REALM
Engineering
1767 Market Street, Suite C, Redding, CA 96001

Hydrology Report

1850 Ogulin Canyon Road, Clearlake, CA

March 10, 2022

Contents

INTRODUCTION

The purpose of this Hydrology Study/Report is to provide adequate information regarding the water usage for a proposed cannabis cultivation operation and its impacts to surrounding areas. This report was written to meet the requirements of an Urgency Ordinance requiring land use applicants to provide enhanced water analysis during a declared drought emergency, approved by the Lake County Board of Supervisors on July 27th, 2021 **(Attachment A – Urgency Ordinance No. 3106)**.

PROJECT DESCRIPTION

Emerald Mountain Farms, Inc. (EMF) is seeking a Major Use Permit from the County of Lake for a proposed Outdoor Commercial Cannabis Cultivation Operation at 1850 Ogulin Canyon Road near Clearlake, CA on Lake County APN 010-053-03 (Project Parcel). The proposed cultivation operation would be composed of a 34,316 ft^2 outdoor cultivation/canopy area, a 15,000 ft^2 outdoor cultivation/canopy area, a 10,000 ft^2 outdoor cultivation/canopy area, a 6,862 ft^2 outdoor cultivation/canopy area, a 2,384 ft^2 outdoor cultivation/canopy area, a 120 ft^2 Pesticides and Agricultural Chemicals Storage Area (existing wooden shed), a 120 ft^2 Security Center (proposed wooden shed), and nine 5,000-gallon water storage tanks. The total combined outdoor cultivation/canopy area would be 68,802 ft^2.

The 78-acre Rural Lands-zoned Project Parcel is located approximately 1.5 miles east of Clearlake, CA in eastern Lake County. The Project Parcel is accessed via Ogulin Canyon Road, a shared private gravel access road that connect to Highway 53 approximately 1.5 miles east of the Project Property. A metal gate across Ogulin Canyon Road controls access to the Project Property (main entrance). Existing improvements on the Project Parcel include a groundwater well, a man-made off stream water storage reservoir, a private residence, and a shop (metal building).

The Project Parcel consists of a series of low hills bisected by Blackeye Canyon, with elevations ranging from 1,556 to 1,790 feet above mean sea level, and 10 and 40 percent slopes. The proposed cultivation operation would be located on a low ridge that divides the Burns Valley-Frontal Clear Lake watershed (HUC12) from the Grizzly Creek-North Fork Cache Creek watershed (HUC12). An unnamed intermittent Class II watercourse at the bottom of Blackeye Canyon flows from south to west through western half of the Project Parcel. Multiple ephemeral Class III watercourses form on the Project Property, and either flow south into Blackeye Canyon or north into Phipps Creek (offsite). There are two existing culverted ephemeral Class III watercourse crossings in the western half of the Project Parcel on Ogulin Canyon Road. All proposed project disturbance would occur more than 100 feet from surface water bodies.

The proposed outdoor cannabis cultivation areas and associated facilities are/will be accessed via an existing private gravel access road off of Ogulin Canyon Road. 6-foot tall woven wire fences will be erected around the proposed cultivation area(s), and privacy screen/cloth will be installed on the fences where necessary to screen the cultivation areas from public view. The growing medium of the proposed outdoor cultivation/canopy areas will be an imported organic soilless growing medium (composed mostly of composted forest material) in aboveground fabric pots, with drip irrigation systems. All cannabis waste generated from the proposed cultivation operation will be composted on-site within a designated secure composting area, and composted cannabis

waste will be incorporated into the soils of the cultivation areas each year as a soil amendment. Fertilizers/nutrients, pesticides, and petroleum products will be securely stored inside the proposed Pesticides and Agricultural Chemicals Storage Area (existing 120 ft^2 wooden shed).

An existing onsite groundwater well located at Latitude 38.980376° and Longitude -122.577846°, will serve as the water source for the proposed cultivation operation. The cultivation season for the proposed outdoor cultivation operation would begin on or after April 15th of each year, and end on or before November 15th of each year. Water from the onsite groundwater well will be stored within nine 5,000-gallon water storage tanks located adjacent to the onsite groundwater well. Irrigation water would then be pumped from the water tanks to the drip irrigation systems of the proposed cultivation/canopy areas.

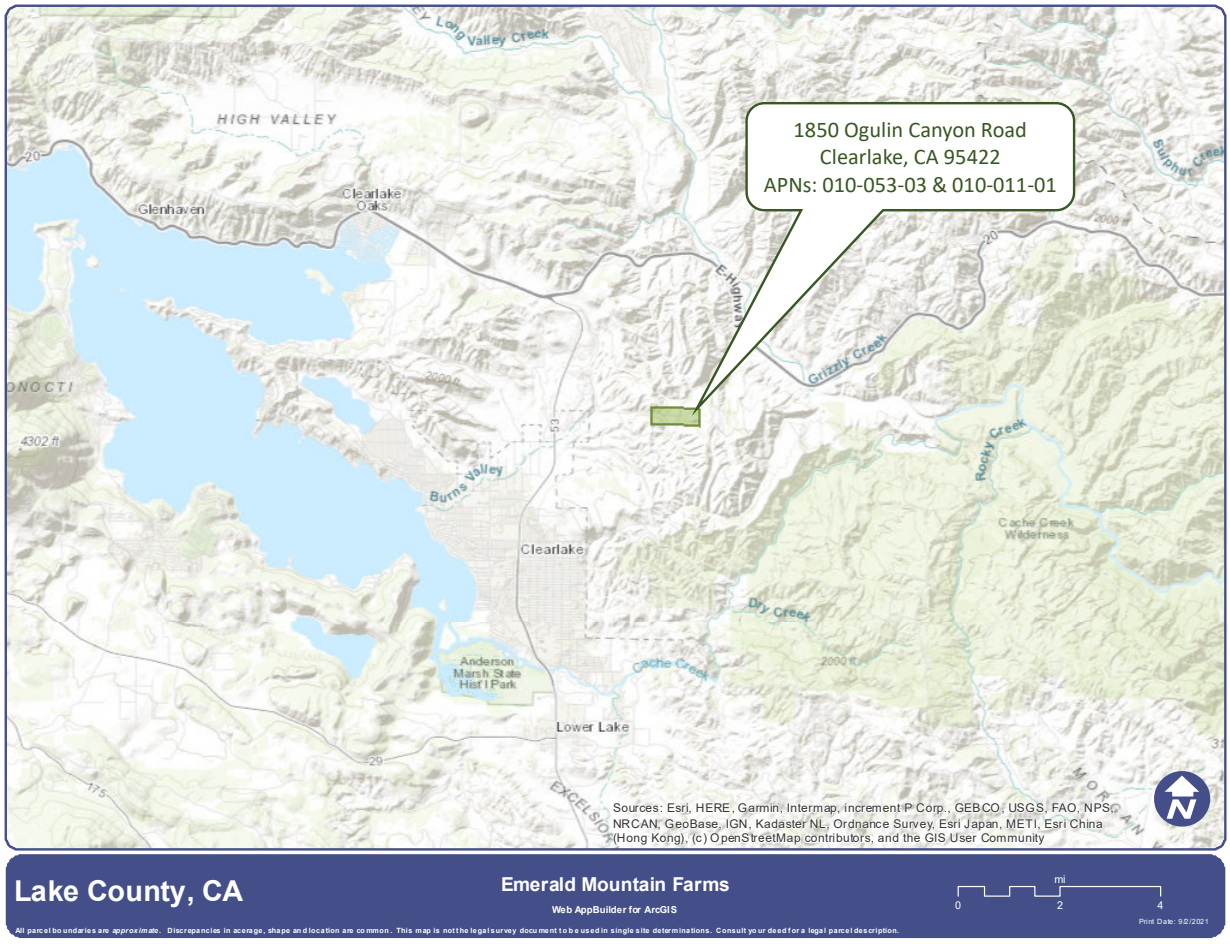


Figure 1 – Site Location Map

WATER USAGE

Cannabis has often been characterized as a high-water-use plant. Bauer et al. (2015)[1] and Carah et al (2015)[2] estimate that cannabis plants can consume up to approximately 6 gallons per plant per day, whereas grapes consume approximately 3.5 gallons per plant per day in the North Coast region of California. Other authors, however, have reported that water use requirement for cannabis plants are similar to those of other agricultural crops, such as corn and hops, with an estimated water use requirement of 25-35 inches per year (Hammon et al. 2015[3]). According to a recent study published in the Journal of Environmental Management (Dillis et al. 2020[4]), outdoor and mixed-light cannabis cultivation uses the most water during the months of August, with an estimated water use of approximately 58,704 gallons per acre during the month of August.

The growing medium of the proposed outdoor cultivation/canopy areas will be an imported organic soilless growing medium (composed mostly of composted forest material) in aboveground fabric pots, with drip irrigation systems, and the total combined outdoor cultivation/canopy area would be 68,562 ft^2. Based on our experience, we estimate that the annual water use requirement for the for the proposed cultivation operation will be approximately 4.7 acre-feet (above ground cultivation = ~3 acre-feet per acre of canopy). **Table 1** (below) presents the expected water use of the proposed cultivation operation in gallons by month during the cultivation season (April through November).

April	May	June	July	August	September	October	November
64,000	196,000	244,000	262,000	294,000	278,000	162,000	32,000

Table 1 – Estimated Monthly Water Use

Based on the water use estimates above, we estimate that the proposed cultivation operation would have a maximum water use requirement of approximately 9,800 gallons per day, with an average water demand of approximately 7,300 gallons per day during the cultivation season (~210 days).

WATER AVAILABILITY

All water for the proposed cultivation operation will come from the existing onsite groundwater well located at Latitude: 38.980376° and Longitude: -122.577846°, near the southern boundary of the Project Property. This groundwater well was drilled to a depth of 260 feet below ground surface (bgs) in March of 2018, through brown gravelly clay (0-40 feet bgs), shale and sandstone (40-200 feet bgs), greenstone (200-210 feet bgs), and Franciscan gravels (210-260 feet bgs). This well had an estimated yield of 50 gallons per minute (gpm) at the time it was drilled **(Attachment B: Onsite Well Completion Report and Well Test)**. On January 14th, 2021 Cramer Enterprises (License No. 98176) conducted a well performance test of the onsite groundwater well. During the well performance test, the water level in the onsite groundwater well was monitored while it was pumped at +30 gpm. The static water level in the onsite groundwater well was 105.8 feet bgs prior to the start of the well performance test. The water level in the onsite groundwater well stabilized at 117.4 feet bgs during the well performance test (**Attachment B: Onsite Well Completion Report and Well Test)**. The water level within the well recovered to 107.8 feet bgs within 10 minutes after the pumping ceased. A Specific

Capacity of 2.6 gpm/foot of drawdown (i.e., 30 gpm / 11.6 feet) was calculated from the well performance test data.

