (i.e., a confining unit at least 20 feet thick exists above the depth of the uppermost perforation). In this case a somewhat lesser distance from the surface channel may be considered, pending the well type and planned well operations;
- The well's uppermost perforations are planned to be shallower than recommended (see **Tables 3, 4, 5**) and there is demonstration of low permeability deposits overlying the zone from which extraction is proposed to occur (i.e., a confining unit at least 40 feet thick exists above the depth of the uppermost perforation). In this case a somewhat lesser distance from the surface channel may be considered, pending the well type and planned well operations;
- The project well is a moderate to high pumping capacity well and the uppermost perforations are located no shallower than 150 feet deep, the perforations may be shallower (e.g., 100 feet deep), if there is a total of at least 50 percent fine-grained

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<sup>17</sup> Streamflow depletion is to be calculated using industry standard method(s) appropriate to the aquifer and surface water source under consideration, such methods include the Hantush Equation applicable for unconfined aquifers with a direct hydraulic connection to a surface water body (Hantush, 1965).

materials in the interval above 100 feet below ground surface (bgs), and at least one fine-grained layer that exceeds 40 feet in thickness in the interval above 100 feet bgs.

**FIGURE F-2.** WAA Additional Analysis Decision Tree (as shown, for groundwater/surface water evaluation), where designated A = applicant responsibility, C = County staff responsibility



<sup>1</sup> Streamflow depletion to be calculated using industry standard method(s) appropriate to the aquifer under consideration, such methods include the Hantush Equation applicable for aquifers hydraulically connected with surface waters (A or C).

<sup>2</sup> Streamflow depletion criteria will be determined according to site-specific conditions (C).

<sup>3</sup> This site-specific analysis may include an aquifer test or an alternative study at the proposed well site to refine aquifer properties used in drawdown calculations and must include details of the project well(s) construction and operation relative to the site hydrogeology and any known information concerning the surface water(s) under consideration (A).

### Data Needs for Additional Analysis

Hydrogeologic information at or in the vicinity of the subject parcel may be available from previous activities, or may be reasonably estimated from prior work conducted by the County. Previous activities may include (but are not limited to) aquifer tests, well completion reports with lithologic logs, water level, and well yield data collected on the parcel, and water level data collected as part of other groundwater monitoring activities. County staff will determine whether and how to best include such data in the WAA evaluation process. If no geologic information exists in the vicinity of the subject parcel, additional analysis may be required of the applicant.

The hydrogeologic information needed for WAA evaluation may include the aquifer storage coefficient, specific yield, hydraulic conductivity, transmissivity, and aquifer thickness. The aquifer storage coefficient for confined aquifers, or storativity, is defined as the volume of water that can be drained from a unit area of aquifer materials per unit decline in head. The storage coefficient can be calculated by multiplying the aquifer thickness and specific storage. In unconfined aquifers a similar property is represented by the specific yield of the aquifer materials.<sup>18</sup> Specific yield is defined as the volume of water that can be drained from a unit area of an unconfined aquifer in response to a unit decline in the water table elevation. **Table F-2** presents a range of values for specific yield for a variety of potential aquifer materials. In a confined aquifer the specific storage of aquifer materials can be calculated as the storage coefficient multiplied by aquifer thickness, where the storage coefficient is the volume of water produced by a unit volume of aquifer material per unit decline in head. **Table F-3** presents a range of possible specific storage values for potential aquifer materials. Storage coefficients for confined aquifers typically range from  $5 \times 10^{-5}$  to  $5 \times 10^{-3}$  (Todd, 2005). Specific yield for unconfined aquifers typically range from 0.1 to 0.3 (Lohman, 1972).

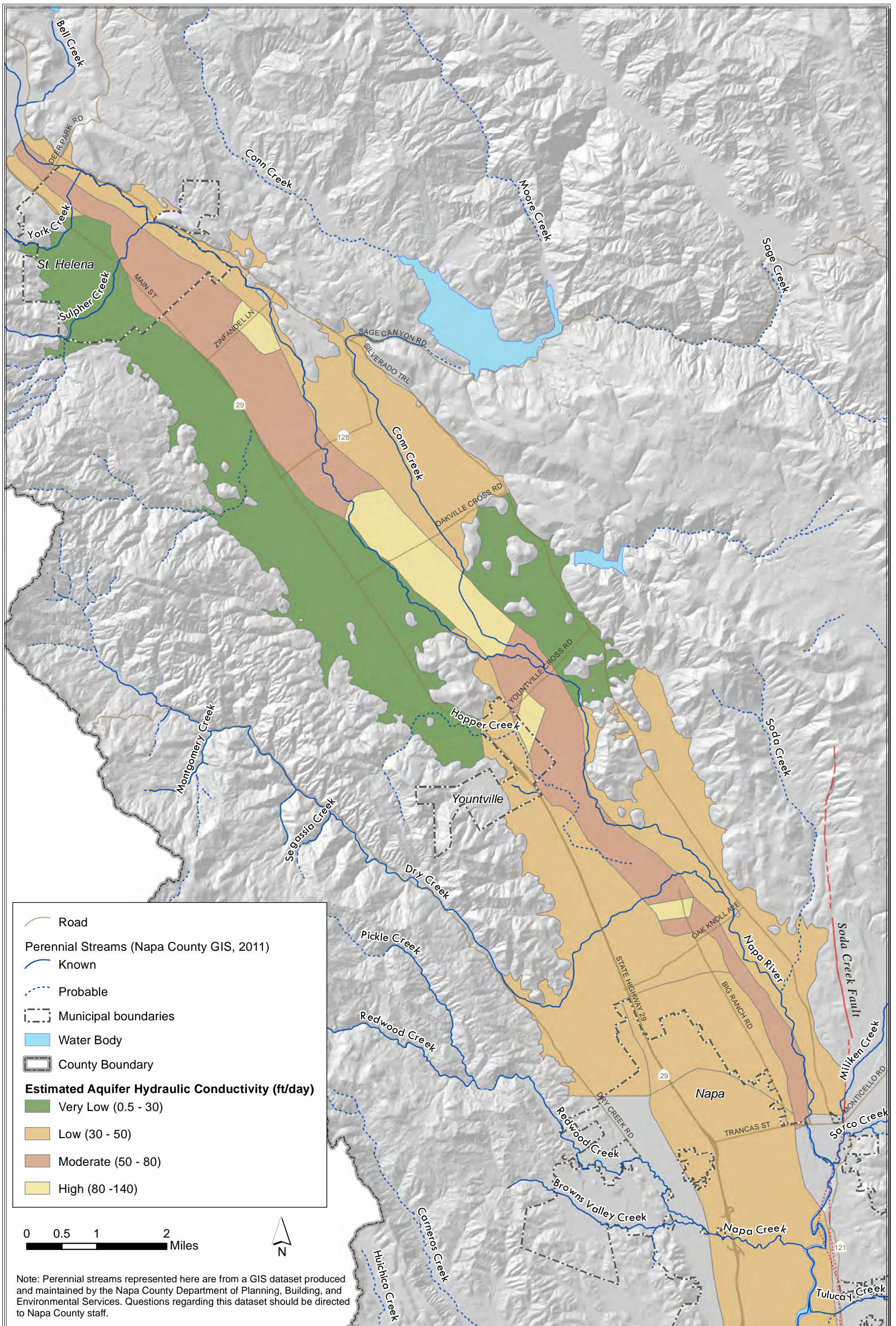
<b>Table F-2. Representative Specific Yield<sup>1</sup> Ranges for Selected Earth Materials</b> (adapted from Walton, 1970)	
<b>Sediment</b>	<b>Specific Yield</b>
Clay	0.01 – 0.10
Sand	0.10 – 0.30
Gravel	0.15 – 0.30
Sand and Gravel	0.15 – 0.25
Sandstone (e.g., Great Valley formation)	0.05 – 0.15
Shale (e.g., Great Valley formation)	0.005 – 0.05
<sup>1</sup> Specific yield can be considered equivalent to the storage coefficient for unconfined aquifers where aquifer compressibility is negligible.	

