

# Appendices

# **Appendix A**

## **Hydrogeologic Report**



# Hydrogeologic Report

## Drought Tolerance Emergency Water Supply and Storage Improvements

Mendocino City Community Services District Drought Tolerance Emergency Water Supply and Storage Improvements

April 19, 2023

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*NOTE: This study was developed utilizing common engineering and hydrogeologic resources and with information provided by the Mendocino City Community Services District, the Mendocino Unified School District and from previous studies. Engineering judgment was applied where appropriate. Future conditions may vary from those predicted in this study. All recommendations should be validated and adjusted as appropriate during the design and construction process. Due to periodic changes to regulations, procedures, design guides, and policies, the potential solutions and recommendations contained herein may be subject to revision.*

# 1. Introduction

## 1.1 Purpose of this report

GHD, Inc. (GHD) was engaged by the Mendocino City Community Services District (MCCSD) to prepare this report summarizing the results of a hydrogeological investigation of groundwater data collected by GHD in the fall of 2022 in the Mendocino Unified School District (MUSD) wellfield and in the immediate vicinity. Groundwater data was collected from MUSD pumping and non-pumping supply wells, and near vicinity domestic wells using manual depth-to-water (DTW) meters and where possible, by installing continuous data logging pressure transducers directly within each well casing. The purpose of the information provided herein is to support the environmental review and design of a new well field consisting of up to ten water supply wells within the MUSD property. This scope of work supports the Drought Tolerance Emergency Water Supply and Storage Improvements project that is jointly supported by the MCCSD and MUSD and funded by the California Department of Water Resources Urban and Multibenefit Drought Relief Grant program and a California Water Resources Control Board Proposition 1 Drinking Water State Revolving Fund Planning Grant.

The project Site is located on MUSD property located north of the K-8 School campus (APN 119-100-03, 119-100-04 and 119-100-23) and west of the school's existing supply wells and storage tanks, shown in Appendix A, Figure 1. The Site consists of only the single parcel (APN: 119-100-03) and does not include the adjacent parcels to the east where the construction of replacement water tanks and a treatment building is planned. The proposed locations of the expanded well field are shown in Appendix A Figure 2.

## 1.2 Scope and limitations

*This report has been prepared by GHD for the Mendocino City Community Services District Drought Tolerance Emergency Water Supply and Storage Improvements and the Mendocino Unified School District and may only be used and relied on by Mendocino City Community Services District Drought Tolerance Emergency Water Supply and Storage Improvements and the Mendocino Unified School District for the purpose agreed between GHD and Mendocino City Community Services District Drought Tolerance Emergency Water Supply and Storage Improvements and the Mendocino Unified School District as set out in Section 1 of this report.*

*GHD otherwise disclaims responsibility to any person other than Mendocino City Community Services District Drought Tolerance Emergency Water Supply and Storage Improvements and the Mendocino Unified School District arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.*

## 1.3 Assumptions

This report summarizes information from the MCCSD, the MUSD, previous studies and data collected during sampling events and presents preliminary information about a new well field proposed to be located on MUSD property which will be subject to review by the MCCSD, the MUSD, the County, State, and others.

Recommendations for the new well field are preliminary and final locations may be updated based on additional data collected during test well installation anticipated in 2023, and feedback received from MCCSD, MUSD and other stakeholders.

## 2. Desktop Review

### 2.1 Background Data Collection

Records available from public resources were reviewed to provide information regarding the Site history, geology, hydrogeology, and other supply wells in the immediate vicinity. The principal sources of information reviewed included:

- **California Department of Water Resources (DWR) Well Completion Reports (WCR).** These reports include information on well number, construction details, groundwater levels, installation and testing dates, and pump testing results. Select WCRs are included in Appendix C.
- **California Water Boards Aquifer Risk Database.** This database provides information tracking for areas where domestic wells and small water systems subject to state regulations may be accessing raw source groundwater that do not meet primary drinking water standards maximum contaminant levels (MCLs). An image of the Site vicinity as shown in the Aquifer Risk Database is presented in Figure 1 below.

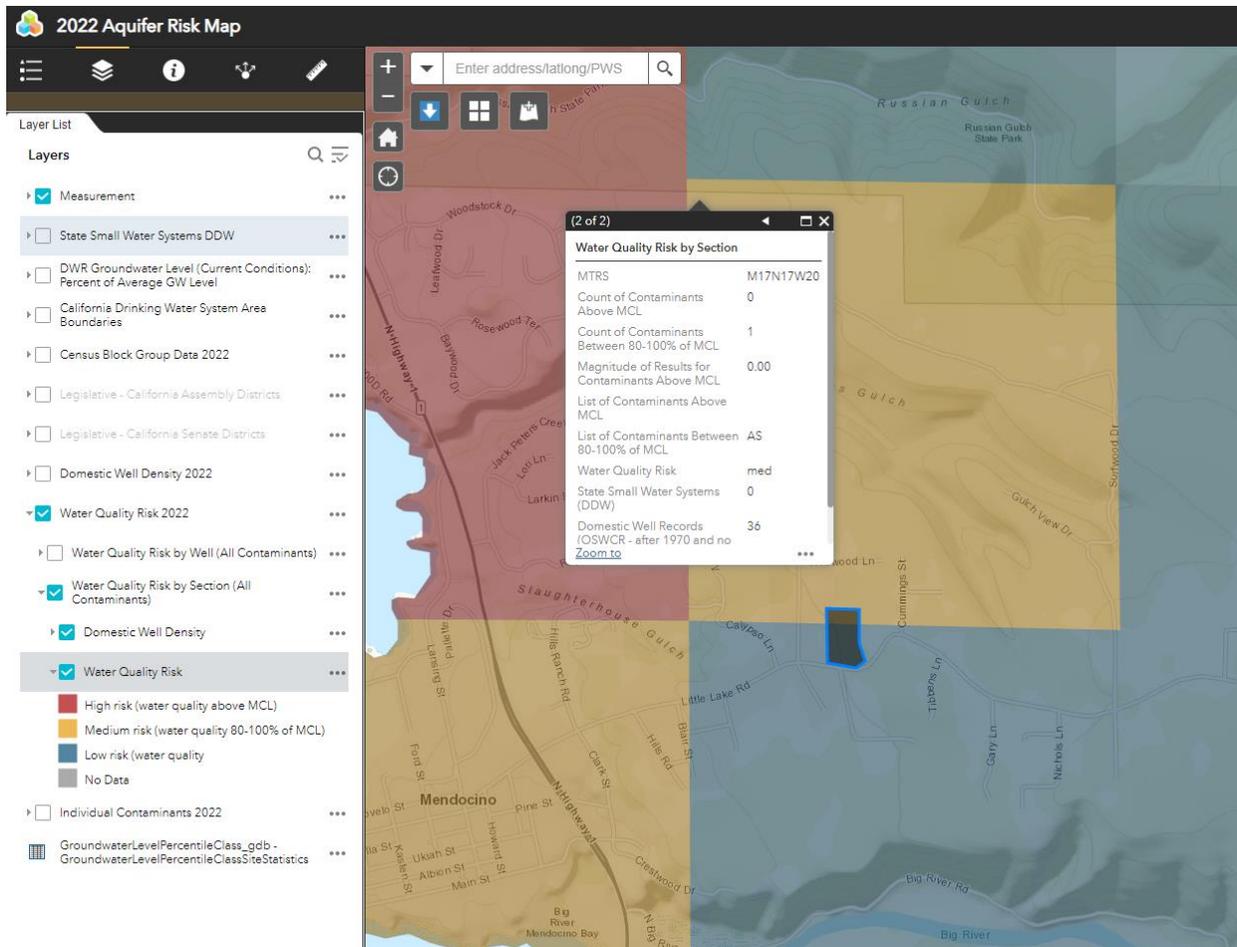


Figure 1 Aquifer Risk Map in Project Vicinity (accessed October 2022). Site Boundary is Approximate.

- **California Geological Survey – Online Geologic Map of California.** This database provides generalized regional geological information. Geological information is described in Section 2.0.

- **DWR Bulletin 118 – Update 2003, California’s Groundwater.** This report provides regional hydrogeological information including groundwater basin descriptions and statistics for groundwater quantity and quality. Hydrogeological information is described in Section 2.0.
- **DWR Bulletin 118 – Interim Update 2020, California’s Groundwater.** This report provides an update to the 2016 version for regional hydrogeological information including groundwater basin descriptions and statistics for groundwater quantity and quality. Hydrogeological information is described in Section 2.0.
- **Department of Toxic Substances Control EnviroStor Database.** This database provides information tracking for clean-up, permitting, enforcement, and investigation efforts at hazardous waste facilities and sites with known contamination or suspected contamination. An image of the Site vicinity as shown in the EnviroStor Database is presented in Figure 2 below.

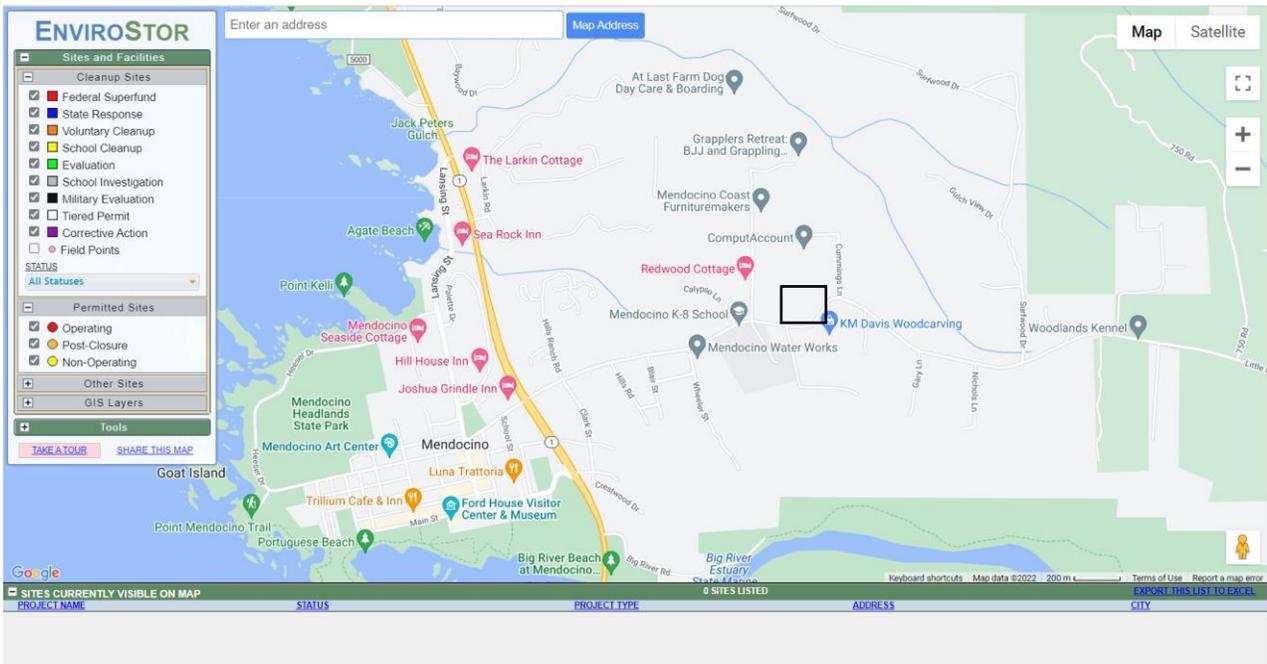


Figure 2 EnviroStor Database in Project Vicinity (accessed November 2022). Site Boundary is Approximate.

- **State of California GeoTracker Database.** This database provides information tracking compliance data from authorized or unauthorized discharges of waste to land, or unauthorized releases of hazardous substances from underground storage tanks. An image of the Site vicinity as shown in the GeoTracker Database is presented in Figure 3 below.

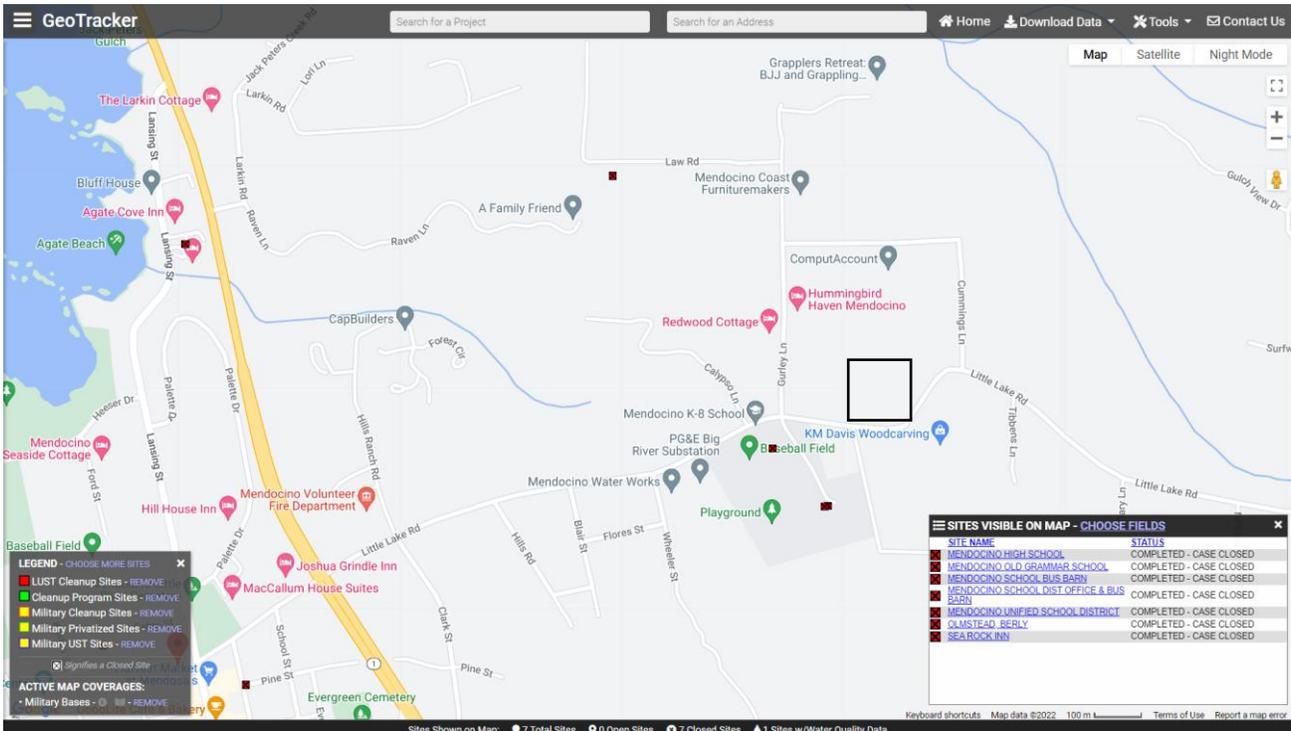


Figure 3 GeoTracker Database in Project Vicinity (accessed November 2022). Site Boundary is Approximate.

- **United States Geological Survey – The National Geologic Map Database:** This database provides generalized regional geological information. Geological information is described in Section 2.0.

## 2.2 Previous Vicinity Studies

GHD previously conducted a series of studies for MUSD for future additional production capacity and source water supply resiliency. These included a source water well inspection and specific capacity testing study (GHD, 2019b), a well siting study (GHD, 2019c), a test well drinking water source assessment and protection and water quality study (GHD, 2020), and construction of a new test well (MUSD Well 6) with pump and specific capacity testing (GHD, 2021). The MUSD currently operates two active wells (MUSD Well 1 and MUSD Well 2) at the Site that will remain operational during the construction and implementation of the proposed well field.

In addition to previous GHD studies, numerous hydrological studies were performed in the 1980s through at least the early 2000s by Don Clark Engineering and Hydrology, and other regional firms. Hard copies were reviewed by GHD as provided by several domestic well owners downgradient to the MUSD.

The MCCSD monitors precipitation and groundwater (since at least 2002) within the MCCSD service district area. In an effort to monitor water resources they also use and annually update a computational groundwater model developed and maintained by Todd Groundwater (Todd). The MCCSD service area and a number of monitoring wells located west of the project area are shown in Figure 4.



**Figure 4** *MCCSD Monitoring Well Locations (TODD 2021)*

In addition to the monitoring wells, data has previously been collected from private water supply wells, shown in Figure 5, that are also incorporated into the MCCSD groundwater model.



**Figure 5** *Private Water Supply Wells Identified by MCCSD (TODD 2021)*

The project location is adjoining the northeast boundary of the groundwater model, however some of eleven documented private wells within the MCCSD boundary are within the vicinity of this project and were reviewed as potential continuous data monitoring locations.

## 2.3 Topographic Setting

The Site is located approximately 1 mile east of the Pacific Ocean on the Mendocino Headlands, on the outskirts of the village of Mendocino. The Mendocino Headlands consist of a series of relatively flat terraces that form benches into the surrounding bedrock. The headlands protrude approximately ½ a mile into the Pacific Ocean and terminate with nearly vertical cliff faces that generally extend between 40 and 60 feet above sea level.

The Site is situated on the north side of Little Lake Road, approximately 0.7 miles east of the intersection of Little Lake Road and State Route 1 at an elevation ranging from 385- to 425- feet NAD88. The Site slopes to the west at a consistent 10 percent grade and is heavily forested throughout with exception to the southwest corner where there is an existing MUSD maintenance building and driveway that leads east to the existing MUSD wells and water tank.

## 2.4 Geologic Setting

Regional geology of the project area consists of the Coast Ranges geomorphic province which is comprised of northwest-trending mountain ranges, typically between 2,000- and 4,000-feet above sea level. The northern Coast Ranges are dominated by irregular, knobby, landslide-topography of the Franciscan Complex that in large areas are overlain by volcanic cones and flows of the Quien Sabe, Sonoma and Clear Lake volcanic fields (CGS, 2002). Ongoing tectonic forces resulting from the collision of the North American Plate with the Pacific Plate have created a broad zone of active, dormant, and inactive faults that are dominated by the San Andreas Fault system which trends along the western coast of the County, the Maacama Fault zone running parallel to State Route 101, and the Bartlett Springs Fault system that runs through Lake Pillsbury. The fault system results in a north-western structural alignment that controls the overall orientation of Mendocino County's ridges and valleys through a series of thrust faults, smaller right lateral faults, the largest documented and active on-land fault ruptures being the San Andreas Fault located approximately 22 miles to the south at State Route 1 and Alder Creek and the Maacama Fault zone located approximately 24-miles west of the Site.

The Site is located on Pleistocene aged marine terrace deposits that are underlain by Franciscan Complex Coastal Belt. A relatively shallow organic soil horizon overlays the terrace deposits that range from 1- to 4-feet in depth. Marine terraces represent former beach and near shore environments and consist of silty sand that form essentially flat stratigraphic surfaces that cover the underlying Franciscan bedrock (DWR, 1985). There are four primary marine terraces that have been documented by Todd and others that constitute the Mendocino Headlands aquifer:

- **Casper Point:** Occurs between elevation of 40- to 80-feet elevation and is the youngest terrace (approximately 100,000 years old). The terrace is composed of medium-grained loose sand with few fines and is generally about 10 feet thick.
- **Jughandle Terrace:** Occurs between 80- to 160-feet elevation and is the second youngest terrace (about 200,000 years old). The terrace is composed of fine-grained silty sand and is generally about 20 feet thick with a maximum thickness of 35 feet.
- **Railroad Terrace:** Occurs between 160- to 200-feet elevation and is the third youngest terrace (about 300,000 years old). The terrace is composed of fine-grained sand with a higher percentage of silt and clay than the younger terraces.
- **Fern Creek Terrace:** Occurs between 300- to 400-feet elevation and is the oldest marine terrace (about 400,000 years old). The terrace is composed of fine-grained silt and clayey sand and is generally up to 15 feet thick.

Franciscan bedrock consists of interbedded greywacke sandstone and shale that is pervasively fractured. The bedrock holds very little potential for water storage however the fractures allow for groundwater storage and transmissivity and generally understood to decrease with depth and distance from the coastline (DWR, 1985).

The Site is located beyond the traditionally mapped extent of the Fern Creek Terrace, located approximately ¼ mile northeast. Nearby well completion reports indicate that the alluvial thickness on the western half of the site is similar to that of the Fern Creek Terrace (around 15 feet) however there is a grade break that increases the elevation by approximately 30 feet which directly translates to increase of the marine terrace thickness to approximately 50 feet. This increase may be an extension of the Fern Creek Terrace or part of an unknown older and unmapped marine terrace.

## 2.5 Hydrologic Setting

The Mendocino Headlands aquifer is located within the Sustainable Groundwater Management Area designated the Fort Bragg Terrace Area which does not have a current Groundwater Sustainability Plan, however, the village of Mendocino is regulated by the MCCSD which maintains a Groundwater Sustainability Plan. The Fort Bragg Terrace Area is a series of discontinuous uplifted marine terrace deposits located along the Mendocino County coastline (DWR, 2004).

The primary method of recharge for the aquifer is precipitation infiltration with excess surface runoff flowing into creeks and ultimately the Pacific Ocean to the west. Areas that have exposed bedrock tend to have poor infiltration rates resulting in the alluvial and marine terraces being primary recharge and storage areas. Due to the topographic setting of the Mendocino Headlands, a major portion of the annual groundwater outflow is through shallow springs along the surrounding cliffs resulting in the shallow aquifer(s) having reduced long-term storage capacity and influenced by the annual weather patterns much more than typical alluvial California aquifers. This means that the Mendocino water supply is very closely associated with year-to-year precipitation and is vulnerable to short period (single and multi-year) droughts. Annual average rainfall for the village of Mendocino is about 40-inches with 97 percent of annual rainfall occurring in the rainy season (October to May), as shown in Figure 6.

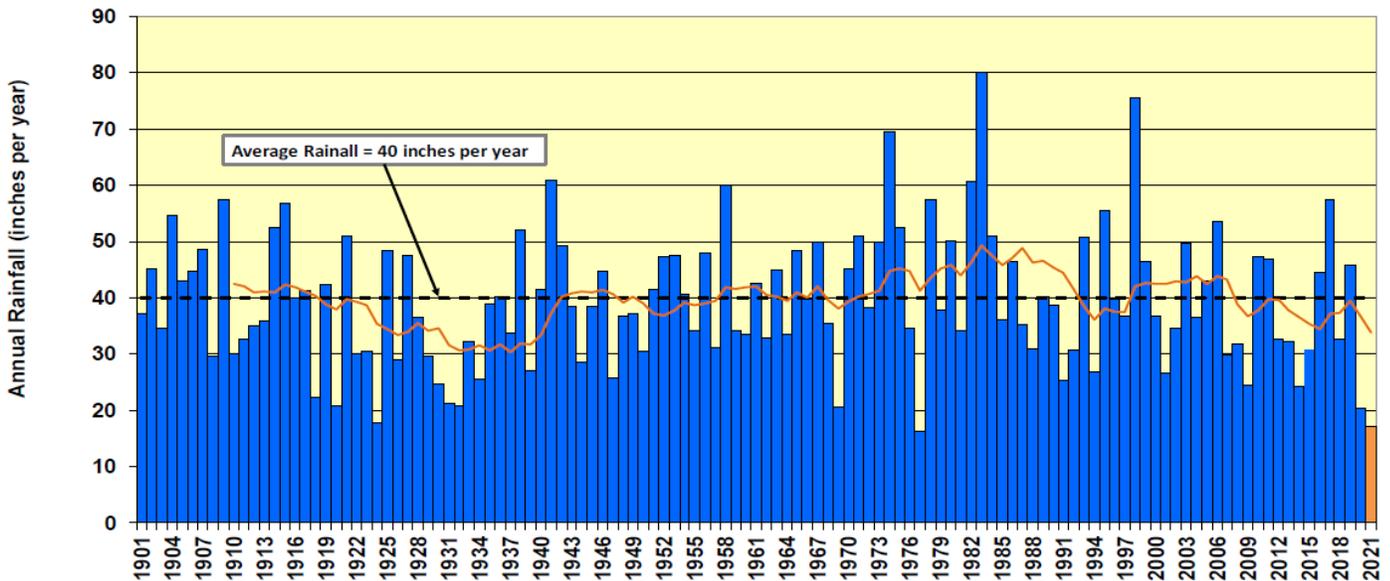


Figure 6 Mendocino Annual Rainfall from 1901 to 2021 (Todd 2021)

Topography and groundwater flow indicate that surface and groundwater flow northwest towards Slaughterhouse Gulch and is disconnected from the Big River Watershed located south of the village of Mendocino. Figure 7 below shows the modeled groundwater elevations within the MCCSD service area. Groundwater levels are typically lowest in the fall prior to the first substantial rainfall of the rainy season and they begin to rise after about 9-inches of precipitation (DWR, 1985).