The well yield test data suggests that the onsite groundwater well can produce approximately 2.6 gpm for every foot of drawdown in the well. Additionally, EMF performed water level measurements during July and August of 2021, and the static water level in the onsite groundwater well was found to be between 113 and 116 feet bgs. The peak anticipated daily demand for water of the proposed cultivation operation is ~9,800 gallons, which the onsite groundwater well could produce in 5 hours and 27 minutes when pumped at 30 gpm. Additionally, EMF proposes to establish at least 45,000 gallons of water storage capacity on the property. The well recovery observations of the well yield test and the recent water level measurements indicate that the onsite groundwater well would be able to produce sufficient water for the proposed cultivation operation without causing overdraft conditions.

AQUIFER/GROUNDWATER RECHARGE

Groundwater recharge is the replenishment of an aquifer with water from the land surface. It is usually expressed as an average rate of inches of water per year, similar to precipitation. Thus, the volume of recharge is the rate times the land area under consideration times the time period, and is usually expressed as acre-ft per year. In addition to precipitation, other sources of recharge to an aquifer are stream and lake or pond seepage, irrigation return flow (both from canals and fields), inter-aquifer flows, and urban recharge (from water mains, septic tanks, sewers, and drainage ditches).

To estimate the groundwater recharge at the site, we first must assume that the recharge to the aquifer is primarily through rainfall across the 78-acre Project Parcel (Lake County APNs 010-053-03). Therefore, the annual precipitation available for recharge onsite can initially be estimated using the following data and equation.

> 78 acres x 2.75 feet (Average Annual Precipitation for Clearlake, CA) = 214.5 acre-feet
> Estimated Annual Precipitation Onsite = 214.5 acre-feet/year

However, this estimate does not account for surface run-off, stream underflow, and evapotranspiration that occurs in all watersheds. According to the USGS, the long-term average precipitation that recharges groundwater in the northern California region is approximately 15 percent. Since the Project Property is hilly and covered in gravelly clay loam soils and vegetation, we estimate that the long-term average precipitation that recharges groundwater within the entire site to be approximately 10%. With this data and the precipitation data presented above, we can estimate the groundwater recharge of the Project Property by using the following equation.

> 214.5 acre-feet/year (annual precipitation onsite) x 0.10 (long term average recharge) =
> Estimated Groundwater Recharge = 21.5 acre-feet/year

Based on the estimated average annual recharge to the aquifer of/under the Project Parcel (~21.5 acre-feet/year) and the estimated annual water usage of the proposed cultivation operation (4.7 acre-feet/year), it appears that EMF will have enough water to meet their demands without causing overdraft conditions.

However, the estimates above do not account for severe drought conditions, as we have seen over the last decade. The California Department of Water Resources ranked Water Year 2021 (October 1st, 2020 through September 30th, 2021) as the State's fourth driest on record. During Water Year 2021, less than 10 inches (approximately 9.5 inches) of precipitation fell on the USGS Cache Creek Precipitation Gage near Lower Lake, CA (closest USGS Precipitation Gage to the Project Parcel). If we rerun the calculations above using this precipitation data, we can obtain the following estimate for groundwater recharge during Water Year 2021.

> 78 acres x 0.8 feet (Water Year 2021 Precipitation for Lower Lake, CA) = 62.4 acre-feet
> 62.4 acre-feet (Water Year 2021 Onsite Precip) x 0.10 (long term average recharge) =
> Estimated Severe Drought Value for Groundwater Recharge = 6.2 acre-feet

The estimated amount of water available to recharge the aquifer under the Project Property during a severe drought year (~6.2 acre-feet) is still greater than the estimated annual water usage of the proposed cultivation operation (~4.7 acre-feet).

POTENTIAL IMPACTS TO STREAMS & NEIGHBORING WELLS

Urgency Ordinance 3106 requires analysis of the "Cumulative impact of water use to surrounding areas due to project" implementation. To do this, we must first identify surrounding areas and uses that could be impacted from the project's well pumping/water usage. As outlined in previous sections of this report, all water for the proposed cultivation operation would come from an existing onsite groundwater well located near the southern boundary of the Project Parcel, and the proposed cultivation operation would have an annual water use requirement of approximately 4.7 acre-feet (~1,532,000 gallons) per year.

An unnamed intermittent Class II watercourse at the bottom of Blackeye Canyon flows from south to west through western half of the Project Parcel. Multiple ephemeral Class III watercourses form on the Project Property, and either flow south into Blackeye Canyon or north into Phipps Creek (offsite). The ephemeral and intermittent watercourses of the Project Property do not support aquatic habitat year-round and are typically dry by May of each year, when pumping for the proposed cultivation operation would increase to potentially significant levels. Therefore, the potential for stream depletion as a result of the proposed onsite groundwater usage is not considered a concern to this assessment.

The California Department of Water Resources' Well Completion Report Map Application indicates that there are seven groundwater wells (including the onsite groundwater well) in the same Sections as the Project Property (Township 13N, Range 07W, Sections 12 & 13; Township 13N, Range 06W, Sections 07 & 18). However, upon further review, it is apparent that four of the wells shown on the Well Completion Report Map Application as being located within the same Sections as the Project Property, are actually located within Sections that over two miles east and northeast of the Project Property. Additionally, three wells shown on the Well Completion Report Map Application as being located in Sections over a mile north of the Project Property, were determined to be located within the same Sections as the Project **(Attachment D: Well Completion Reports for Nearest Known Wells)**. Figure 2, on the next page, shows the approximate locations of the nearest known wells to the Project Property **(Figure 2 – Nearest Known Wells Location Map)**.

To evaluate potential well pumping impacts to surrounding areas and uses, the potential lateral extent of pumping from the onsite groundwater well was estimated. Using general relationships discussed in Groundwater and Wells, Second Edition (Driscoll 1986[5]), we estimate the lateral pumping influence using information from the January 14, 2021 well performance test performed by Cramer Enterprises (License No. 984176). An approximate relationship between specific capacity calculated from the well yield test and aquifer transmissivity was used to obtain aquifer characteristics and estimate a potential radius of pumping influence. Transmissivity was estimated for a confined aquifer, using the relationship of specific capacity (yield/drawdown) multiplied by the coefficients of 1,500 (for an unconfined aquifer) and 2,000 (for a confined aquifer). To develop the slope of the drawdown curve from the pumping well, the value of Δs (drawdown over on log graph cycle) was calculated for a distance-drawdown relationship, where T = 528Q/Δs (Driscoll 1986, equation 9.11[5]). The analysis is shown on the attached semi-log plot (**Attachment E – Radius of Influence Analysis)**.

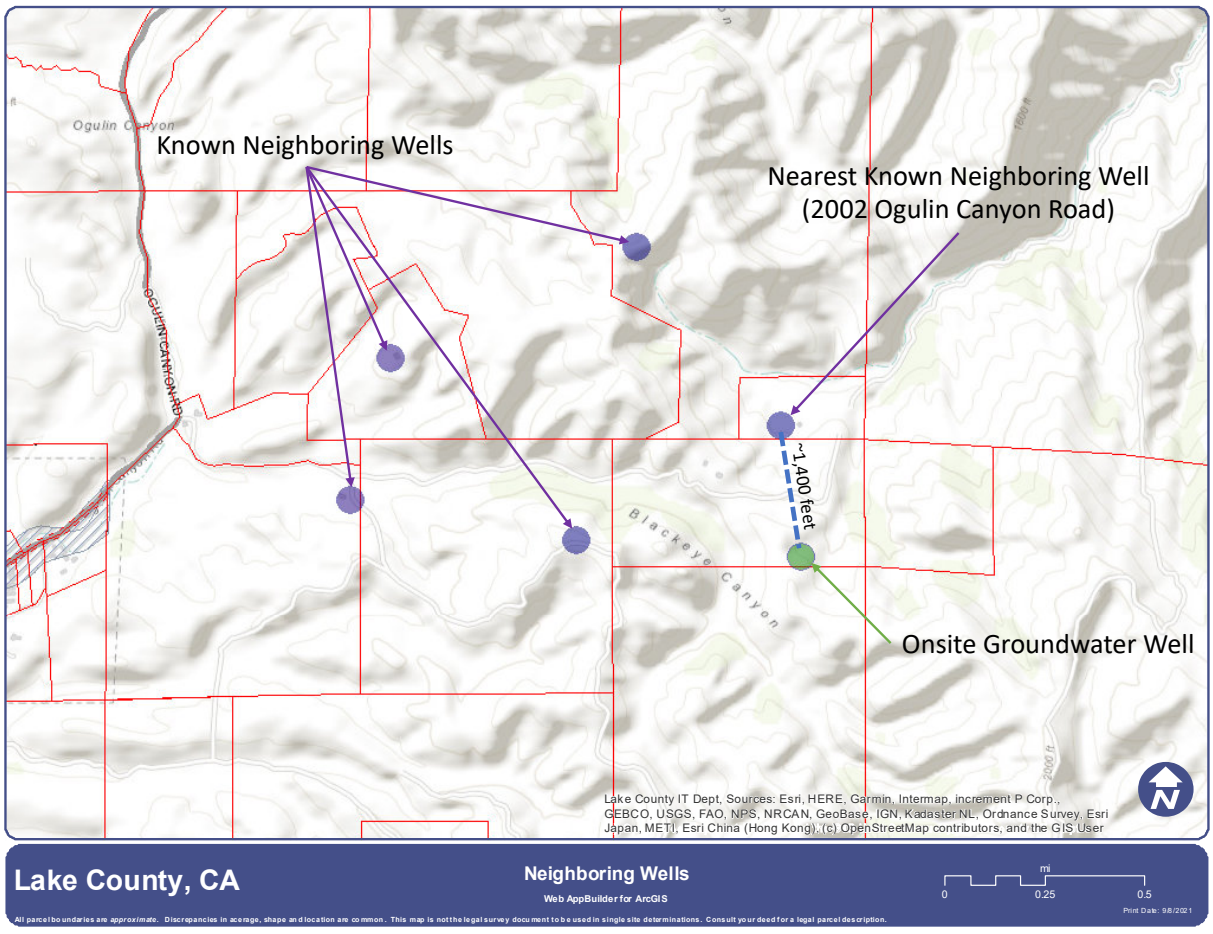


Figure 2 – Nearest Known Wells Location Map

Using data from the Well Performance Test Report and the general relationships outlined above, we calculated a zone of pumping influence extending approximately 100 feet from the onsite groundwater well for an unconfined aquifer, and approximately 1,100 feet for a confined aquifer. The nearest known neighboring well, located at 2002 Ogulin Canyon Road (Lake County APN 010-055-43), is located approximately 1,400 feet north of the onsite groundwater well. The second

nearest known neighboring well, located at 2122 Ogulin Canyon Road (Lake County APN 010-053-02), is located over 2,300 feet east of the onsite groundwater well. Given the horizontal and vertical separations between the onsite groundwater well and neighboring wells, it does not appear that pumping for the proposed cultivation operation will result in well interference.