<b>Table F-3. Representative Specific Storage Ranges for Selected Materials</b> (adapted from Batu, 1998)	
<b>Material</b>	<b>Specific Storage (ft<sup>-1</sup>)</b>
Loose Sand	$1.5 \times 10^{-4}$ to $3.1 \times 10^{-4}$
Dense Sand	$3.9 \times 10^{-5}$ to $6.2 \times 10^{-5}$
Dense Sandy Gravel	$1.5 \times 10^{-5}$ to $3.1 \times 10^{-5}$
Rock, fissured	$1 \times 10^{-6}$ to $2.1 \times 10^{-5}$

<sup>18</sup> An unconfined aquifer is defined by a water table that occurs where pore space pressures coincide with atmospheric pressure and where water released from aquifer storage occurs in large part due to the draining of saturated pore spaces in the aquifer material.

Transmissivity is another frequently used aquifer parameter. Transmissivity is defined as the capacity of the aquifer to transmit water across its entire thickness, calculated as the product of the aquifer hydraulic conductivity and the aquifer thickness. **Table F-4** presents representative hydraulic conductivity values found in the literature. Hydraulic conductivity ranges for the alluvial aquifer system have been mapped in Napa Valley by the US Geological Survey (USGS) (Faye, 1973), with more recent interpretations provided here based on a review of well driller's logs and other geologic data available through 2011 (LSCE and MBK, 2013). These ranges for hydraulic conductivity are depicted in **Figure F-3** and described in **Table F-5**, as interpreted by the County's groundwater consultants. Recent hydrogeologic investigations performed for the County have also produced maps and cross sections of subsurface geologic conditions which may be consulted for the determination of aquifer thickness in the vicinity of a proposed project (LSCE and MBK, 2013).

<b>Table F-4. Representative Hydraulic Conductivity Ranges for Selected Materials</b> (adapted from Leap, 1999 and Batu, 1998)			
<b>Material</b>	<b>Hydraulic Conductivity (ft/day)</b>		
Gravel (Alluvium)	$10^1$	to	$10^5$
Sand (Alluvium)	$10^{-1}$	to	$10^3$
Silty Sand (Alluvium)	$10^{-2}$	to	$10^2$
Silt (Alluvium)	$10^{-4}$	to	1
Sandstone (e.g. Great Valley formation)	$10^{-5}$	to	$10^{-1}$
Shale (e.g., Great Valley formation)	$10^{-8}$	to	$10^{-4}$
Fractured Basalt (e.g., Sonoma Volcanics)	$10^{-2}$	to	$10^2$



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<b>Table F-5.</b> Representative Hydraulic Conductivity values for WAA analysis of Napa Valley Floor unconsolidated alluvial aquifer materials <sup>3</sup>		
<b>Hydraulic Conductivity, K, class</b>	<b>Hydraulic Conductivity range<sup>1</sup>, ft./day</b>	<b>Hydraulic Conductivity value, ft./day (used for scenario results)</b>
high	80 - 140	80
moderate	50 - 80	50
low	30 - 50	30
very low <sup>2</sup>	0.5 - 30	0.5, 10

<sup>1</sup> Hydraulic conductivity range have been developed from mapped values from Faye (1973) and interpretations based on a review of well driller’s logs and other geologic data available through 2011 (LSCE and MBK, 2013).

<sup>2</sup> A hydraulic conductivity value of 0.5 ft./day was applied for calculations of groundwater and surface water interaction (Tables 3, 4 and 5). A hydraulic conductivity value of 10 ft./day was applied for calculations of well interference (Table 2B and F1).

<sup>3</sup> Representative hydraulic conductivity values shown here are applicable to the unconsolidated alluvial aquifer materials in the Napa Valley Floor and not aquifer zones beneath the Napa Valley Floor alluvium or outside of the Napa Valley Floor.

County staff will review well construction permits and records for wells within 500 feet of the proposed project. Information about existing wells within 500 feet of the proposed project site will include the following as available: the location of those wells relative to the project well(s), total depth, depth of screened intervals, annular seal depths, the geologic or lithologic record made as part of well construction, the elevation of the static water level in the well post-construction, the elevation of water levels while pumping, and the pump depth setting.