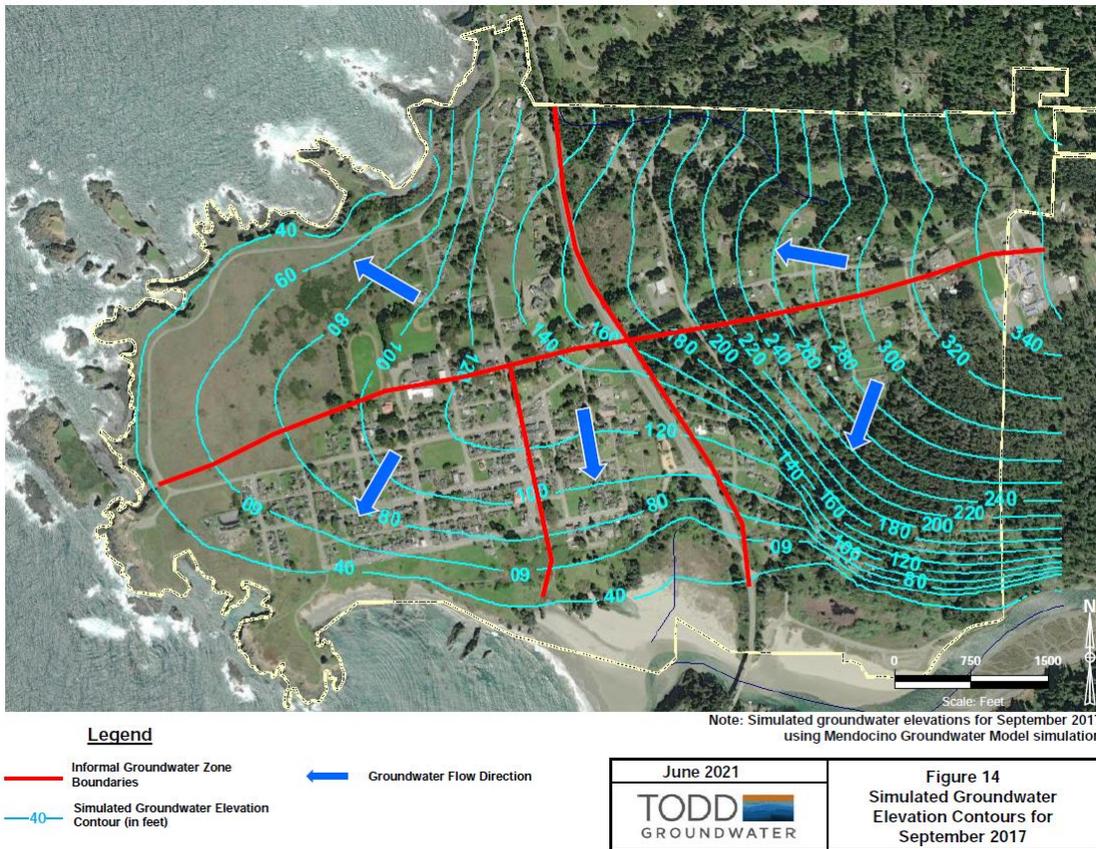


Figure 7 2021 Groundwater Elevations (Todd)

During droughts, the highest groundwater levels occur during the winter and are several feet lower than the same months in an above average rainfall year. During severe droughts, the average depth-to-water falls below 20 feet and results in a number of dry wells in the area. Groundwater pumping is generally metered for both commercial and domestic uses with total annual extractions for the region ranging from 65 to 74 acre-feet over the last six years (Todd 2022).

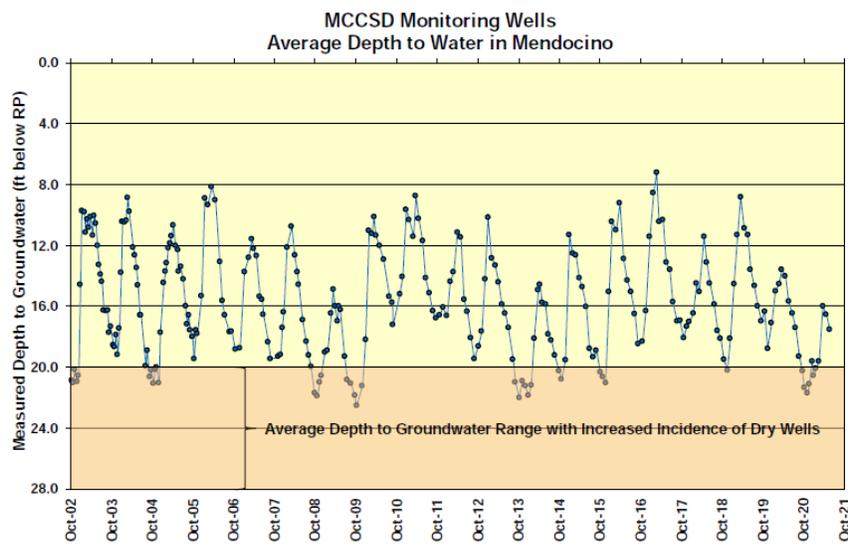


Figure 8 Mendocino City Community Service District Monitoring Wells – Depth to Groundwater (Todd 2021)

## 2.6 Water Quality

The Site is located in the Mendocino Coast Hydrologic Unit as defined by the North Coast Regional Water Control Board in which groundwater is defined as having the following beneficial uses:

- Municipal and Domestic Water Supply
- Industrial Water Supply
- Industrial Process Water Supply
- Agricultural Water Supply
- Freshwater Replenishment to Surface Waters

A review of the GeoTracker and Enviorstor databases indicates that there are no known active environmental clean-up sites within 1,000 feet of the Site. There are three closed leaking underground storage tank (UST) environmental sites within 1,000-feet of the Site, all located to the southwest and located within the MUSD K-8 School. Based on the down gradient and closed nature of the three closed UST sites, the risk to water quality at the Site is low. There is one known detection of elevated levels of arsenic in nearby water quality samples. Groundwater quality within the basin is generally high with no widespread issues.

Raw groundwater samples from the MUSD wells (Well 1 and Well 2) have been tested intermittently for total coliform and Escherichia coli since 2008 and have predominately shown no bacteriological contamination. Title 22 water quality results collected after the construction and initial development of MUSD Well 6 (2020) did not indicate the presence of any constituents of concern that are subject to U.S. Environmental Protection Agency (EPA) Primary Drinking Water Standards. Concentrations of aluminum and manganese in the initial water samples were reported above the Secondary Drinking Water Standards, but these constituents are expected to drop with further well development. The Secondary Drinking Water Standards are enforceable guidelines regulating constituents that may cause aesthetic effects in drinking water. Private water quality records shared during data collection records did not indicate the presence of any constituents of concern.

## 3. Data Collection

### 3.1 Public Outreach and Fieldwork

In September 2022, GHD, MCCSD and MUSD engaged in a public outreach campaign sending letters (Appendix B) and making phone calls to domestic well owners in the vicinity of the proposed well field who are immediately adjacent to and downgradient of the anticipated groundwater flow direction (westerly). The letter identified individual parcels containing wells that were identified as high priority and requested access to begin collecting DTW data and that owners allow continuous groundwater level data loggers (pressure transducers) be installed within their wells, if possible. Pressure transducer data was collected from existing MUSD wells (except MUSD Well 2 which was inaccessible and only manual DTW measurements were collected) and two of the respondent owner wells over three sampling events on September 29<sup>th</sup> and 30<sup>th</sup>, October 19<sup>th</sup>, and November 22<sup>nd</sup> in 2022. Data collection involved obtaining relevant well information, wellhead inspection, DTW measurements, and installation of pressure transducers when possible. Initial requested well locations are shown in Appendix A. Figure 3 and associated well construction details are provided in Table 1 below.

**Table 1** Wells Inspected and Requested Access for This Study

Well Location	Surface Elevation (ft)	Depth (ft)	GPM	Diameter (in)	Well Casing Access for DTW Meter & Transducer (Yes or No / Yes or No)	Well Log No.	Drill Date
10601 Gurley Ln	375	Ukn	Ukn	Ukn	Ukn	Ukn	Ukn
10650 Gurley Ln	359.3	59	4.5	5	Yes/Yes	140367	1988
10651 Gurley Ln	381.1	140	1.5	5	Yes/Yes	924893	2005
10821 Gurley Ln	422	24	2	36	Yes/No	Unk	Ukn
10651 Calypso Ln	375	Ukn	Ukn	Ukn	Ukn	Ukn	Ukn
10700 Calypso Ln	343	300	0.10	5	Yes/Yes	Unk	2022
44000 Little Lake Rd	435	200	1	5	No/No	Unk	Unk
44200 Little Lake Rd	360	16	1	36	Yes/Yes	Unk	Unk
44300 Little Lake Rd	337	138	0.5	5	Yes/No	098675	1981
MUSD N Caisson	406.0	30	0	36	Yes/Yes	112963	1963
MUSD S Caisson	403.5	30	0	36	Yes/No	112963	1963
MUSD Well 1	432.2	35	Ukn	8	Yes/Yes	141427	1976
MUSD Well 2	432.2	45	Ukn	8	Yes/No	Unk	Unk
MUSD Well 6	431.6	45	6	5.6	Yes/Yes	001445	2020

Unk = unknown

Transducers were installed into two MUSD wells (Well 1 and Well 6) with Well 1 being active and Well 6 acting as a monitoring well. Additionally, two abandoned 36-inch diameter concrete caisson wells were identified for potential monitoring (north caisson and south caisson). The north caisson was determined to be in sufficient condition to allow the installation of a transducer while the south caisson was only capable of DTW measurements.

In addition to the MUSD wells, GHD performed a public outreach effort to identify wells of interest based on their location in relation to the proposed well field. In total, nine (9) nearby residents were identified as having wells adjacent to or downgradient of the proposed well field that could provide valuable data or potentially be impacted by the operation of the proposed well field. Six of the nine residents responded and had wellheads in sufficient condition to allow monitoring, two of which were capable of allowing the installation of a transducer. Figure 9 shows examples of the conditions of the private wells encountered.



**Figure 9** Existing Nearby Domestic Wells

## 3.2 Groundwater Data and Hydrographs

Manual depth-to-water measurements were taken from top of casing (TOC). The TOC varied for each well but in general were less than 2 feet above the ground surface. Figure 10 shows the depth-to-water measurements relative to the total depth of each well and Figure 11 shows the depth-to-water measurements relative to their elevation and projected onto cross section A-A'.

Water levels around the project area range from 4 feet to 40 feet below ground surface with wells in the shallow terrace deposits having water levels around 5 to 10 feet below TOC and bedrock wells having water levels around 15 to 20 feet below TOC. The exceptions to this are the three MUSD wells (Well 1, Well 2, and Well 6) which have water levels between 20 and 40 feet below their respective TOC. This could be due to their much more active use compared to the other wells and within a higher elevation marine terrace that is not directly hydraulically connected to the lower elevation wells within different formational types (alluvium and bedrock). Transducer recordings from September 29<sup>th</sup> to November 24<sup>th</sup> are shown in Figure 12.

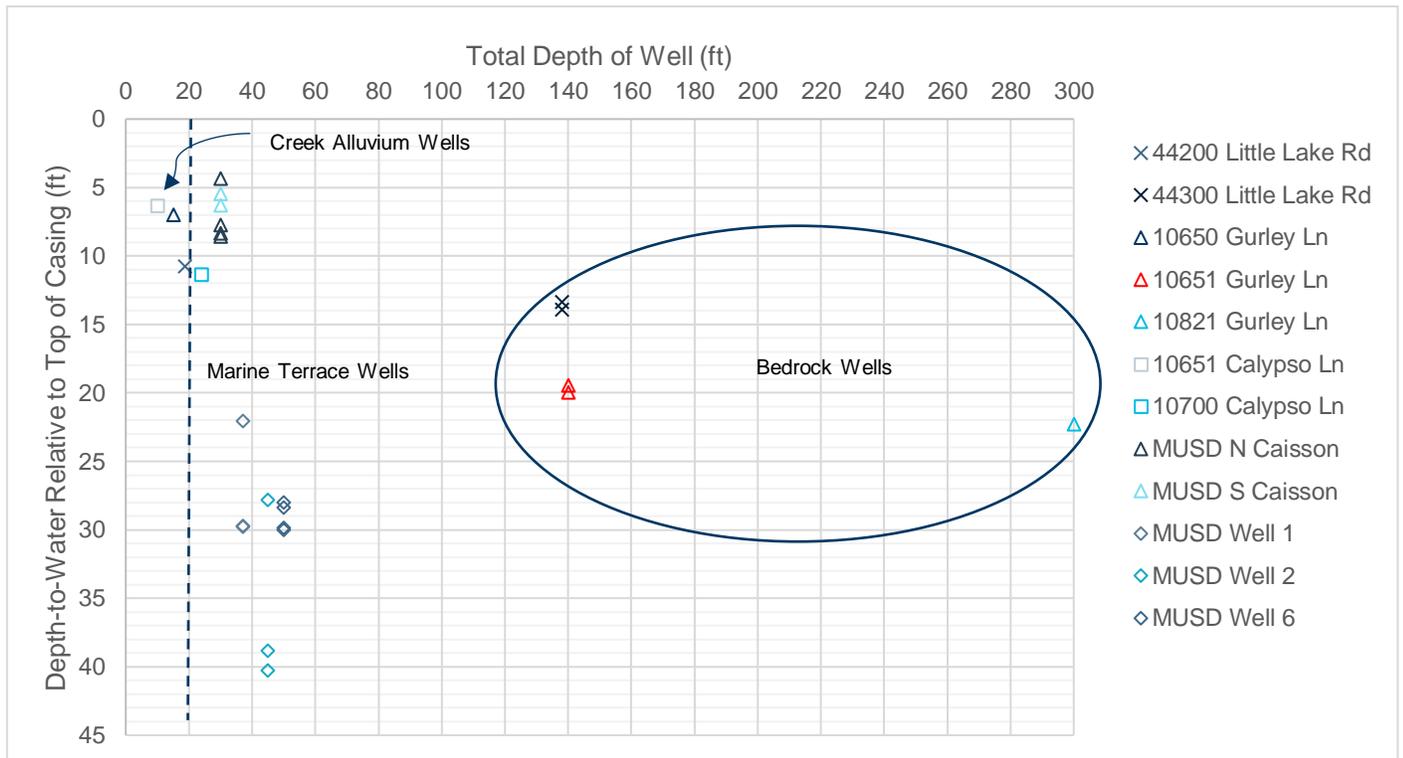


Figure 10 Depth-to-Water vs Total Well Depth of Monitored Wells

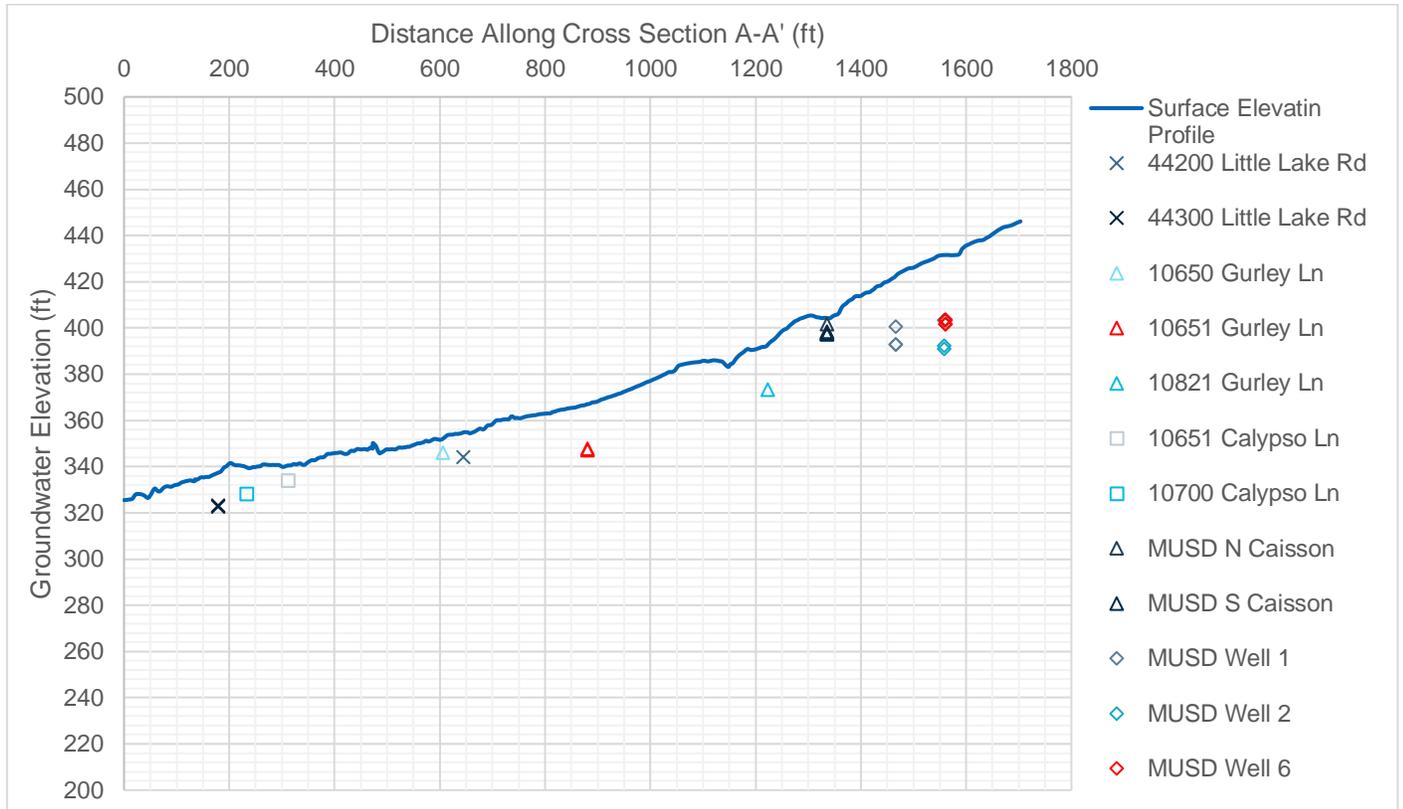


Figure 11 Depth-to-Water Measurements During Sampling Events Between September 29<sup>th</sup> and November 22<sup>nd</sup>

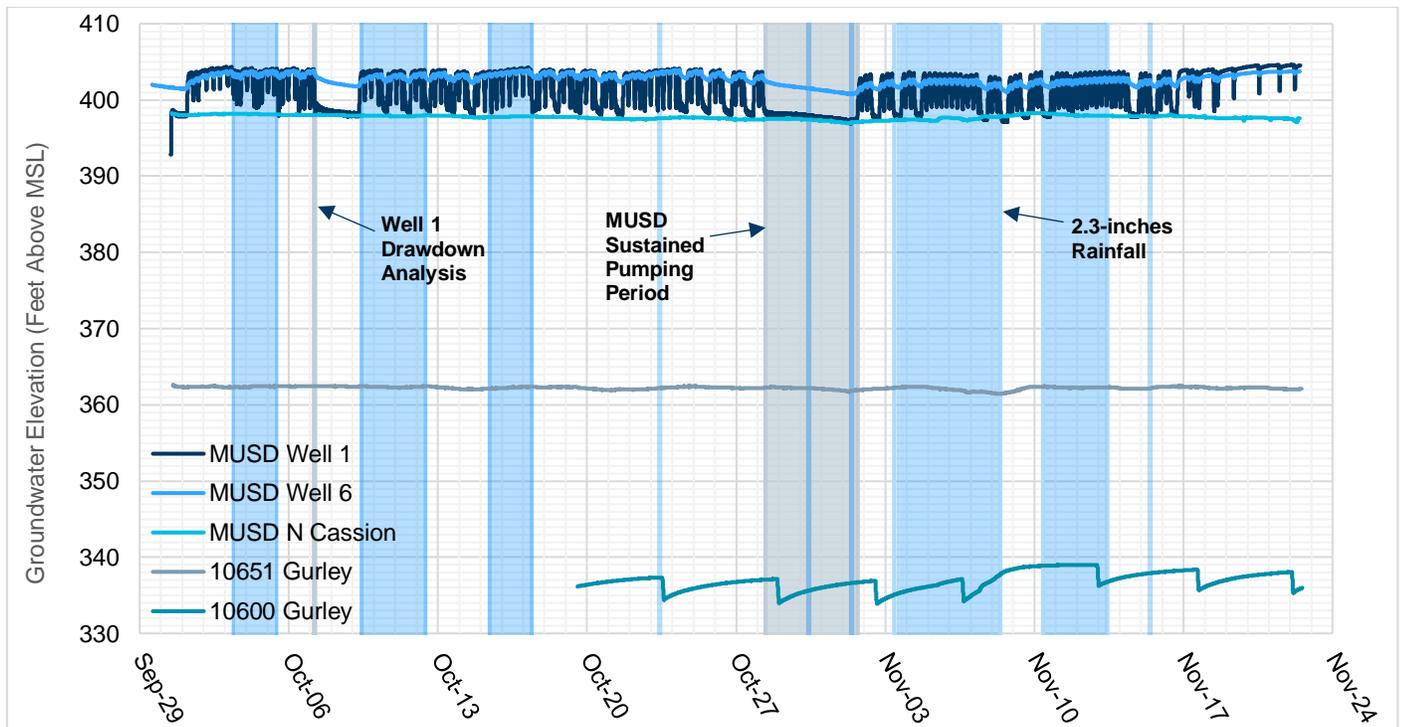


Figure 12 Pressure Transducer Data from September 29<sup>th</sup> to November 24<sup>th</sup> 2022. Measured Rainfall (shaded blue) is less than 0.2 inches unless otherwise noted.

# 4. Data Analysis and Results

## 4.1 MUSD Groundwater Pumping

Transducer data from the MUSD wells indicate that Well 6 (non-pumping monitoring well) has interference drawdown effects from Well 1 (when actively pumping) of up to four feet. Wells located 285+ feet way from MUSD Well 1 show no apparent effects from sustained pumping activities. Under normal water demands Well 1 cycles on and off 3 to 4 times a day. Normal water demands are about 4,488 gallons per day of water use (GHD, 2019a).