DROUGHT MANAGEMENT PLAN

The Urgency Ordinance approved by the Lake County Board of Supervisors on July 27th, 2021 (Ordinance No. 3106) requires applicants to provide a plan depicting how the applicants plan to reduce water use during a declared drought emergency. EMF's proposed cannabis cultivation operation would have up to 68,562 ft^2 of outdoor cultivation/canopy area, with a total combined estimated annual water use requirement of approximately 4.7 acre-feet (~1,532,000 gallons). Per the Water Conservation and Use requirements outlined in the State Water Resources Control Board's Cannabis General Order, EMF shall implement the following Best Practical Treatment and Control (BPTC) measures to conserve water resources:

- Regularly inspect their entire water delivery system for leaks and immediately repair any leaky faucets, pipes, connectors, or other leaks;
- Apply weed-free mulch in cultivation areas that do not have ground cover to conserve soil moisture and minimize evaporative loss;
- Implement water conserving irrigation methods (drip or trickle and micro-spray irrigation);
- Maintain daily records of all water used for irrigation of cannabis. Daily records will be calculated by using a measuring device (inline water meter) installed on the main irrigation supply line between the water storage area and cultivation area(s);
- Install float valves on all water storage tanks to keep them from overflowing onto the ground.

With the Water Conservation and Use requirements outlined above, EMF's proposed cultivation operation would efficiently use water resources at all times.

To ensure both success and decreased impacts to the surrounding areas, EMF plans to reduce their outdoor cultivation/canopy area and water usage by 10 percent, when a drought emergency has been declared for their region. To reduce their water usage by 10 percent, EMF will not plant 6,856 ft^2 or more of their proposed cultivation/canopy area. The cultivation/canopy area(s) to be left fallow will depend on when a drought emergency is declared (before or after the proposed canopy areas have been planted) and the phase of site/project development. Additionally, EMF will prioritize the preferred canopy areas over less desirable canopy areas (based on cultivation experience) when determining which canopy areas to maintain and which to leave fallow. By implementing the Drought Management Plan outlined above, EMF would reduce their estimated annual water demand from approximately 1,532,000 gallons to 1,378,000 gallons during periods of drought.

CONCLUSIONS

All water for the proposed cultivation operation will come from the existing onsite groundwater well located at Latitude: 38.980376° and Longitude: -122.577846°, near the southern boundary of the Project Property. This groundwater well was drilled to a depth of 260 feet below ground surface in March of 2018, with an estimated yield of 50 gallons per minute at the time it was drilled. A recent well performance test performed in January of 2021, indicates that the onsite groundwater well can produce at least 30 gallons per minute. From the well performance test data we can calculate a Specific Capacity of approximately 2.6 gpm/foot for the onsite groundwater well. The total estimated annual water use requirement for the proposed cultivation operation is approximately 1,532,000 gallons per year.

Based on data from the recent well performance test and the estimated water use requirement(s) for the proposed cultivation operation, it appears that the onsite groundwater well is a sufficient water source for the proposed cultivation operation. Based on the estimated average annual recharge to the aquifer under the Project Parcel (~21.5 acre-feet/year) and the estimated annual water usage of the proposed cultivation operation (4.7 acre-feet/year), it appears that the aquifer storage and recharge area are sufficient to provide for sustainable annual water use at the site and on the Project Property.

The calculated a zone of pumping influence for the proposed cultivation operation extends up to 1,100 feet from the onsite groundwater well. It does not appear that pumping for the proposed cultivation operation will impact neighboring wells, given the horizontal and vertical separations between the onsite groundwater well and neighboring wells. Additionally, it does not appear that pumping for the proposed cultivation operation will impact nearby ephemeral and intermittent watercourses, as they are typically dry by April or May of each year, when pumping for the proposed cultivation operation would increase to potentially significant levels.

Emerald Mountain Farms' Drought Management Plan is to reduce their outdoor cultivation/canopy area and water usage by 10 percent, to ensure both success and decreased impacts to the surrounding areas during a drought emergency. The canopy area(s) to be left fallow will depend on when a drought emergency is declared and the phase of site/project development. By implementing their Drought Management Plan, Emerald Mountain Farms would reduce their estimated annual water demand from approximately 1,532,000 gallons to approximately 1,378,000gallons, during periods of drought.

LIMITATIONS

Realm Engineering is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, and interpretations presented in this report.

Groundwater systems of Lake County are typically complex, and available data rarely allows for more than general assessment of groundwater conditions and delineation of aquifers. Hydrologic interpretations are based on Well Completion Reports made available to us through the California Department of Water Resources, available geologic maps and hydrological studies and professional judgment. This analysis is based on limited available data and relies significantly on interpretation of data from disparate sources of disparate quality.

It should be noted that hydrological assessments are inherently limited in the sense that conclusions are drawn and recommendations developed from information obtained from limited research and site evaluation. Additionally, the passage of time may result in a change in the environmental characteristics at this site and surrounding properties. This report does not warrant against future operations or conditions, nor does this warrant operations or conditions present or a type or at a location not investigated.

This report is for the exclusive use of Emerald Mountain Farms, Inc., their affiliates, designates and assignees, and no other party shall have any right to rely on any service provided by Realm Engineering without prior written consent.

Please feel free to contact me with any questions that you may have regarding this Hydrology Study/Report.

Sincerely,
Jason Vine, P.E. 67800

Realm Engineering
1767 Market Street, Suite C
Redding, CA 96001
530-526-7493
info@realm-engineering.com

REFERENCES

[1]Bauer, S., Olson, J., Cockrill, A., et al. 2015. Impacts of surface water diversions for marijuana cultivation on aquatic habitat in four northwestern California watersheds. PLOS ONE, 10(9): e0137935

[2]Carah, J.K., Howard, J.K., Thompson, S.E., *et al.* 2015. High time for conservation: adding the environment to the debate on marijuana liberalization. Bioscience, 65, pp.822-829

[3]Hammon, B., Rizza, J. and Dean, D. 2015. Current impacts of outdoor growth of cannabis in Colorado. Colorado State University Extension, Fact Sheet No. 0.308

[4]Dillis, C.R., Grantham, T.E., Mcintee, C., McFadin, B., Grady, K.V. 2020. Water storage and irrigation practices for cannabis drive seasonal patterns of water extraction and use in Northern California. Journal of Environmental Management, Volume 272, 15 October 2020, 110955

[5]Driscoll, Fletcher G., 1986, Groundwater and Wells, Second Edition, Johnson Division, St. Paul Minnesota, 1089p.

ATTACHEMENT A

URGENCY ORDINANCE NO. 3106

BOARD OF SUPERVISORS, COUNTY OF LAKE, STATE OF CALIFORNIA

ORDINANCE NO. 3106

AN URGENCY ORDINANCE REQUIRING LAND USE APPLICANTS TO PROVIDE ENHANCED WATER ANALYSIS DURING A DECLARED DROUGHT EMERGENCY

WHEREAS, the Sheriff, acting as the OES Director of Lake County, declared a local emergency due to drought conditions on May 6, 2021; and

WHEREAS, the Lake County Board of Supervisors approved the ratification of the declaration of a local emergency due to drought conditions on May 11, 2021; and

WHEREAS, the Board of Supervisors wish to ensure continued access to drinking water from private wells or from water purveyors throughout the county; and

WHEREAS, the Board of Supervisors wish to ensure that all current agricultural activities and projects find success during this declared drought emergency; and

WHEREAS, the Board of Supervisors of the County of Lake finds that additional information is critical to ensuring that the Planning Commission approves projects based on evidence of water use and water impacts and the analysis of the impacts to the surrounding areas.

NOW THEREFORE, the Board of Supervisors of the County of Lake hereby ordains as follows:

Section One: Due to the exceptional drought that we are experiencing and the declaration of a drought emergency, any land use approvals are required to provide adequate information regarding water usage for the project being considered and its impacts to surrounding areas. All projects that require a CEQA analysis of water use must include these additional items:

A. Hydrology report prepared by a California licensed civil engineer, hydro-geologist, hydrologist, or geologist experienced in water resources
    a. Approximate amount of water available for the project's identified water source
    b. Approximate recharge rate for the project's identified water source
    c. Cumulative impact of water use to surrounding areas due to project
B. Drought Management Plan
    a. Provide a plan depicting how the applicants plan to reduce water use during a declared drought emergency, to ensure both success and decreased impacts to the surrounding areas

Section Two: This urgency ordinance, if approved, shall take effect on all future Planning Commission considerations until the declared drought emergency has expired or if the Board of Supervisors revokes the ordinance.

Section Three: It can be seen with certainty that there is no possibility that this urgency Ordinance may have a significant effect on the environment.

Section Four: All ordinances or parts of ordinances or resolutions or parts of resolutions in conflict herewith are hereby repealed to the extent of such conflict and no further.

Section Five: This ordinance shall go into effect immediately, and before the expiration of fifteen days after its passage, it shall be published at least once in a newspaper of general circulation printed and published in the County of Lake.