**Tables F-6 to F-9** present, for comparison purposes, the results of scenarios intended to represent the groundwater drawdown experienced in the vicinity of a proposed project after a 24-hour continuous pumping period. The results in **Tables F-6 and F-7** indicate that drawdown in a confined aquifer would be greater than drawdown in an unconfined aquifer for a given pumping rate. These results also indicate that wells pumping at rates less than 30 gallons per minute (gpm) for periods of time less than 24-consecutive hours will likely have negligible drawdown effects at distances beyond 25 feet in a confined aquifer.

These scenarios are presented for comparison purposes. Actual drawdown due to well interference will have to be calculated using well construction information and site-specific hydrogeologic information and/or values from **Tables F-2, F-3, F-4 and F-5** that are applicable to site-specific conditions.

**Table F-6:** Simulated effect of a project well on water levels at an existing non-project well after one day of pumping at the stated flow rate in a confined aquifer

<b>30 gpm Scenarios, calculated drawdown (ft)</b>					
aquifer thickness = 75 ft. time = 1 day		distance between project well and existing non project well (ft)			
Specific Storage	Hydraulic Conductivity (ft./day)	25	50	100	500
0.0005	10	5.3	4.4	3.6	1.6
0.001	10	4.8	4.0	3.1	1.2

**Table F-7:** Simulated effect of a project well on water levels at an existing non-project well after one day of pumping at the stated flow rate in a confined aquifer

<b>100 gpm Scenarios, calculated drawdown (ft)</b>					
aquifer thickness = 75 ft. time = 1 day		distance between project well and existing non-project well (ft)			
Specific Storage	Hydraulic Conductivity (ft./day)	25	50	100	500
0.0005	10	13.6	11.5	9.4	4.5
0.001	10	12.5	10.4	8.3	3.5

**Table F-8:** Simulated effect of a project well on water levels at an existing non-project well after one day of pumping at the stated flow rate in an unconfined aquifer

<b>30 gpm Scenarios, calculated drawdown (ft)</b>					
aquifer thickness = 75 ft. time = 1 day		distance between project well and existing non-project well (ft)			
Specific Storage	Hydraulic Conductivity (ft./day)	25	50	100	125
0.1	80	0.4	0.3	0.2	n/a
0.1	50	0.6	0.4	n/a	n/a
0.1	30	0.9	0.6	n/a	n/a
0.1	10	2.0	n/a	n/a	n/a

"n/a" denotes cases where This equation results are not available due to mathematical constraints on valid parameter values.



**Table F-9:** Simulated effect of a project well on water levels at an existing non-project well after one day of pumping at the stated flow rate in an unconfined aquifer

100 gpm Scenarios, calculated drawdown (ft)					
aquifer thickness = 100 ft. time = 1 day		distance between project well and existing non-project well (ft)			
Specific Storage	Hydraulic Conductivity (ft./day)	25	50	100	125
0.1	80	1.1	0.8	0.6	0.5
0.1	50	1.6	1.2	n/a	n/a
0.1	30	2.4	1.7	n/a	n/a
0.1	10	5.5	n/a	n/a	n/a

"n/a" denotes cases where This equation results are not available due to mathematical constraints on valid parameter values.

**Example Applications of Additional Analysis Methods**

**Example 1:** *Addition of a commercial tasting room facility with 10 acres of new vineyard and landscaping to an existing winery in a non-groundwater deficient area. The project involves construction of a new well proposed to be 30 feet from an existing six-inch diameter non-project well.*

**Is well proposed to be completed in the same aquifer as an existing well ≤ 500 ft. away?**

Yes, County well construction records indicate that the existing non-project well was constructed to a total depth of 160 feet in an unconfined aquifer, with a total screened interval of 80 feet throughout the older alluvium that is also mapped in the vicinity of the proposed well.

**Calculate drawdown at all existing wells within 500 ft. of the proposed well. Is the calculated drawdown significant?**

Yes, 10.9 feet of drawdown is calculated at the existing non-project well, based on available information about the existing well and the hydrogeology of the site (see **Table F-10**). This amount of drawdown exceeds the default well interference criterion of 10 feet and represents a potentially significant impact on groundwater resources.

<b>Table F-10.</b> Example 1: Drawdown calculated at an existing non-project well as a result of pumping a proposed well at 300 gallons per minute, where hydraulic conductivity = 30 ft./day, storage coefficient = 0.02, and aquifer thickness = 80 feet.		
	<b>Distance between Proposed Well and Existing Well (ft.)</b>	<b>Calculated Drawdown in Existing Well (ft.)<sup>1</sup></b>
Initial Project Well Location	30	10.9
Alternate Project Well Location A	50	9.0
Alternate Project Well Location B	70	7.7
<sup>1</sup> Drawdown at an existing non-project well as a result of pumping the project well calculated using the Theis Equation.		

**Conduct a site-specific analysis of drawdown induced by project well(s). Include, as necessary, site-specific project modifications (i.e., revise proposed well location, construction, and/or operational details).**

**Is simulated drawdown significant (see Table F-1)?**

No, after reviewing the site's existing and proposed infrastructure the project applicant modified the proposed well location to a location 50 feet away from the existing non-project well. Calculated drawdown values at the existing wells using the same available information about the existing wells, site hydrogeology, and the new proposed well location show less than significant drawdown at the existing non-project well (i.e., 9.0 feet). The applicant's groundwater use permit was approved on the condition of adherence to the revised well location and County standards for well construction.

**Example 2:** *Modification of an existing 40-year old irrigation well on a 12-acre parcel. The parcel also includes a primary, single-family residence with an existing (or available) connection to a public water supply system. The applicant proposes installing a new 80 gallon per minute pump to supply irrigation water for 10 acres of replanted winegrapes on lands which had not been actively farmed for several years. The applicant proposes operating the pump for 3 days at a time during the irrigation season. One existing non-project well is located 50 feet from the applicant's project well on one adjacent parcel and another existing non-project well is located 120 feet from the applicant's project well on another adjacent parcel. Both non-project wells are six-inch diameter wells.*

**Is well proposed to be completed in the same aquifer as an existing well ≤ 500 ft. away?**

Yes, well construction records provided by the applicant (or available from the County) indicate that the applicant’s existing well is constructed to a total depth of 140 feet, with a total screened interval of 60 feet, in the older, unconsolidated alluvium.

