Attachment 5

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

Hydrology Report

17870 Little High Valley Road, Lower Lake, CA

February 4, 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

17870 Little High Valley, LLC (LHV) is seeking a Major Use Permit from the County of Lake for a proposed outdoor commercial cannabis cultivation operation at 17870 Little High Valley Road near Lower Lake, CA on Lake County APN 012-061-03 (Project Parcel). The proposed cultivation operation would be composed of 87,120 ft^2 of outdoor cultivation/canopy area and a 3,500 ft^2 Processing Facility (**Attachment B – Existing and Proposed Conditions Site Plans**). All water for the proposed cultivation operation would come from an existing onsite groundwater well located at Latitude: 38.86856° and Longitude: -122.57838°.

The 78.4-acre Rural Lands-zoned Project Parcel is located within the Copsey Creek watershed (HUC12) on a broad north-south trending ridge between Excelsior and Little High Valleys (Figure 1: Site Location Map). The Project Parcel is accessed via a shared private gravel and native soil surfaced access road off of Little High Valley Road. An unnamed ephemeral Class III watercourse forms in the southwest corner of the Project Parcel, and flows from northeast to southwest into an unnamed tributary of Copsey Creek.

Soils of the Project Parcel are identified primarily as the Collayomi-Whispering complex, the Konocti-Hambright complex, and the Stonyford-Guenoc complex by the NRCS Web Soil Survey, and characterized as well drained gravelly clay loams derived from residuum weathered from basalt, metavolcanics, and andesite. The United States Geological Survey Map of the Santa Rosa Quadrangle defines the area in the vicinity of the Project Property as Clear Lake Volcanics, composed of dacite, andesite, basalt, rhyolite, tuff and other pyroclastic rocks. The Project Parcel and existing onsite groundwater well are located within the Clear Lake Pliestocene Volcanic Ar. Groundwater Management Plan Area/Clear Lake Volcanics Groundwater Source Area as identified in the 2006 Lake County Groundwater Management Plan[1]. Groundwater in the Clear Lake Volcanics occurs primarily in fractures, joints, and within weathered zones that formed in between volcanic eruptions.

The proposed outdoor cultivation/canopy areas would be enclosed with 6-foot tall chain link fences, with locking metal gates and privacy mesh/screen. The growing medium of the proposed outdoor cultivation/canopy areas would be an imported organic soilless growing medium (composed mostly of composted forest material) in aboveground garden beds. Drip irrigation systems would be used to deliver irrigation water to the aboveground fabric pots. Water from the onsite groundwater well would be pumped to eight proposed 2,500-gallon water storage tanks located upslope and north of the proposed outdoor cultivation/canopy areas. Irrigation water would be gravity fed from the water storage tanks to the drip irrigation systems of the proposed cultivation/canopy areas, via HDPE water supply lines.

Figure 1 – Site Location Map

WATER USAGE

Cannabis has often been characterized as a high-water-use plant. Bauer et al. (2015)[2] and Carah et al (2015)[3] 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[4]). According to a recent study published in the Journal of Environmental Management (Dillis et al. 2020[5]), 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.

According to LHV's Property Management Plan, they expect a total annual water use requirement of 4.6 acre-feet or approximately 1,493,480 gallons for irrigation purposes, with the greatest daily water usage during the months of July, August, and September (approximately 8,265 gallons per day). LHV's maximum total proposed cannabis cultivation/canopy area is 87,120 ft^2. Using the water use requirements outlined in Hammon et al. 2015[4], we estimate that the proposed cultivation operation would have an annual water use requirement between 4.2 and 5.8 acre-feet. The

following table presents the expected water use of the proposed cultivation operation in gallons by month during the cultivation season (April through November), using water usage information provided in LHV's Property Management Plan.

	April	May	June	July	August	September	October	November
Low (25"per year)	75,000	150,000	190,000	230,000	260,000	230,000	150,000	75,000
High (35" per year)	100,000	200,000	280,000	325,000	370,000	325,000	200,000	100,000

Based on the water use estimates above, we estimate that the proposed cultivation operation would have a maximum daily water use requirement of approximately 12,333 gallons, with an average daily water use requirement between 5,040 and 7,040 gallons per day during the cultivation season (April through November).

WATER AVAILABILITY

The Project Parcel is located within the Clear Lake Volcanics Groundwater Source Area as identified in the 2006 Lake County Groundwater Management Plan[1]. The Clear Lake Volcanics consist of basalt, andesite, and other volcanic rocks in a complex sequence. Groundwater in the Clear Lake Volcanics occurs primarily in fractures, joints, and within weathered zones that formed in between volcanic eruptions. The amount of groundwater available to a well in the formation is highly dependent on the size, openness, frequency, and interconnection of fractures and joints encountered in the well.

All water for the proposed cultivation operation would come from the existing onsite groundwater well located at Latitude: 38.86856° and Longitude: -122.57838°, near the center of the Project Parcel and directly adjacent to the proposed cultivation operation. This groundwater well was drilled to a depth of 320 feet below ground surface (bgs) in August of 2020, through red clay with basalt boulders (0-50 feet bgs), volcanic ash (50-75 feet bgs), and red and black volcanics (75-320 feet bgs). This well had an estimated yield of +400 gallons per minute (gpm) at the time it was drilled **(Attachment C: Onsite Well Completion and Performance Test Reports)**. Based on the information provided in the Well Completion Report, it appears that the onsite well receives groundwater from a confined aquifer located beneath the Project Parcel.