Section Six: This Ordinance is adopted as an urgency Ordinance pursuant to the provisions of Government Code sections 25123 and 25131 and shall be effective immediately upon adoption. Based on the declaration of purpose and facts constituting the urgency set forth above in Section One of this Ordinance, the Board of Supervisors finds and determines that the adoption of this Ordinance as an urgency Ordinance is necessary for the immediate preservation of the public peace, health and safety to address critical groundwater conditions in Lake County.

The Foregoing Ordinance was introduced before the Board of Supervisors on the 27th day of July, 2021, and passed by the following vote on the 27th day of July, 2021.

AYES: Supervisors Simon, Crandell, Scott, Pyska, and Sabatier

NOES: None

ABSENT OR NOT VOTING: None

COUNTY OF LAKE

Chair, Board of Supervisors

ATTEST: CAROL J. HUCHINGSON
Clerk of the Board of Supervisors

By: _____
Deputy

APPROVED AS TO FORM:

ANITA L. GRANT
County Counsel

By: _____

ATTACHEMENT B

ONSITE WELL COMPLETION REPORT AND WELL TEST

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

File Original with DWR

Page 1 of 1

Owner's Well Number 1

Date Work Began 3-29-18 Date Work Ended 4-2-18

Local Permit Agency Lake County Environmental Health

Permit Number _____ Permit Date _____

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. xxxxxxx

DWR Use Only – Do Not Fill In

State Well Number/Site Number

N Latitude W Longitude

APN/TRS/Other

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify _____

Drilling Method Air Rotary Drilling Fluid _____

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	40	Brown Gravely clay
40	70	Grey shale / sandstone
70	200	Black shale / sandstone / calsite
200	210	Green stone
210	260	Franciscan Gravels

Total Depth of Boring 265 Feet

Total Depth of Completed Well 260 Feet

Well Owner

Name Dale Soditus

Mailing Address P.O. Box 3416

City Clearlake State CA Zip 95422

Well Location

Address 1850 Ogulin Canyon Rd.

City Clear Lake County LAKE

Latitude 38° 58' 48.87" N Longitude 122° 34' 40.88" W

(Deg. Min. Sec.)

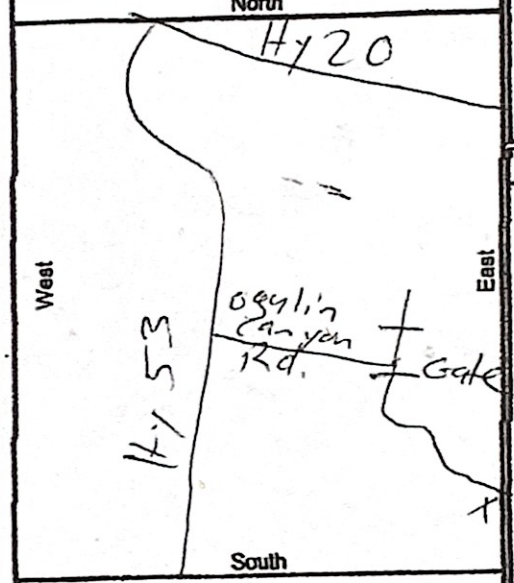
Datum _____ Dec. Lat. _____ Dec. Long. _____

APN Book _____ Page _____ Parcel 010-053-03

Township _____ Range _____ Section _____

Location Sketch

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



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

Activity

◉ New Well
○ Modification/Repair
○ Deepen
○ Other _____
○ Destroy
Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

○ Water Supply
☒ Domestic ☐ Public
☐ Irrigation ☐ Industrial
○ Cathodic Protection
○ Dewatering
○ Heat Exchange
○ Injection
○ Monitoring
○ Remediation
○ Sparging
○ Test Well
○ Vapor Extraction
○ Other _____

Water Level and Yield of Completed Well

Depth to first water 210' (Feet below surface)

Depth to Static Water Level 110 (Feet) Date Measured 4-2-18

Estimated Yield * 50 (GPM) Test Type Air Lift

Test Length 2 HRS (Hours) Total Drawdown _____ (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	60	9"	F480	PVC	1/4"	5"	Blank	—
60	200	7 1/4	F480	PVC	1/4"	5"	Blank	—
200	260	7 1/4	F480	PVC	1/4"	5"	Perf	.032"

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	1	Concrete	SEAL
1	21	Bentonite	
21	260	5/16 Pea	Gravel Pack

Attachments

☐ Geologic Log
☐ Well Construction Diagram
☐ Geophysical Log(s)
☐ Soil/Water Chemical Analyses
☐ Other _____

Attach additional information, if it exists.

Certification Statement

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

Name Will Peterson Well Drilling
Person, Firm or Corporation

4789 Cascade Hy Kelseyville CA 95451
Address City State Zip

Signed _____ 4-2-18 100905 3
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

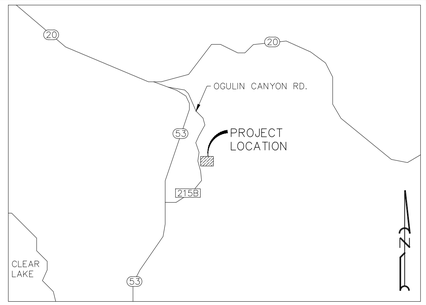
Well Test

Job Name-	Danielle Fontenot	**Well Diam**	4 1/2" pvc
Location-	1850 Ogulin Canyon Rd	**Static**	105.8'
Operator-	RH/Reese	**Well Depth**	246'
Meter SN-	16944649	**Setting**	240' + pump
Original Meter Reading-	0035150	**Pump**	2 HP 230v Grundfos
Final Meter Reading -	0040540	**Was the pump running upon arrival?**	Yes ☐ No ☒

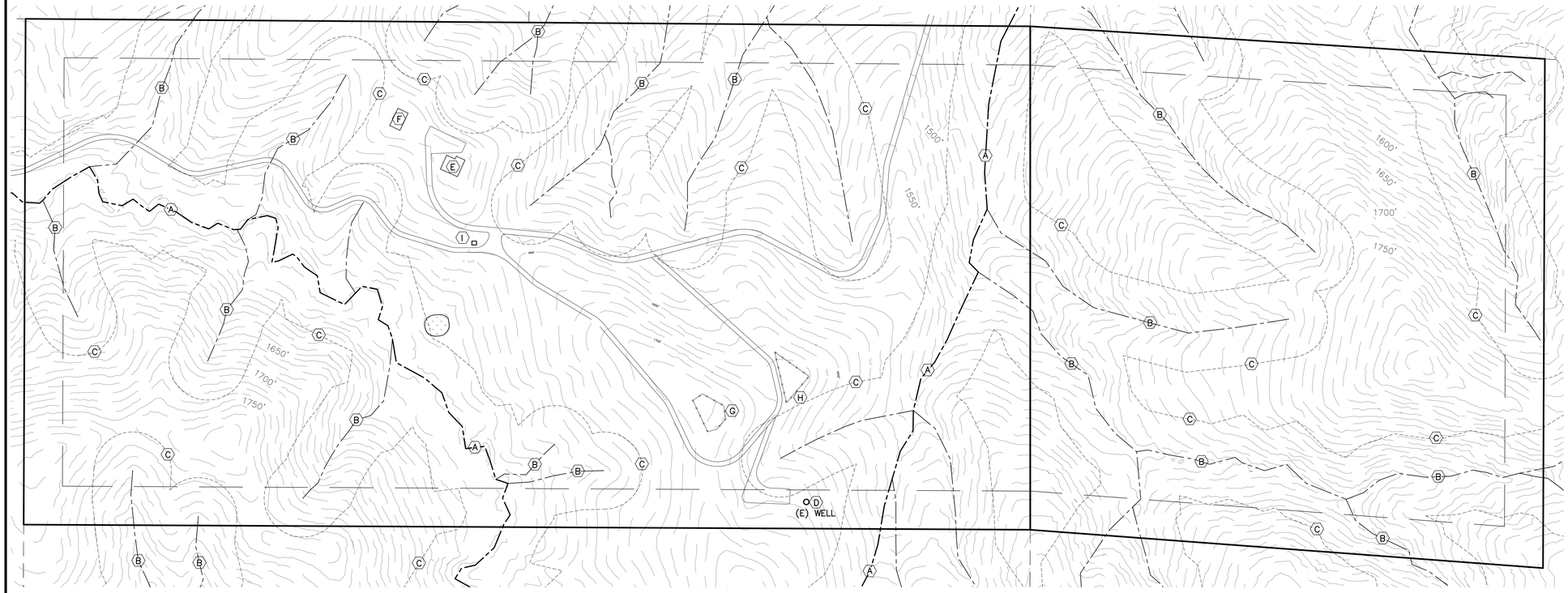
Date	Time	Time Since Last Reading	Meter Reading	GPM	Pumping Level	Color	Comment
1/14/21							
	13:35	1 min	0035150	30.5	112.7'	Clear	Sulfur smell
	13:36	1 min		30.5	115.3'		
	13:37	1 min		30.5	115.7'		
	13:38	1 min		30.5	115.6'		
	13:39	1 min		30.5	115.8'		
	13:40	1 min		30.5	115.8'		
	13:42	2 min		30.5	115.8'		
	13:44	2 min		30.5	115.8'		
	13:46	2 min		30.5	115.8'		
	13:48	2 min		30.5	115.8'		
	13:50	2 min		30.5	115.8'		Sulfur smell
	13:55	5 min		30	116.2		
	14:00	5 min		30	116.2'		
	14:05	5 min		30	116.4'		
	14:20	15 min		30	116.5'		
	14:35	15 min		30	116.6'		
	14:50	15 min		30	116.7'		
	15:05	15 min		30	116.8'		
	15:35	30 min		30	117'		
	16:05	30 min		30	117.2'		
	16:35	30 min		30	117.4'	Clear	Sulfur smell
	17:05	30 min	0040540		117.4'		
	Recovery						
	17:10				117'		
	17:11				114'		
	17:12				111'		
	17:13				108'		
	17:14				107.8'		
	17:15				107.8'		

ATTACHEMENT C

PROPOSED AND EXISTING CONDITIONS SITE PLANS



VICINITY MAP
NO SCALE



LEGEND:

	CONTOUR ELEVATION
	FENCE
	ASPHALT
	GRAVEL
	EARTH
	FLOOD ZONE
	CREEK / SWALE
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:
1. CONTOUR INTERVAL IS 10'