County well construction records indicate that the existing non-project well 50 feet from the project well was constructed to a total depth of 115 feet, with a total screened interval of 50 feet throughout the older alluvium.

**Calculate drawdown at all existing wells within 500 ft. of the proposed well. Is the calculated drawdown significant?**

No, 5.8 feet of drawdown is calculated to occur at the existing non-project well, based on available information about the existing well and the hydrogeology of the site (see **Table F-11**). This amount of drawdown does not exceed the default well interference criterion of 10 feet and represents a less than significant impact on groundwater resources. The applicant’s groundwater use permit was approved contingent upon the proposed pumping duration.

<b>Table F-11.</b> Example 2: Drawdown calculated at an existing non-project well as a result of pumping the applicant’s existing project well, where hydraulic conductivity = 10 ft./day, storage coefficient = 0.1, and aquifer thickness = 60 feet.			
	<b>Applicant’s well pumping rate (gpm)</b>	<b>Applicant’s well seasonal pumping duration (days)</b>	<b>Calculated Drawdown in Existing Well (ft.)<sup>1</sup></b>
Initial Proposal	80	3	5.8
<sup>1</sup> Drawdown calculated using the Theis Equation at an existing non-project well as a result of pumping the applicant’s existing project well located 50 feet away.			

## Definitions

**Aquifer** – A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

**Aquifer Unit** - One part of a number of units that comprise a larger aquifer system.

**Hydraulic Conductivity** – The capacity of subsurface materials to permit flow through interconnected pores, fractures, or other void spaces, subject to intrinsic properties of the fluid. As applied in this WAA, hydraulic conductivity is equivalent to saturated hydraulic conductivity.

**Specific Storage**– an aquifer hydraulic property which is the volume of water that can be drained from a unit volume of aquifer materials per unit decline in head.

**Specific Yield** – an aquifer hydraulic property which is the volume of water that can be drained from a unit area of an unconfined aquifer in response to a unit decline in the water table elevation.

**Storage Coefficient (also Storativity)** – an aquifer hydraulic property which is the volume of water released or added to aquifer storage per unit surface area of a confined aquifer per unit change in head.

**Substantial Evidence** - Defined by case law as evidence that is of ponderable legal significance, reasonable in nature, credible and of solid value. The following constitute substantial evidence: facts, reasonable assumptions predicated on facts; and expert opinions supported by facts. Argument, speculation, unsubstantiated opinion or narrative, or clearly inaccurate or erroneous information do not constitute substantial evidence.

**Surface Water** - For the purposes of this procedure, surface waters are defined to include only those surface waters known or likely to support special status species or surface waters with an associated water right; however, as with all of the procedures in this WAA, there may be unique circumstances that require additional site-specific analysis to adequately evaluate a project's potential impacts on surface water bodies.

**Transmissivity** – an aquifer hydraulic property which reflects the capacity of the aquifer to transmit water across its entire thickness, calculated as the product of the aquifer hydraulic conductivity and the aquifer thickness.

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**NAPA VALLEY  
GROUNDWATER  
SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

**APPENDIX J:**

**Communication and Education Plan**



A Tradition of Stewardship  
A Commitment to Service



## COMMUNICATION AND EDUCATION PLAN

August 23, 2012

### I. Purpose and Overview

The purpose of this plan is to serve as a strategic guide for the public communication and education activities of the Napa County Groundwater Resources Advisory Committee (GRAC). The **communication goal** of the plan is to ensure that interested parties, and Napa County residents as a whole, are well-informed of the deliberations and activities of the GRAC. The **education goal** of the plan is to increase the understanding of groundwater resources so that interested parties and Napa County residents as a whole have a factual basis for discussion and decision making. Key elements of this plan include a set of objectives and guiding principles, a list of potential audiences and partners, and fundamental messages. A series of communication and education strategies are also provided. The last element of the plan includes a recommendation for periodic evaluation of the plan's implementation and effectiveness.

### II. Objectives

- A. Ensure that interested parties and residents as a whole are aware of the GRAC's work, schedule, progress, and deliberations, and have opportunities to provide input.
- B. Expand participation in the County's voluntary groundwater level monitoring efforts and potential optional groundwater quality monitoring.
- C. Establish a common understanding of groundwater resources in the County, including conditions and trends evidenced by monitoring data and scientific analyses.
- D. Support informed public dialogue and policy decision-making regarding groundwater resources in Napa County.
- E. Establish consensus from the GRAC members on the Communication and Education Plan and its purpose.

### III. Guiding Principles

- A. Be proactive and utilize GRAC member's existing networks to help locate appropriate well owners.
- B. Partner with interested groups and individuals to leverage existing communication networks and programs.
- C. Provide information and materials in a timely manner, allow interested parties to provide input and participate.
- D. Characterize messages and activities, so that interested parties in different areas hear the same messages.



- E. Tailor messages and materials to different audiences to increase their effectiveness.

## IV. Priorities

The following is a prioritized list of communication and education actions:

- 1) Develop a GRAC brochure (folded 11x17 tabloid) and informative slip-sheets (8.5x11 maps, current activities, report summaries, staff contacts and GRAC membership...).
- 2) Actively reach out to well owners to participate in voluntary groundwater level monitoring in high priority sub-areas.
- 3) Utilize outreach and education to attract well owners to participate in the voluntary groundwater level monitoring program.
- 4) Identify education and communication partners and partnerships (particularly those identified in the 2010 Groundwater Stakeholder Assessment).
- 5) Maintain and promote use of GRAC website (<http://www.countyofnapa.org/bos/grac/>).