Sometime prior to October 28<sup>th</sup> MUSD had a leak in their system which drained their water storage tanks. During this time, there was a 5-day continuous pumping period from both Well 1 and Well 2 (no groundwater elevation data) until November 2<sup>nd</sup> to refill the tanks, which is shown in Figure 13. The MUSD SCADA database indicates that the combined flow rate for both Wells 1 and 2 are approximately 15 gallons per minute and electrical records indicate that both pumps were operating on a nearly identical schedule.

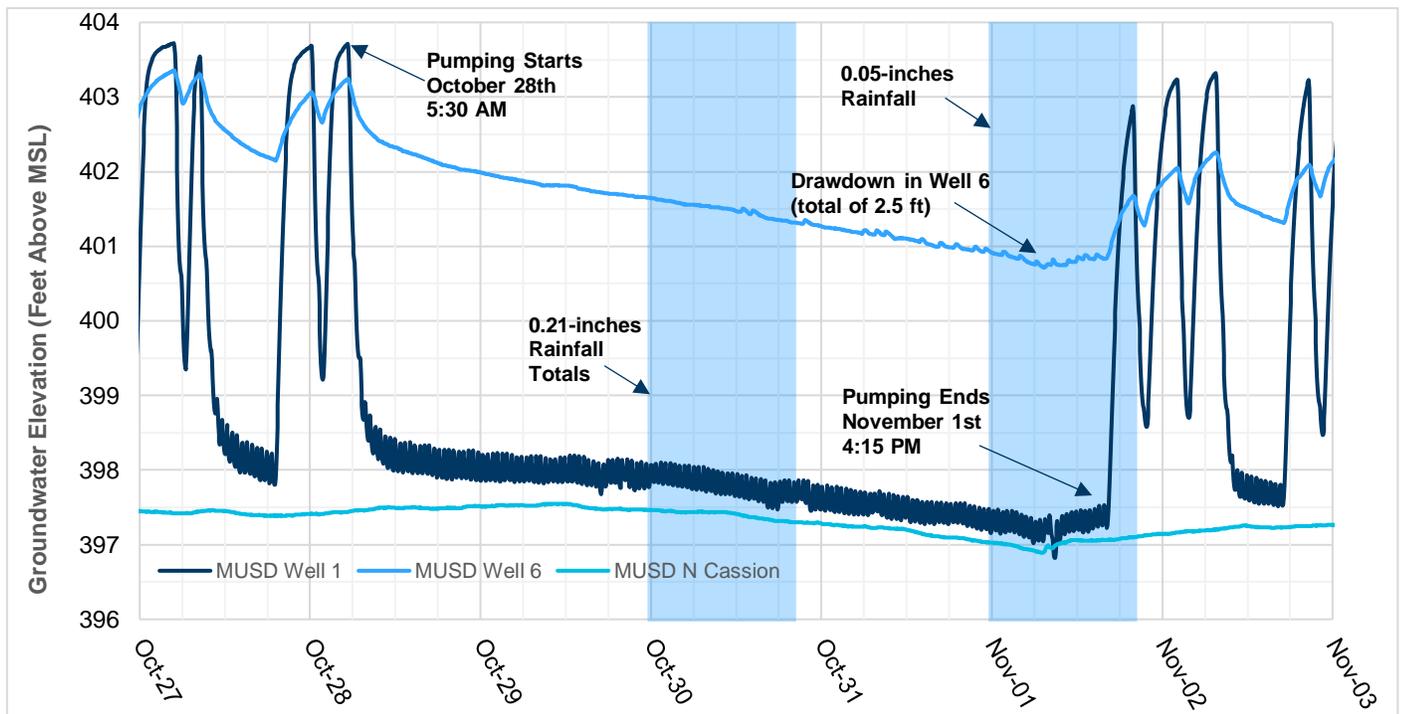


Figure 13 MUSD Wells Groundwater Elevation from October 27<sup>th</sup> to November 3<sup>rd</sup>

Water levels in Well 1 indicate that there is an automatic shutoff around elevation 394 feet below mean sea level (msl), which is 28.5 feet below TOC. During the sustained pumping period the Well 1 pump rapidly cycled off and on to maintain water levels above the pump intake. During this period Well 6 had a little over 2.5 feet of drawdown after 4.5 days of continuous pumping from Well 1 and supplemented from Well 2 based on pump time records (MUSD, 2022). The MUSD north caisson, located 220 feet north of Well 1, doesn't appear to be affected by the pumping of Well 1 as the water levels appear to trend upward during portions of the extended pumping period. It is uncertain if the variations in the north caisson Well water level (1 foot) are due to atmospheric pressure changes or pumping from MUSD wells, shown in Figure 14.

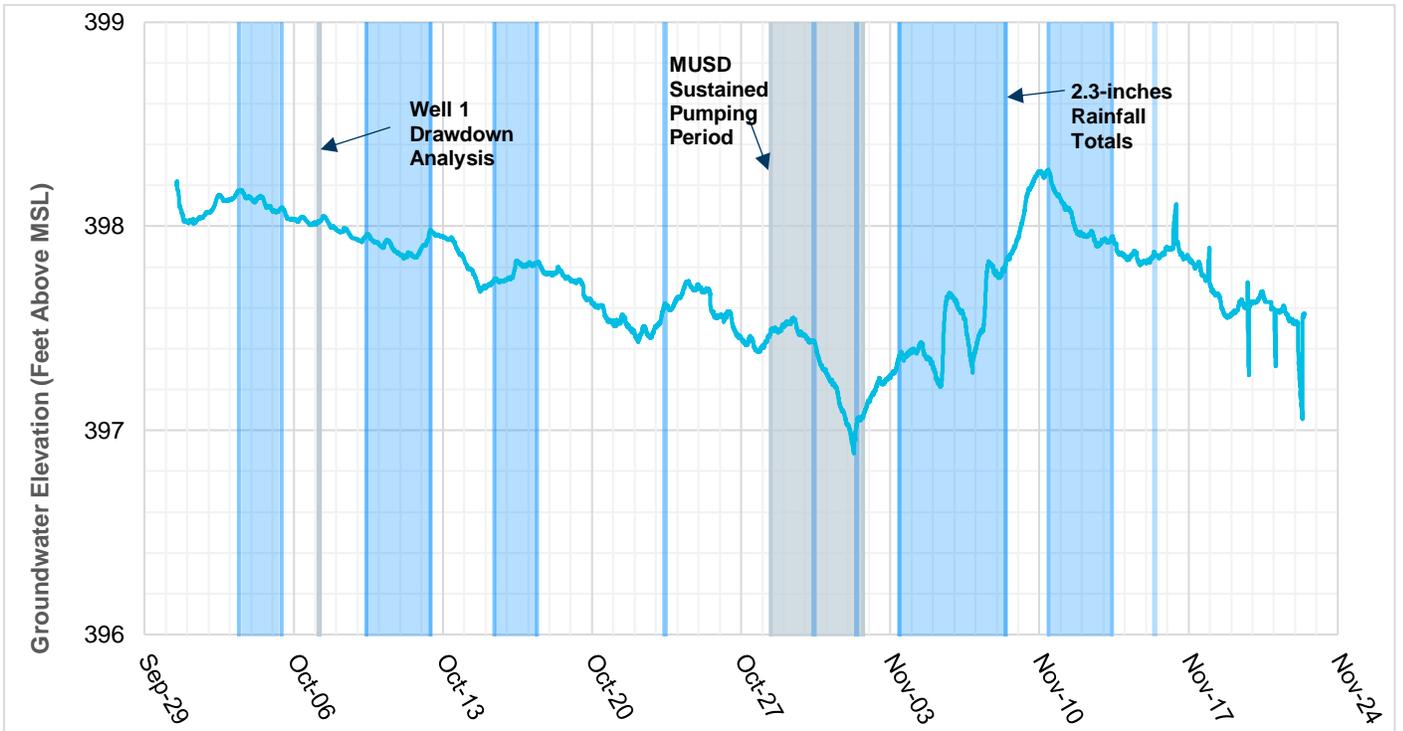


Figure 14 *MUSD North Caisson Transducer Data (shaded grey during sustained drawdown period). Measured Rainfall (shaded blue) is less than 0.2 inches unless otherwise noted.*

Based on the pumping test performed during the Well 6 initial development (2020) and the information from Well 1 during another pumping event duration from October 7th 4:15 am to 5:45 am, shown in Figure 15, a Cooper-Jacob aquifer analysis was performed to evaluate the aquifer transmissivity for MUSD Wells 1 and 6, which is shown in Figure 16.

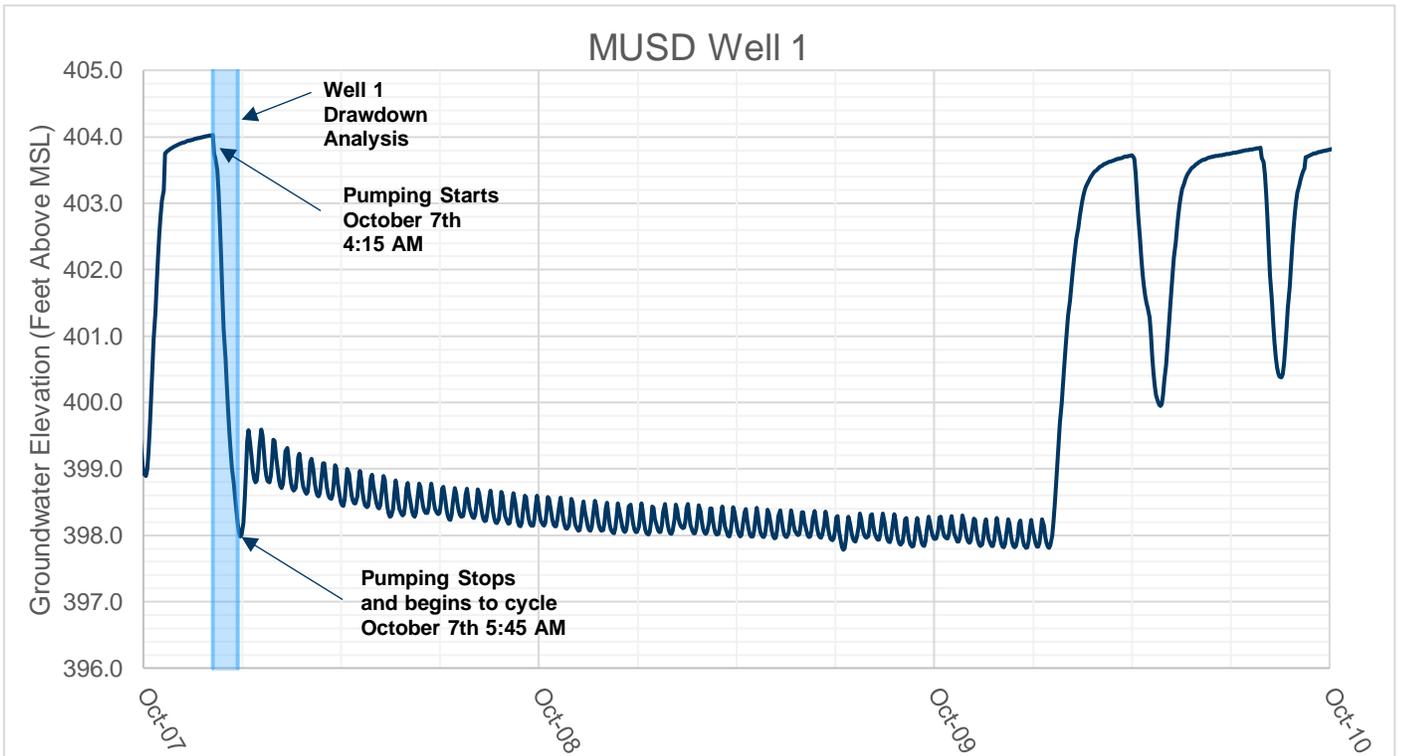


Figure 15 MUSD Well 1 Drawdown Analysis Period

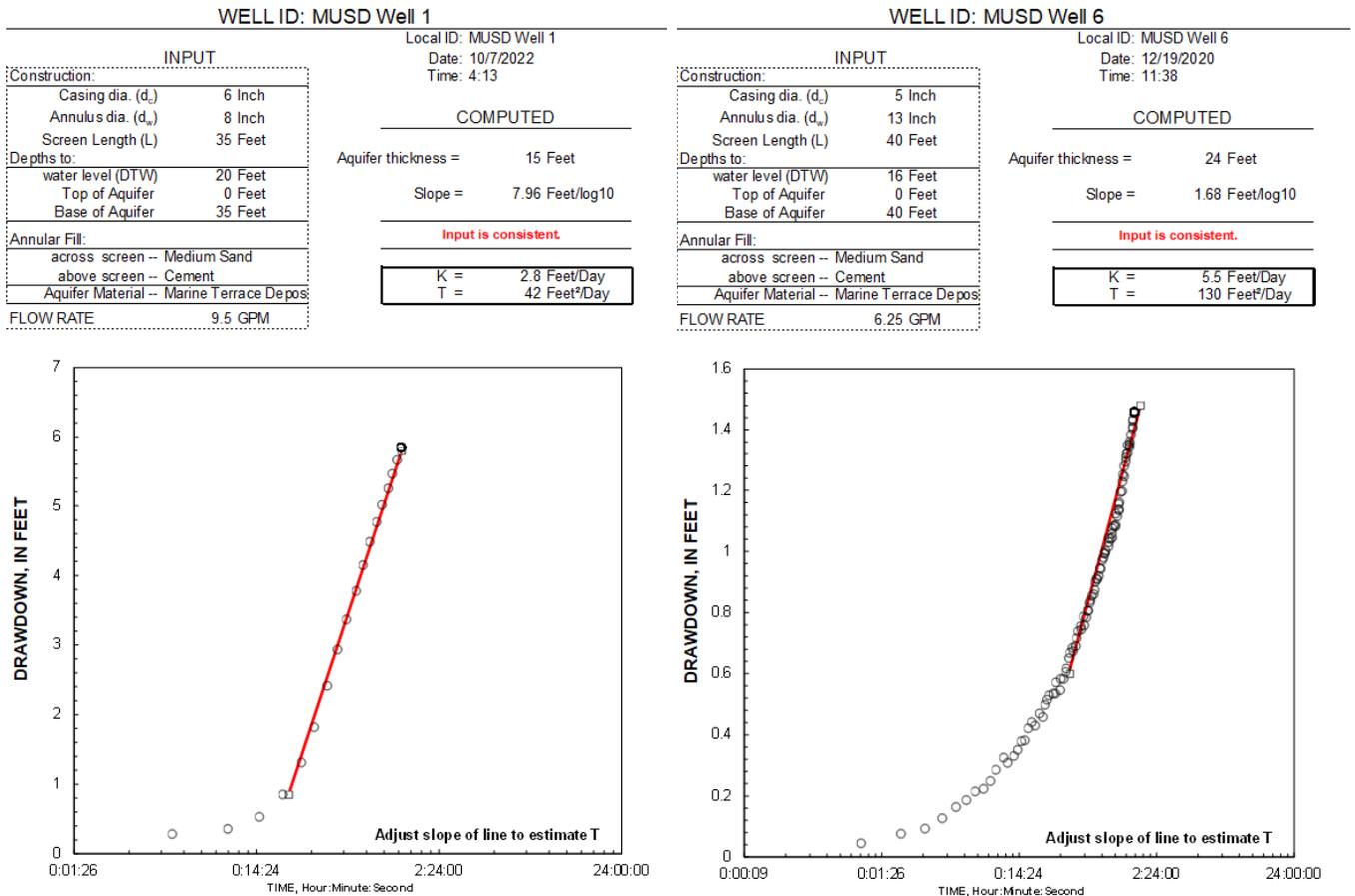


Figure 16 Cooper-Jacob Analysis of Single-Well Aquifer Tests

Flow rates for Well 1 were not recorded during the pumping period however they were visually observed to be 9.5 gallons per minute on September 30, 2022 using a totalizer located on the wellhead and a stopwatch. The long-term flow rate after multi-day pumping periods is likely lower, and in the 6-gpm range (MUSD, 2022).

Hydraulic conductivity is a measure of how easily water can pass through soil or rock. High values indicate permeable material through which water can pass easily, and low values indicate that the material is less permeable. Calculated hydraulic conductivities are relatively close and are generally consistent with what would be expected from relatively fine silty sands to coarse sands which range from 0.03 to 300 feet per day (Fetter, 2001). Transmissivity describes the ability of the aquifer to transmit groundwater throughout its entire saturated thickness and is measured as the rate at which groundwater can flow through an aquifer section of unit width under a unit hydraulic gradient. Transmissivity values vary due to Well 6's higher conductivity and Well 1 being located at a lower elevation than Well 6 and has a correspondingly shallower aquifer thickness. Notably, both test periods are during a severe drought as designated by MCCSD and therefore when the aquifer thickness is near its lowest. Additionally, Well 2 was likely pumping during the analysis period which would decrease the effective conductivity and transmissivity values.

Using these transmissivity values, we can estimate the radius of influence of each well using the following equation:

$$R = r_1 * e^{\left(\frac{2\pi T s}{Q}\right)}$$

R<sub>MUSD Well 1</sub> = 160 feet

R<sub>MUSD Well 6</sub> = 58 feet

Where:

$r_1$  = distance to monitoring well (156 ft from Well 1 to Well 6 and 55 feet from Well 6 to MUSD Well 2)  
 $T$  = transmissivity (4,260 ft<sup>2</sup>/min for Well 1 and 7,800 ft<sup>2</sup>/min for Well 6)  
 $s$  = drawdown in monitoring well (1 ft in Well 6 during Well 1 pumping and 0.5 ft in Well 2 during Well 6 pumping in 2020)  
 $Q$  = pumping rate (9.5 gpm in Well 1 (estimated) and 6.25 gpm in Well 6).

These values for Well 1 are conservative, since the pumping effects of Well 2 (which intermittently pumped) during this time period is not accounted for and assumed here into Well 1. Therefore, the Well 1 radius of influence is likely at least on the order of approximately 25 percent less. This would have to be confirmed with a proper long-term pumping test, in which Well 2 is non-operational during the test.

Specific capacities of Well 1 and Well 2 have previously been estimated as 4.2 gallons per minute per foot of drawdown and 1.1 gallons per minute per foot of drawdown, respectively, during simultaneous pumping over an 8-hour period, shown in Figure 17 (GHD, 2019b). Again, these specific capacities have been estimated during a period of simultaneous pumping and would increase during a single pump analysis.

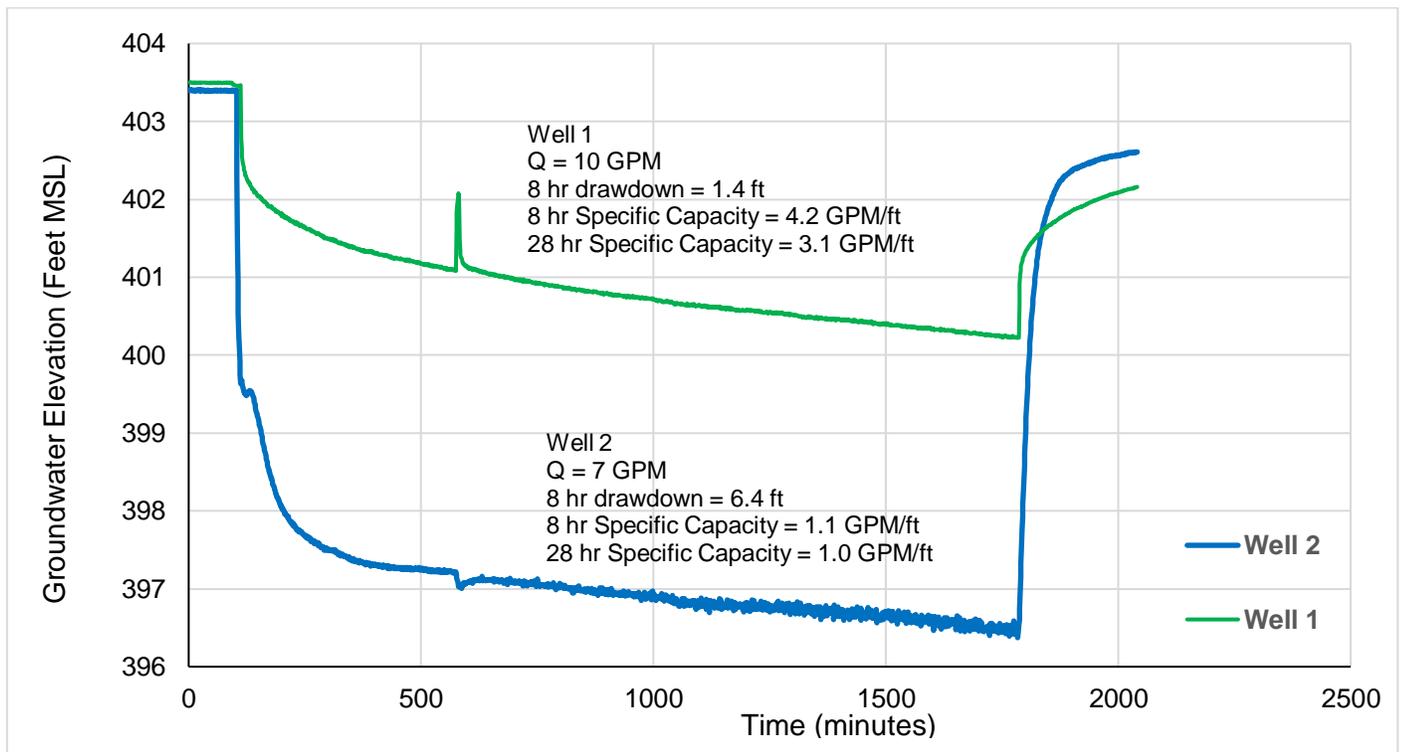
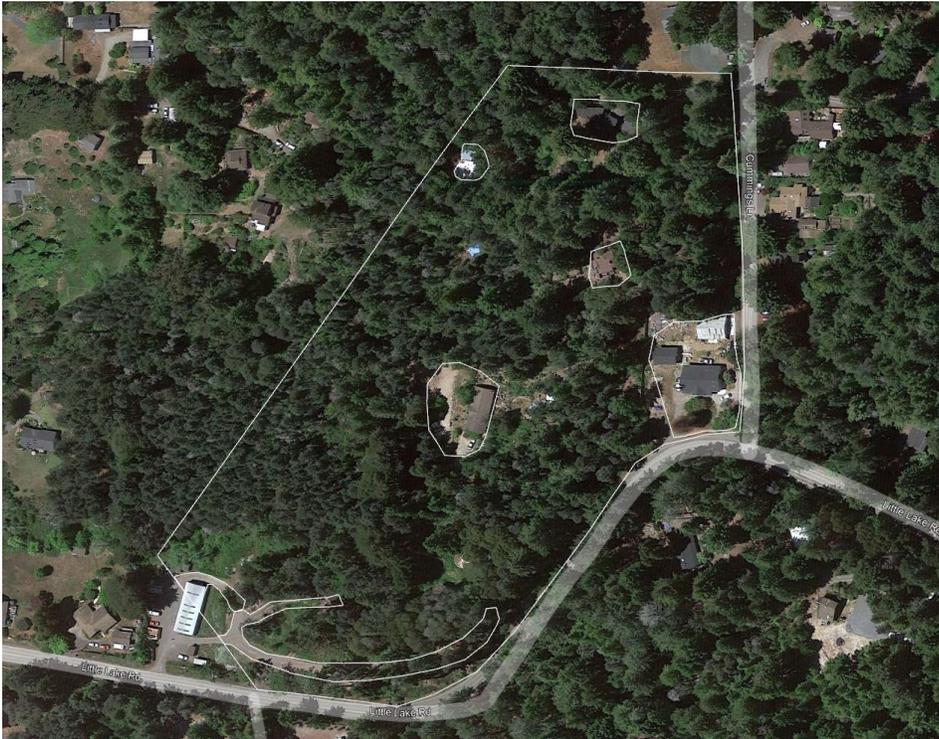


Figure 17 MUSD Well 1 and Well 6 Constant Rate Pump Test (GHD, 2019b)

## 4.2 Water Budget

Within a given watershed area, a water budget can be made to evaluate the quantity of water entering and leaving that watershed area. Incoming sources of water include precipitation over the watershed area and incoming groundwater from upgradient sources. Outgoing water pathways include surface water runoff, groundwater springs, and evapotranspiration from soils and plants. Typically, an imbalance in incoming and outgoing water sources results in a change in groundwater storage, however the local aquifer is relatively shallow and flows out the Mendocino headlands and into the Pacific Ocean due to its geometry and shallow bedrock. This results in the aquifer having a relatively small storage capacity that slowly drains out of downgradient springs and into Slaughterhouse Gulch. A full water budget is outside of the scope of this report however, precipitation, runoff, evapotranspiration, and upgradient groundwater have been reviewed to evaluate groundwater availability and are discussed below.