On January 15th, 2021 Cal-Tech Pump Well & Water Treatment (License No. 923640) conducted a 4-hour 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 55.5 gpm. The static water level in the onsite groundwater well was 180 feet bgs prior to the start of the well performance test. During the well performance test, the water level in the onsite groundwater well dropped to 195 feet bgs (**Attachment C: Onsite Well Completion and Performance Test Reports)**. The water level within the well recovered to 186 feet bgs within 30 minutes after the pumping ceased. A Specific Capacity of 3.7 gpm/foot of drawdown (i.e., 55.5 gpm / 15 feet) was calculated from the well performance test data.

The well yield test data indicates that the onsite groundwater well can produce approximately 3.7 gpm for every foot of drawdown, and at least 55.5 gpm. The well recovery observations

demonstrate that the well may be able to produce this water without causing overdraft conditions. The peak anticipated daily demand for water of the proposed cultivation operation is ~12,333 gallons per day, which the onsite groundwater well could produce in less than 3 hours and 45 minutes, when pumped at 55.5 gpm. Additionally, LHV proposes to establish at least 20,000 gallons of water storage capacity on the property. Based on the well performance test data and the estimated water use requirements of the proposed cultivation operation, it appears that the existing onsite groundwater well could sustainably produce the water needed to meet the project demands.

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 multiplied by 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 78.4-acre Project Parcel (Lake County APNs 003-046-02). Therefore, the annual precipitation available for recharge onsite can initially be estimated using the following data and equation.

> 78.4 acres x 2.75 feet (Average Annual Precipitation for Clearlake, CA) = 216 acre-feet
> Estimated Annual Precipitation Onsite = 216 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 soils of and geology of/under the Project Parcel are typical for the northern California region, we can estimate that the long-term average precipitation that recharges groundwater within the entire site to be at least 10 percent. With this data and the precipitation data presented above, we can estimate the groundwater recharge of the Project Parcel by using the following equation.

> 216 acre-feet/year (annual precipitation onsite) x 0.10 (long term average recharge) =
> Estimated Groundwater Recharge = 21.6 acre-feet/year

Based on the estimated average annual recharge to the aquifer under the Project Parcel (~22 acre-feet/year) and the estimated annual water usage of the proposed cultivation operation (4.2 and 5.8 acre-feet/year), it appears that LHV 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

Property). If we rerun the calculations above using this precipitation data, we can obtain the following estimate for groundwater recharge during Water Year 2021.

> 78.4 acres x 0.8 feet (Water Year 2021 Precipitation for Lower Lake, CA) = 62.7 acre-feet
> 62.7 acre-feet (Water Year 2021 Onsite Precip) x 0.10 (long term average recharge) =
> Estimated Severe Drought Value for Groundwater Recharge = 6.3 acre-feet

The estimated amount of water available to recharge the aquifer under the Project Property during a severe drought year (~6.3 acre-feet) is still greater than the estimated annual water usage of the proposed cultivation operation (4.2 to 5.8 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 and the proposed cultivation operation would have an annual water use requirement between 4.2 and 5.8 acre-feet (1,369,000 to 1,890,000 gallons) per year.

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[6]), we estimate the lateral pumping influence using information from the onsite groundwater well's Well Completion Report and from the well performance test performed by Cal-Tech Pump Well & Water Treatment January 15th, 2021 **(Attachment C: Onsite Well Completion and Performance Test Reports)**. An approximate relationship between specific capacity calculated from the well performance 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 coefficient of 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 $T = 528Q/\Delta s$ (Driscoll 1986, equation 9.11[6]). The analysis is shown on the attached semi-log plot (**Attachment D – Radius of Influence Analysis)**.

Using data from the Well Completion and Performance Test Reports and the general relationships outlined above, we calculated a zone of pumping influence extending approximately 2,000 feet from the onsite groundwater well. There are several unnamed ephemeral Class III watercourses within 2,000 feet of the onsite groundwater well, but ephemeral watercourses do not support aquatic habitat and are typically dry by April of each year, when pumping for the proposed cultivation operation would begin. Therefore, the potential for stream depletion as a result of the proposed onsite groundwater usage is not considered a concern to this assessment.

The Project Parcel is located in the southeast corner of Section 24 of Township 12 North and Range 7 West. The Well Completion Reports for all wells filed with the California Department of Water Resources (DWR) within Section 24 and the three adjoining Sections (Township 12N, Range 6W, Sections 19 & 30 and Township 12N, Range 7W, Section 25) were reviewed for this Hydrology Report. DWR's Well Completion Report Map Application indicates that there are forty-two (42)

wells located within these four sections. Well log data from those Well Completion Reports are summarized in a table attached to this report **(Attachment E – Nearby Wells Inventory)**. Additionally, the Lake County Environmental Health Department was consulted to determine the presence of any wells on the parcel adjacent to the Project Parcel.

The Lake County Environmental Health Department and DWR both had records indicating that there was one offsite groundwater well within a 2,000-foot radius from the onsite groundwater well, located at 12999 Spruce Grove Road on Lake County APN 012-067-35. As part of our research for this Hydrology Report, we contacted the landowner of APN 012-067-35 on January 26, 2022. The landowner indicated that the well was not currently in use and that he planned to use it as a domestic water source for a future residence. According to the Well Completion Report for the groundwater well located at 12999 Spruce Grove Road (**Attachment F – Nearest Known Neighboring Well Completion Report**), this well was drilled to a depth of 180 feet bgs in May of 2021, through red clay with volcanic boulders (0-20 feet bgs), black shale and sandstone (20-140 feet bgs), and black sandstone with gravels (140-180 feet bgs). The Well Completion Report does not indicate the exact location of the well located at 12999 Spruce Grove Road, but the landowner was kind enough to provide us with its location (Figure 2 – Area of Influence Diagram).