## V. Audiences and Partners

Groundwater resource issues involve a broad range of geographical and interest-based audiences and partners. Below is a partial list of likely audiences:

- 1) Well owners who voluntarily participate in groundwater level monitoring and water quality monitoring (which may become available at a later date);
- 2) Landowners and other interested parties in under represented groundwater basins identified by the CA Dept. of Water Resources (Pope Valley, Clearlake Pleistocene Volcanic Area, and Berryessa Valley groundwater basins);
- 3) Landowners and other interested parties in the Napa-Sonoma Valley groundwater basin, including the Milliken-Sarco-Tulocay, Angwin, Carneros, Calistoga, St. Helena, Yountville, and Napa sub-areas;
- 4) County residents (incorporated and unincorporated);
- 5) Agricultural and wine industry groups;
- 6) Environmental and park/open-space groups;
- 7) Residential and commercial developers;
- 8) Community groups interested in water resources;
- 9) Landowner/Homeowner groups and associations;
- 10) Public agencies (local, regional, state, federal); and
- 11) Elected officials.

In general, messages and materials will need to be addressed to County residents as a whole. However, in many cases information should be tailored to specific audiences. Additional special

audiences will need identification; for example the elderly, minorities, non-English speakers and disadvantaged communities<sup>1</sup>.

Some members of the audiences listed above may choose to support the GRAC's communication and education efforts, thereby becoming GRAC partners in outreach. In the 2010 Stakeholder Assessment ([see GRAC website](#)), several organizations volunteered to use their existing networks to help share information and news with their constituencies. Creating partnerships with these organizations and use of their networks will be critical to maximizing the efficiency and effectiveness of GRAC outreach efforts. Additional partners will be solicited as GRAC activities are developed.

## VI. Partners

Various partners in groundwater education and communication **may** include: local growers, geologists, well drillers, professional groups and associations in priority areas throughout the County. GRAC members will utilize existing contacts as partners in education and outreach.

Partners may also include press and media outlets throughout Napa County including: local newspapers, radio and television stations.

## VII. Messages

The GRAC will identify several key messages to be used for outreach and education. Examples of global messages regarding groundwater are:

- a. Groundwater is a vital water source for residential, commercial and agricultural users in Napa County.
- b. Napa County has a number of unique and hydrologically distinctive groundwater subareas.
- c. The Napa Valley Floor (St. Helena, Yountville, and Napa areas), except for the Milliken-Sarco-Tulocay (MST) Subarea, generally has stable long term trends and a shallow depth to groundwater level (10-30 feet below ground surface).
- d. High priority subareas and monitoring needs will be determined as part of the GRAC's work plan.

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<sup>1</sup> CAL. PRC 75005(g) "Disadvantaged community" means a community with a median household income less than 80% of the statewide average. "Severely disadvantaged community" means a community with a median household income less than 60% of the statewide average.

- e. Ground-water systems are dynamic and adjust continually to short-term and long-term changes in climate, ground-water withdrawal, and land use.
- f. A common fact-based understanding of groundwater resources in the County supports more informed public dialogue and public-policy decision-making. While observation helps to identify concerns, factual information and thoughtful technical analyses provides the foundation for informed decision-making.

Examples of messages that will need to be tailored to match the objectives and purpose of the GRAC may include:

- a. The importance of better understanding of county-wide hydrogeologic conditions in order to better understand groundwater priority areas within Napa County.
- b. How to participate in voluntary groundwater level monitoring and optional water quality monitoring.
- c. How groundwater information will be used and refined as resources and monitoring information becomes available.
- d. What kind of groundwater data will be gathered, when and by whom, and how will it be used?
- e. What is the confidentiality of the data collected?
- f. What are the benefits to and incentives for, participants in the voluntary monitoring program?
- g. The importance of voluntary groundwater level data is to help anticipate future groundwater issues.
- h. Groundwater level data is primarily collected within the Napa Valley Floor Subareas, leaving the rest of the County unaccounted for.
- i. Groundwater quality monitoring data is more spatially distributed than groundwater level data.

Additional messages will be developed as needed for specific areas, special audiences, specific groundwater topics and actions undertaken by the GRAC.

## VIII. Communication and Education Strategies

This section identifies seven primary communication and education strategies that provide a framework for more specific activities. Each strategy includes information on supporting materials, audiences that would benefit, next step timelines, potential constraints and potential partners.

1. Develop a standardized series of general promotional and educational brochures (press materials), as well as activity/topic-specific materials as needed.

**Materials:** GRAC brochure (folded 11x17 tabloid) and informative slip-sheets (8.5x11 maps, current activities, report summaries, staff contacts and GRAC membership...), informational letters to current and potential groundwater level monitoring volunteers, newsletter articles to targeted groups, answers to frequently asked questions (all in electronic and hard copy)

**Special Target Audiences:** county residents and others as appropriate

**Next Steps & Timelines:** general promotional materials during 3<sup>rd</sup> quarter of 2012, activity and topic-specific materials in coordination with the GRAC's work plan

**Constraints:** need for subject matter expertise, graphic design and printing

**Potential partners:** none, GRAC members will work with County staff to develop materials (staff may enlist graphical support, outside printing)

2. GRAC members periodic briefing of the geographical or interest-based groups they represent, participate in, or serve as appointed members on the GRAC.

**Materials:** standard promotional materials mentioned above; PowerPoint presentations with talking points about work plan, progress, and milestones

**Special Target Audiences:** constituencies represented on the GRAC, regional and sub-regional groups, community-based groups, groups listed as potential partners

**Next Steps & Timelines:** identify initial dates for briefings, prepare materials, assign appropriate GRAC members

**Constraints:** need for consistent messaging and characterization of the GRAC's activities

**Potential partners:** organizations that GRAC members participate in, potential partners listed above, the GRAC members themselves

3. GRAC members and County staff conduct an annual round of briefings for elected officials and agency executive officers, including but not limited to members of the Watershed Information Center and Conservancy (WICC) Board of Napa County.