The annual average precipitation for the Mendocino area is approximately 40 inches, and a summary of average precipitation by month is provided in Table 2, below. The total area that drains through the Site, shown in Figure 18, is approximately 12.4 acres of which an estimated 1.0 acres are developed impermeable areas. Development of the well field is not anticipated to significantly change this impermeable area as the only planned impervious developments are the new concrete well heads which will be approximately 4 feet in diameter each, with an overall negligible impervious area developed. Land use is not anticipated to change significantly as the surrounding area is primarily developed residential properties. While minor tree removal will be required to construct access for the installation and maintenance of the new well field, select removal of trees and construction of a permeable gravel access road is not anticipated to cause any significant change in land use, runoff characteristics, or soil infiltration capacity.



**Figure 18** Approximate Drainage Area and Impervious Areas (Image from Google Earth)

The ground cover for the area is dominated by heavy brush, trees, and vegetation. Soils are moderately fine to fine grained. Using the SCS runoff method, the area draining through the Site has the following characteristics:

- Hydrologic Soil Group C (relatively low infiltration rates typical of documented silty sands and clays)
- Curve Number for trees and heavy brush 57 (88 percent of total area) [SCS TR-55 Table 2-2d]
- Curve Number for impervious areas 98 (12 percent of total area) [SCS TR-55 Table 2-2a]
- Average Curve Number 62

$$S = \frac{1000 - 10CN}{CN}$$

$$P_e = \frac{(P - 0.2S)^2}{(P + 0.8S)}$$

Where:

S = the maximum soil retention

P = Precipitation

P<sub>e</sub> = Accumulated precipitation (Estimated Runoff)

Table 2 Estimated Annual Precipitation and Runoff for the Site

Month	Average Rainfall (in)	Average Estimated Runoff (in)
October	2.29	0.16
November	4.99	1.43
December	7.15	2.91
January	7.09	2.87
February	6.53	2.46
March	5.97	2.07
April	2.96	0.38
May	1.41	0.01
June	0.47	0.00
July	0.07	0.00
August	0.20	0.00
September	0.59	0.00
<b>Total (in)</b>	<b>39.7</b>	<b>12.3</b>
<b>Total (acre-feet)</b>	<b>41.0</b>	<b>12.7</b>

Based on the estimated drainage area of the Site (12.4 acres) and average total precipitation (39.7 inches) there is approximately 41 acre-feet of water annually falling in the Site drainage area. Of these 41 acre-feet, approximately 12.7 acre-feet is estimated to be runoff as surface flow, while the remaining 28.3 acre-feet is estimated to infiltrate into the soil and groundwater. These monthly estimates for runoff / infiltration provide a conservative upper bound as these precipitation events happen over several storm events throughout the rainy season and not all at once (as assumed in this estimate). Precipitation distributed over numerous events would decrease the amount of surface runoff and increase infiltration and shallow groundwater recharge.

Potential evapotranspiration (PET) is the total amount of water that could potentially be lost from a vegetated surface given unlimited water. PET is dependent on many different factors including solar intensity, air temperature, humidity and wind speed. Regional PET estimates indicate that there is between 20 to 30 inches of evapotranspiration annually at the project location (UMNTSG, 2015). Applying this across the non-impervious drainage area (11 acres), PET is estimated to be between 18 and 27 acre-feet per year. Actual rates of evapotranspiration only ever reach PET after heavy rain events and the soil reaches its maximum water capacity (saturation). In general plant roots are found in the topsoil layer, above the water table that defines the top of the groundwater aquifer and are therefore dependent on water supplied by precipitation. When the amount of plant-available water in the soil decrease, actual evapotranspiration rates quickly fall to a fraction of PET and during droughts this ratio commonly falls below 50 percent (Andersen and Pollyea, 2012). Seasonally, evapotranspiration follows trends in air temperature with the maximum rates occurring during the summer months, and minimum rates during the winter months.

Upgradient groundwater flows are difficult to estimate and have a high degree of uncertainty due to the complex nature of hydraulic conductivities over long distances and variable aquifer geometry, however by limiting the boundary of incoming groundwater (inflows) to the limits of the upgradient project parcel boundary (eastern edge) we can make a 1-dimensional conservative estimate of the groundwater inflow volume for the Site using the following equation.

$$\text{Incoming Groundwater} \left[ \frac{\text{cubic feet}}{\text{day}} \right] = \text{Boundary Length [ft]} * \text{Aquifer thickness [ft]} * \text{Hydraulic Conductivity} \left[ \frac{\text{ft}}{\text{day}} \right]$$

$$180 \frac{\text{acre} - \text{feet}}{\text{year}} \text{ or } 21,000 \frac{\text{cubic feet}}{\text{day}} = 500 \text{ ft} * 15 \text{ ft} * 2.8 \frac{\text{ft}}{\text{day}}$$

### 4.3 CEQA Considerations

The installation of new wells may influence the water levels in nearby wells and a pumping test should be conducted per MCCSD District Ordinance 2020-1 (Appendix D) with transducers and or manual DTW measurements in neighboring wells to monitor for potential hydraulic groundwater drawdown interference during that test.

Sustainable Groundwater Management Considerations:

- **Chronic Lowering of Groundwater Levels:** Groundwater levels in the aquifer are highly dependent on seasonal precipitation and not traditional seasonal pumping cycles. MCCSD and MUSD will monitor groundwater levels and manage pumping schedules to prevent a prolonged reduction of groundwater levels.
- **Reduction in Groundwater Storage:** Similar to groundwater levels, groundwater storage is highly dependent on seasonal precipitation and the aquifer has limited storage capacity due to shallow terrace deposits and outlets to the Pacific Ocean.
- **Seawater Intrusion:** Seawater intrusion is not a concern due to the topographic elevation, depth of proposed wells, and shallow bedrock.
- **Degraded Groundwater Quality:** Groundwater quality is not anticipated to decrease from the construction and operation of the proposed well field because the wells will have DDW approved well seals and historic groundwater extraction from the same area by MUSD has not affected water quality.
- **Land Surface Subsidence:** Land surface subsidence is not anticipated due to the relatively shallow alluvial thickness and high variability in seasonal groundwater levels.
- **Depletion of Interconnected Surface Water:** Anecdotal evidence from property owners down gradient of the Site indicate that at the confluence of the two unnamed seasonal tributaries that form Slaughterhouse Gulch there is a year-round flow of water. It has previously been estimated that this flow is at a minimum of 900 gallons per day (Clark, 2000). A Biological Resources Report is being prepared in parallel with this report that delineates sensitive areas including potential groundwater dependent ecosystems (GDEs) which for this project take the form of wetlands. While a GDE analysis is not required since this project is not located in a medium or high priority groundwater basin as defined by the State, the identified sensitive areas in the Biological Resources Report will be protected from the well field by a setback from new wells, gravel access road, and underground conveyance piping to protect from potential drawdown from the well field.

## 5. Conclusions

The location of the proposed well field is outside of primary documented hydrogeology of the Mendocino Headlands (DWR and TODD) and the MCCSD service area. The terrace deposits at the MUSD parcel are either an upper section of the Fern Creek Marine Terrace Deposits or are part of a fifth unnamed older marine terrace formation.

### 5.1 Site Hydrogeological Conceptual Groundwater Model

Briefly developed here from this study and review of previous studies, is a general hydrogeological conceptual model (HCM) for groundwater underlying the Project Site and the immediate vicinity aquifers downslope. This is intended to aid in the design of the proposed well field recommendations and for future surface and groundwater monitoring protocols. This should be considered preliminary and should be updated as future groundwater monitoring data is collected.

Directly below the study area (MUSD) and to the west are three principal aquifer types – alluvial aquifers, marine terrace aquifers, and Franciscan bedrock aquifers. An older, potentially distinct 4<sup>th</sup> marine terrace of up to 50-feet thick occupies the MUSD parcel and transmits relatively shallow groundwater within an unconfined aquifer ranging in approximately 15 to 30-feet of aquifer depth (seasonally and rain type year dependent) that flows to the west. The three existing MUSD wells are constructed up to 50-feet deep and have the highest relative specific capacities and long-term yields in the nearby area, ranging from approximately 6 to 9-gpm. For this reason, the wells also have the most potential to hydraulically interfere with each other if too closely spaced and pumping simultaneously. This older marine terrace thins to the west and a few springs and wetlands emerge downslope where the marine terrace has been naturally eroded from surface water incision and bedrock is correspondingly encountered at shallower depths. Bedrock seasonally forces groundwater to the surface of the marine terrace, as evident in the springs located west of the MUSD water tanks and east of the MUSD maintenance building. These springs represent a portion of Slaughterhouse Gulch headwaters and its first seasonal surface flows in the immediate area. Another distinct spring fed branch to Slaughterhouse Gulch begins offsite approximately 1,000-feet to the northwest on the northeast portion of Gurley Lane. The two spring systems flow westerly downslope and converge near Calypso Lane to form the defined Slaughterhouse Gulch stream, with year-round surface flows even during periods of drought.

The alluvial (creek) deposits are generally less than 20-feet in thickness and have formed from overland flow incising and eroding the various marine terraces. This is shown in caisson wells installed adjacent to Slaughterhouse Gulch which are generally less than 20-feet deep and used for both irrigation and domestic supply purposes. The relatively thin and shallow alluvial aquifers have developed from the deposition, erosion, and redepositing cycle of those sediments along the creek banks and gulches as the surface water has migrated westerly to the Pacific Ocean over time. Creek alluvial groundwater flow is generally directly connected with the surface water in Slaughterhouse Gulch and thus this groundwater type is most vulnerable to seasonal variations in precipitation and droughts. The alluvial groundwater is a very shallow; near the ground surface unconfined aquifer that ranges from approximately 5 to 15-feet in thickness.

The Site and lower elevation marine terraces and alluvial terraces are underlain by Franciscan hard rocks of graywacke to slaty materials of relatively very low permeability and transmissivity, that also contain variable groundwater aquifers that move via fracture flow. The Franciscan rocks have variable long-term yields in wells, ranging 0.1 to 3-gpm in near vicinity wells, have variable to unknown total depths of groundwater, have a relatively low storage potential, and are recharged much more slowly by the overlying marine and alluvial terraces over longer periods of time. Bedrock completed wells generally range from 100 to 300-feet or more in depth, and likely exhibit mostly confined to semi-confined conditions.

## 6. Recommendations

Based on data collected during this study and previous reports GHD recommends the following:

1. A total of up to ten (10) new wells be constructed with approximately 120-foot spacing as an anticipated radius of influence to reduce the potential for wellfield interference. Wells should be constructed similar to the design of the active MUSD wells (Well 1, 2, and Well 6) terminating at the bedrock interface.
2. An initial operational plan of the new well field should be developed and the existing MUSD wells (Well 1, Well 2 and Well 6) included. It is initially recommended that no more than half of the well field (6-7 wells) should operate at one time with operating wells staggered such that no adjacent wells are pumping at the same time to reduce the potential for adverse drawdown and hydraulic interference effects. Additionally, pumping of any one well should not exceed 12 hours in a 24-hour period to allow for aquifer recharge in the immediate areas of the pumped wells. Based on this initial operational recommendation, an approximate maximum annual extraction of 24.15 acre-feet per year from the wellfield can be anticipated (assuming an average flow of 5 gallons per minute per well). The well pumping schedule may be revised from this initial recommendation

based on the actual capacity of individual wells, monitoring data, measured aquifer response, and actual future emergency water supply needs.

3. Continuous monitoring of the adjacent domestic wells previously identified in this report, the existing and new wells on MUSD property, and the north caisson well (representing downslope wetland groundwater levels) should be performed.
4. Advise the adjacent property owners who were not able to install pressure transducers due to access issues to have their wellheads repaired / modified by a pump/well contractor to allow future installation of pressure transducers and subsequent groundwater monitoring.
5. The proposed well field should be pump tested during the MCCSD hydrological testing period which begins after August 20<sup>th</sup> and before a total of 6-inches of rainfall has been recorded (Ordinance 2020-1).
6. Consider test wells installed near surface water to be setback by a minimum of 1.5 times their anticipated radius of influence. If future monitoring indicates potential surface water interference, the pumping of those wells should be limited until after the hydrological testing period has ended when 6-inches of rainfall has been recorded after August 20<sup>th</sup> each year (Ordinance 2020-1) to prevent surface water drawdown during the dry season.
7. Consider installing a stream gauge in upper Slaughterhouse Gulch, on the project parcel just down gradient of the existing caisson wells and near the property boundary where observed surface water flows leave the parcel.
8. Consider installing two additional groundwater level monitors, one in the well upgradient of the proposed well field at 44000 Little Lake Road and one downgradient at 416 Palm Avenue, if allowed by owners.
9. Convert the existing northern MUSD caisson well into a monitoring well to monitor the one identified GDE (wetland) and to seal and properly destroy the southern MUSD caisson well to remove a potential contamination pathway into the aquifer.
10. Based on the relatively shallow aquifer thickness, it is recommended that wells be constructed with a reduced surface seal (20-feet in depth) with approval from the Division of Drinking Water (DDW). This reduction may result in a review from the DDW to assess whether one or more wells may be considered Groundwater Under Direct Influence of Surface Water (GWUDI). Other wells near the Site that have a reduced surface seal are not currently considered GWUDI. Wells considered by DDW to be GWUDI are required to meet surface water treatment standards, which may require additional treatment (e.g., filtration).
11. After the initial construction and pump testing of the proposed well field, consider installing one deep (up to approximately 400-foot) test well into bedrock using air rotary drilling methods, and sealing off the upper shallow aquifer zone to approximately 50-feet.

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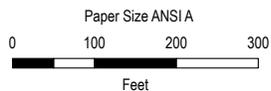
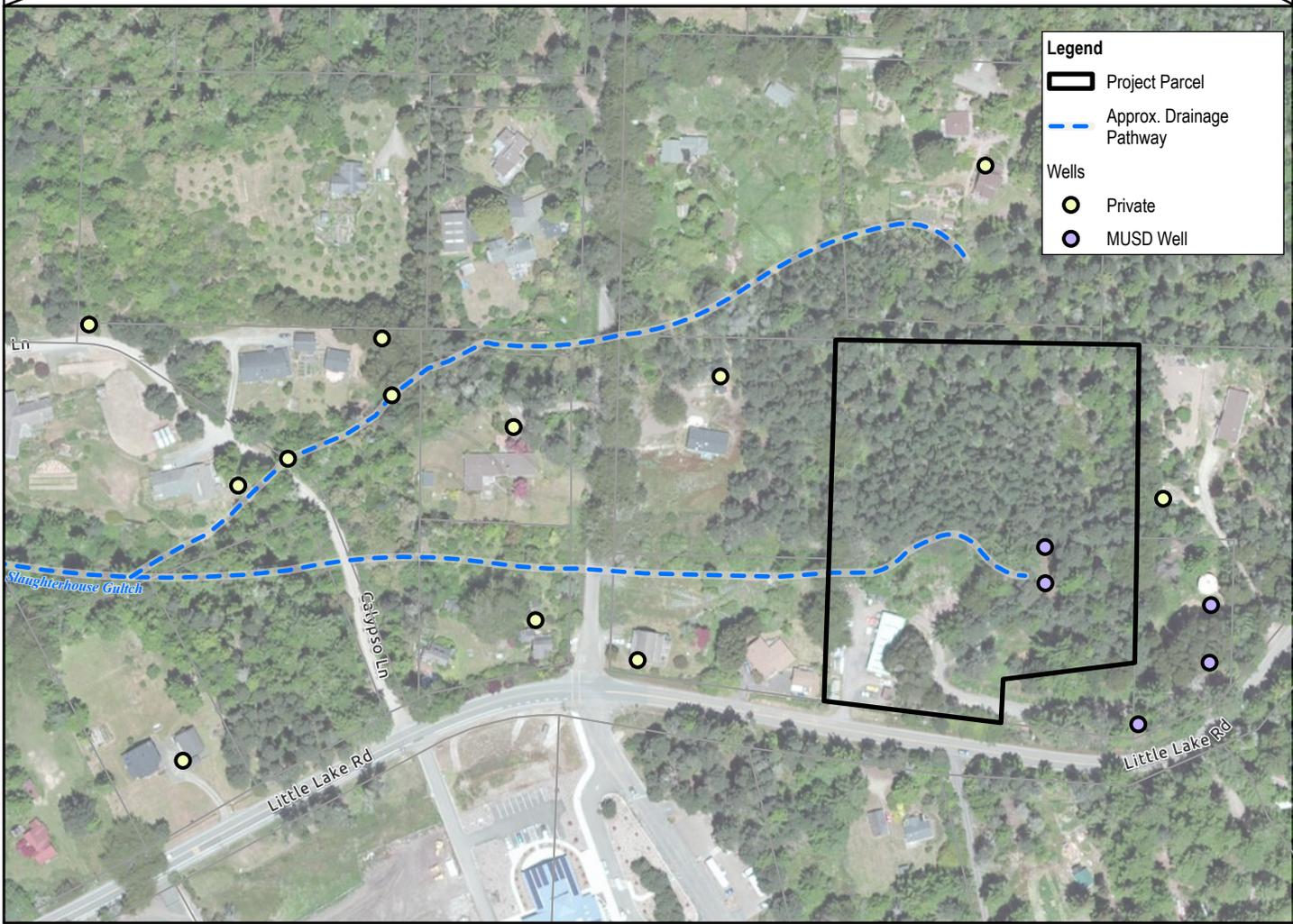
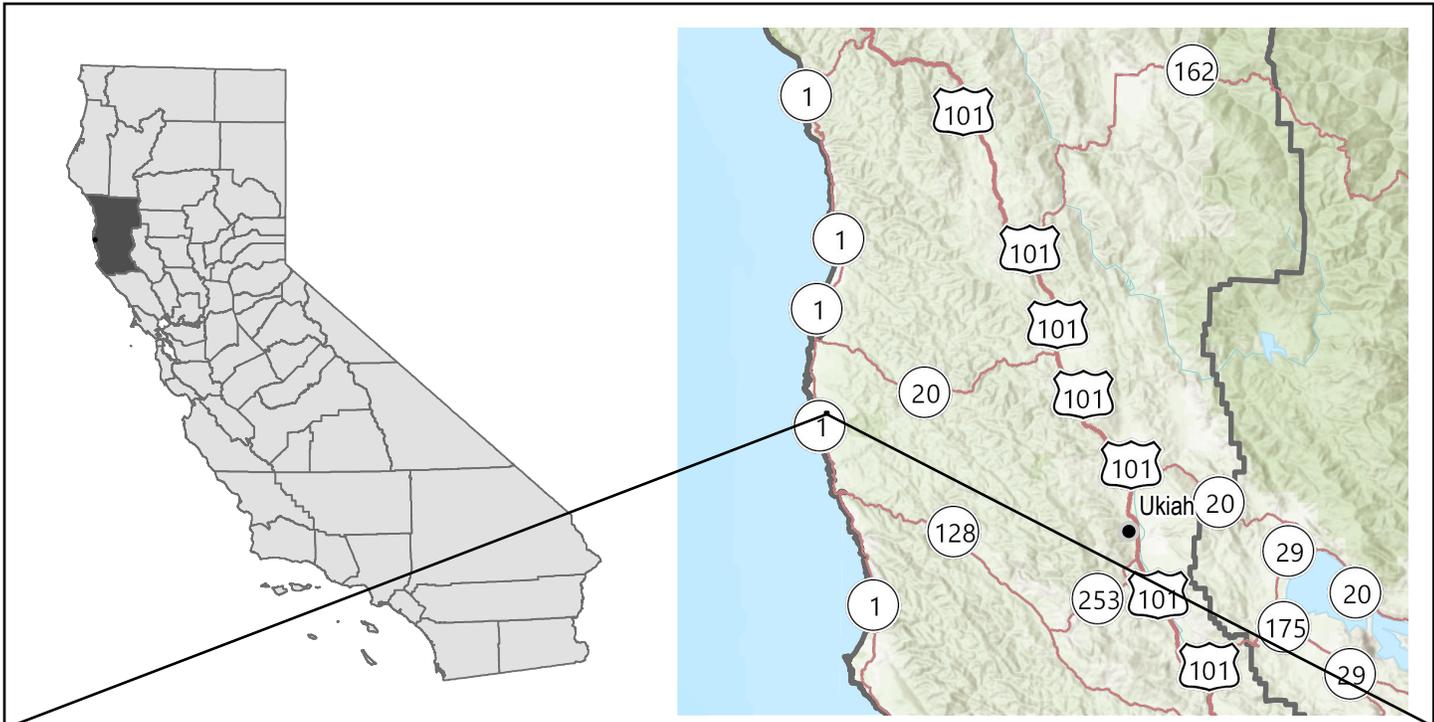
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# Appendices

# Appendix A

Figures



Map Projection: Mercator Auxiliary Sphere  
 Horizontal Datum: WGS 1984  
 Grid: WGS 1984 Web Mercator Auxiliary Sphere