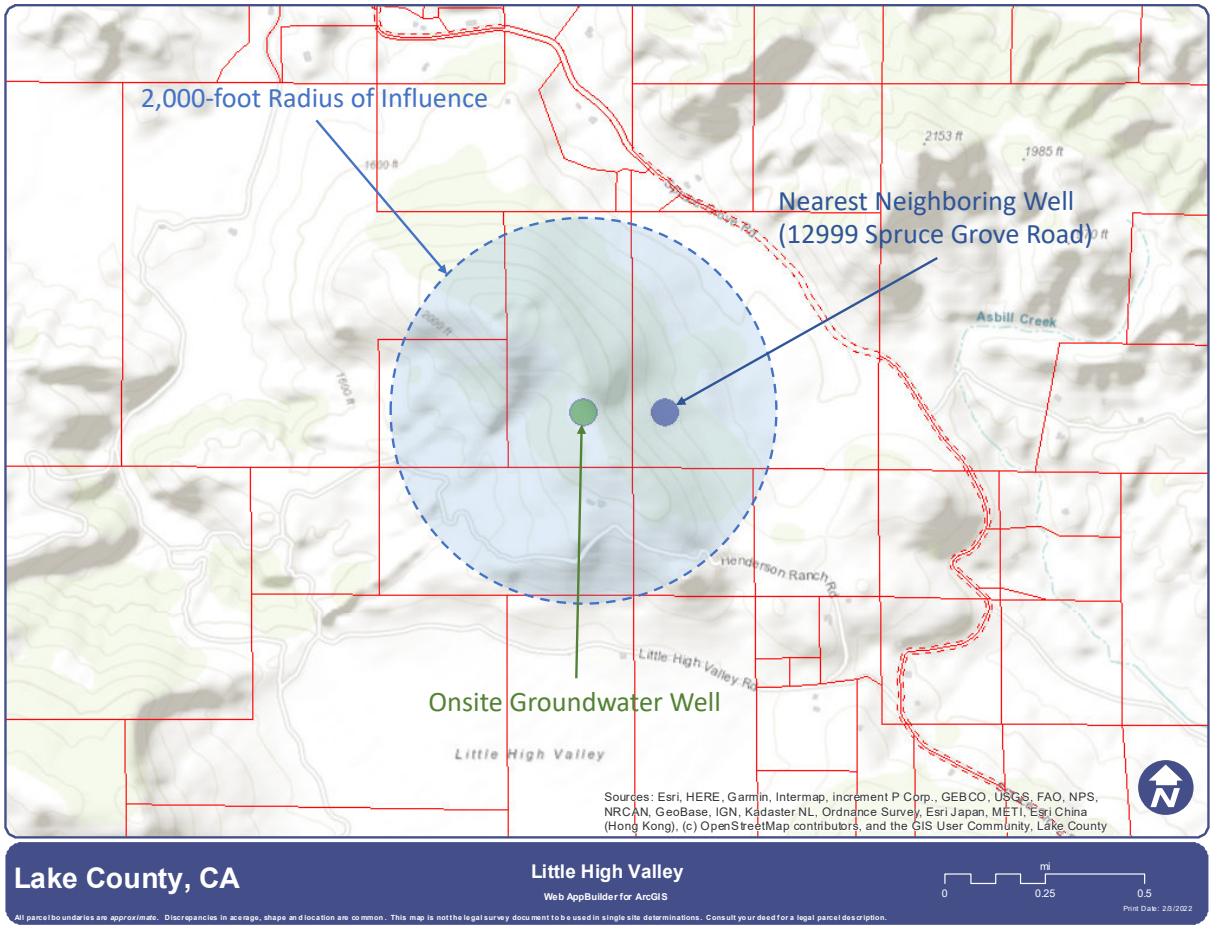


Figure 2 – Area of Influence Diagram

The wellhead of the onsite groundwater well is located at approximately 2,060 feet above mean sea level, and the well is screened between 220 and 320 feet bgs (~1,840 to ~1740 feet above mean sea level). The wellhead of the nearest known neighboring groundwater well is located at approximately 1,800 feet above mean sea level, and the well is screened between 140 and 180 feet bgs (~1,660 to ~1,620 feet above mean sea level). Both the onsite groundwater well and the nearest known neighboring groundwater well were drilled by Will Peterson Well Drilling. Will Peterson Well Drilling described the aquifer in which the onsite groundwater well was screened as "red/black volcanics", and described the aquifer in which the nearest neighboring groundwater well was screened as "black sandstone with gravels". Based on the information provided in the Well Completion Reports, it appears that the onsite well and nearest neighboring well receive groundwater from two different confined aquifers. Therefore, 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. LHV proposed cultivation operation would be composed of 87,120 ft^2 of outdoor cultivation/canopy area and a 3,500 ft^2 Processing Facility. All water for the proposed cultivation operation would come from an existing onsite groundwater well located at Latitude: 38.86856° and Longitude: -122.57838°, and the proposed cultivation operation would have an annual water use requirement between 4.2 and 5.8 acre-feet per year/cultivation season. As outlined above, we do not anticipate any impacts to streams and/or neighboring wells as a result of pumping of the onsite groundwater well for the proposed cultivation operation.