**Materials:** standard promotional materials mentioned above

**Special Target Audiences:** state legislative representatives, county supervisors, mayors and council members, federal and state agency executive officers and staff

**Next Steps & Timelines:** identify appropriate period for briefings and schedule well in advance (e.g., Joint GRAC-WICC meeting-July 26, 2012), identify appropriate briefing format and appropriate group (staff/GRAC members) to conduct briefings, develop key messages and supporting materials

**Constraints:** limited availability of elected officials and agency executive officers

**Potential partners:** none (GRAC members will work with County staff)

4. GRAC hosting of public workshops or other public events. Including events that may coincide with the rollout of key deliverables, such as the County's monitoring program, revised pump test protocols and related revisions to the groundwater ordinance, and groundwater sustainability objectives.

**Materials:** special announcements; materials to support the event activities

**Special Target Audiences:** Napa County residents as a whole, perhaps with identical workshops in the northern and southern parts of the County. Collaborate with industry groups to develop workshop topics. Potential topics may include best sustainable practices and water use efficiency. Showcase examples of better sustainable practices.

**Next Steps & Timelines:** agree upon deliverables that will need a public rollout component, the type of public input desired (e.g., comment on draft, comment on final), and a corresponding timeframe (See GRAC Work Plan)

**Constraints:** advance scheduling and publicity required to ensure turnout, significant logistical and administrative work, and associated costs.

**Potential partners:** WICC, other local organizations or educational groups listed above as potential partners

5. Use the GRAC's website (<http://www.countyofnapa.org/bos/grac/>) as an informational clearinghouse for materials associated with the GRAC meetings and general communication and education efforts.

**Materials:** standard promotional materials mentioned above, special meeting/workshop materials developed, and posting of existing materials developed for regular GRAC meetings and activities

**Special Target Audiences:** all audiences

**Next Steps & Timelines:** continual, the website has been official and functioning since June, 2011, redesign of the site as needed to accommodate the assimilation of information over time

**Constraints:** organization and accessibility as documents accumulate, staffing resources and expertise for upkeep and maintenance

**Potential partners:** none (County staff will maintain the website)

6. Development and maintenance of an interested-parties email and address distribution list, including denotation of parties that express an interest in partnering with the GRAC.

**Materials:** email and address data management software, and existing news, promotional and educational materials

**Special Target Audiences:** individual interested parties

**Next Steps & Timelines:** develop and solicit initial list during 3<sup>rd</sup> quarter of 2012, with ongoing expansion and maintenance

**Constraints:** staffing resources needed to maintain up-to-date entries

**Potential partners:** none (County staff will develop and maintain the list)

7. Proactively develop and regularly utilize relationships with key public relations, press and media outlets for the purpose of sharing news and information.
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**Materials:** meeting synopses, statements developed by the GRAC, telephone calls, talking points, frequently asked questions

**Special Target Audiences:** Napa County residents as a whole

**Next Steps & Timelines:** County staff to identify and contact major press and media outlets as needed

**Constraints:** inability to control final product, need to adhere to GRAC Media Protocol

**Potential partners:** See potential list above

## IX. Evaluation

As part of its normal business, the GRAC will periodically evaluate the effectiveness of its communication and education efforts, and revise this plan accordingly.

**NAPA VALLEY  
GROUNDWATER  
SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

**APPENDIX K:**

**Groundwater Resources in Napa  
County, Monitoring for Sustainability  
and Napa County's Voluntary  
Groundwater Level Monitoring Program  
(outreach brochure)**

# Napa County's Voluntary Groundwater Level Monitoring Program

The Voluntary Groundwater Level Monitoring Program measures groundwater levels in spring and fall. These measurements improve the understanding of groundwater for both the well owner and the County. A network of privately volunteer wells, along with publicly owned wells, provide a greater understanding of our aquifers. The program is strengthened by expanding the voluntary well network to areas where data is lacking or nonexistent.

## Well owners who participate in the program:

- Receive accurate groundwater level readings twice per year (*spring and fall*);
- See seasonal and long-term groundwater level trends for their well;
- Receive water quality data for their well (*if testing is agreed to and conducted*); and
- Receive notification if anyone submits a public records request for information.

The County currently monitors wells throughout our community and is not in need of additional wells at this time. However, if you are interested in volunteering your well for County monitoring, please contact us, as we periodically update our monitoring network. The County publishes an annual report on the status of overall groundwater conditions.

## Do it Yourself (DIY) Groundwater Level Monitoring

Napa County has a Groundwater Self-Monitoring Program. This DIY program offers training and a special hand-held sonic measuring device to determine the depth to water in most wells.

### How do I borrow the tool from the County?

1. Contact County staff and indicate your interest ,
2. Napa County Resource Conservation District staff will demonstrate the equipment at your well and help with initial tool calibration,
3. Then borrow the equipment seasonally to measure your water level.

### Reserve the tool or learn more:

Charles Schembre,  
707-252-4189 x113,  
[charles@naparcd.org](mailto:charles@naparcd.org)  
Jeff Sharp, 707-259-5936,  
[jeff.sharp@countyofnapa.org](mailto:jeff.sharp@countyofnapa.org)



## FAQ'S

### Why should I measure water depth in my well?

To know how water depth changes over the course of the year and better understand how the groundwater reservoir beneath your land responds to winter recharge and use over the dry months. Measurements are best taken in spring and fall over multiple years to see long-term trends in recharge.

### Will someone curtail my well use if I participate?

No. The Voluntary Groundwater Level Monitoring Program is a non-regulatory, voluntary program that measures the depth to groundwater (level only). Groundwater use is not being measured or monitored as part of the program.

### Will my well information be kept confidential?

Napa County will make every effort to maintain the confidentiality of a well owner's information. However, such information may be accessed through a public records request. In such a case the County will notify the well owner.

### How long is the voluntary groundwater level monitoring program going to last?

The monitoring is intended to be long-term, however an individual well owner may leave the program at any time.

### Who is eligible to participate?

If your well is in an area where data is lacking and well construction information is available, your well may be eligible to participate in the program.

### How will the collected information be used?

The information will be used to monitor and track groundwater levels to help the County understand relationships between surface water and groundwater, maintain a centralized data management system, and improve the accuracy and reliability of relevant water resource models.