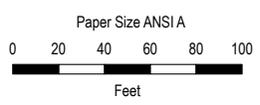
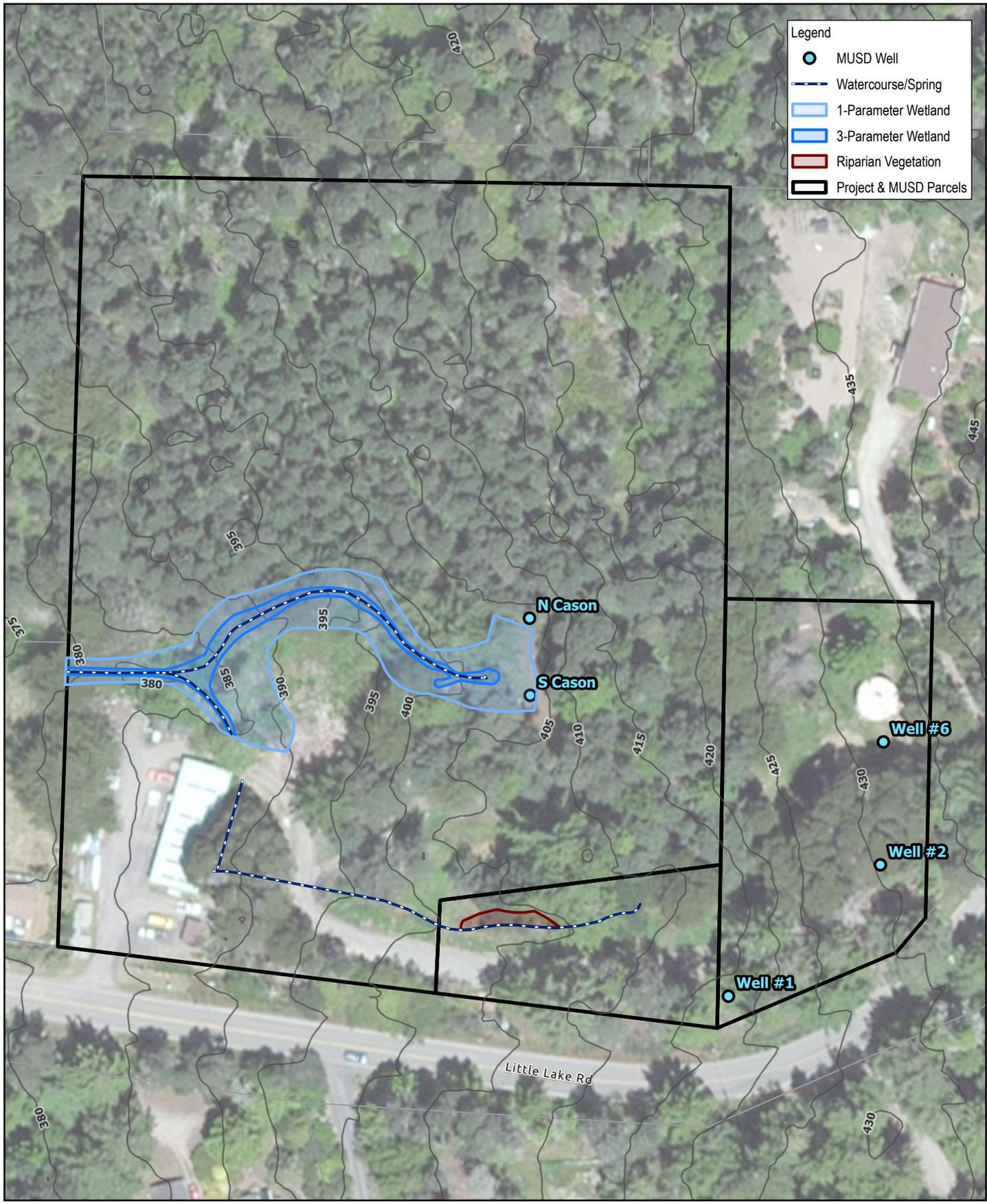


**Mendocino City CSD  
 PW Drought Tolerance Supply  
 and Storage Improvements**

Project No. 12584992  
 Revision No. -  
 Date 12/16/2022

Vicinity Map

**FIGURE 1**



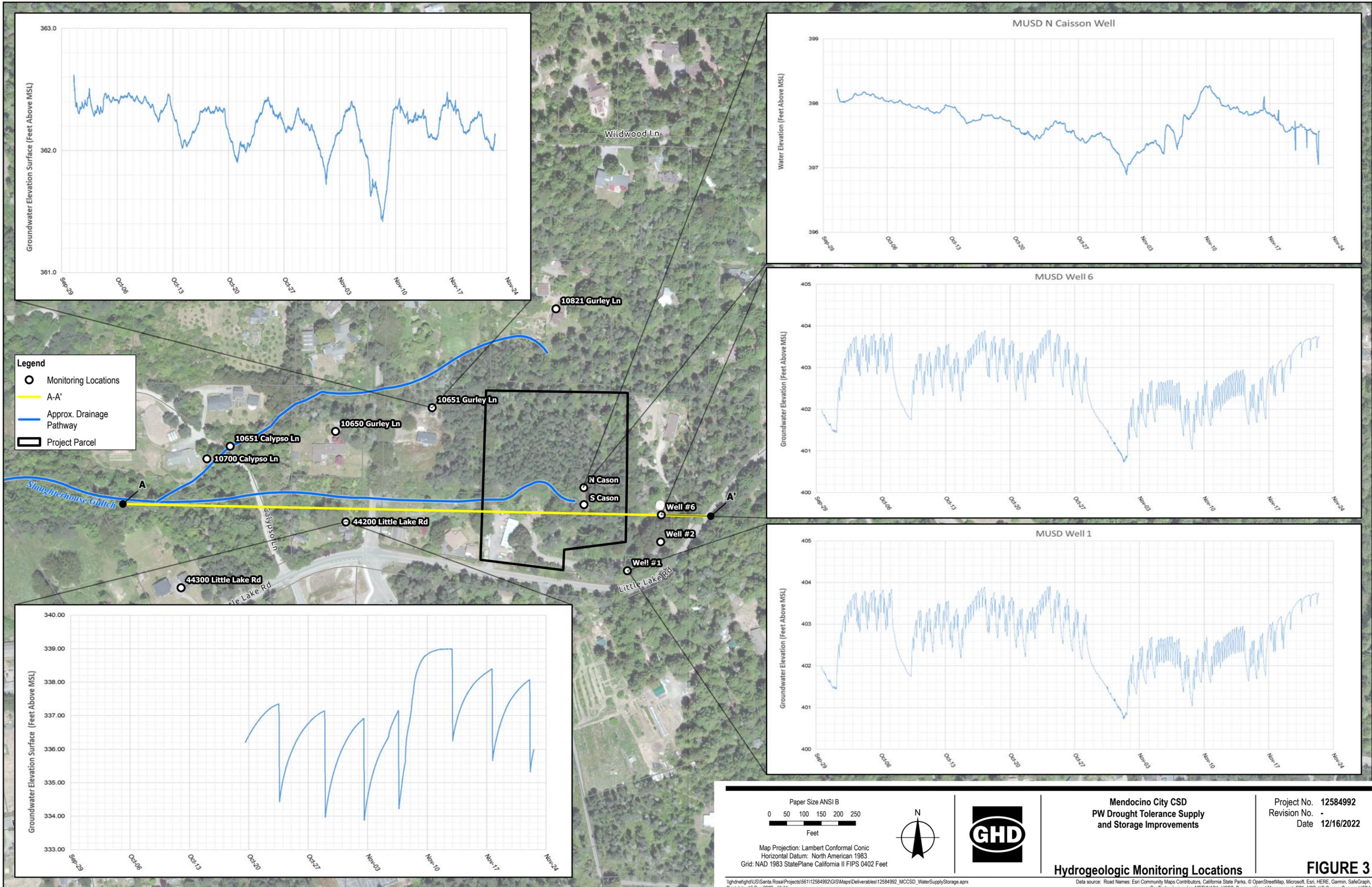
Mendocino City CSD  
PW Drought Tolerance Supply  
and Storage Improvements

Project No. 12584992  
Revision No. -  
Date 12/16/2022

Map Projection: Lambert Conformal Conic  
Horizontal Datum: North American 1983  
Grid: NAD 1983 StatePlane California II FIPS 0402 Feet

Site Plan

FIGURE 2



\\ghdnet\ghd\US\Santa Rosa\Projects\156112584992\GIS\Maps\Deliverables\12584992\_MCCSD\_WaterSupplyStorage.aprx  
 Print date: 16 Dec 2022 - 15:51

Data source: Road Names: Esri Community Maps Contributors, California State Parks, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc., METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA  
 Inside: This work is licensed under the Esri Master License Agreement. View Summary | View Terms of Use/Export: This layer is not intended to be used to export files

# **Appendix B**

**Outreach Letter**

MENDOCINO CITY COMMUNITY SERVICES DISTRICT  
Post Office Box 1029  
Mendocino, CA 95460  
Business Phone (707) 937-5790  
[mccsd@mcn.org](mailto:mccsd@mcn.org)

September 22, 2022

Town of Mendocino Resident/Neighbor  
California Postal Code 95460

**RE: Eastern Area Town of Mendocino – Mendocino City Community Services District Water Level Monitoring**

Dear Friends and Neighbors:

The Mendocino City Community Services District (MCCSD) in partnership with the Mendocino Unified School District (MUSD) has just begun planning for the construction of a water storage tank and some new supply wells on the MUSD maintenance yard property. An almost six acre parcel, northeast of the Mendocino K-8 school. In preparation for these potential new wells, the MCCSD has begun obtaining water level measurements in the nearby areas to further our understanding of the groundwater flow and levels in the vicinity and to evaluate if the new wells may cause adverse effects in existing wells.

The purpose of this letter is to request to install a transducer in your well by our consultant GHD Inc. (GHD) of Santa Rosa. The transducer will be in place for approximately 6 months to record the water levels during the wet and dry season for water level monitoring. MCCSD would greatly appreciate your help in this effort by allowing GHD to collect data from your water supply well.

This would consist of a one-time installation and a one-time removal of equipment at the end of the monitoring period with a couple of data downloads and groundwater measurements. This can be coordinated with you on a weekday at your convenience prior to our anticipated schedule. It would take approximately 30 minutes for GHD to install and uninstall the transducer. You would be provided the results of the monitoring period, and your ownership information would be kept private.

Attached is a location map showing the requested wells to be sampled as part of this study. Please contact Ryan Crawford at (707) 496-8070 or email him at [ryan.crawford@ghd.com](mailto:ryan.crawford@ghd.com) when you are ready to participate in this program or have any questions. He will also be in Town and available for questions/discussion on September 29<sup>th</sup> & 30<sup>th</sup>, if you are interested. Thank you for your time and willingness to assist us on this important study.

Sincerely,

Mendocino City  
Community Services District



Ryan Rhoades  
Superintendent

GHD Inc.



Ryan Crawford  
Senior Hydrogeologist

Attachment: Proposed Eastern Area Domestic Well Monitoring Location Map

# **Appendix C**

**Well Completion Reports**

State of California  
**Well Completion Report**  
 Form DWR 188 Auto-Completed 4/19/2021  
 WCR2021-001445

Owner's Well Number WW-2 Date Work Began 12/10/2020 Date Work Ended 12/11/2020  
 Local Permit Agency Environmental Health Division - Fort Bragg Office  
 Secondary Permit Agency \_\_\_\_\_ Permit Number WW23932 Permit Date 12/02/2020

Well Owner (must remain confidential pursuant to Water Code 13752)	Planned Use and Activity
Name <u>XXXXXXXXXXXXXXXXXXXX</u>	Activity <u>New Well</u>
Mailing Address <u>XXXXXXXXXXXXXXXXXXXX</u> <u>XXXXXXXXXXXXXXXXXXXX</u>	Planned Use <u>Water Supply Domestic</u>
City <u>XXXXXXXXXXXXXXXXXXXX</u> State <u>XX</u> Zip <u>XXXXX</u>	

Well Location	
Address <u>44020 Little Lake RD</u>	APN <u>119-100-23</u>
City <u>Mendocino</u> Zip <u>95460</u> County <u>Mendocino</u>	Township <u>17 N</u>
Latitude <u>39</u> <u>18</u> <u>45.9035</u> N Longitude <u>-123</u> <u>46</u> <u>54.1397</u> W	Range <u>17 W</u>
Deg. Min. Sec.	Section <u>29</u>
Dec. Lat. <u>39.312751</u> Dec. Long. <u>-123.7817055</u>	Baseline Meridian <u>Mount Diablo</u>
Vertical Datum _____ Horizontal Datum <u>WGS84</u>	Ground Surface Elevation _____
Location Accuracy <u>Unknown</u> Location Determination Method <u>Unknown</u>	Elevation Accuracy _____
	Elevation Determination Method _____

Borehole Information	
Orientation <u>Vertical</u> Specify _____	
Drilling Method <u>Auger</u> Drilling Fluid <u>None</u>	
Total Depth of Boring <u>45</u> Feet	
Total Depth of Completed Well <u>45</u> Feet	

Water Level and Yield of Completed Well	
Depth to first water <u>16</u> (Feet below surface)	
Depth to Static _____	
Water Level <u>26.5</u> (Feet) Date Measured <u>12/11/2020</u>	
Estimated Yield* <u>6</u> (GPM) Test Type <u>Pump</u>	
Test Length <u>8</u> (Hours) Total Drawdown <u>10.5</u> (feet)	
*May not be representative of a well's long term yield.	

Geologic Log - Free Form		
Depth from Surface	Feet to Feet	Description
0	5	Silty clay with sand (dry-soft)
5	10	Silty sand yellowish (dry-loose)
10	15	Poorly graded sand, fine sand mix
15	20	Graded sand light gray, fine sand
20	25	Well graded sand, yellowish (wet) fine-coarse sand
25	30	Yellowish silty sand
30	35	Poorly graded sand, coarse sand (wet)
35	40	Dark brown wethered bed rock
40	45	Solid bed rock



17N/17W - 29

Do Not Fill In

No 141427

CONFIDENTIAL LOG  
Water Code Sec. 13752

ORIGINAL  
File with DWR

STATE OF CALIFORNIA  
THE RESOURCES AGENCY  
DEPARTMENT OF WATER RESOURCES  
WATER WELL DRILLERS REPORT

State Well No. \_\_\_\_\_  
Other Well No. \_\_\_\_\_

CONFIDENTIAL LOG  
Water Code Sec. 13752

(1) OWNER:  
Name \_\_\_\_\_  
Address \_\_\_\_\_

(11) WELL LOG:  
Total depth 35 ft. Depth of completed well 35 ft.  
Formation: Describe by color, character, size of material, and structure  
ft. to \_\_\_\_\_ ft.

(2) LOCATION OF WELL:  
County Mendocino Owner's number, if any \_\_\_\_\_  
Township, Range, and Section \_\_\_\_\_  
Distance from cities, roads, railroads, etc. MUSD Watershed on north side of Little Lake Road, Mendocino

0 - 1 Brown top soil  
1 - 8 Brown sandy clay  
8 - 15 Gray sand  
15 - 20 Brown and gray sandy clay  
20 - 25 Birds eye gravel making water  
25 - 35 Brown clay and shale

(3) TYPE OF WORK (check):  
New Well  Deepening  Reconditioning  Destroying   
If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):  
Domestic  Industrial  Municipal   
Irrigation  Test Well  Other

(5) EQUIPMENT:  
Rotary   
Cable   
Other Bucket

(6) CASING INSTALLED:

STEEL:		(OTHER: )		If gravel packed			
From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.	
0	36	8	160	30"			
			PSI				

Size of shoe or well ring: none Size of gravel: pea  
Describe joint Bell & glue joint

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen sawn

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
21	36	5	2	1/8 x 4

(8) CONSTRUCTION:  
Was a surface sanitary seal provided? Yes  No  To what depth 20 ft.  
Were any strata sealed against pollution? Yes  No  If yes, note depth of strata \_\_\_\_\_  
From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Method of sealing cement on gravel pack

Work started 3/23/76, Completed 3/23/76  
WELL DRILLER'S STATEMENT:

(9) WATER LEVELS:  
Depth at which water was first found, if known \_\_\_\_\_ ft.  
Standing level before perforating, if known \_\_\_\_\_ ft.  
Standing level after perforating and developing 9 ft.

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.  
NAME Weeks Drilling and Pump Co.  
(Person, firm, or corporation) (Typed or printed)

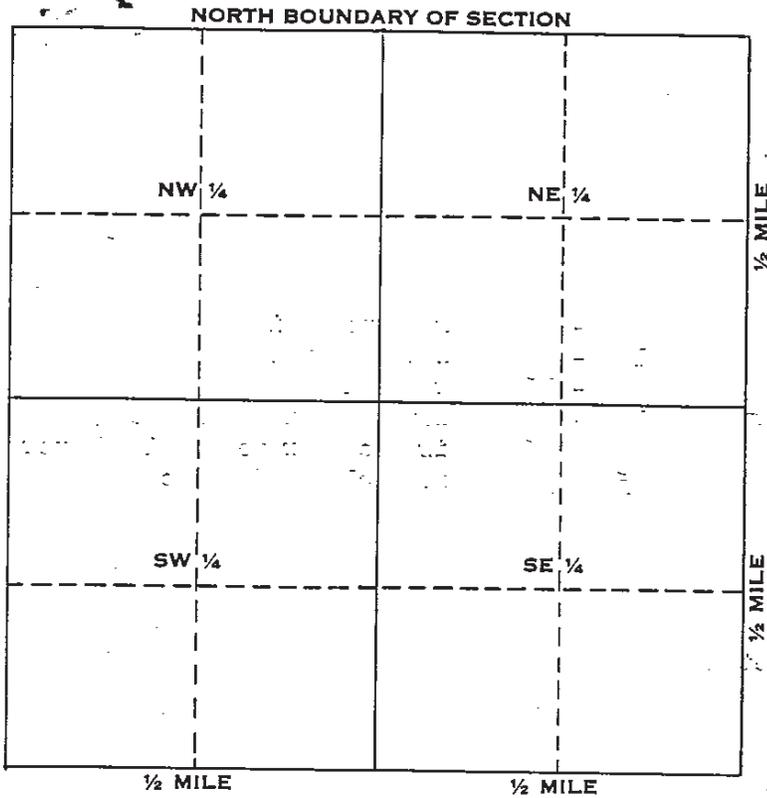
(10) WELL TESTS:  
Was pump test made? Yes  No  If yes, by whom? bail  
Flow: 30 gal./min. with 22 ft. drawdown after \_\_\_\_\_ hrs.  
Temperature of water cold Was a chemical analysis made? Yes  No   
Was electric log made of well? Yes  No  If yes, attach copy

Address Sebastopol Road  
Sebastopol, California 95470  
[SIGNED] Gerald Thompson  
By: Mary E. Thompson (Well Driller)  
License No. 177681 Dated March 24, 19 76

SKETCH LOCATION OF WELL ON REVERSE SIDE

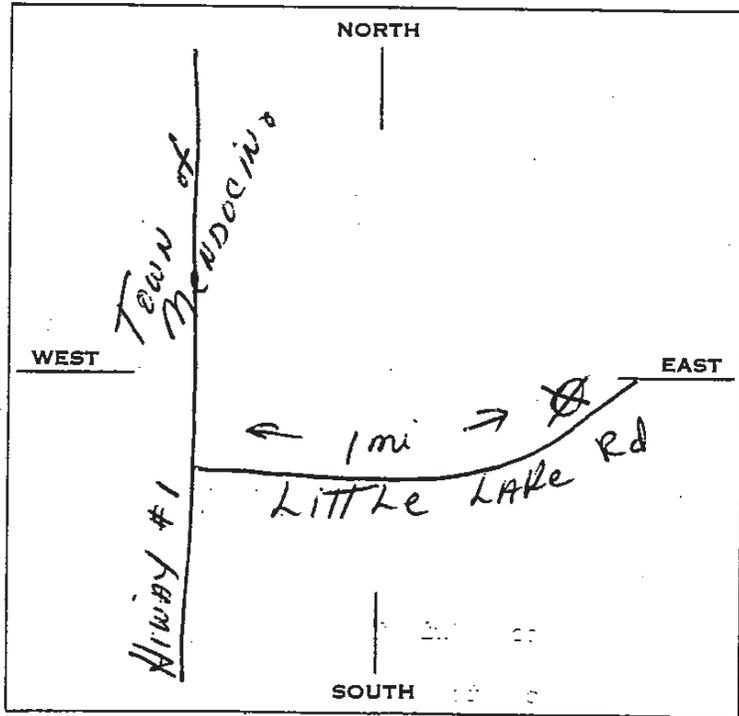
WELL LOCATION SKETCH

141427



Township 17 N/S  
 Range 17 E/W  
 Section No. 29C

A. Location of well in sectionized areas.  
 Sketch roads, railroads, streams, or other features as necessary.



B. Location of well in areas not sectionized.  
 Sketch roads, railroads, streams, or other features as necessary.  
 Indicate distances.

1976 APR 1 AM 11 15

DEPT. OF WATER RESOURCES

ORIGINAL  
File Original, Duplicate and Triplicate with the  
REGIONAL WATER POLLUTION  
CONTROL BOARD No. 1  
(insert appropriate number)

**WATER WELL DRILLERS REPORT**  
(Sections 7076, 7077, 7078, Water Code)  
**THE RESOURCES AGENCY OF CALIFORNIA**

Do Not Fill In  
**No 112963**

State Well No. \_\_\_\_\_  
Other Well No. 17N17W295

**OWNER:**

Name \_\_\_\_\_  
Address \_\_\_\_\_

**(2) LOCATION OF WELL:**

County Mendocino Owner's number, if any—  
R. F. D. or Street No. map attached

**(3) TYPE OF WORK (check):**

New well  Deepening  Reconditioning  Abandon   
If abandonment, describe material and procedure in Item 11.

**(4) PROPOSED USE (check):**

Domestic  Industrial  Municipal   
Irrigation  Test Well  Other

**(5) EQUIPMENT:**

Rotary   
Cable   
Dug Well

**(6) CASING INSTALLED:**

SINGLE <input type="checkbox"/> DOUBLE <input type="checkbox"/>		Gage or Wall	If gravel packed	
From	ft. to		Diam.	ft.
36"	concrete casing		60"	0" to 30"
Type and size of shoe or well ring <u>none</u>			Size of gravel: <u>1 1/2 inch</u>	
Describe joint <u>slip</u>				

**(7) PERFORATIONS:**

Type of perforator used	Size of perforations	in., length, by	in.
From	ft. to	ft.	Perf. per row
bottom	6'		

**(8) CONSTRUCTION:**

Was a surface sanitary seal provided?  Yes  No To what depth 12 ft.  
Were any strata sealed against pollution?  Yes  No If yes, note depth of strata  
From \_\_\_\_\_ ft. to \_\_\_\_\_ ft.  
Method of Sealing \_\_\_\_\_

**(9) WATER LEVELS:**

Depth at which water was first found 12 ft.  
Standing level before perforating 12 ft.  
Standing level after perforating 12 ft.

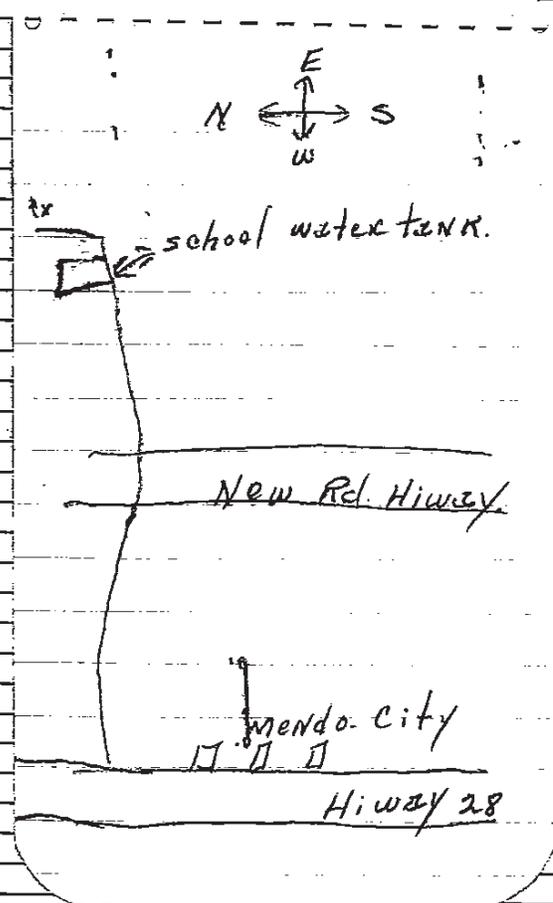
**(10) WELL TESTS:**

Was a pump test made?  Yes  No If yes, by whom?  
Yield: \_\_\_\_\_ gal./min. with \_\_\_\_\_ ft. draw down after \_\_\_\_\_ hrs.  
Temperature of water \_\_\_\_\_ Was a chemical analysis made?  Yes  No  
Was electric log made of well?  Yes  No

**(11) WELL LOG:**

Total depth 29 ft. Depth of completed well \_\_\_\_\_  
Formation: Describe by color, character, size of material, and structure.