(A) CLASS II INTERMITTENT WATERCOURSE
(B) CLASS III EPHEMERAL WATERCOURSE
(C) 100' SETBACK FROM WATERCOURSE
(D) (E) GROUNDWATER WELL
LAT: 38.980376°
LONG: -122.577846°
(E) (E) RESIDENCE
(F) (E) SHOP
(G) (E) 4,962 SF LEGACY CULTIVATION AREA
(H) (E) 4,900 SF LEGACY CULTIVATION AREA
(I) (E) 10'x12' 120SF WOODEN SHED

Revisions:

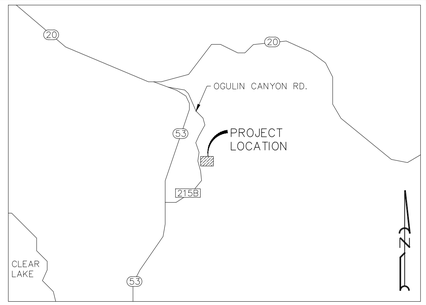
REALM ENGINEERING
CIVIL ENGINEERING, SURVEYING & PLANNING
1767 MARKET STREET SUITE c
REDDING, CA. 96001
530-526-7493

PLANS PREPARED UNDER THE SUPERVISION OF:

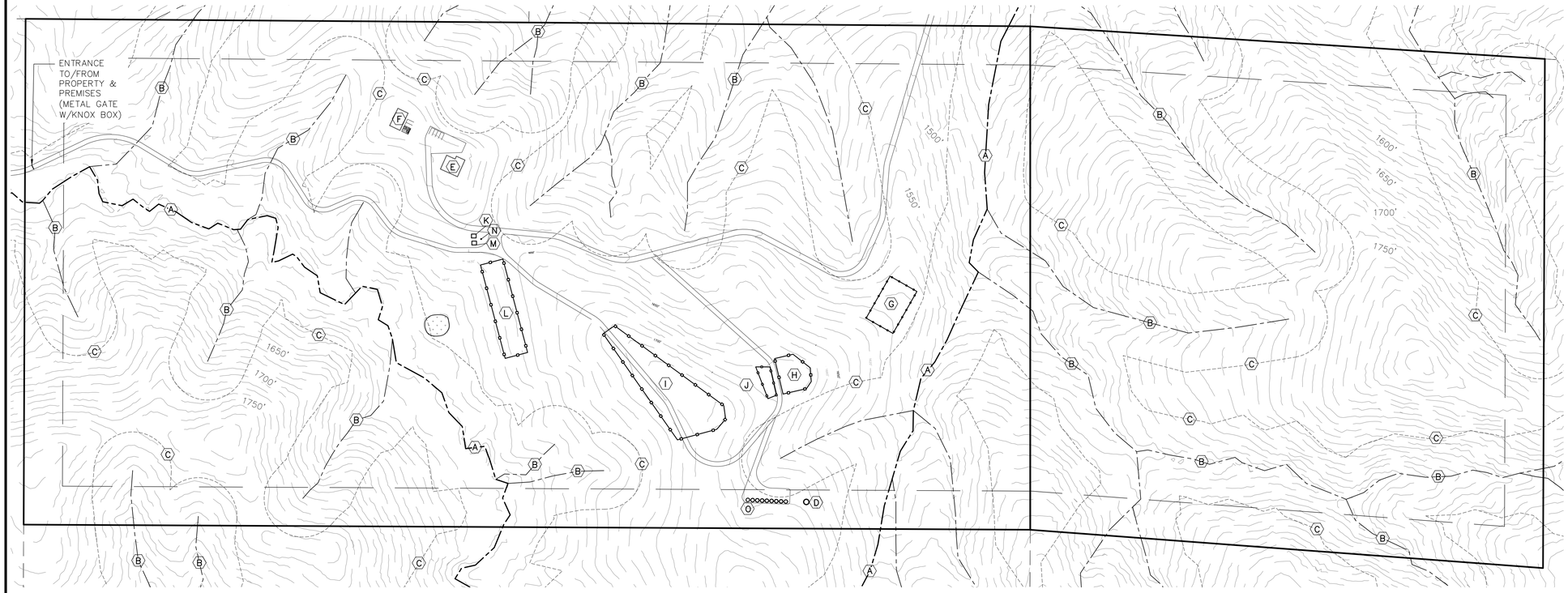
EXISTING CONDITIONS SITE PLAN
EMERALD MOUNTAIN FARMS, INC.

APN: 010-053-03
18501 OGULIN CANYON RD.
CLEARLAKE, CA 95422
LAKE COUNTY

PLOTTED BY: ---
DATE PLOTTED: 3/11/22
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1



VICINITY MAP
NO SCALE



LEGEND:

	CONTOUR ELEVATION
	FENCE
	ASPHALT
	GRAVEL
	EARTH
	FLOOD ZONE
	CREEK / SWALE
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:
1. CONTOUR INTERVAL IS 10'

Ⓐ CLASS II INTERMITTENT WATERCOURSE

Ⓑ CLASS III EPHEMERAL WATERCOURSE

Ⓒ 100' SETBACK FROM WATERCOURSE

Ⓓ (E) GROUNDWATER WELL
LAT: 38.980376°
LONG: -122.577846°

Ⓔ (E) RESIDENCE

Ⓕ (E) SHOP

Ⓖ (P) 10,000 SF OUTDOOR CULTIVATION / CANOPY AREA

Ⓗ (P) 6,862 SF OUTDOOR CULTIVATION / CANOPY AREA

Ⓘ (P) 34,316 SF OUTDOOR CULTIVATION / CANOPY AREA

Ⓙ (P) 2,384 SF OUTDOOR CULTIVATION / CANOPY AREA

Ⓚ (P) 10'x12' PESTICIDE & AGRICULTURAL CHEMICAL STORAGE AREA

Ⓛ (P) 15,000 SF OUTDOOR CULTIVATION / CANOPY AREA

Ⓜ (P) 10'x12' SECURITY CENTER

Ⓝ (P) DESIGNATED REFUSE AREA

Ⓞ (P) 9-5,000 GALLON WATER STORAGE TANKS

Revisions:

REALM ENGINEERING
CIVIL ENGINEERING, SURVEYING & PLANNING
1767 MARKET STREET SUITE c
REDDING, CA. 96001
530-526-7493

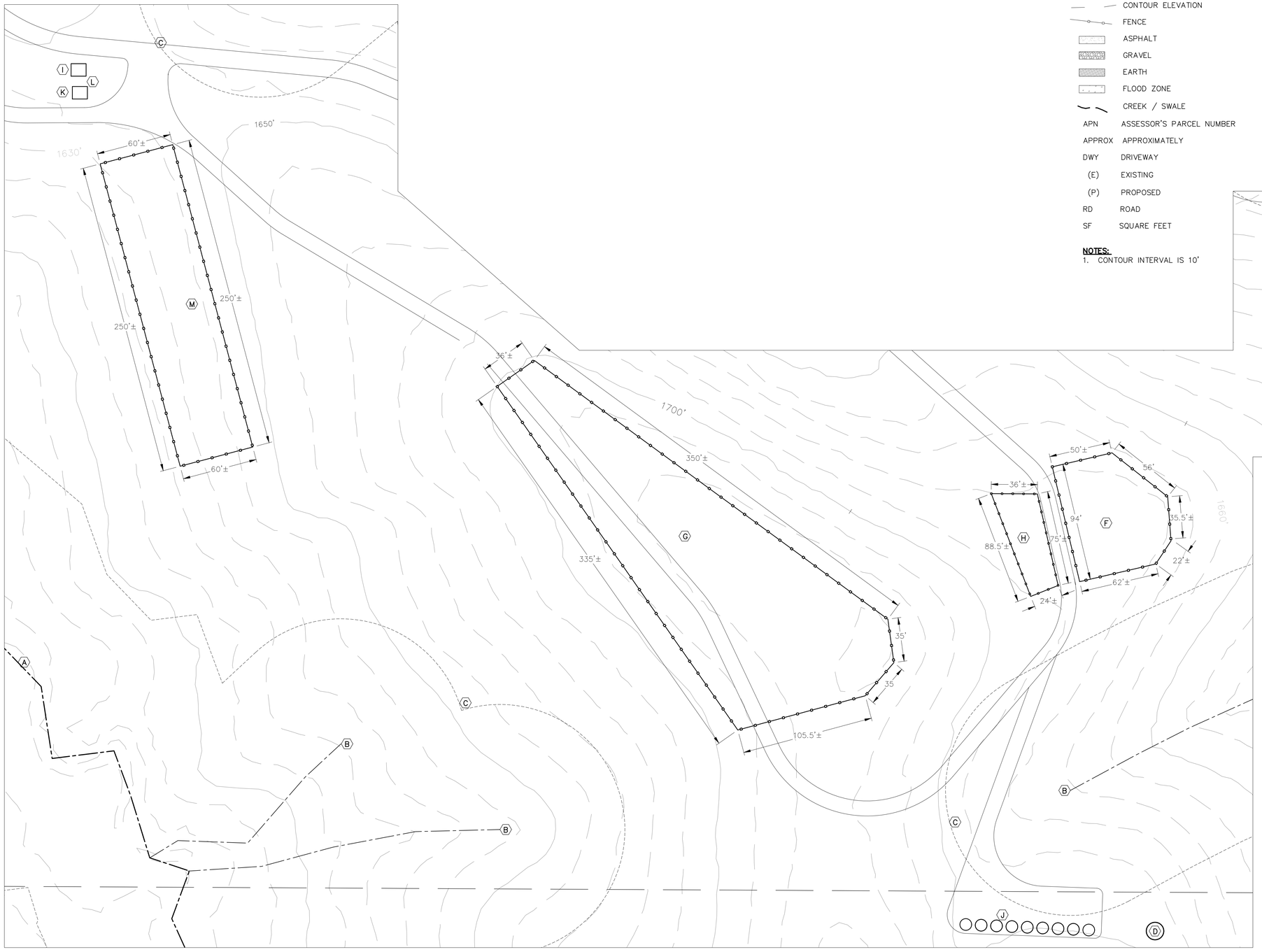
PLANS PREPARED UNDER THE SUPERVISION OF:

PROPOSED CONDITIONS SITE PLAN

EMERALD MOUNTAIN FARMS, INC.