Per the Water Conservation and Use requirements outlined in the State Water Resources Control Board's Cannabis General Order, LHV shall implement the following Best Practical Treatment and Control (BPTC) measures to conserve water resources:

- Regularly inspect the 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, the proposed cultivation operation would efficiently use water resources at all times. Additionally, Article 27 Section 27.11 of the Lake County Zoning Ordinance requires commercial cannabis cultivators using water from a groundwater well to install a water level monitor on their water supply well, and to regularly

record readings from the continuous water level monitor. Well water level monitoring and reporting shall be performed as follows:

Seasonal Static Water Level Monitoring
Seasonal monitoring of well water levels provides information regarding long-term groundwater elevation trends. The water level in the onsite groundwater well shall be measured and recorded prior to the start of the cultivation season (March/April), and once in the fall (November) after the cultivation season has ended. Data reported to the Lake County Community Development Department as part of the Project's annual reporting requirements shall include a hydrograph plot of all seasonal water level measurements for the onsite groundwater well.

Water Level Monitoring During Extraction
The purpose of monitoring the water level in a well during extraction is to evaluate the performance of the well to determine the effect of the pumping rate on the water source during each cultivation season. This information can be used to determine the capacity and yield of the onsite groundwater well for determining pump rates and the need for water storage. The frequency of water level monitoring will depend on the source, the source's capacity, and the pumping rate. It is recommended that initially the water level be monitored twice per week or more, and that the frequency be adjusted as needed depending on the impact the pumping rate has on the well water level. Data reported to the Lake County Community Development Department as part of the Project's annual reporting requirements shall include a hydrograph plot of the water level readings during the cultivation season.

In addition to the monitoring and reporting described above, the Project's annual report shall include an analysis of the water level monitoring data, demonstrating whether or not use of the onsite groundwater well is causing significant drawdown and/or impacts to the surrounding area and what measures were taken to reduce impacts. If there are impacts, a revised Water Management Plan shall be prepared and submitted to the Lake County Community Development Department, for review and approval, demonstrating how the project will mitigate the impacts in the future.

DROUGHT EMERGENCY RESPONSE

When a drought emergency has been declared for the area of the proposed cultivation operation, LHV may implement the following additional measures, as needed or appropriate to the site, to reduce water use and ensure both success of the cultivation operation and decreased impacts to surrounding areas:

- Install moisture meters to monitor how much water is in the soil at the root level and reduce watering to only what is needed to avoid excess;
- Irrigate only in the early morning hours or before sunset;
- Cover plants with shaded meshes during peak summer heat to reduce plant stress and water needs;
- Add a soil amendments/ingredients to growing medium that retains water in a way to conserve water and aid plant growth/health. Soil amendments/ingredients such as peat moss, coco coir, compost, perlite, and vermiculite retain water and provide a good environment for cannabis to grow.

Additionally, to ensure both success and decreased impacts to the surrounding areas, LHV 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, LHV

will not plant 8,712 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 cultivation/canopy areas have been planted), and LHV will prioritize the preferred cultivation/canopy areas over less desirable cultivation/canopy areas (based on cultivation experience). By implementing the Drought Management Plan outlined above, LHV would reduce their estimated annual water demand from 1,369,000 to 1,890,000 gallons, to 1,232,100 to 1,701,000 gallons (10 percent), during periods of drought.

CONCLUSIONS

All water for the proposed cultivation operation will come from the existing onsite groundwater well located at Latitude: 38.86856° and Longitude: -122.57838°. This groundwater well was drilled to a depth of 320 feet below ground surface in August of 2020, with an estimated yield of +400 gallons per minute (gpm) at the time it was drilled. A well performance test performed in January of 2021, indicates that the onsite groundwater well can sustainably produce at least 55.5 gallons per minute. From the well performance test data we calculated a Specific Capacity of approximately 3.7 gpm/foot for the onsite groundwater well. The total estimated annual water use requirement for the proposed cultivation operation is between 1,369,000 to 1,890,000 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 Property (~21.6 acre-feet/year) and the estimated annual water usage of the proposed cultivation operation (4.2 to 5.8 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 zone of pumping influence for the proposed cultivation operation extends approximately 2,000 feet from the onsite groundwater well. There is a neighboring well within 2,000 feet of the onsite well, but this well appears to receive water from a confined aquifer that is different from the aquifer from which the onsite well receives groundwater (based on the Well Completion Reports for the two wells). Therefore, 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 the nearest known wells. Pumping for the proposed cultivation operation should not impact nearby ephemeral watercourses, as they are typically dry by April of each year, when pumping for the proposed cultivation operation would start.

LHV's 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 cultivation/canopy area(s) to be left fallow will depend on when a drought emergency is declared, prioritizing the preferred cultivation/canopy areas over less desirable cultivation/canopy areas. By implementing their Drought Management Plan, Little High Valley would reduce their estimated annual water demand from 1,369,000 to 1,890,000 gallons, to 1,232,100 to 1,701,000 gallons, 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 17870 Little High Valley, LLC, 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]Lake County Watershed Protection District, Lake County Groundwater Management Plan, 2006

[2]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

[3]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

[4]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

[5]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

[6]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

EXISTING AND PROPOSED CONDITIONS SITE PLANS

Lake County Planning Consultants

Little High Valley
17870 Little High Road, Lower Lake, CA 95457
APNs: 012-061-03

Scale
100 ft.