0 ft. to 12 ft. spongy clay  
12 " 13 " gravel  
13 " 22 " yellow clay  
22 " 29 " shale and rock  
Two identical wells side by side



**FOR OFFICIAL USE ONLY**

Work started 10/14/63 19 \_\_\_\_\_ Completed 10/18/63 19 \_\_\_\_\_

**WELL DRILLER'S STATEMENT:**

This well was drilled under my jurisdiction and this statement is true to the best of my knowledge and belief.

NAME R & B Drilling  
(Person, firm, or corporation) (Typed or printed)  
Address RT. 1 Box 617-H  
Ukiah, California

[SIGNED] Ralph Brown  
Well Driller  
License No. 197854 Dated 11/12/63, 19 \_\_\_\_\_

ORIGINAL

STATE OF CALIFORNIA

Do not fill in

File with DWR

THE RESOURCES AGENCY

No. 140367

DEPARTMENT OF WATER RESOURCES

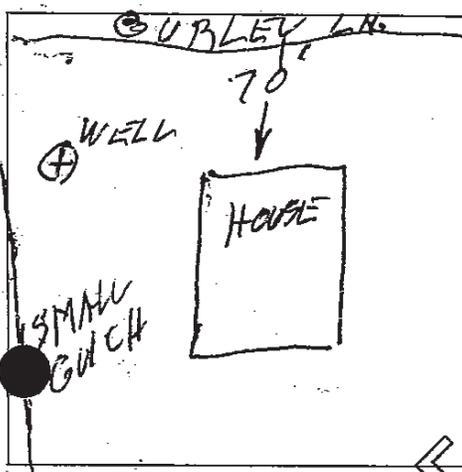
WATER WELL DRILLERS REPORT

Local Permit No. or Date 8002 replaces #7721

119-090-004

State Well No. 17N17W29D  
Other Well No.

(1) LOCATION OF WELL (See instructions):  
County Mendocino Owner's Well Number 119-090-004  
Well address if different from above 10650 Gurley Lane  
Township Mendocino, CA 95460 Range Section  
Distance from cities, roads, railroads, fences, etc.



(3) TYPE OF WORK:  
New Well  Deepening   
Reconstruction   
Reconditioning   
Horizontal Well   
Destruction  (Describe destruction materials and procedures in Item 12)  
(4) PROPOSED USE:  
Domestic   
Irrigation   
Industrial   
Test Well   
Stock   
Municipal   
Other

(5) EQUIPMENT:  
Rotary  Reverse   
Cable  Air   
Other  Bucket   
(6) GRAVEL PACK:  
Yes  No  Size 20 and 40  
Diameter of bore 26 and 40  
Packed from 20 to 59 ft

(7) CASING INSTALLED: Steel  Plastic  Concrete   
(8) PERFORATIONS:  
Type of perforation or size of screen  
From ft. To ft. Dia. in. Gauge or Wall From ft. To ft. Slot size  
1 ft. above grd. 20 59 1/8"  
59 1/4"

(9) WELL SEAL:  
Was surface sanitary seal provided? Yes  No  If yes, to depth 17 ft.  
Were strata sealed against pollution? Yes  No  Interval ft.  
Method of sealing concrete

(10) WATER LEVELS:  
Depth of first water, if known 20 ft.  
Standing level after well completion ft.

(11) WELL TESTS:  
Was well test made? Yes  No  If yes, by whom? Driller  
Type of test Pump  Bailor  Air lift   
Depth to water at start of test ft. At end of test ft.  
Discharge 4 1/2 gal/min after 3 hours Water temperature  
Chemical analysis made? Yes  No  If yes, by whom?  
Was electric log made? Yes  No  If yes, attach copy to this report

(12) WELL LOG: Total depth 59 ft. Depth of completed well 60 ft.  
from ft. to ft. Formation (Describe by color, character, size or material)  
0 - 12 Brown Clay  
12 - 15 White sandy clay  
15 - 20 Blue rock  
20 - 29 Black rock  
29 - 59 Blue and black rock

WATER CODE SEC. 13752

Work started May 16, 1988 Completed May 25, 1988

WELL DRILLER'S STATEMENT:  
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.  
SIGNED John W Murray (Well Driller)  
NAME Murray Well Drilling (Person, firm, or corporation) (Typed or printed)  
Address 30520 Sherwood Rd.  
City Fort Bragg, Ca. Zip 95437  
License No. 268792 Date of this report June 25, 1988

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
 No. **807026**

OWNER'S WELL No. 4796  
 Date Work Began 8/19/02 Ended 8/19/02  
 Local Permit Agency Mendocino  
 Permit No. 15481 Permit Date 7-22-2002

DWR USE ONLY - DO NOT FILL IN  
 STATE WELL NO. STATION NO. 17M/7420M  
 LATITUDE \_\_\_\_\_ LONGITUDE \_\_\_\_\_  
 APN / TRS / OTHER \_\_\_\_\_  
 WFI OWNER \_\_\_\_\_

**GEOLOGIC LOG**

ORIENTATION Vertical Degree of Angle \_\_\_\_\_

DEPTH FROM SURFACE		DEPTH TO FIRST WATER (ft.) BELOW SURFACE	DESCRIPTION
Ft.	Ft.		
0	2		topsoil
2	20		brown clay
20	30		weathered sandstone
30	140		sandstone
140	160		shale w/clay

WELL LOCATION \_\_\_\_\_  
 Address same as above \_\_\_\_\_  
 City \_\_\_\_\_ County Mendocino \_\_\_\_\_  
 Apn Book 119 Page 050 Parcel 43  
 or Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_ 1/4 \_\_\_\_\_ 1/4  
 or Latitude \_\_\_\_\_ NORTH Longitude \_\_\_\_\_ WEST  
 Deg. Min. Sec. \_\_\_\_\_ LOCATION SKETCH \_\_\_\_\_

ACTIVITY	NEW WELL	PLANNED USE(S)	Domestic Water
DRILLING METHOD	ROTARY AIR	FLUID	
DEPTH OF STATIC WATER LEVEL	20 (Ft.)	DATE MEASURED	Aug 19, 2002
ESTIMATED YIELD	* 2 (G.P.M.)	TEST TYPE	Airlift
TEST LENGTH	.2 (Hrs.)	TOTAL DRAWDOWN	150 (FT.)

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

TOTAL DEPTH OF BORING 160 (Feet)  
 TOTAL DEPTH OF COMPLETED WELL 160 (Feet)

CASING								ANNULAR MATERIAL			
DEPTH FROM SURFACE		BORE-HOLE DIA.	TYPE	Material / Grade	Dia.	Gauge	Slot size	DEPTH FROM SURFACE	Seal Material	Filter Pack (Type / Size)	
Ft.	To Ft.							Ft.	To Ft.		
0	30	10 5/8	Blank	F480 PVC	5	160		0	20	Bentonite	
30	160	7.5	Perfs	F480 PVC	5	160	1/8	20	160	Pea Gravel	

- Attachments
- Geologic Log
  - Well Construction Diagram
  - Geophysical Logs
  - Soil Water Chemical Analyses
  - Other

**CERTIFICATION STATEMENT**  
 I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Fisch Bros. Drilling, Inc.  
 (PERSON, FIRM, OR CORPORATION): (TYPED OR PRINTED)  
5001 Gravenstein Hwy No. Sebastopol CA 95472

Signed Dale Theiss Carol Hughes 8-20-02 399226  
 WELL DRILLER / AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

STATE OF CALIFORNIA  
WELL COMPLETION REPORT

No. **0924893**

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO. STATION NO.

LATITUDE

LONGITUDE

APN/TRS/OTHER

WELL OWNER

Work Began 9/9/05 Ended 9/9/05

Local Permit Agency MENDOCINO

Permit No. WN20432

Permit Date 8-16-2006

GEOLOGIC LOG

ORIENTATION Vertical Degree of Angle

DEPTH FROM SURFACE FL. DEPTH TO FIRST WATER (ft.) BELOW SURFACE FL. DESCRIPTION

DEPTH FROM SURFACE FL.	DEPTH TO FIRST WATER FL.	DESCRIPTION
0	2	topsoil
2	20	brown clay
20	25	weathered greenstone
25	140	greenstone w/ shale

Address **10651 GURLEY LANE** CA 94942  
 City **MENDOCINO** County **MENDOCINO**  
 Apr Book **119** Page **100** Parcel **01**  
 Township or Range Section **1/4 1/4**  
 Latitude or NORTH Longitude WEST  
 Deg. Min. Sec. LOCATION SKETCH Deg. Min. Sec.

ACTIVITY NEW WELL PLANNED USE(S) Domestic Water  
 DRILLING METHOD ROTARY AIR FLUID Bentonite  
 DEPTH OF STATIC WATER LEVEL 20 (ft.) & DATE MEASURED Sep 9, 2005  
 ESTIMATED YIELD \* 1.5 (G.P.M.) & TEST TYPE Airlift  
 TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN 135 (ft.)  
 \*May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING 140 (Feet)  
 TOTAL DEPTH OF COMPLETED WELL 140 (Feet)

CASING					ANNULAR MATERIAL			
DEPTH FROM SURFACE FL.	BORE HOLE DIA.	TYPE	Material / Grade	Dia.	Gauge	Slot size	Seal Material	Filter Pack (Type / Size)
0	20	10 5/8	Blank	E480 PVC	5	160	Bentonite	
20	40	8 3/4	Blank	E480 PVC	5	160		
40	140	7 1/2	Perfs	E480 PVC	5	200 Factor		Rea Gravel

- Attachments
- no Geologic Log
  - no Well Construction Diagram
  - no Geophysical Logs
  - no Soil Water Chemical Analyses
  - no Other

CERTIFICATION STATEMENT  
 I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.  
 NAME **FISCH BROS. DRILLING, INC.**  
 (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)  
**5001 Gravenstein Hwy No. Sebastopol CA 9547**  
 Signed **Dale Theiss** *[Signature]* **091305**  
 WELL DRILLER / AUTHORIZED REPRESENTATIVE DATE SIGNED **399226**  
 C- 57 LICENSE NUMBER

# **Appendix D**

**Mendocino City Community Services  
District Ordinance 2020-1**

**ORDINANCE 2020-1**  
**MENDOCINO CITY COMMUNITY SERVICES DISTRICT GROUNDWATER**  
**EXTRACTION PERMIT REQUIREMENT FOR ALL REAL PROPERTY WITHIN ITS**  
**BOUNDARY**

**WHEREAS**, Mendocino City Community Services District (hereafter MCCSD or District) adopts the following Groundwater Extraction Permit Ordinance amending and replacing Groundwater Extraction Permit Ordinances No. 90-1 and No. 91-3, as amended; and

**WHEREAS**, all real property within the boundaries of MCCSD shall be subject to these regulations; and

**WHEREAS**, it is the intent of the MCCSD to protect the groundwater resources within its boundary for the common good of all present and potential users; and

**WHEREAS**, in 1987, the California Legislature passed California Water Code Section 10700 – 10717, as outlined in Assembly Bill No. 786, which provided the MCCSD with the authority to prepare and implement a Groundwater Management Plan and to establish programs for groundwater resources management within the District boundary; and

**WHEREAS**, in 1990, the MCCSD assumed responsibility for groundwater management, and adopted the Groundwater Extraction Permit (GWEP) Ordinance to permit all new development, changes of existing use, and expansion of existing use; and

**WHEREAS**, prior to the adoption of This Ordinance, the District held a public hearing on April 16, 2020 after publication of notice for the first hearing on April 2 & 9, 2020 pursuant to Section 6066 of the Government Code. The District adopted a resolution of intention to adopt and implement the groundwater management program on April 16, 2020. A copy of the program was published in a newspaper of general circulation on April 23, 2020. Notice of the second hearing was published on April 2 & 9, 2020. The Board of Directors scheduled the second hearing for April 27, 2020 to consider protests to the implementation of the program by eligible registered voters residing within the boundaries of the District. There was no majority protest by more than 50% of eligible registered voters in the District. The Board may accordingly adopt This Ordinance within 35 days of the second hearing.

The Board of Directors of the Mendocino City Community Services hereby **ORDAINS AS FOLLOWS:**

**1. Groundwater Extraction Permit Requirement**

To manage the groundwater resources within the MCCSD boundary during both normal rainfall years or during drought conditions and to protect the District's limited groundwater resources, all developed parcels within the MCCSD, whether their water supply is from groundwater extracted from privately owned well(s) or from mutual water company well(s), shall be required to have a valid Groundwater Extraction Permit and limit groundwater extraction to an approved GWEP allotment or Mutual Water Company Memorandum of Understanding allotment.

In addition, no person shall extract groundwater within the boundaries of the MCCSD for "new development", "change in use", or "expansion of existing use" unless the person possesses a valid and current Groundwater Extraction Permit, and no groundwater shall be extracted from a well that is constructed or modified following the adoption of this ordinance without an approved Groundwater Extraction Permit as set forth herein.

Groundwater Extraction Permit shall be obtained prior to:

1. issuance of a Mendocino County Use Permit or Coastal Development Permit;
2. issuance of a Mendocino County Building Permit for other than minor repair and maintenance; or
3. issuance of a Mendocino County Well Permit.

A Groundwater Extraction Permit shall not be necessary for minor repair and maintenance to existing structures and wells, or cleaning of an existing well, but a Groundwater Extraction Permit shall be required for any modifications in the structure or depth of the well.

A Groundwater Extraction Permit shall remain in effect in perpetuity or until a new Groundwater Extraction Permit is issued pursuant to the requirements of this ordinance.

The District Superintendent is authorized to advise appropriate agencies that no permit action is required with regard to cases exempt from MCCSD permit procedures established by this Ordinance.

## **2. Application Required for Groundwater Extraction Permit**

Application for a Groundwater Extraction Permit shall be made in writing on forms provided by MCCSD. The Groundwater Extraction Permit application shall contain the assessor's parcel number, a description of the parcel, the address of the parcel, a description of the proposed change to the parcel, a description of the proposed new development, expansion of existing use, and/or the change in use, a list of all adjacent property owners and their addresses, the existing and proposed placement of wells and water storage facilities on the parcel, the location of existing wells on all adjacent properties, if known, and the maximum amount of water per day anticipated to be extracted by the applicant for the project. A scaled plot map showing all structures, wells, and the proposed development shall be attached to the Groundwater Extraction Permit application. A floor plan for all existing and proposed structures shall be included with the Groundwater Extraction Permit Application. A fee in an amount determined by the Board to cover the cost of administering this groundwater extraction permit process shall accompany the application. The application shall be deemed complete once it is reviewed by the District Superintendent and accepted as complete. The District Superintendent shall contact the applicant regarding the completeness of the application within thirty (30) days of submission and may require further information from the applicant.

## **3. Hydrological Study**

Except as set forth below in Section 4 of this ordinance, all applicants shall be required to submit a hydrological study prior to the issuance of a Groundwater Extraction Permit. A qualified hydrologist (see definition, Appendix B) must perform the hydrological study. Once an application is deemed complete, the applicant shall be permitted to conduct an aquifer pump test from the proposed well(s), as set forth in the application, for the purpose of proving that the amount of water capable of being extracted from the well(s) will support the proposed project as described in the application, based on water use standards established by the Board. The aquifer pump test is also required in order to determine whether the proposed water extraction will have any adverse effect and adverse cumulative effect on hydrologically contiguous wells (see definitions, Appendix B).

The aquifer pump test (Appendix A) shall be conducted continuously over a seventy-two (72) hour period, followed by a monitored twenty-four (24) hour recovery period. The test shall be conducted during the Hydrological Testing Period (see definitions). The Board may modify the time of year for the test upon determination that weather conditions make such modification appropriate. All aquifer pump tests in the District shall be scheduled by the District Superintendent to avoid conflict in the data obtained. Water pumped shall be conserved by storage or shall be routed to a recharge/discharge area beyond the influence of the pump test at the applicant's expense.

The hydrological study shall present data obtained and conclusions derived from the aquifer pump test (see Appendix A for hydrological study outline). The hydrological study should include consideration of local geology and hydrology, documentation of current groundwater development, estimation of water use by the development, a pump test, assessment of on-site availability of groundwater, analysis of potential impacts of the proposed groundwater development, and an analysis of cumulative effects to hydrologically contiguous wells. The hydrological study should be documented in a report summarizing the information and analyses, and it should include appendices containing supporting data. The following report outline is suggested:

- Introduction
- Estimated Water Allotment
- Hydrological Setting
- Performance of Pump Test
- Pump Test Data Analysis
- Mitigation of Adverse Effect and Adverse Cumulative Effects
- Conclusions
- Appendices

All conclusions expressed by the hydrologist in the hydrological study shall be supported by data and other facts, consistent with good hydrological practices. All assumptions and equations relied on by the hydrologist in conducting the aquifer test and forming his/her conclusions shall be included in the hydrological study report. The hydrological study shall consider: 1) the adequacy of the water supply to support the proposed new development, expansion of existing use, or change in use during the dry summer months and drought conditions, and 2) any adverse effects and adverse cumulative effects to hydrologically

contiguous wells. Once a hydrological study has been completed it shall be delivered to the District Office for review.

#### **4. Exceptions to Hydrological Study Requirement**

##### **a. No Increase in Water Demand**

If it is clear, based on the Groundwater Extraction Permit Application, that the proposed water extraction will not increase the applicant's existing quantity of water extraction, the District Superintendent may administratively issue the requested Groundwater Extraction Permit without requiring an applicant to submit a hydrological study. If the proposed new use results in a decrease in water use, a new allotment shall be calculated, and shall be based on the new use.

##### **b. Limited Increase in Water Demand**

Based on the information contained in the Groundwater Extraction Permit application, the District Superintendent may administratively issue a Groundwater Extraction Permit without requiring an applicant to submit a hydrological study if the proposed change results in a limited increase in water demand. A limited increase is the quantity of water required for "new development", "change in use", or "expansion of existing use", as defined by the Water Use Standard adopted by the Board. A limited increase is determined by the increased water demand for the proposed project. As calculated from the Water Use Standard, a limited increase shall not exceed:

1. 30% of an existing water demand that is less than or equal to 320 gallon per day.
2. 10% of an existing water demand that is greater than 320 gallons per day.

As a condition of approval for an exception to the hydrological study requirement, the applicant agrees not to exceed the water use allotment for the existing use. A limited increase only applies to Section 4(b) of the ordinance. Following the issuance of a Groundwater Extraction Permit under Section 4(b) Exceptions to Hydrological Study Requirements, future "new development", "change in existing use", or "expansion of existing use", which result in a limited increase in water demand, may require approval of a Hydrological Study prior to issuance of a new Groundwater Extraction Permit to review the effect that incremental development may have on adjacent wells or the aquifer.

**c. Modification in the Structure or Depth of an Existing Well or Drilling a New Well**

No hydrological study shall be required for modification in the structure or depth of an existing well or to construct a new well located on developed residential or commercial property.

A property owner may apply to drill a test well on an undeveloped parcel. A test well permit is not a Groundwater Extraction Permit. The purpose of the test well is to determine if groundwater is available for future development of the parcel. A hydrological study must be applied for and approved by the District Board of Directors prior to the issuance of a Groundwater Extraction Permit that authorizes extraction from the test well. Following completion of the aquifer pump test for the hydrological study, no groundwater shall be extracted from a test well without a valid Groundwater Extraction Permit.

**d. Prior to Issuance of a Mendocino County Use Permit or a Coastal Development Permit**

Approval of a Groundwater Extraction Permit application shall be required prior to the issuance of a Mendocino County Use Permit or a Coastal Development Permit. No hydrological study shall be required prior to issuance of a Mendocino County Use Permit unless the project is a “new development”, “change of use”, or “expansion of existing use” that establishes an initial water demand on an undeveloped parcel or increases the water demand on a developed parcel.

**e. Prior to Issuance of a Mendocino County Building Permit**

Approval of a Groundwater Extraction Permit application shall be required prior to the issuance of a Mendocino County Building Permit. A Groundwater Extraction Permit application shall not be necessary prior to issuance of a Mendocino County Building Permit for minor repair and maintenance, such as painting, minor repairs to structures, and repair and replacement of roofs. No hydrological study shall be required prior to issuance of a Mendocino County Building Permit unless project is a “new development”, “change of use”, or “expansion of existing use” that establishes an initial water demand on an undeveloped parcel or increases the water demand on a developed parcel.

**f. Section 4 Groundwater Extraction Permit Approval Conditions**

No person shall extract groundwater from a well within the boundaries of MCCSD unless the person possesses a valid and current Groundwater Extraction Permit. A Permittee who has received a permit pursuant to this Section 4 shall install a water meter, record monthly water

meter readings, and submit readings to the District as required. The permit shall specify the quantity of groundwater that the permittee may extract. For those properties assigned water use allotments under provisions of this Ordinance, a penalty will be assessed for continued water use in excess of that allotment. If total use exceeds that allowed by the permit by 25% for three non-consecutive months in one calendar year, the Board may revoke the Groundwater Extraction Permit. Following revocation of a Groundwater Extraction Permit, continued groundwater pumping is a violation of Section 15 of this Ordinance, and a penalty shall be incurred.

**g. Litigation Fees and Costs**

In the event legal proceedings are filed by the District or any other party concerning this Ordinance, the prevailing party in such litigation shall be entitled to recover reasonable attorney's fees and costs (including expert costs) incurred in such legal proceedings in addition to such other relief as may be granted by the court. This provision shall apply to any mediation, arbitration or litigation concerning this Ordinance. The District's successful defense of its groundwater extraction permit program in any legal proceeding shall entitle the District to recover its attorney's fees and costs in accordance with this Section.

**5. Board Shall Adopt Water Use Standards and Require Conservation Devices**

Water use standards have been established by the District designating the quantity of water necessary for a "new development", "expansion of existing use", or "change in use". These water use standards shall be periodically re-evaluated based on actual data collected by the District. The Board shall require water conservation devices including, but not limited to, low flush toilets, to be purchased and installed by permittees.

**6. Hydrological Study Review**

Following delivery of the hydrological study to the District Office, the District shall refer the hydrological study to an approved hydrologist for review. This review shall include, but not be limited to, consideration of adherence to testing conventions, completeness of data, adequacy of the groundwater supply for the proposed development or change in use, cumulative impact on the District's groundwater resources, and any reported adverse effects and adverse cumulative effects to hydrologically contiguous wells. The applicant shall pay a fee as determined by the Board to cover the cost of such review. The hydrological review and the initial study shall then be submitted to the Board for consideration.

## **7. Hydrological Study Approval**

Within sixty (60) days of receipt of the hydrological study review, the Board shall consider both the hydrological study and the review at a regular meeting or a special meeting. Public comment on the proposed hydrological study shall be heard at the regular or special meeting called by the Board. If necessary, the Board may require the applicant, reviewing hydrologist, or author of the hydrological study to submit supplemental information before deciding whether to approve or reject a hydrological study.