APN: 010-053-03
18501 OGULIN CANYON RD.
CLEARLAKE, CA 95422
LAKE COUNTY

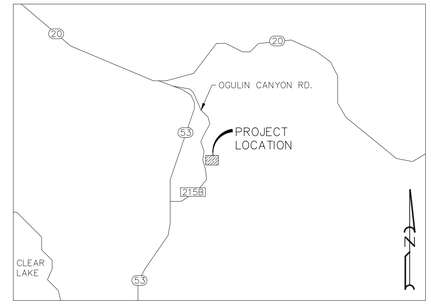
PLOTTED BY: ---
DATE PLOTTED: 3/11/22
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1



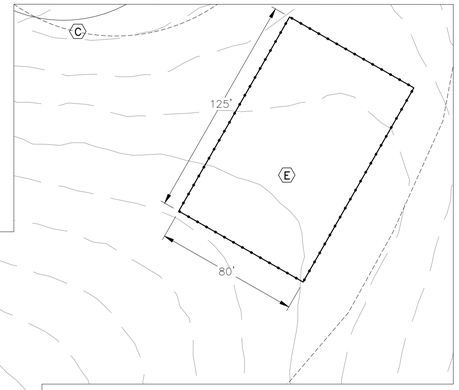
LEGEND:

	CONTOUR ELEVATION
	FENCE
	ASPHALT
	GRAVEL
	EARTH
	FLOOD ZONE
	CREEK / SWALE
APN	ASSESSOR'S PARCEL NUMBER
APPROX	APPROXIMATELY
DWY	DRIVEWAY
(E)	EXISTING
(P)	PROPOSED
RD	ROAD
SF	SQUARE FEET

NOTES:
1. CONTOUR INTERVAL IS 10'



VICINITY MAP
NO SCALE



Ⓐ CLASS II INTERMITTENT WATERCOURSE

Ⓑ CLASS III EPHEMERAL WATERCOURSE

Ⓒ 100' SETBACK FROM WATERCOURSE

Ⓓ (E) GROUNDWATER WELL
LAT: 38.980376°
LONG: -122.577846°

Ⓔ (P) 10,000 SF OUTDOOR CULTIVATION/CANOPY AREA

Ⓕ (P) 6,862 SF OUTDOOR CULTIVATION/CANOPY AREA

Ⓖ (P) 34,316 SF OUTDOOR CULTIVATION/ CANOPY AREA

Ⓗ (P) 2,384 SF OUTDOOR CULTIVATION / CANOPY AREA

Ⓘ (P) 10'x12' PESTICIDE & AGRICULTURAL CHEMICAL STORAGE AREA

Ⓙ (P) 9-5,000 GALLON WATER STORAGE TANKS

Ⓚ (P) 10'x12' SECURITY CENTER

Ⓛ (P) DESIGNATED REFUSE AREA

Ⓜ (P) 15,000 SF OUTDOOR CULTIVATION/CANOPY AREA

Revisions:

REALM ENGINEERING
CIVIL ENGINEERING, SURVEYING & PLANNING
1767 MARKET STREET SUITE c
REDDING, CA. 96001
530-526-7493

PLANS PREPARED UNDER THE SUPERVISION OF:

CULTIVATION SITE PLAN WITH CANOPY
EMERALD MOUNTAIN FARMS, INC.

APN: 010-053-03
1850 OGULIN CANYON RD.
CLEARLAKE, CA 95422
LAKE COUNTY

PLOTTED BY: ---
DATE PLOTTED: 3/11/22
SCALE OF DRAWING: SEE PLAN
JOB NUMBER:
CADD FILE:
SHEET: 1

ATTACHEMENT D

WELL COMPLETION REPORTS FOR NEAREST KNOWN WELLS

ORIGINAL
File with DWR

Page ___ of ___

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 1089188

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

Owner's Well No. ___
Date Work Began 10/12/06 Ended 10/20/06
Local Permit Agency Lake County Environmental Health
Permit No. WE2496 Permit Date 10/12/06

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Air

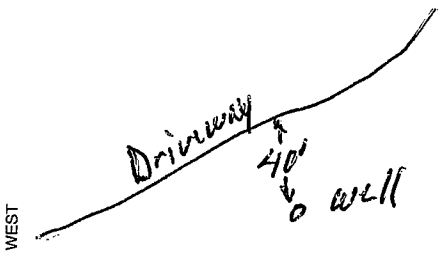
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	Brn. Soil
5	40	Brn. Shale
40	410	Blue, Gray, Green, Shale

TOTAL DEPTH OF BORING 410 (Feet)
TOTAL DEPTH OF COMPLETED WELL 403 (Feet)

WELL LOCATION

Address 1030 Junction Plaza
City Clearlake
County Lake
APN Book 010 Page 003 Parcel 68
Township 13N Range 7W Section 12
Lat ___ DEG. ___ MIN. ___ SEC. N Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH

NORTH


WEST EAST
SOUTH

*Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. **PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)

WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 300± (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 280± (Ft.) & DATE MEASURED 10/20/06
ESTIMATED YIELD 42 (GPM) & TEST TYPE Air Lift
TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* *May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	40	9	X				PVC F480	4½	SDR26	
40	363	8	X				PVC F480	4½	SDR26	
363	403	8		X			PVC F480	4½	SDR26	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	X			
20	403				pea gravel

ATTACHMENTS (✓)

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

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Dan McMullen Well Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 1487 Old Long Valley Rd. CITY Clearlake Oaks STATE CA ZIP 95423
Signed Dan L Mull C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 10/29/06
C-57 LICENSE NUMBER 533152

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

ORIGINAL
File with DWR

Page ___ of ___

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1089186

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

Owner's Well No. ___
Date Work Began 10/10/06 Ended 10/20/06
Local Permit Agency Lake County Environmental Health
Permit No. WE2494 Permit Date 10/4/06

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Air

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	Brn Soil
5	30	Yellow Clay
30	120	Brn Green, Gray, Shale
120	170	Gray Shale

TOTAL DEPTH OF BORING 170 (Feet)
TOTAL DEPTH OF COMPLETED WELL 165 (Feet)

WELL LOCATION

Address 950 Junction Plaza
City Clearlake CA
County Lake
APN Book 010 Page 003 Parcel 45
Township 13N Range 7W Section 12
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH

NORTH
Fire Road
301
WEST
EAST
SOUTH

*Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. **PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)

WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 120± (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 92' (Ft.) & DATE MEASURED 10/20/06
ESTIMATED YIELD 20 (GPM) & TEST TYPE Air Lift
TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	125	9	X				PVC F480	4½	SDR26	
125	165	9		X			PVC F480	4½	SDR26	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	X			
20	165				pragravel

ATTACHMENTS (✓)

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

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Dan McMullen Well Drilling
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 1487 Old Long Valley Rd. CITY Clearlake Oaks STATE CA ZIP 95423
Signed Dan C McMullen
C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 10/29/06
C-57 LICENSE NUMBER 533152

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

13N/07W-23M

ORIGINAL

File with DWR

RECEIVED
JAN 06 2000

No. Intent No.

Local Permit No. or Date

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

WATER WELL DRILLERS REPORT

AP 010-021-37

Do not fill in

No. 228021

State Well No.

Other Well No.

(1) OW

Address

City

(2) LOCATION OF WELL (See instructions):

County Lake Owner's Well Number

Well address if different from above 16150 Davis

Township Clearlake Range Section

Distance from cities, roads, railroads, fences, etc. 13N/07W-23

WELL LOCATION SKETCH

(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 3/8

Diameter of bore

Packed from 20 to 240 ft.

(7) CASING INSTALLED:

Steel ☐ Plastic ☒ Concrete ☐

(8) PERFORATIONS:

Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot size
0	240	4"	c160 psi	~~4x~~ 200	~~200~~ 240	1/8

(9) WELL SEAL:

Was surface sanitary seal provided? Yes ☒ No ☐ If yes, to depth 20 ft.

Were strata sealed against pollution? Yes ☐ No ☒ Interval ft.

Method of sealing cement

(10) WATER LEVELS:

Depth of first water, if known ft.

Standing level after well completion 20 ft.

(11) WELL TESTS:

Was well test made? Yes ☐ No ☐ If yes, by whom?

Type of test Pump ☐ Bailer ☐ Air lift ☐

Depth to water at start of test ft. At end of test ft

Discharge gal/min after 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 ft. Depth of completed well ft.

from ft. to ft. Formation (Describe by color, character, size or material)

CONFIDENTIAL NOT FOR PUBLIC USE WATER CODE SEC. 13752

JAN 25 2000

Work started 19 Completed 19

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 Larry Herman (Well Driller)

NAME Fisch Herman (Person, firm, or corporation) (Typed or printed)

Address

City Sebastopol Zip

License No. 399226 Date of this report

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

ORIGINAL
File with DWR

APR 04 2002

Page ___ of ___

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

DWR USE ONLY — DO NOT FILL IN
13N/07W-12
STATE WELL NO./STATION NO.
LATITUDE ___ LONGITUDE ___
APN/TRS/OTHER

Owner's Well No. ___
Date Work Began 11-3-00 Ended 11-8-00 No. 713341
Local Permit Agency Health Dept.
Permit No. WE 2031 Permit Date 10-31-00

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD air rotary FLUID ___

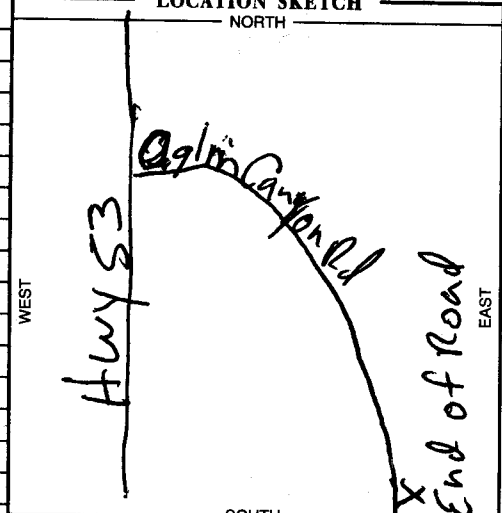
DEPTH FROM SURFACE Ft. to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0 20	Brown Clay
20 150	Blue Clay w small stringers of sandstone
150 170	Sandstone, Quartz, misc (soft)

TOTAL DEPTH OF BORING 170 (Feet)
TOTAL DEPTH OF COMPLETED WELL 170 (Feet)