01/19/21

Existing and Proposed Conditions

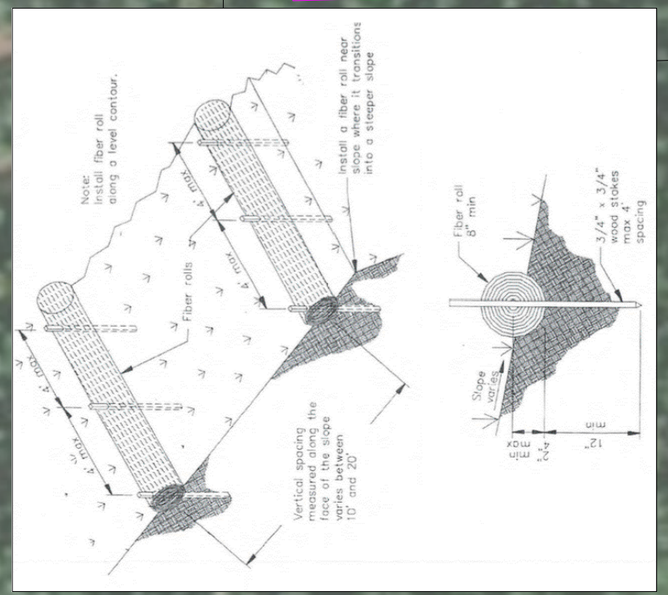
N

A

B

C

D



A: 2 Acres of Outdoor Canopy Space
B: 50' x 70' Processing Building
C: 2,500 Gallon Watertank
D: Well Location
100' Property Line Setback
Property Line
Fence
100' Watercourse Top of Bank Setback
Watercourse Top of Bank
20' wide private access driveway, 801' in length, 0-1% grade, graveled to a 75,000 lbs capacity, with a 60' by 20' hammerhead turnaround at the terminus.
Existing Natural Vegetation Buffer
Straw Wattle Location

Lake County Planning Consultants

Little High Valley
17870 Little High Road, Lower Lake, CA 95457
APNs: 012-061-03

Scale
100 ft.

01/19/21

Sediment and Erosion Control

Lake County Planning Consultants

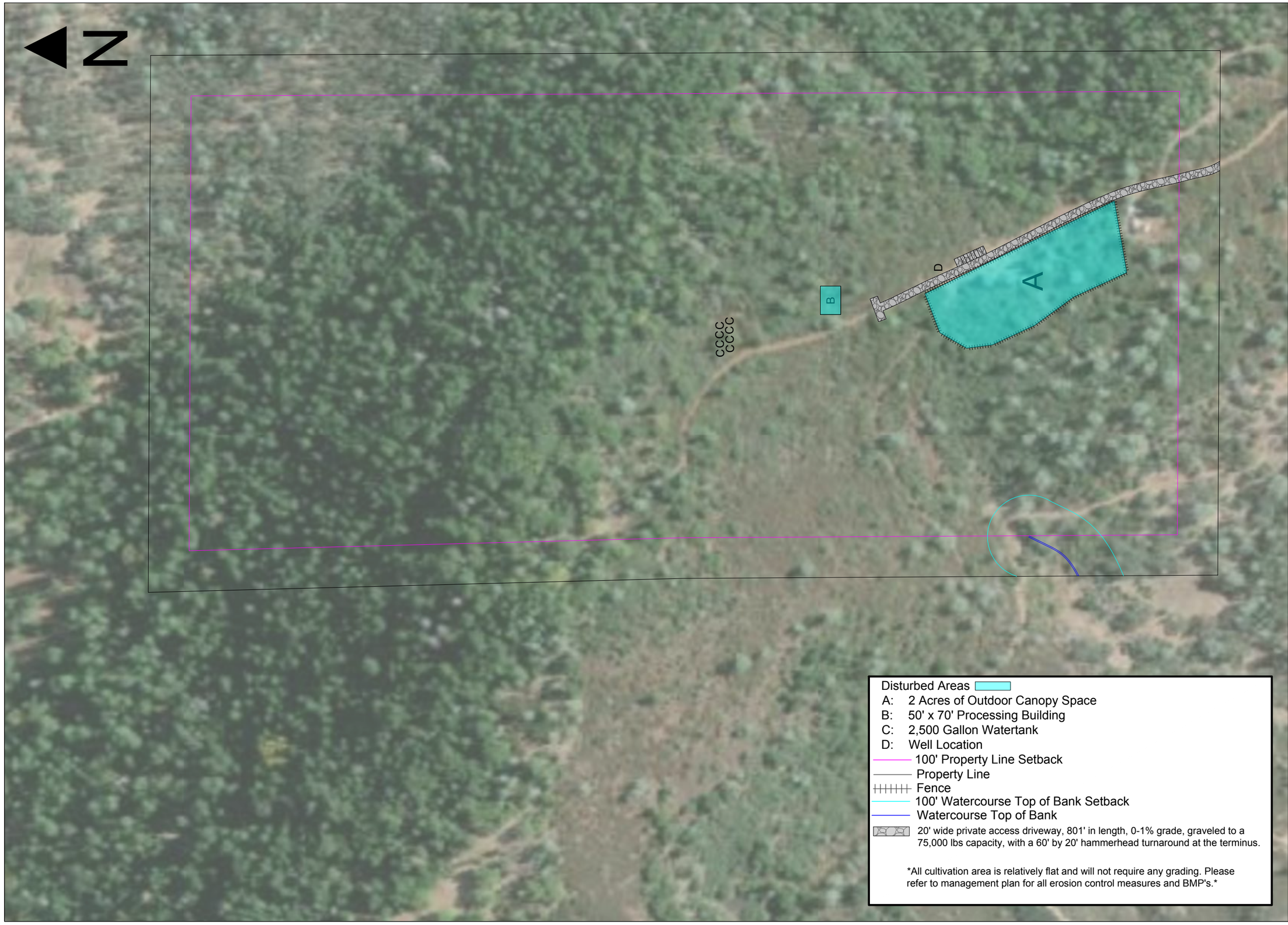
Little High Valley
17870 Little High Road, Lower Lake, CA 95457
APNs: 012-061-03

Scale
100 ft.