# Groundwater Resources in Napa County *Monitoring for Sustainability*

## The Importance of Groundwater in Napa County

Groundwater is water below ground contained in formations known as aquifers, which supply significant quantities of water to wells and springs. **Groundwater is a vital source of water supply in Napa County.** Many residents, businesses and agriculture rely on groundwater, as do fish, wildlife and natural habitats. These water demands make it essential that we:

- Preserve the quality and availability of local and imported water supplies;
- Sustain groundwater supplies and meet water needs during drought conditions;
- Anticipate and avoid potential negative environmental effects due to groundwater use; and
- Anticipate and avoid adverse changes in long-term groundwater availability and quality.

## What we know

Napa County and other public agencies have been monitoring groundwater resources since the mid 1900s. Based on long-term data and recent studies by the County's consultants, Luhdorff & Scalmanini Consulting Engineers (LSCE) and MBK Engineers, the County continues to:

- Expand voluntary groundwater monitoring in key locations to provide better data and fill data gaps;
- Develop and implement better groundwater data collection procedures;
- Report on annual groundwater conditions and trends;
- Estimate the rates of aquifer replenishment and study groundwater and surface water interaction;
- Update groundwater basin water budgets and models; and
- Implement actions in compliance with the Sustainable Groundwater Management Act (SGMA).

## What Are We Trying to Learn?

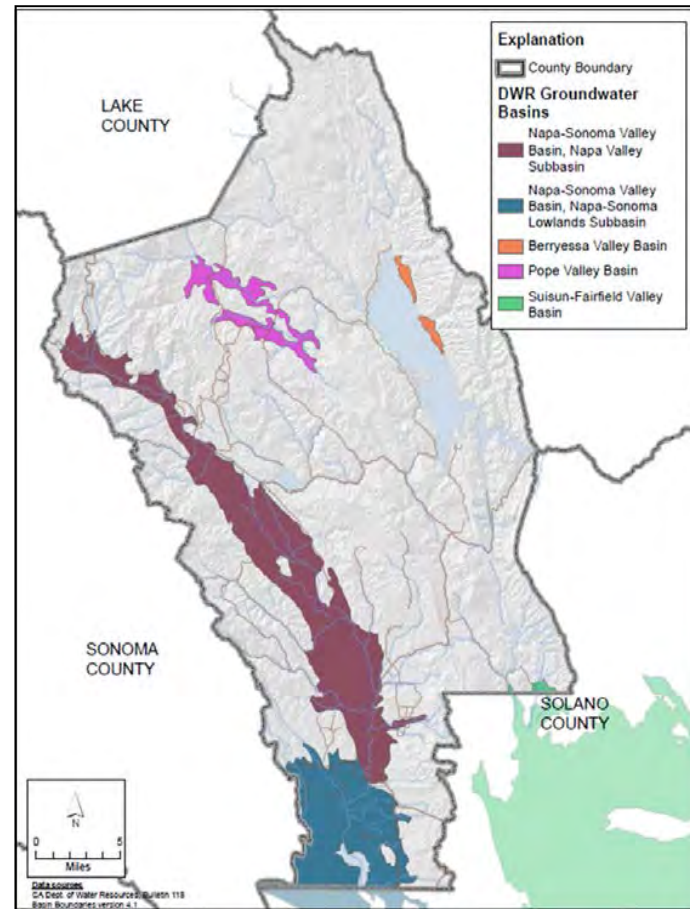
- How does groundwater move through our aquifer system?
- What is the overall status of the ground water aquifers within the county?
- What are the amounts of loss and replenishment to creeks, rivers and aquifers?
- What are the key relationships between ground water surface water in our creeks, rivers, and lakes?





## DWR Groundwater Basins

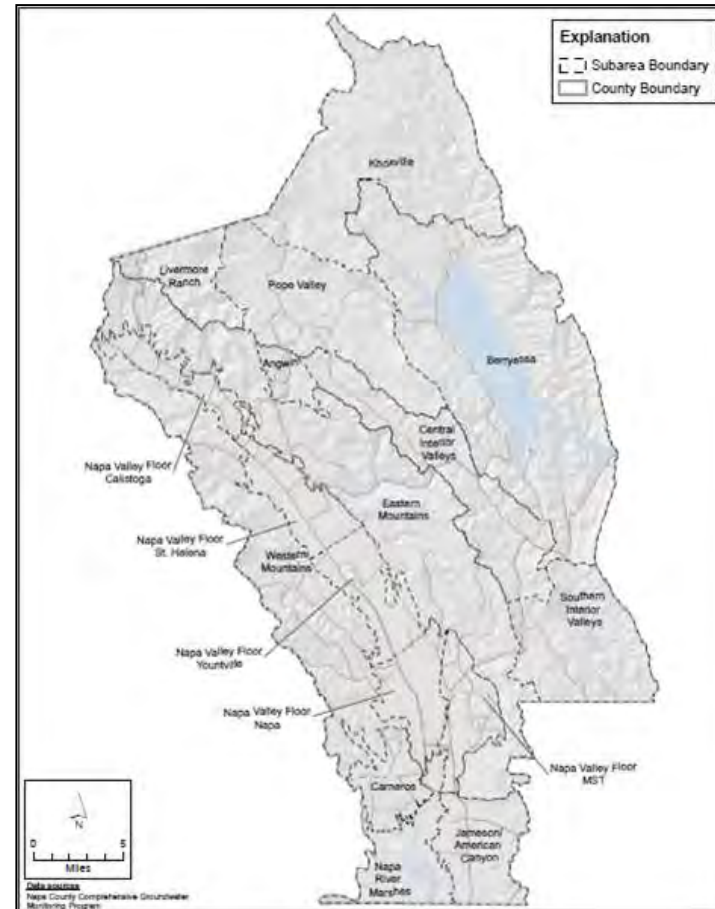
The Department of Water Resources (DWR) collects, summarizes, and evaluates groundwater data. DWR has defined 5 alluvial groundwater basins in Napa County (see map). The 2014 Sustainable Groundwater Management Act (SGMA) sets basin management priorities based upon those basin boundaries. The Napa Valley Sub-basin is designated a Medium Priority basin under SGMA.