**a.** In making their decision, the Board shall consider the findings of the aquifer pump test and the hydrological study, all challenges to the aquifer pump test and the hydrological study that have been received by the District during or prior to the public hearing, all information provided by the reviewing hydrologist, and all public comment.

**b.** If, based on the considerations as set forth above, the Board finds that approval of the hydrological study and issuance of a proposed Groundwater Extraction Permit would more likely than not have an adverse effect on the groundwater supply, or the evidence shows that there is insufficient groundwater to support the proposed Groundwater Extraction Permit project, the Board shall reject the hydrological study.

**c.** The Board may consider mitigation measures that eliminate adverse effects and adverse cumulative effects to hydrologically contiguous wells as a condition for approval of the hydrological study.

**d.** The Board shall approve or reject a hydrological study or grant a continuance, within one hundred twenty (120) days of the time the applicant's hydrological study is filed. If good cause exists, the Board may allow additional time for the review.

**e.** If an applicant's hydrological study is denied, the applicant may request reconsideration. Said request shall be in writing stating the reason for the request and must be filed with the District Office within twenty (20) days of the Board's decision. The Board may require the applicant, reviewing hydrologist, or author of the hydrological study to submit supplemental information before deciding whether to approve or deny reconsideration of the hydrological study. The Board shall continue, approve or deny the reconsideration within forty-five (45) days of said request.

## **8. Groundwater Extraction Permit Approval**

Within sixty (60) days after the filing of a Groundwater Extraction Permit application, the Board shall consider the permit at a regular meeting or a special meeting. Public comment on the proposed Groundwater Extraction Permit shall be heard at the regular or special meeting called by the Board.

**a.** In making their decision, the Board shall rely on the findings of the approved hydrological study and the hydrological study review.

**b.** If, based on the considerations set forth above, the Board finds that issuing of a Groundwater Extraction Permit for the project would not have an adverse effect on the groundwater supply, and the evidence from the hydrological study shows that there is sufficient groundwater to support the proposed Groundwater Water Extraction Permit project, the Board shall approve the permit.

**c.** The Board shall approve or deny a permit or grant a continuance, within one hundred twenty (120) days of the time the applicant's Groundwater Extraction Permit is filed.

**d.** The Board shall establish the maximum amount of groundwater an applicant is allowed to extract, and the permit for groundwater extraction shall be issued on condition of that limitation.

**e.** The applicant shall have two (2) years to complete the Groundwater Extraction Permit process if the groundwater source is not in use when the Groundwater Extraction Permit Approval is issued. If groundwater is currently extracted from an existing well, the applicant shall complete the Groundwater Extraction Permit process within the timeframe stated as a condition of the approval. The Groundwater Extraction Permit Application Approval shall automatically expire by its own terms if the applicant does not adhere to all permit conditions within the time frame stated in the approval.

**f.** The District shall have the right to inspect the water meter installation.

**g.** If an applicant is denied a Groundwater Extraction Permit, the applicant may request reconsideration. The request shall be in writing stating the reason for the request and must be filed with the District Office within twenty (20) days of the Board's decision. The Board shall continue, approve or deny the reconsideration within forty-five (45) days of the request and if they do not act within forty-five (45) days, the request is deemed approved.

## **9. Water Meter Requirements**

Prior to the issuance of any Groundwater Extraction Permit, the applicant shall agree in writing to install an approved water meter prior to any groundwater extraction, at applicant's expense. The applicant agrees to install the water meter as a condition of the groundwater extraction permit approval within the date specified in the approval conditions. The applicant shall agree to submit regular monthly meter readings to the District on the first day of the month for the previous month's groundwater extraction. All applicants and permittees shall give permission for the meter to be read by a District employee. Following the issuance of the Groundwater Extraction Permit, the District, its agents and assigns, may enter onto owner's real property at reasonable times to read the water meter if the property owner fails to submit monthly meter readings for two consecutive months. The water meter shall be accessible by the District during regular business hours. Applicants and Permittees shall provide permission for District employees to sample and test water and to take well depth readings as required for District records, at District expense. Applicant and Permittees may install water meter at property line to facilitate the reading of the meter by District personnel. As a condition of the Groundwater Extraction Permit approval, applicant shall agree to allow District personnel to inspect a water meter installation that is offset from the wellhead. Applicants and Permittees agrees to replace a defective, inaccurate, or inoperable water meter at applicant's expense. No waterline connections (taps) shall be permitted between the water meter and the wellhead.

For new water meter installations, a letter from the District will be sent requesting that the applicant provide the District with groundwater extraction readings beginning thirty (30) days after the issuance of the Final Groundwater Extraction Permit, and thereafter on the first day of each month for the previous month's extraction.

All developed parcels required to obtain a valid Groundwater Extraction Permit with an approved allotment are required to install an approved water meter, and submit monthly meter readings to the District. The applicant shall agree to submit regular monthly meter readings on the first day of the month for the previous month's groundwater extraction.

The District has the following Three-Step Meter Reading Policy to achieve water meter reading compliance from developed property owners subject to groundwater extraction water meter reading and reporting requirements:

**a.** If a developed property owner that is required to submit a monthly water meter reading to the District misses one month's reading, on the twentieth day after the reading is due, District will send the property owner a 1<sup>st</sup> Notice of Violation letter by regular mail. The letter to the property owner will discuss the importance of timely readings and reporting, and advise the property owner that District personnel will read the water meter if timely readings are not forthcoming. They will be informed of various options that are available for submitting the water meter readings other than by regular mail.

1. Through the website
2. E-mail
3. Fax
4. Telephone
5. Annual meter reading service by District personnel for an annual fee

If the developed property owner is served by a mutual water company, and that company is responsible for reading its customers' meters, the 1<sup>st</sup> Notice of Violation shall be sent to the mutual water company serving the developed property. However, the developed property owner shall remain ultimately responsible for the submission of the required water meter readings in a timely fashion, as well as any penalty for failure to submit timely water meter readings.

**b.** If a developed property owner subject to groundwater extraction water meter reading reporting fails to submit a reading by the twentieth day of the second month, a 2<sup>nd</sup> Notice of Violation letter will be sent by Certified Mail to the property owner to inform the property owner that a service charge will be added to their sewer bill for each month of water meter reading non-compliance. If a property owner subject to groundwater extraction water meter reading reporting persists in non-reporting, the District may take the readings on a date and time specified in a 3<sup>rd</sup> Notice of Violation letter sent by Certified Mail, and the property owner subject to groundwater extraction water meter reading reporting will be informed that they will be billed accordingly. A property owner subject to groundwater extraction water meter reading reporting will be asked in the third letter to be present when District personnel read the meter. The third letter will advise a property owner subject to groundwater extraction water meter reading reporting that a service fee will be added to their monthly sewer bill for this service to cover staff time and District expenses. Both the second and third letters will provide them with an alternative to sign up for the water meter reading service on an annual basis for an annual fee. The letters will also reiterate the importance of water meter reading.

c. If the property owner subject to groundwater extraction water meter reading reporting refuses to provide access to the property or refuses to pay the monthly service charge added to their sewer bill for each month of water meter reading non-compliance, the matter may be referred to legal counsel for further handling. One method of further handling such a problem would be to obtain an injunction against the property owner's interference with the District's groundwater management program.

d. The District offers a water meter reading service for all developed parcels within the District that have been required to install a water meter. The charge is based on a determination of the reasonable cost of providing the service. Applications for the meter reading service may be obtained from the District Office. The annually fee for meter reading shall be paid in advance of the service.

#### **10. Groundwater Extraction Permit Approval Extension**

The applicant may request an administrative Groundwater Extraction Permit Approval Extension for a period of two (2) years. An extension of a Groundwater Extraction Permit Approval that was based on the findings of a Hydrological Study shall not be issued for more than ten (10) years from the date of the original Hydrological Study Approval without the applicant providing at applicant's expense a supplemental report showing the conclusions of the Hydrological Study are still valid. The report shall be prepared by a qualified hydrologist (see definition, Appendix B). The report shall include a discussion and supporting data that establish there are no adverse cumulative effects to adjacent wells from the applicant's approved extraction and any additional extraction within the radius of influence of the applicant's test well approved by other hydrological studies for "new development", "expansion of existing use", or "change of use". The Board shall approve or deny a supplemental report at a regular meeting or a special meeting.

There will be an administrative fee for a Groundwater Extraction Permit Extension.

#### **11. Permitted Groundwater Extraction Allotment**

The Groundwater Extraction Permit shall state the maximum amount of groundwater to be extracted. This limit shall constitute an allotment of groundwater to be extracted by the applicant, and the District shall not reduce this amount during normal rainfall conditions unless there is evidence of an error in the application or hydrological study discovered within twelve

months, which the Board determines is sufficient to justify a quantity modification, which would lower or increase the groundwater use allotment. The allotment shall be based on the size and type of District approved development on the parcel. The amount of the allotment is determined from the MCCSD Water Use Standard (Appendix C).

All developed parcels with Groundwater Extraction Permits shall be required to limit groundwater extraction to the Groundwater Extraction Permit allotment, which shall be based on the size and type of development on the parcel. Allotments may be temporarily reduced during drought conditions to help extend the groundwater resource.

Up to two times the amount of a Permittee's approved allotment may be extracted and stored for dry season use during the months of January, February, and March if cumulative rainfall during October, November, and December exceeds 120% of normal average rainfall for that three month period. Permittees extracting additional groundwater during January, February or March shall immediately reduce extraction to the approved allotment if monthly rainfall measured by the District falls below 120% of average monthly cumulative precipitation during January, February, or March.

## **12. Final Groundwater Extraction Permit**

Once a permittee has complied with the conditions of the Groundwater Extraction Permit Approval, which include issuance of an allotment to limit groundwater extraction and installation of a water meter at the wellhead of all production wells, the District shall administratively issue a Final Groundwater Extraction Permit. The Final Groundwater Extraction Permit shall be signed by the property owner. A Groundwater Extraction Permit issued for "new development", "change of use", and "expansion of existing use" shall remain in effect in perpetuity or until approval of a new Groundwater Extraction Permit for the property.

## **13. Prior Extraction Permit Approvals by Mendocino County**

The District shall acknowledge any restrictions on water usage imposed by the County of Mendocino in groundwater extraction permits issued prior to June 1, 1990, and District shall enforce the restrictions under the provisions of the BOS 90-113 agreement. After June 1, 1990, any Permittee previously issued an allotment by Mendocino County under the provisions of BOS 90-113 that submits an application and is approved for a District Groundwater Extraction Permit

for “new development”, “change of use”, or “expansion of existing use” shall be subject to the District’s Groundwater Extraction Permit Ordinance regulations, requirements, and restrictions.

**14. Action on County Referrals of Applications for Use Permits, Land Use Permits, Land Divisions, Local Coastal Plan Consistency Reviews and Coastal Development Permits**

The provisions of this Ordinance shall be applied to all County referrals regarding use permits, land divisions, Local Coastal Plan consistency reviews and Coastal Development Permits.

**15. Misdemeanor and Penalty**

After the adoption and publication of this ordinance, it shall be a misdemeanor for any person to violate any provision, restriction or prohibition contained in this Ordinance or any condition of any valid Groundwater Extraction Permit issued pursuant to this Ordinance, until said Ordinance has been repealed.

Groundwater extraction without a valid Groundwater Extraction Permit is a violation of this Ordinance, and a penalty of \$100.00 per day shall be incurred for groundwater extraction without a valid Groundwater Extraction Permit, or for continued groundwater extraction following revocation of a Groundwater Extraction Permit. Each day of groundwater extraction without a valid Groundwater Extraction Permit shall be deemed a separate violation for purposes of assessment of penalties under this Ordinance. Non-compliance shall be determined commencing with the first day of water extraction activities without a valid Groundwater Extraction Permit.

For those properties assigned groundwater use allotments under provisions of this Ordinance, a penalty will be assessed for continued groundwater use in excess of the allotment. Penalty will be at a rate of two cents per gallon of excess use per month, up to 10% overage, five cents for each gallon in excess of 10%, after there has been excess use for two consecutive months, or for three months during any yearly period. If total use exceeds that allowed by the permit by 25% for three non-consecutive months in one calendar year, the Board may revoke the Groundwater Extraction Permit. For those properties assigned groundwater use allotments under provisions of this Ordinance that extract additional groundwater during the months of January,

February, or March, a penalty will be assessed for groundwater use in excess of twice the permitted allotment. Penalty will be at a rate of two cents per gallon of excess use per month, up to 10% overage, five cents for each gallon in excess use per month.

The District is authorized to read meters to verify water usage. For all other permit violations, a penalty of \$100.00 shall be incurred for each violation. Each day of non-compliance with this ordinance or with the permit conditions shall be deemed a separate violation for purposes of assessment of penalties under this Ordinance. Non-compliance shall be determined commencing with the first day of groundwater extraction activities regulated by the program.

The Board may impose a penalty of \$100.00 per day if the property owner subject to the groundwater extraction water meter reading reporting requirements fails or refuses to:

1. submit the monthly meter reading for a period of three consecutive months;
2. provide access to District personnel to read the meter; or
3. pay the monthly service charge imposed for failure to submit water meter readings.

The Board may impose a penalty of \$100.00 per day if the property owner subject to the groundwater extraction water meter installation requirement fails or refuses to install an accurate operable water meter(s) to measure groundwater production from all wells used to extract groundwater on the owner's property.

Each day of non-compliance shall be deemed a separate violation for purposes of assessment of penalties under this Ordinance.

In the event legal proceedings are filed by the District or any other party concerning this Ordinance, the prevailing party in such litigation shall be entitled to recover reasonable attorney's fees and costs (including expert costs) incurred in such legal proceedings in addition to such other relief as may be granted by the court. This provision shall apply to any mediation, arbitration or litigation concerning this Ordinance. The District's successful defense of its groundwater extraction permit program in any legal proceeding shall entitle the District to recover its attorney's fees and costs in accordance with this Section.

#### **16. California Environmental Quality Act**

The Board of Directors finds that this Ordinance is not a "project" subject to the requirements of the California Environmental Quality Act (CEQA), and/or is exempt from CEQA requirements in accordance with the following reasons:

a. This Ordinance is not a project within the meaning of Section 15378 of the CEQA Guidelines, because it has no potential for resulting in physical change in the environment, directly or ultimately.

b. On a separate and independent basis, the District finds this Ordinance is categorically exempt from CEQA under Sections 15307 of the CEQA Guidelines as a regulatory action taken by the District pursuant to its powers under California Water Code Section 10700 *et seq.* to assure maintenance and protection of a natural resource and the environment during the existence of the water shortage condition and potential emergency declared pursuant to this Ordinance.

c. On a separate and independent basis, the District finds this Ordinance is categorically exempt from CEQA under Sections 15308 of the CEQA Guidelines as a regulatory action taken by the District pursuant to its powers under California Water Code Section 10700 *et seq.* to assure maintenance and protection of a natural resource and the environment during the existence of the water shortage condition and potential emergency declared pursuant to this Ordinance.

d. On a separate and independent basis, the District finds this Ordinance is not subject to CEQA under the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment as the Ordinance is intended to help maintain current groundwater availability.

For the reasons set forth above it can be stated that there is no possibility that adoption and enforcement of this Ordinance will have a significant effect on the environment, consistent with applicable guidelines for CEQA assessment."

**17. Severability**

If any section, subsection, paragraph, sub-paragraph, sentence, clause or phrase of this ordinance is for any reason held to be invalid or unconstitutional, such invalidity or unconstitutionality shall not affect the validity or constitutionality of the remaining portions of this Ordinance and such remaining portions of this Ordinance shall remain in full force and effect.

**18. Board May Issue Emergency Permit**

Nothing in this permit process shall be deemed to diminish the authority of the Board to act in any manner consistent with the existing laws. Nothing in this permit process shall prohibit the Board from issuing any permit for groundwater extraction or other water development without public notice in the event that the Board determines that an emergency situation requires the issuance of such permit.

**19. Constitutionality**

This Ordinance is not intended to authorize, and shall not be construed as authorizing, the MCCSD to exercise its power in a manner which will take or damage private property for public use. This ordinance is not intended to increase or decrease the rights of any owner of property under the Constitution of the State of California or the United States of America.

This ordinance shall be published once in the Mendocino Beacon, a newspaper of general circulation published within the District. This Ordinance was introduced at a meeting of the Board of Directors on May 11, 2020, and adopted by the Board of Directors on May 18, 2020, by the following vote:

AYES: Directors Hauck, Arnold, & Sullivan

NOES: Rice

ABSENT: None

\_\_\_\_\_, Board President

ATTEST:

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Jeanne Christ, District Secretary

## **Appendix A**

### **Hydrological Study Guidelines**

#### **General**

No person shall extract groundwater within the boundaries of the MCCSD for “new development”, “change in use”, or “expansion of existing use” and no water shall be extracted from a well constructed or modified following the adoption of this ordinance within the boundaries of MCCSD unless the person possesses a valid and current Groundwater Extraction Permit. Except as noted in the ordinance, all applicants shall be required to submit a hydrological study prior to issuance of a Groundwater Extraction Permit.

#### **Approved Hydrologists**

MCCSD will maintain a list of approved hydrologists who are authorized to conduct hydrological studies and/or peer review hydrological studies conducted by other approved hydrologists.

#### **Professional Qualifications of Hydrologist**

A California Registered Geologist, who is a hydrologist , a Certified Engineering Geologist, and/or a California Certified Hydrogeologist /or a California licensed Civil Engineer, or Registered Geologist with a minimum of five (5) years of experience in groundwater hydrology are eligible to be approved hydrologists.

#### **Elements of the Hydrological Study**

The hydrological study should include consideration of local geology and hydrology, documentation of current groundwater development, estimation of water use by the development, a pump test, assessment of on-site availability of groundwater, analysis of potential impacts of the proposed groundwater development, and an analysis of cumulative effects to hydrologically contiguous wells. The hydrological study should be documented in a report summarizing the information and analyses, and should include appendices containing supporting data. The following report outline is suggested:

- **Introduction**

The introduction should include: 1) a description of the project, 2) a description of the location of the proposed development with respect to contiguous properties and wells, and 3) location and site maps. The well head location and elevation should be surveyed in using a benchmark and datum acceptable to MCCSD.

- **Estimated Water Allotment**

The water allotment for the proposed development shall be calculated from the Groundwater Extraction Permit Ordinance Water Use Standard. The allotment is based on the size and type of proposed development described in the Water Use Standard.

- **Hydrological Setting**

Include a summary of the local hydrological setting, site characteristics, and present groundwater use on the contiguous properties and current groundwater use on the proposed development parcel. Discuss the following:

- 1. Local Geology and Groundwater**

Describe the local geology and occurrence of groundwater. Locate all streams and springs on the project parcel and on contiguous parcels, and measure the spring and stream flows, or estimate their dry season flow from available reports by California Department of Water Resources, State Water Resources Control Board, and others.

- 2. Aquifer Description**

Identify the aquifer(s) to be developed. For terrace aquifers, note the extent of the aquifer, average thickness, and average storage capacity. For bedrock aquifers, and composite terrace/bedrock aquifers, provide information on weathering and fracturing, depth to hard bedrock, and other relevant information.

- 3. On-Site Hydrological Conditions**

Document on-site hydrological conditions, including geologic materials encountered during the drilling of the well, and static depth to water during the

Hydrological Testing Period (see Appendix B Definitions). DWR Water Well Drillers Report(s) of the well(s) should be included.

#### **4. Existing Wells**

Identify all wells on the study parcel and on contiguous parcels. Show well locations and elevations on the assessors parcel map and on the well inventory and topographic map of the Mendocino Headlands available from MCCSD show measured distances to the pumping well. Describe each well, including depth, pump setting, well construction details, geological log if available, static water level in wells, use and estimated pumpage, and water level fluctuations. Observed well interference between hydrologically contiguous wells identified in previous hydrological studies that are within the radius of influence of the test well must be included in the Hydrological Study. Geologic cross-sections illustrating information from available well logs are recommended.

- **Performance of Pump Test**

The pump test is intended to document that an adequate groundwater supply is available on the site for the proposed project and to determine any adverse effect and adverse cumulative effects on local groundwater users and the aquifer(s) as a whole. Pump testing requirements for hydrological studies are as follows:

- 1. Notice Requirements for Aquifer Pump Test**

At least ten days before the beginning of the aquifer test, the District shall publish notice of the test in a local paper of general circulation in the town of Mendocino. The District shall also post notice of the aquifer test at the District Office, the Mendocino Fire House and the Mendocino Post Office ten days before the beginning of said test. At least ten days before the beginning of the aquifer pump test the District shall notify in writing all adjacent property owners along with any person who requests notice in writing. All notifications will be mailed certified-return receipt requested. The **Notice(s) of Aquifer Test** supplied by MCCSD shall be posted in conspicuous visible location(s) on the parcel where the test is to be conducted ten days prior to the test. Such notices shall inform such

property owners of date, time, location and purpose of the pump test, and provide a contact name, phone number and address in the event that their wells are apparently affected by the test. The notices will emphasize the importance of response as soon as any effects are observed. The notices shall also advise property owners that they can request that their wells be included in the monitoring process. Surrounding property owners who feel that their wells may be hydrologically contiguous may request that their wells be included in the monitoring process. Such request shall be made to the District at least 72 hours prior to beginning of the pump test. Any expense related to this monitoring of wells involved in the pump test shall be borne by the applicant. Any property owner that requests that their well be monitored must agree not to use the well during the aquifer pump test. The Superintendent shall schedule all aquifer tests that are to be conducted in the District.

## **2. Pump Testing Method**

A hydrological study aquifer pump test shall be designed and conducted by or under the supervision of an approved Hydrologist. Pump testing shall be conducted generally in accordance with the procedures outlined in the Mendocino County Coastal Groundwater Development Guidelines (Questa, Engineering, 1989), which details the test procedures for the Constant Rate and Step Drawdown Tests.

Authorization to use any other than the constant rate pump test must be obtained from the District Superintendent before conducting the actual test, and shall be based on submission of items “a”, “b”, and “c” below.

- a) Provide peer reviewed, multiple literature documentation showing that the substitute test provides equal or greater accuracy for predicting aquifer and well characteristics in the study area setting, compared to the constant rate pump test.
- b) Supply industry recognized literature thoroughly documenting how the substitute pump test should be conducted, and the limitations of the test.
- c) Supply industry recognized literature showing how the substitute pump test is analyzed.

The minimum pump test duration will be for 72-hours, with a 24-hour monitoring of aquifer recovery. A minimum of 10 groundwater level measurements per log cycle shall be collected from the test well and monitoring well used to determine aquifer characteristics. Water level measurements are to be accurate within 0.1-foot (or 1-inch). The pump discharge rate is to be monitored and maintained to within 10-percent of the selected pump test rate.

Any variation from these guidelines including total length of pumping time, gaps in pumping, and variation in pump discharge, will require a technical explanation by the professional under whom the tests were performed. It should be noted that these guidelines are not rigid requirements, with the understanding that the ultimate goal of the pump test is to allow a determination of ground water availability and potential effects on the aquifer and nearby wells.