01/19/21

Security Plan

Sheet 3 of 6



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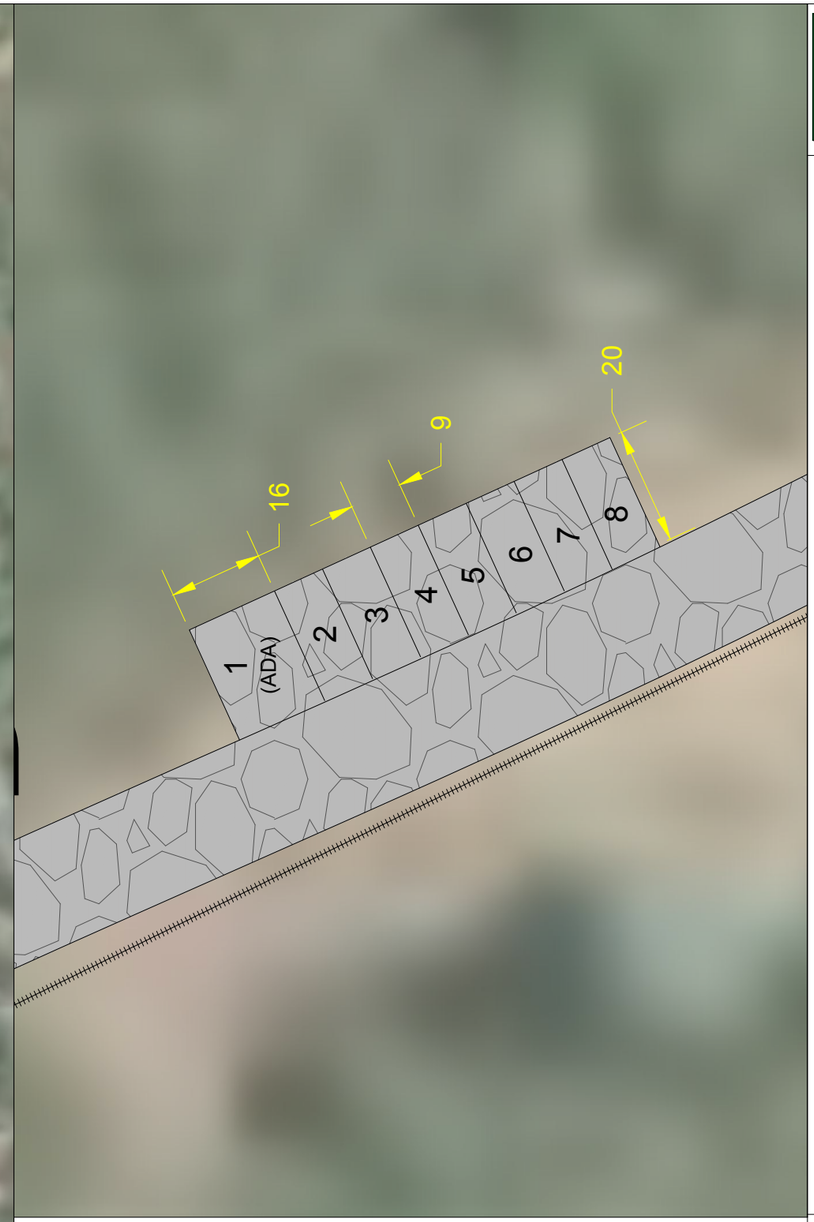
Little High Valley
17870 Little High Road, Lower Lake, CA 95457
APNs: 012-061-03

Scale
100 ft.

01/19/21

Grading and Erosion Control

Sheet 4 of 6



A: 2 Acres of Outdoor Canopy Space
B: 50' x 70' Processing Building
C: 2,500 Gallon Watertank
D: Well Location
100' Property Line Setback
Property Line
Fence
100' Watercourse Top of Bank Setback
Watercourse Top of Bank
20' wide private access driveway, 801' in length, 0-1% grade, graveled to a 75,000 lbs capacity, with a 60' by 20' hammerhead turnaround at the terminus.