DWR Groundwater Basin Map

## Groundwater Subareas

Groundwater conditions outside of DWR designated basins are also important in Napa County. To improve our understanding of groundwater throughout the county, seventeen subareas have been designated. These subareas are used for local planning and are based upon watershed boundaries, groundwater basin boundaries, and other data. There are five subareas covering the floor of the Napa Valley. Other subareas include the MST, Carneros, Angwin, eastern/western mountains, interior valleys, among others.



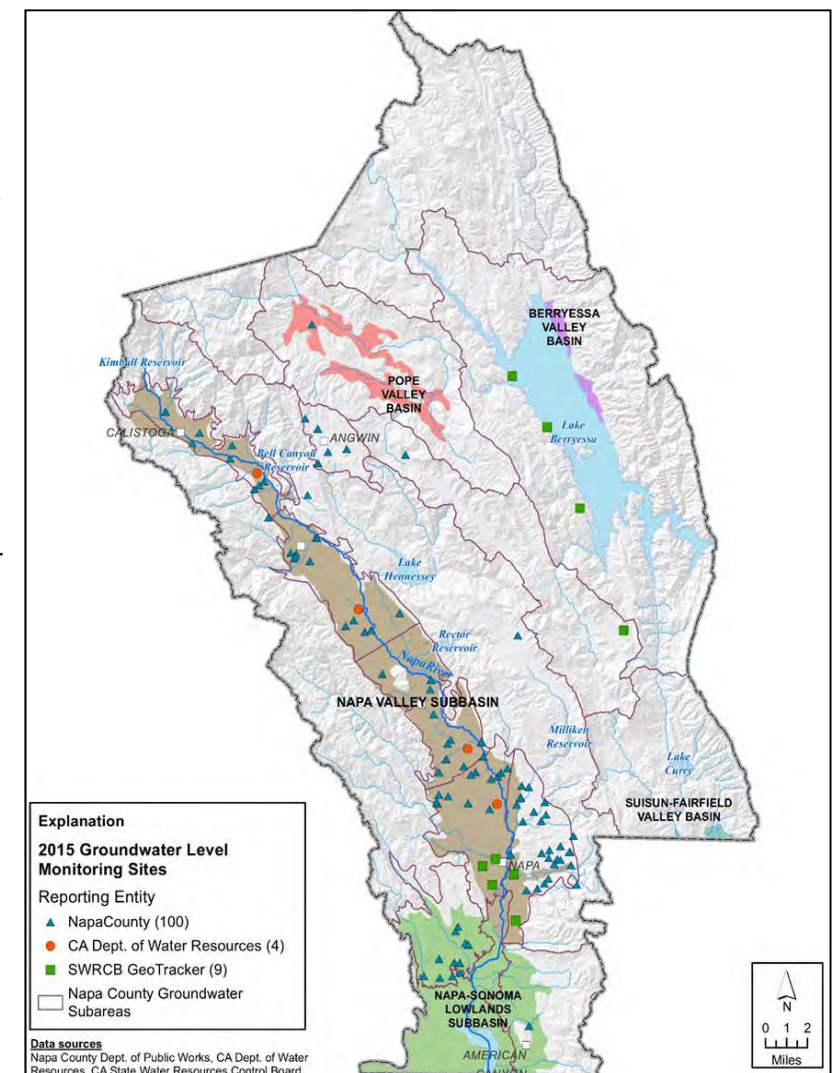
Napa Groundwater Subareas Map

## Groundwater Levels and Trends

Based on recent studies and on-going bi-annual monitoring of groundwater levels in nearly 100 volunteered wells, level trends in the Napa Valley Sub-basins of the Napa-Sonoma Valley Groundwater Basin are stable in the majority of wells with long-term records. Although some wells show a response to drought conditions, levels in recent drought years are generally higher than those during the 1976 to 1977 drought.

Elsewhere in the County long-term groundwater level records are more limited, with the exception of the Milliken-Sarco-Tulucay (MST) Subarea. Groundwater level declines observed in the MST Subarea as early as the 1960s and 1970s have stabilized since about 2008. The observation that groundwater level responses differ within the MST Subarea and even within the north, central, and southern sections of this subarea indicate that localized conditions, whether geologic or anthropogenic in nature, might be the primary influence on conditions in the subarea.

Over the past 5 years, Napa County has developed a more focused understanding of the geology that controls the occurrence and availability of groundwater and doubled the number and distribution of wells that it monitors. Additionally, the County has constructed dedicated monitoring facilities in key locations designed specifically to provide data on the interactions between groundwater and surface water.



Groundwater Monitoring Network Map

## Contact Information and Resources

### More Information:

Learn more about Napa County's groundwater resources, levels, trends and reports at:

<http://www.napawatersheds.org/groundwater>

### Join the Napa County Groundwater Email List:

<http://www.countyofnapa.org/groundwater>



Scan with your phone to sign up for the groundwater list serve

### For Questions Contact:

Patrick Lowe

[Patrick.Lowe@countyofnapa.org](mailto:Patrick.Lowe@countyofnapa.org)

Jeff Sharp

[Jeff.Sharp@countyofnapa.org](mailto:Jeff.Sharp@countyofnapa.org)

Napa County Department of Public Works, Natural Resources Conservation  
804 First St. Napa CA 94559  
707-259-8600

## Groundwater Quality

While there is limited long-term data is available on groundwater quality, overall quality appears to be good except in select areas in the most northern and southern parts of the County. Areas near Calistoga exhibit geothermal influences and the southern lowlands of the County exhibit elevated levels of naturally occurring dissolved solids and chlorides, likely due to their proximity to San Pablo Bay. Additional groundwater quality monitoring is currently underway and also planned for the upcoming year.



# **NAPA VALLEY GROUNDWATER SUSTAINABILITY:**

**A BASIN ANALYSIS REPORT FOR THE  
NAPA VALLEY SUBBASIN**

## **APPENDIX L:**

**Draft Napa Valley Subbasin Basin  
Analysis Report:  
Public Comments and Responses  
and  
Frequently Asked Questions About  
Groundwater in Napa County**

*(To be inserted following County approval of the  
Basin Analysis Report)*