WELL LOCATION

Address 2388 Hwy 53
City Clearlake
County Lake
APN Book 10 Page 003 Parcel 011
Township 13N Range 7W Section 12
Latitude ___ DEG. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WEST

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. ***PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USES (✓)

WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 75 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 50 (Ft.) & DATE MEASURED 11-3-00
ESTIMATED YIELD 200 (GPM) & TEST TYPE air lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 150	9	X				PVCF480	4½	160	
150 170	9		X			" "	"	"	1/8

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft. to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0 20	X			
20 170				5/16 Pea

ATTACHMENTS (✓)

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

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 13011 Hwy 29 CITY Lower Lake STATE Ca ZIP 95457
Signed Larry Herman (WELL DRILLER/AUTHORIZED REPRESENTATIVE)
DATE SIGNED 11-8-00 C-57 LICENSE NUMBER 465071

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ORIGINAL
File with DWR MAY 17 2012

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 0963006

Page ___ of ___
Owner's Well No. ___
Date Work Began 5/7/2012, Ended 5/11/2012
Local Permit Agency Lake County Environmental Health
Permit No. WE2828 Permit Date 5/4/2012

DWR USE ONLY — DO NOT FILL IN
13N | 07W-12 | | |
STATE WELL NO./STATION NO.
LATITUDE | LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Rotary FLUID Air

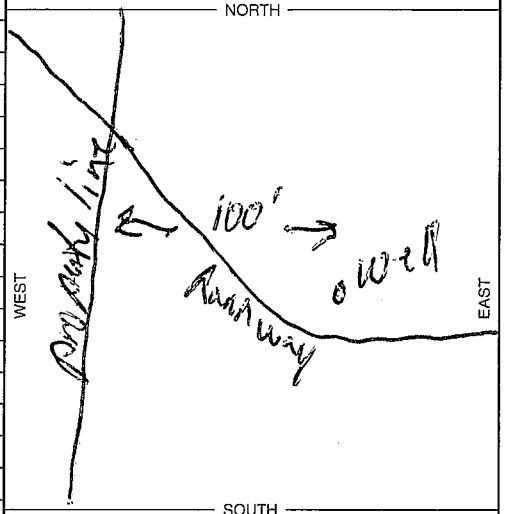
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	2	Brown Soil
2	25	Brown Gritic Clay
25	40	Brown Cemented Gravel
40	140	Brown & Gray Clay with Gravel
140	250	Black and Gray Shale
250	420	Black and Shale, Greenstone, Red Chert

TOTAL DEPTH OF BORING 420 (Feet)
TOTAL DEPTH OF COMPLETED WELL 420 (Feet)

WELL LOCATION

Address 990 Junction Plaza
City Clearlake
County Lake
APN Book 010 Page 055 Parcel 420
Township 13N Range 07W Section 12
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH



*Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. **PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
X Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 315 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 267 (Ft.) & DATE MEASURED 5/11/2012
ESTIMATED YIELD 2.5 (GPM) & TEST TYPE Air Lift
TEST LENGTH 1/2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	40	9	X				PVC F480	4½	SDR 26	
40	250	8	X				"	"	"	
250	320	7	X				"	"	"	
320	420	7		X			"	"	"	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	1	X			
1	21		X		
21	420				Pea gravel

ATTACHMENTS (✓)

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

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Dan McMullen Well Drilling
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 1487 Old Long Valley Rd. CITY Clearlake Oaks STATE CA ZIP 95423
Signed Dan McMullen
C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 5/12/2012 C-57 LICENSE NUMBER 533152

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

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

File Original with DWR

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. xxxxxxx 1075152

DWR Use Only – Do Not Fill In

13N/07W-12-

State Well Number/Site Number

N | W

Latitude | Longitude

APN/TRS/Other

Page 1 of 1

Owner's Well Number MW-1

Date Work Began 01/30/2008 Date Work Ended 1/30/2008

Local Permit Agency Lake County Health Services Department - Environmental Health

Permit Number WE-2591 Permit Date Jan 9/2008

Geologic Log

Orientation ◉ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Hollow Stem Auger Drilling Fluid

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
		See Attached Boring/Well Construction Log

Total Depth of Boring Feet

Total Depth of Completed Well Feet

Well Location

Address 3620 Pine Street (Burns Valley Elementary School)

City Clearlake County Lake

Latitude 38 Deg. 57 Min. 32 Sec. N Longitude -122 Deg. 38 Min. 40 Sec. W

Datum NAD83 Decimal Lat. 38.95902 Decimal Long. -122.64435

APN Book 039 Page 187 Parcel 12

Township 13N Range 7W Section 21

Location Sketch

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

North

West

East

See attached Site Map

South

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

Activity

◉ New Well

○ Modification/Repair

○ Deepen

○ Other

○ Destroy

Describe procedures and materials under "GEOLOGIC LOG"

Planned Uses

○ Water Supply

☐ Domestic ☐ Public

☐ Irrigation ☐ Industrial

○ Cathodic Protection

○ Dewatering

○ Heat Exchange

○ Injection

◉ Monitoring

○ Remediation

○ Sparging

○ Test Well

○ Vapor Extraction

○ Other

Water Level and Yield of Completed Well

Depth to first water 3 (Feet below surface)

Depth to Static Water Level 16 (Feet) Date Measured 02/06/2008

Estimated Yield * (GPM) Test Type

Test Length (Hours) Total Drawdown (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	10	8	Blank	PVC Sch. 40		2		
10	25	8	Screen	PVC Sch. 40		2	Milled Slots	0.020

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	6	Cement	
6	8	Bentonite	
8	26	Filter Pack	#3 sand

Attachments

☑ Geologic Log

☑ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☑ Other Site Map

Attach additional information, if it exists.

Certification Statement

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

Name Scott Graham (MACTEC) for WDC

Person, Firm or Corporation

5341 Old Redwood Highway Petaluma CA 94954

Address City State Zip

Signed C-57 Licensed Water Well Contractor

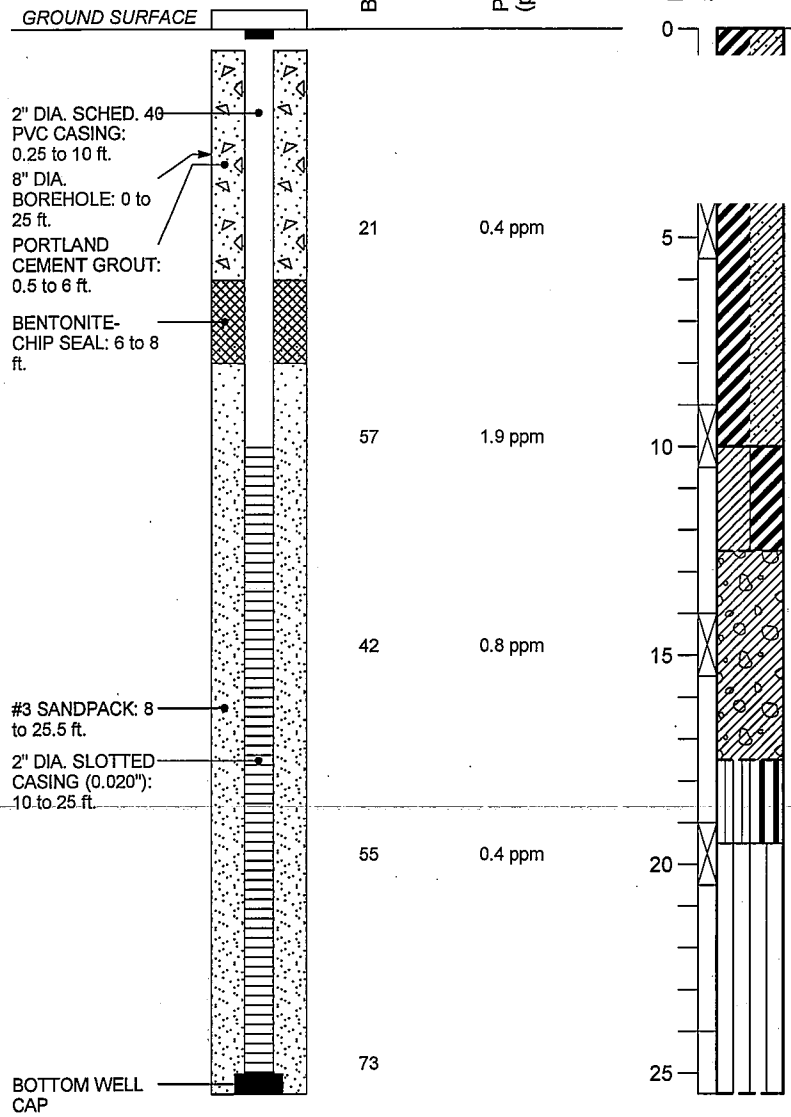
04/01/2008 Date Signed

283326 C-57 License Number

DWR 188 REV. 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Equipment
Sample Method Hollow Stem Auger
Hole Diameter 8 inches
Surface Elevation Date 1/30/08
Reference Datum
Logged By SRG



Depth (ft.)	Sample	Blows/Foot	PID Reading (ppm)	
0				Hand augered to 5 ft.
		21	0.4 ppm	
5				
		57	1.9 ppm	Bluish-gray clay with sand and silt, wet, trace of gravel up to 1/4"-diam., 80% clay, 10% coarse grained sand, 10% silt
10				Bluish-gray clay with gravel and some silt, moist, 60% clay, 30% gravel up to 1/2"-diam., 10% silt
		42	0.8 ppm	
15				Bluish-gray silt with clay and some gravel, wet, 60% silt, 30% clay, 10% gravel up to 1/4"-diam.
		55	0.4 ppm	Bluish-gray silt with gravel and some clay, wet, 50% silt, 30% gravel up to 1/2"-diam., 20% clay
20				
		73		Boring terminated at 25.5 ft. Groundwater first encountered at approximately 3 ft.
25				