Lake County Planning Consultants

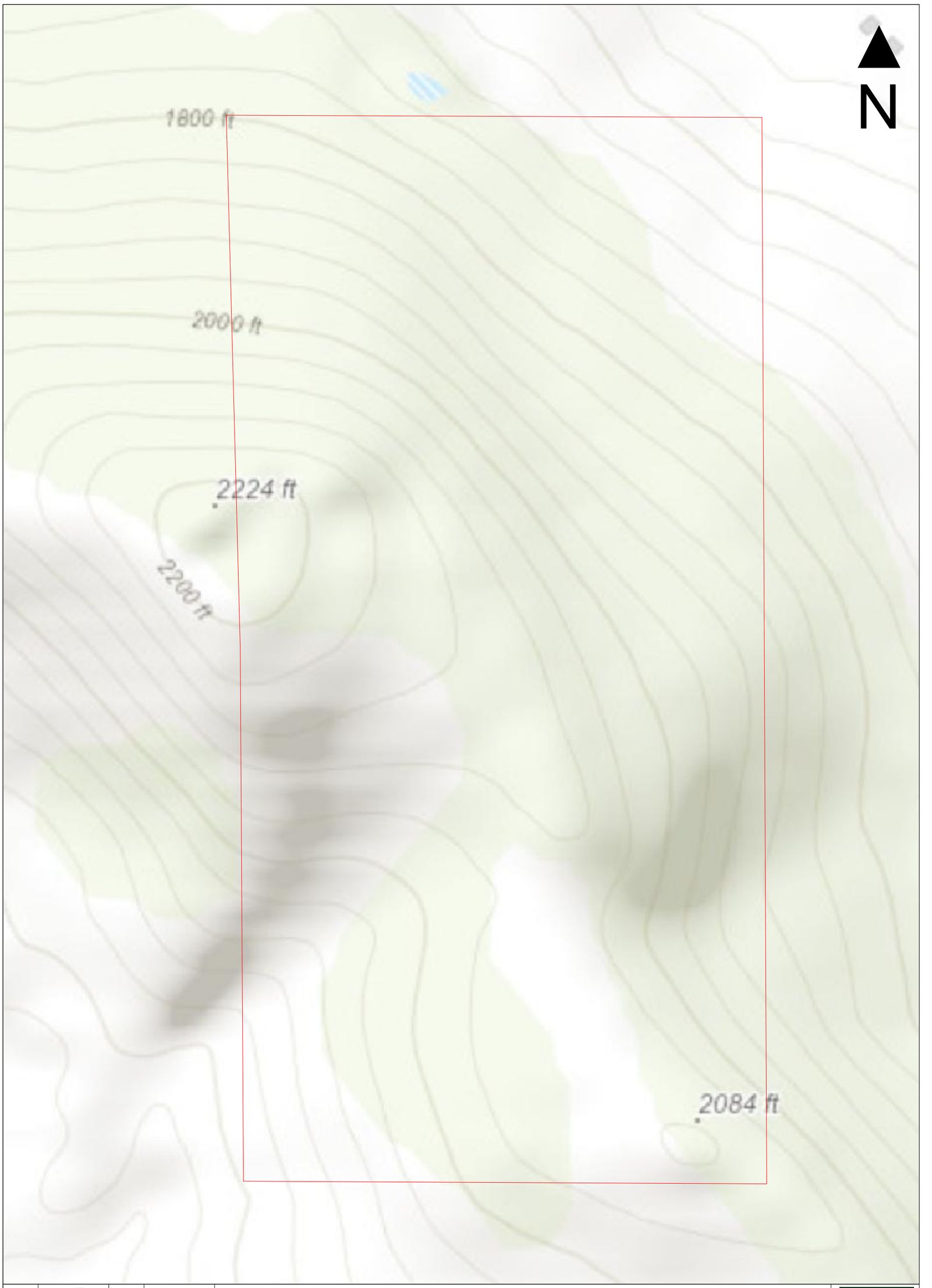
Little High Valley
17870 Little High Road, Lower Lake, CA 95457
APNs: 012-061-03

Scale
100 ft.

01/19/21

Circulation and Parking Plan

Sheet 5 of 6



Sheet 6 of 6	Topographic Map	01/19/21	40' Contour Intervals	Little High Valley 17870 Little High Road, Lower Lake, CA 95457 APNs: 012-061-03	Lake County Planning Consultants

ATTACHEMENT C

ONSITE WELL COMPLETION AND PERFORMANCE TEST REPORTS

*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 8-13-20 Date Work Ended 9-4-20

Local Permit Agency LAKE County Environmental Health

Permit Number WE-5555 Permit Date 5-12-20

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. XXXXXXX

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ○ Vertical ○ Horizontal ○ Angle Specify

Drilling Method Drilling Fluid

Depth from Surface Feet	to Feet	Description: Describe material, grain size, color, etc
0	50	Red clay with basalt boulders
50	60	Orange ash
60	75	Maroon volcanics with ash
75	120	Red/Black volcanics
120	190	Cindery Red/Black volcanics
190	220	Red/Black volcanics
220	240	Red/Black volcanics with fine ash
240	320	Red/Black volcanics

Total Depth of Boring 320 Feet

Total Depth of Completed Well 320 Feet

Well Owner

Name Marcie McDonald

Mailing Address P.O. Box 44

City Fulton State CA Zip 95439

Well Location

Address 17870 Little High Valley Rd.

City Lower Lake County LAKE

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

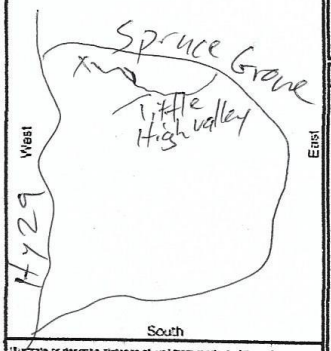
Datum Dec. Lat. Dec. Long.

APN Book 012 Page 061 Parcel 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 "DESTRUCTION"

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 220 (Feet below surface)

Depth to Static Water Level 200 (Feet) Date Measured

Estimated Yield * 400+ (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	40	20"		steel	1/4"	12 3/4	Blank	—
0	220	12 1/4"		steel	1/4"	8 5/8	Blank	—
220	320	8 1/2"		steel	1/4"	6 5/8	Perfs	.060

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	40	Concrete	SEAL
40	320	Sacks	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 P.O. Box 683 Address Kelseyville City CA State 95451 Zip

Signed C-57 Licensed Water Well Contractor Date Signed 1009053 C-57 License Number

DWR 188 REV 12006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

CAL-TECH PUMP WELL & WATER TREATMENT

P.O. Box 1261
Middletown, CA 95461
Ph. 707-987-4488

www.cal-techpump.com
State License # 923640
Fax. 707-987-4411

Well Inspection Log

For: Mark Mcdonald

Site: 17870 Little High Valley
Project:
Escrow #:

Ph: 799-8202

Email: Mdm@sonic.net

Start Date: 1/15/2020

Technician: Joe

WELL DEPTH	CASING SIZE	STATIC LEVEL	PUMP TYPE	PUMP SETTING	MAX PUMP OUTPUT	TOTAL DRAWDOWN	DEAD HEAD	AMPS	VOLTAGE
320'	6" Steel	180'	60 GPM 5HP 230v Franklin	273' 2" Galv.	55.5 GPM	195'	N/a	N/a	230v