### **3. Monitoring Well(s)**

Pump testing for hydrological studies shall include water level observations in at least one monitoring well throughout the pumping period. It is recommended that at least one monitoring well be installed within the area of influence of the pumped well specifically for use in the pump test. If a monitoring well is installed specifically for the pump test, care should be taken to assure that the screened interval of the monitoring well intersects the aquifer from which the pumped well draws water. As an alternative, existing nearby water wells may be suitable as monitoring wells, provided: (a) they have a screened interval, which intersects the same aquifer as the well to be tested; (b) they are not pumped during the test. A 24-hour pre-test monitoring of water levels in the well to be pumped and in the monitoring wells is recommended. The pre-test monitoring is used to establish any background influences on groundwater levels, i.e., other pumping activities.

Throughout the full duration of the pump test and recovery period, water level measurements in the monitoring well(s) should be made at regular intervals, similar to readings taken for the pumped wells. Measurements are to be accurate within 0.1-foot.

- **Pump Test Data Analysis**

An analysis should be provided of the pump test results and other information in order to document proof of adequate water supply and to determine impacts on local water users and the regional aquifer.

- 1. Well and Aquifer Characteristics**

The following calculations and data should be provided from field measurements to characterize the pumped well and local aquifer.

- a) Drawdown and Recovery. Plot aquifer drawdown and recovery curves on log paper for both the pumped well and monitoring well(s). The curves should be presented for easy comparison. Tabulate all time, water level, and pump rate data in an appendix.
- b) Transmissivity and Storativity. Compute transmissivity and storativity for the local aquifer using the Theis equation, Cooper-Jacobs method (Todd, 1980) or other appropriate techniques. Document methodology, including equations and assumptions, and interpretations. If pump testing data analysis software is used, provide information on the software (program name and synopsis).
- c) Well Efficiency and Specific Capacity. Compute well efficiency and the specific capacity of the well, if appropriate (Todd, 1980).

- 2. Proof of Adequate Water Supply**

The observed pump rate during the pump test should be a minimum of 2.5 times the estimated daily water use allotment to establish proof of an adequate water supply for the proposed development.

- 3. Aquifer Effects**

The observed and computed drawdown at neighboring wells or installed monitoring wells will provide the basis for assessing the extent of adverse effects and adverse cumulative effects on the aquifer and wells on surrounding properties.

- a) Evaluation Criteria for Adverse Effects and Adverse Cumulative Effects

Adverse Effect: An adverse effect on the water table or aquifer shall be considered to occur if the pump rate during the aquifer test results in an aquifer drawdown at the well of an adjacent property or at a well within the

radius of influence which amounts to more than 10-percent of the available water column at such well.

Adverse Cumulative Effect: An adverse cumulative effect will be considered to occur when the sum of incremental drawdown(s) from the current test well(s) and test well(s) from previously approved hydrological studies:

- 1) amounts to more than 10-percent of the maximum available water column at a hydrologically contiguous well.

The cumulative effect is based on the calculated drawdown using:

- 1) the aquifer parameters computed for each well when the well was tested,
- 2) the aquifer conditions for the current test,
- 3) the pump rate for the drawdown calculation for each test well that is equivalent to their approved allotment, and
- 4) a three day pumping period for the calculation.

This analysis assumes that adjacent wells or wells within the radius of influence operate under similar hydrogeologic conditions and physical characteristics as the pumped well, unless evidence to the contrary is available. If more than one well is proposed; it must be demonstrated by calculations, or by actual pump testing, that the cumulative drawdown effect from all wells will be less than 10-percent of the available water column at adjacent wells or wells within the radius of influence.

**b)** Pump Test Results. Aquifer drawdown at all wells within the radius of influence of the production well in the study area shall be reported or computed for conditions during pump testing. Various procedures for computing drawdown and the zone of influence of the pumping well are provided in Appendix A of the Mendocino County Coastal Groundwater Development Guidelines, 1989.

**c)** Projected Drawdown. The projected drawdown effect on the aquifer and the adjacent wells should also be estimated for the following conditions: 1)

maximum day water use demand, 2) 90-day dry weather conditions, and 3) 180-day drought conditions.

#### **4. Regional Aquifer Impact**

To evaluate the regional impact on the aquifer, the expected annual pumpage of the well should be computed. If the well penetrates a terrace aquifer, compare the annual well pumpage amount to the storage capacity of the local aquifer and annual recharge as estimated from water balance calculations. Refer to the Groundwater Modeling Study of the Mendocino Headlands (Questa Engineering and ETIC, June 2004) for additional background information. The Regional Aquifer Impact determination is for informational purposes and for use by MCCSD in further developing and implementing a groundwater management plan, and will not be the basis for issuing the groundwater extraction permit.

- **Mitigation of Adverse Effect And Adverse Cumulative Effect**

Mitigation measures that eliminate adverse effects and adverse cumulative effects on hydrologically contiguous wells shall be included in the hydrological study.

- **Conclusions**

Conclusions should include: 1) comparison of the estimated water allotment for the proposed development and the well capacity used to establish proof of an adequate water supply for the development; 2) summary of effects on hydrologically contiguous wells; and, 3) comparison of annual well pumpage and storage capacity of the aquifer to assess the impact of the well on available groundwater supply.

- **Appendices**

Appendices should include all relevant pump test data and well logs, as well as letters or other communications from nearby well owners, and written responses.

#### **Peer Review of Hydrological Studies**

The District shall refer the hydrological study to an approved hydrologist for review. This review shall include, but not be limited to, consideration of adherence to testing conventions, completeness of data, adequacy of the groundwater supply for the proposed

development or change in use, cumulative impact on the District's groundwater resources, and any reported adverse effects and adverse cumulative effects to hydrologically contiguous wells. The applicant shall pay a fee as determined by the Board to cover the cost of such review. The hydrological review and the initial study shall then be submitted to the Board for consideration.

## **REFERENCES**

1. Calif. Dept of Water Resources (DWR) Town of Mendocino Groundwater Study, June 1985, 53 pp
2. Driscoll, F. G., Groundwater and Wells, 1995.
3. Questa Engineering Corp., Mendocino County Coastal Groundwater Development Guidelines, 1989
4. Questa Engineering Corp. and ETIC, Inc. Groundwater Modeling Study of the Mendocino Headlands, Mendocino, Calif., Consultant Report prepared for MCCSD. June 2004
5. Todd, David Keith, Groundwater Hydrology, 1980 2nd edition, John Wiley & Sons, New York, 535p.

## Appendix B

### DEFINITIONS

**ADEQUATE WATER SUPPLY:** Sufficient quantities of water to support proposed uses and to maintain contiguous and surrounding uses. Adequate water supply is 2.5 times the daily water use allotment established by this Ordinance for the project involved.

**ADJACENT:** Any real property parcels that shares a common border with an applicant's parcel and all surrounding parcels that are separated by a road or easement.

**ADVERSE CUMULATIVE EFFECT:** An adverse cumulative effect will be considered to occur when the sum of incremental drawdown(s) from the current test well(s) and test well(s) from previously approved hydrological studies:

- 1) amounts to more than 10-percent of the maximum available water column at a hydrologically contiguous well.

The cumulative effect is based on the calculated drawdown using:

- 1) the aquifer parameters computed for each well when the well was tested,
- 2) the aquifer conditions for the current test,
- 3) the pump rate for the drawdown calculation for each test well that is equivalent to their approved allotment.
- 4) a three day pumping period for the calculation.

**ADVERSE EFFECT:** An adverse effect on the water table or aquifer shall be considered to occur if the pump rate during the aquifer test results in an aquifer drawdown at the well of an adjacent property or at a well within the radius of influence which amounts to more than 10-percent of the available water column at such well.

**ALLOTMENT:** The maximum amount of water an applicant is permitted to extract on a daily basis, as averaged over a thirty-day (30-day) period.

**APPLICANT:** Any person as defined herein who applies for a Groundwater Extraction Permit.

**AQUIFER:** A saturated bed, formation, or group of formations or strata, which yields water in sufficient quantity to be economically useful.

**AQUIFER PUMP TEST:** Physical testing for evaluation of an aquifer to determine the existence of an adequate water supply and to provide data for the hydrological study. Test to be conducted during Hydrological Testing Period.

**BOARD:** Mendocino City Community Services District Board of Directors.

**CHANGE IN USE:** Any change in use of the property to a different use category as defined in the Water Use Standard.

**CHANGED CIRCUMSTANCE:** A hydrological change that diminishes water availability within the boundaries of the Mendocino City Community Services District or any part therein.

**CLEANING:** Shall include removal of silt and other soft materials, but does not include removal of rock or rock materials.

**CONE OF DEPRESSION:** The depression, roughly conical in shape, produced in a water table by the extraction of water from a well at a given rate. The volume of the cone varies with the rate and duration of withdrawal of water.

**CUMULATIVE EFFECTS:** The sum of incremental drawdown effects by the test well(s) and by previous aquifer pumps tests performed for hydrological studies for granted Groundwater Extraction Permit Approval(s) on a hydrologically contiguous well.

**DEplete:** The lowering of groundwater levels in an aquifer to the point where there is no longer an adequate water supply for existing uses.

**DISTRICT:** Mendocino City Community Services District (MCCSD)

**EMERGENCY:** A sudden, generally unexpected occurrence or set of circumstances demanding immediate action.

**EXPANSION OF EXISTING USE:** Any increase in water usage by action other than New Development or Change of Use.

**GROUNDWATER:** That part of the subsurface water which is the zone of saturation, including underground streams.

**HYDROLOGY:** The science that deals with continental water (both liquid and solid), its properties, circulation, and distribution, on and under the Earth's surface and in the atmosphere, from the moment of its precipitation until it is returned to the atmosphere through evapotranspiration or is discharged into the ocean.

**HYDROLOGIST:** A Registered Geologist, a Certified Engineering Geologist, a Registered Hydrologist, or a Registered Civil Engineer with a minimum of five (5) years of experience in groundwater hydrology and hydrological studies.

**HYDROLOGICALLY CONTIGUOUS WELL:** Any well serving a contiguous or surrounding property where such well is hydraulically connected to the pumping well where there is a reasonable expectation of well interference during the aquifer test or increase in water extraction.

**HYDROLOGICAL STUDY:** A study of the hydrology of a defined area.

**HYDROLOGICAL TESTING PERIOD:** The hydrological testing period will commence on August 20 of any given year and will terminate when 6 inches of rainfall has been recorded beginning August 1<sup>st</sup> of the same year, as measured on the Community Services District’s rain gauge. After December 31<sup>st</sup>, if 6 inches of rainfall has not been recorded, the testing period will be extended and will terminate when 7 inches of rain has fallen since August 1<sup>st</sup> of the prior year. After January 31<sup>st</sup>, if 7 inches has not been recorded, additional extension will allow hydrological testing until 8 inches has fallen as measured from August 1<sup>st</sup> of the prior year. After February 28<sup>th</sup>, termination of the testing period will occur when 9 inches of rain has fallen or March 31<sup>st</sup>, whichever comes first. During the defined testing period, no hydrological testing will be allowed for 5 consecutive days following a recorded rainfall of 1 inch or more. Testing may be resumed after the 5-day waiting period, provided that the total rainfall has not exceeded the above-defined limits of the hydrological test period. The hydrological test period as defined may be modified by Board action in case of unusual rainfall patterns.

**LIMITED INCREASE:** A limited increase is the quantity of water required for “new development”, “change in use”, or “expansion of existing use”, as defined by the Water Use Standard adopted by the Board. A limited increase is determined by the increased water demand for the proposed project. As calculated from the Water Use Standard, a limited increase shall not exceed:

1. 30% of an existing water demand that is less than or equal to 320 gallons per day.
2. 10% of an existing water demand that is greater than 320 gallons per day.

As a condition of approval for an exception to the hydrological study requirement, the applicant agrees not to exceed the water use allotment for the current existing use. A limited increase only applies to Section 4(b) of the ordinance. Following the issuance of a Groundwater Extraction Permit under Section 4(b) Exceptions to Hydrological Study Requirements, future “new development”, “change in use”, or “expansion of existing use”, which result in a limited increase in water demand, may require approval of a Hydrological Study prior to issuance of a new Groundwater Extraction Permit to review the effect that incremental development may have on adjacent wells or the aquifer.

**MINOR REPAIR AND MAINTENANCE:** Repair and maintenance to the existing well structure or equipment. Minor repair and maintenance does not include deepening the well or replacing the casing in the well. Minor repair and maintenance includes painting or minor repairs to structures, replacement of windows, floor coverings, and interior and exterior siding, and repair and replacement of roofs. Construction of a foundation under an existing structure is not considered minor repair and maintenance.

**NEW DEVELOPMENT:** Development of any new water source, division of an existing parcel, or any project, which requires a building or use permit according to Mendocino County regulations.

**PERSON:** Includes any state or local governmental agency, private corporation, partnership, individual, group of individuals, owner(s) or developer(s) of a property subdivision, or, to the extent authorized by law, any federal agency.

**RADIUS OF INFLUENCE:** Is the horizontal distance from the center of a pumping well to the limit of the cone of depression.

**SAFE YIELD:** The maximum quantity of water that is allotted in the Groundwater Extraction Permit Water Use Standard for the proposed development, which can be withdrawn from an aquifer without causing an undesirable effect.

**SUSTAINED YIELD:** Is the maximum pumping rate that a pump can remove water from a well without lowering the water level in the well below the pump intake. A sustained yield in a well exists when drawdown stabilizes and equilibrium conditions are achieved during the aquifer test.

**WATER DEMAND:** Is the quantity of water use calculated from the Water Use Standard for all uses on a parcel. Existing allotments may be greater than or less than the parcel water demand.

**WATER METER:** Any water-measuring device or any other reasonable method used to accurately measure groundwater extraction that is approved by the District.

## Appendix C Water Use Standard

1-2 Bedroom Residential ESD = 200 gal/day

Category number	User Category	ESD/Unit	Gal/Unit	Unit Description
	<b>Residential:</b>			
1	Residence w/ 1-2 bedrooms	1.0	200	gal/d per 1-2 bdr. residence
	Each additional bedroom	0.3	60	gal/d per additional bedroom
2	Apartment	1.0	200	gal/d per 1-2 bdr. residence
3	Guest Cottage	0.5	100	gal/d per unit
	<b>Commercial Visitor Accommodation:</b>			
4	Sleeping Unit	0.6	120	gal/d per unit
5	Vac. Home or Single Unit Rental	1.0	200	gal/d per 1-2 bdr unit
	Each additional bedroom	0.3	60	gal/d per additional bedroom
	<b>Inns, Hotels, B&amp;B's, Motel</b>			
6	Dwelling Unit, w/ kit.	0.8	160	gal/d per unit
7	Dwelling Unit, w/ kit., laundry	1.0	200	gal/d per unit
8	Sleeping Unit w/o kit.	0.6	120	gal/d per unit
9	Sleeping Unit w/o kit., laundry	0.8	160	gal/d per unit
	<b>Commercial Business:</b>			
	<b>Cottage Ind./Home Occupation</b>			
10	Residence	1.0	200	gal/d per residence
11	Business Portion of Residence	0.00075	0.15	gal/d/ft <sup>2</sup>
12	<b>Retail Store/Gallery/Office</b>	0.00075	0.15	gal/ft <sup>2</sup> work or display area
13	<b>Library</b>	1.0	200	gal/d per unit
	<b>Food and Beverage Establishments</b>			
14	Full Service w/ bar	0.017	3.4	gal/d/ft <sup>2</sup> dining area
15	Full Service w/o bar	0.0145	2.9	gal/d/ft <sup>2</sup> dining area
16	No Service, w/seats, no dish washing	0.0105	2.1	gal/d/ft <sup>2</sup> dining area
17	No On-Premise Consumption	0.0105	2.1	gal/d/ft <sup>2</sup> work area
	<b>Bar</b>			
18	Bar area, per linear foot	0.0335	6.7	gal/d/linear ft of bar
19	Patron area	0.007	1.4	gal/d/ft <sup>2</sup> patron area
20	<b>Laundromat</b>	2	400	gal/d/machine
21	<b>Service Station/Garage</b>	5.0	1,000	gal/d/service station
22	<b>Grocery Store</b>	0.001	0.2	gal/d/ft <sup>2</sup> display & work area

<b>Appendix C Water Use Standard</b>				
Category number	User Category	ESD/Unit	Gal/Unit	Unit Description
	<b>Commercial Business:</b>			
	<b>Churches</b>			
23	Church w/ kit.	0.025	5	gal/d/seat
24	Church w/o kit.	0.015	3	gal/d/seat
25	<b>Hall/ Auditorium</b>	0.015	3	gal/d/seat
26	<b>Theater</b>	0.025	5	gal/d/seat
	<b>School:</b>			
27	<b>Rainbow School</b>	0.075	15	gal/d/student
28	<b>Government Office/ Building</b>	0.00075	0.15	gal/d/ft <sup>2</sup> office or work area
	<b>Personal Services</b>			
29	<b>Hair Salons</b>	0.005	1	gal/d/ft <sup>2</sup> work area
30	<b>Hot Tubs</b>	0.0075	1.5	gal/d/ft <sup>2</sup> work area
	<b>Miscellaneous:</b>			
31				
32	<b>Ballpark</b>	4	800	gal/d per unit
33	<b>Mendo. Coast Park &amp; Rec.</b>	0.00075	0.15	gal/d/ft <sup>2</sup>
34	<b>Headlands State Park</b>	10.00	2,000	gal/d
35	<b>MFPD Station</b>	1	200	gal/d per station
36	<b>Veterinary Clinic</b>	0.0039	0.77	gal/d/ft <sup>2</sup>

**Other uses not defined herein shall be determined by the Board of Directors.**

## **Appendix D**

### **Water Use Standard Definitions**

**Additional Residence** shall mean occupancy, by non-transient residents, of a second dwelling unit on a parcel, attached to or detached from the primary residence or commercial business, with provisions for, sleeping, eating, cooking, and sanitation. Typical uses include an apartment or studio.

**Bar** shall mean an establishment or place of business primarily engaged in the sale of prepared food or beverages for on premises consumption.

**Bed & Breakfast** shall mean any building or portion thereof or group of buildings containing no more than four (4) dwelling units or sleeping units, which are designed or intended to be used, let, or hired out for occupancy by transient guests for compensation or profit, with the express permission of the owner, wherein breakfast may be provided for compensation or profit.

**Cottage Industry** shall mean a secondary use of a parcel containing a Single Family Residence, which is the primary residence of the owner or operator of the Cottage Industry. No Cottage Industry may occupy more than 640 square feet of area within any building or buildings on the same parcel and not more than 10 customers or clients shall come to the parcel for service or products during any one-day. Specific standards are:

1. Not more than one (1) outside person may be employed on the premises in addition to the members of the family residing on the premises;
2. The Cottage Industry shall be a secondary use of a parcel containing a Single Family Residence or Dwelling Unit as a principal residence of the owner or operator of the Cottage Industry.
3. No Cottage Industry permitted pursuant to the Ordinance may occupy more than 640 square feet of area within any building or buildings on the same parcel.
4. Not more than ten (10) customers or clients shall come to the residence for service or products during any one-day.

**Detached Bedroom** shall mean a separate incidental structure containing one (1) room only without a kitchen or sanitation facilities, designed for and intended to be used as a sleeping or living facility for family members to be used in conjunction with a main structure which includes kitchen and sanitation facilities. A detached bedroom shall be located no farther than one hundred fifty (150) feet from the main structure, and shall not exceed five hundred (500) square feet of floor area.

**Dwelling Unit** shall mean a living space, which provides independent living facilities for one or more persons, including provisions for sleeping, eating, cooking, and sanitation.

**Equivalent Single-Family Dwelling (ESD)** shall mean a 1-2 bedroom single-family residence in the District's with a water demand of 200 gallons per day or one ESD.

**Food and Beverage Establishments shall mean:**

- 1) Full Service w/ Bar: Eating and drinking establishments or places of business engaged in the sale of prepared food and beverages for on-premise consumption with a bar and full service.
- 2) Full Service w/o Bar: Eating and drinking establishments or places of business engaged in the sale of prepared food and beverages for on-premise consumption without a bar and with full service.
- 3) No Service: Eating and drinking establishments or places of business engaged in the sale of prepared food and beverages for on-premise consumption with seating and no dish washing and no service.
- 4) No On-Premise Consumption: Eating and drinking establishments or places of business engaged in the sale of prepared food and beverages, and which no consumption of the product occurs on the premises.

**Gallery** shall mean an establishment that engages in the retail sale of art or specialty items.

**Guest Cottage** shall mean a living space without provisions for cooking, with provisions for sleeping, and sanitation, and where the person or persons are guest(s) of the regular occupants of the primary residence. Living space shall be restricted to 640 sq. ft.

**Home Occupation** shall mean an accessory use within a Single Family Residence for gainful employment, which involves the manufacture, provision or sale of goods and /or services, where such uses are clearly incidental and secondary to the use of the Single Family Residence for residential purposes, and must not change the character thereof, or adversely affect the residential or rural nature of its surroundings. Specific Standards are:

1. No person other than members of the family residing on the premises shall be engaged in such occupation;
2. No additional water or sewer demands will be created by the use;
3. The Home Occupation shall be incidental and subordinate to its use for residential purposes and not more than 25 % of the floor area of the residence shall be used for such occupation. Use of any accessory building or garage for these purposes shall be prohibited.
4. No more than ten (10) customers or clients shall come to the residence for service or products in any one-day.

**Hotel** shall mean any building or portion thereof containing five (5) or more dwelling units or sleeping units each used, designed or intended to be used, let or hired out for occupancy by transient guests for compensation or profit wherein meals may be provided for compensation or profit.

**Inn** shall mean any building or portion thereof or group of buildings containing five (5) or more dwelling units or sleeping units each used, designed or intended to be used, let or hired out for occupancy by transient guests for compensation or profit, and where regular meals may be provided for compensation or profit.

**Motel** shall mean any building or portion thereof or group of buildings containing five (5) or more dwelling units or sleeping units where such units are directly accessible from an outdoor parking area and where each is used, designed or intended to be used, let or hired out for occupancy by transient guests for compensation or profit.

**Office** shall mean private firms or organizations, which are primarily used for the provision of professional, executive, management, or administrative services.

**Personal Services** shall mean an establishment or place of business primarily engaged in the provision of services of a personal nature. Typical uses include: beauty salon, barbershop, massages studio, or dance studio.

**Retail Store** shall mean a business that is engaged in the sale or rental of commonly used goods and merchandise for personal or household use.

**Single Family Residence** shall mean the occupancy of the primary residential unit of a parcel on a non-transient basis, and the dwelling unit shall provide provisions for sleeping, eating, cooking, and sanitation.

**Single Unit Rental** shall mean the rental of an attached or detached structure (not the primary residence or business) on a parcel for Visitor Accommodations for transient guests for compensation or profit (30 days or less), and shall provide provisions for sleeping, sanitation, and with eating and cooking.

**Sleeping Unit** shall mean a living space, which provides living facilities for one or more persons, but does not include provisions for cooking and eating within the unit.

**Vacation Home Rental** shall mean the rental of Single Family Residence for 30 days or less where the only use on the property is for Visitor Accommodations, to be let or hired as an entire unit for occupancy by transient guests for compensation or profit, and limited to one unit per parcel.

**Veterinary Clinic** shall mean an establishment or place of business primarily engaged in the provision of medical, diagnostic, surgical, dental, and therapeutic services to pet, companion, domestic, exotic, wildlife, and livestock animals.

**Visitor Accommodations** shall mean establishments engaged in the provision of lodging services on a less than monthly basis, which may provide incidental food and drink intended for the convenience of the guests.