BORING_WELL_MACTEC WELLS_MW1_MW2_MW3.GPJ GEOL.GDT 4/1/08

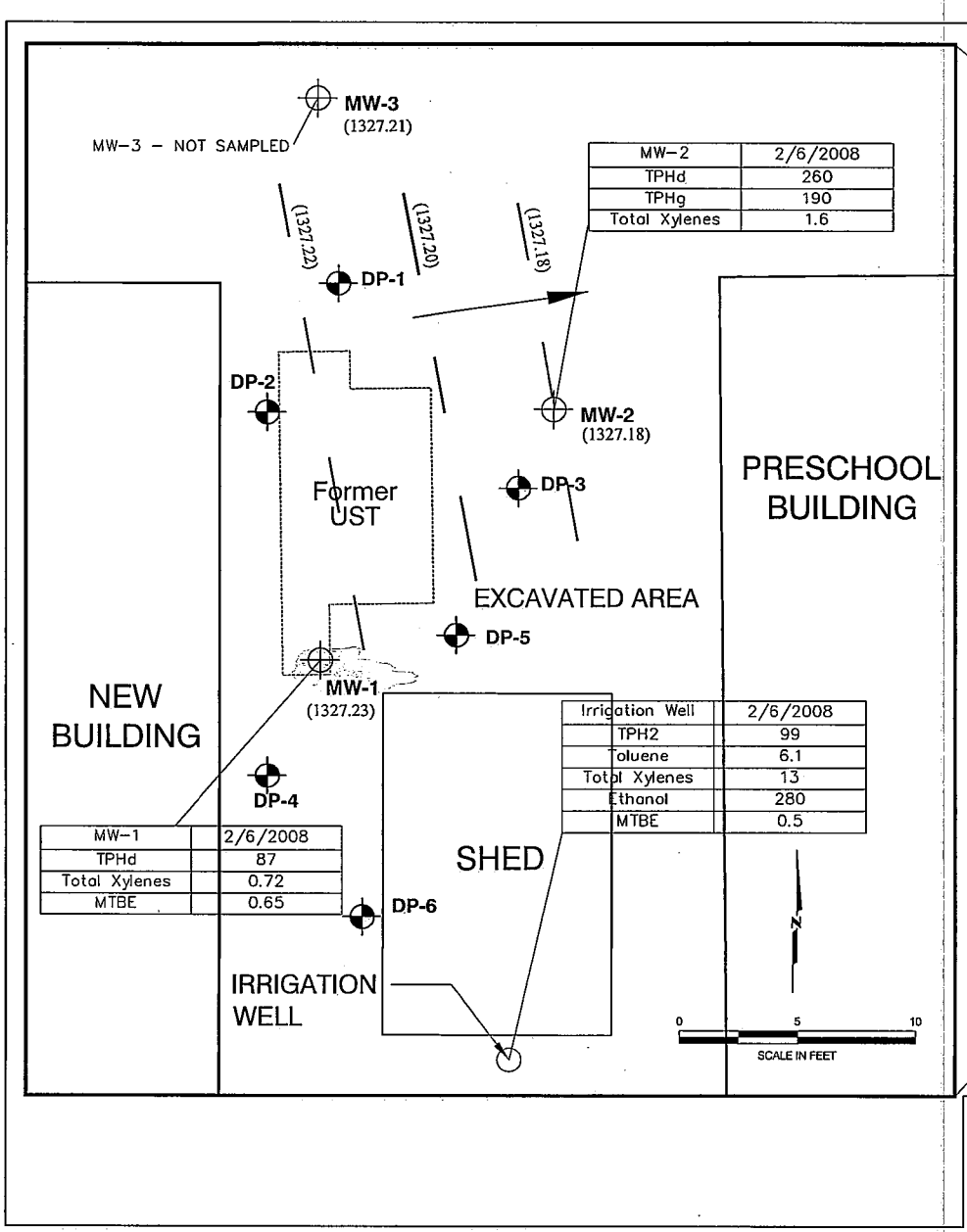
MACTEC

Well Construction Details and Log of Boring MW-1

Burns Valley Elementary School
Groundwater Monitoring Well Installation and Sampling Report
Burns Valley Elementary School, Clearlake, California

FIGURE **3**

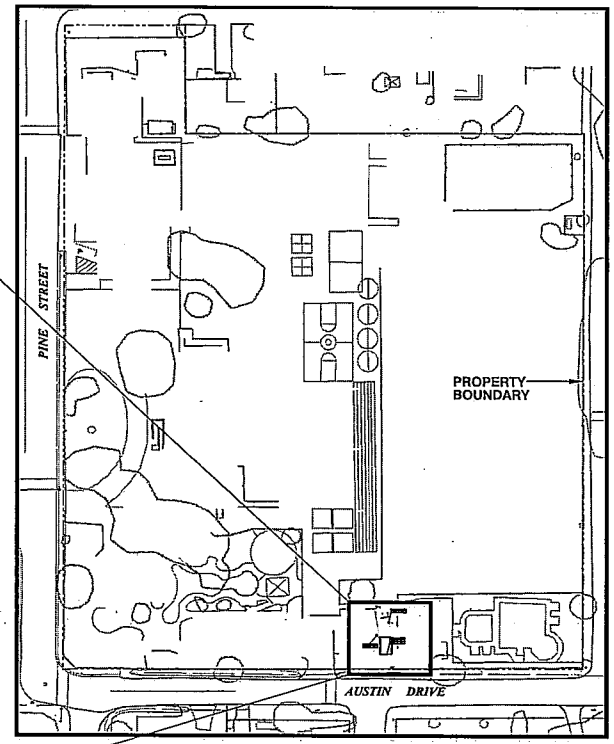
DRAWN	JOB NUMBER	CHECKED	CHCK'D DATE	APPROVED	APPRV'D DATE
1/31/08	4088087504		4/08		



MW-2	2/6/2008
TPHd	260
TPHg	190
Total Xylenes	1.6

Irrigation Well	2/6/2008
TPH2	99
Toluene	6.1
Total Xylenes	13
Ethanol	280
MTBE	0.5

MW-1	2/6/2008
TPHd	87
Total Xylenes	0.72
MTBE	0.65



EXPLANATION

- DIRECT PUSH BORING LOCATION
- GROUNDWATER MONITORING WELL LOCATION
- (1327.21) GROUNDWATER ELEVATION FEBRUARY 6, 2008
- 1327.18 GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL) AND ESTIMATED GROUNDWATER FLOW DIRECTION
- CONCENTRATION IN GROUNDWATER SAMPLES (MICROGRAMS PER LITER) COMPOUNDS NOT LISTED WERE NOT DETECTED

MW-2	2/6/2008
TPHd	260
TPHg	1.60

4088075471001.DWG 1.0
2008/03/19 09:30

FIGURE

MACTEC

Groundwater Monitoring Data - February 6, 2008
Burns Valley Elementary School
3620 Pine Street
Clearlake, California

2

DRAWN	JOB NUMBER	CHECKED	CHECKED DATE	APPROVED	APPROVED DATE
ACM	4088075471 01		03/08		

ORIGINAL
File with DWR

Page ___ of ___
Owner's Well No. ___
Date Work Began 6-5-06 Ended 6-6-06
Local Permit Agency Health Dept.
Permit No. WE-2417 Permit Date 10-3-05

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 1093073

DWR USE ONLY — DO NOT FILL IN
13N/07W/13
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD Air Rotary FLUID ___

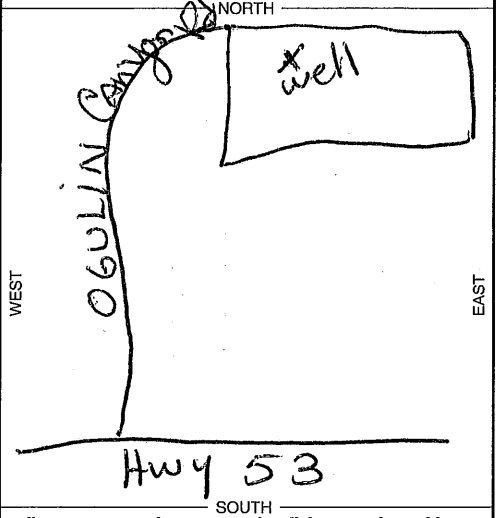
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	160	Franciscan
160	180	Green Stone
180	240	Green Stone

TOTAL DEPTH OF BORING 240 (Feet)
TOTAL DEPTH OF COMPLETED WELL 240 (Feet)

WELL LOCATION

Address 2122 Ogulin Canyon Road
City Clearlake Ca 95422
County Lake
APN Book 010 Page 053 Parcel 020
Township 13N Range 7W Section 13
Lat ___ DEG. ___ MIN. ___ SEC. N
Long ___ DEG. ___ MIN. ___ SEC. W

LOCATION SKETCH



Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. ***PLEASE BE ACCURATE & COMPLETE.***

ACTIVITY (✓)
✓ NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

USES (✓)
WATER SUPPLY
✓ Domestic ___ Public
___ Irrigation ___ Industrial
MONITORING ___
TEST WELL ___
CATHODIC PROTECTION ___
HEAT EXCHANGE ___
DIRECT PUSH ___
INJECTION ___
VAPOR EXTRACTION ___
SPARGING ___
REMEDIATION ___
OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 180 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 175 (Ft.) & DATE MEASURED 6-6-06
ESTIMATED YIELD * 50 (GPM) & TEST TYPE Air Lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	200	9"	X				PVC	4½"	160	
200	240	7⅞		X			PVC	4½"	200	.030

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	30	✓			
30	240				5/16 pea Gravel

ATTACHMENTS (✓)
___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other ___
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

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

NAME Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS PO Box 1152 CITY Lower Lake STATE Ca ZIP 95457
Signed Larry Herman C-57 LICENSED WATER WELL CONTRACTOR
DATE SIGNED 6-9-06 C-57 LICENSE NUMBER 465071

DWR 188 REV. 05-03 IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM OSP 03 78836

ATTACHEMENT E

RADIUS OF INFLUENCE ANALYSIS

Radius of Influence Analysis

Well Borehole Radius (from Well Completion Report) = 7.25”/2 x 1’/12” = 0.3 feet

Specific Capacity (using data from Well Test)
30 gpm (yield) / 11.6 feet (drawdown) = 2.6 gpm/foot of drawdown
Specific Capacity (SC) = 2.6

Modified Jacob’s equation from Driscoll Appendix 16-D (Driscoll 1986[5])
Transmissivity Confined Aquifer T = SC x 2000; T = 5,200 gpft/day

Distance Drawdown Equation Driscoll 9.11 (Driscoll 1986[5]) T=528Q/ Δs
Δs = 528Q/T; Δs = 528 x 10.6 gpm (peak anticipated 24-hour demand) / 5,200
Δs = 1.1’