DATE	TIME	TECH	WATER LEVEL	GAL.PER MINUTE	WATER COLOR	WATER METER	COMMENTS
1/15/2020	11:55 AM	Joe	180	55.5	Clear/cold	348,000	Start test
	11:59		186	55.5	Clear/cold		
	12:17		188	55.5	Clear/cold		
	12:39		190	55.5	Clear/cold		
	12:55		190	55.5	Clear/cold		
	1:20		191	55.5	Clear/cold		
	1:35		192	55.5	Clear/cold		
	2:00		194	55.5	Clear/cold		
	2:40		194	55.5	Clear/cold		
	3:20		194	55.5	Clear/cold		
	3:55		195	55.5	Clear/cold	361,800	End test
Recovery:	3:55		195				
	4:01		188				
	4:25		186				

Water Quality Sample Taken: No **Total Pumping Time: 4 Hrs.**
Pump Broke Suction During Test: No **Estimated Total Volume Pumped: 13,800**
Well Yield For Duration Of Test: 55.5

NOTES & RECOMMENDATIONS:

Well casing is above grade, and it has a proper seal. Pump is set 273' on 2" galvanized drop pipe.

ATTACHEMENT D

RADIUS OF INFLUENCE ANALYSIS

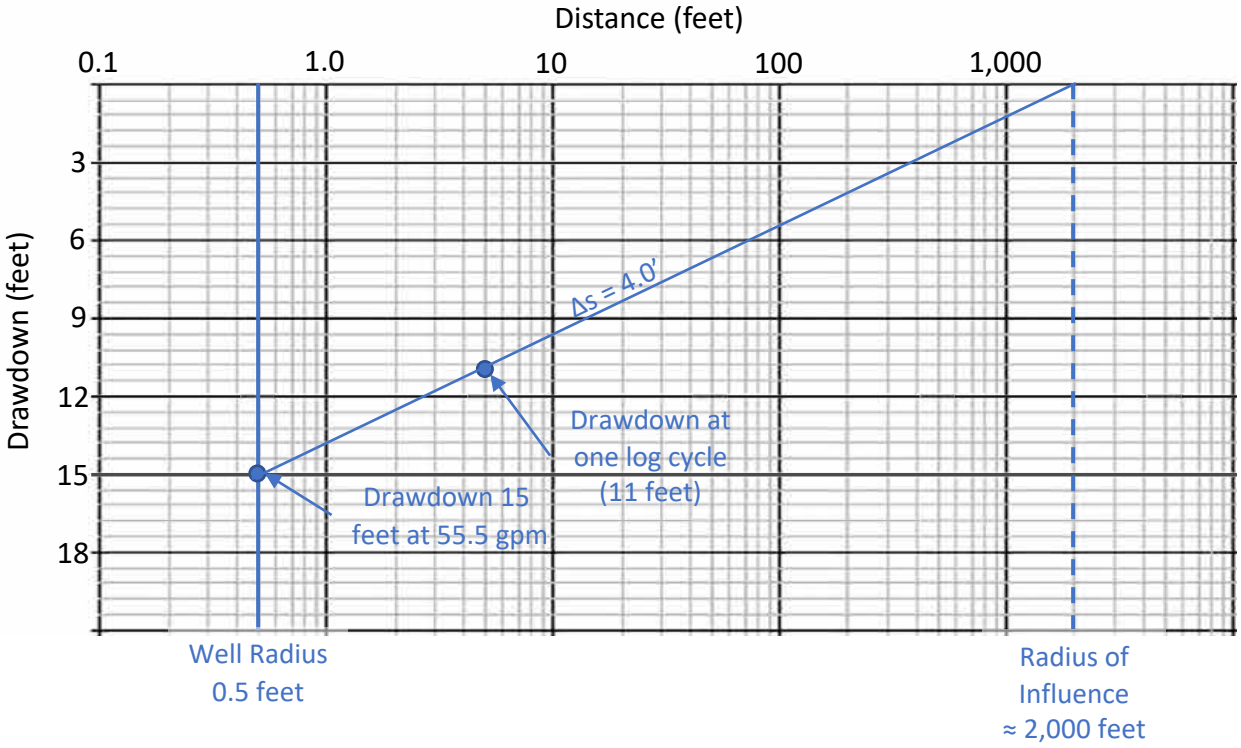
Radius of Influence Analysis

Well Radius (from Well Water Yield & Inspection Report) = 12”/2 x 1’/12” = 0.5 feet

Specific Capacity (using data from 1/15/21 Well Performance Test)
55.5 gpm (yield) / 15 feet (drawdown) = 3.7 gpm/foot of drawdown
Specific Capacity (SC) = 3.7

Modified Jacob’s equation from Driscoll Appendix 16-D (Driscoll 1986[6])
Transmissivity Confined Aquifer T = SC x 2000; T = 7,400 gpft/day

Distance Drawdown Equation Driscoll 9.11 (Driscoll 1986[6]) T=528Q/ Δs
Δs = 528Q/T; Δs = 528 x 55.5 gpm / 7,400
Δs = 4.0’



ATTACHEMENT E

NEARBY WELLS INVENTORY

Section	APN	Well Number	Year Drilled	Permit Number	Total Well Depth	Screen Interval (feet)	Aquifer Material	Additional Location Info (when APN is NA)
12N06W19	012-067-35	NA	2021	WE-5518	180	140-180	Sandstone & Gravel	
12N06W19	012-067-23	177974	1980	NA	275	215-275	Shale & Sandstone	
12N06W19	012-067-29	0951453	2014	WE-3046	100	60-100	Shale	
12N06W19	012-067-40	008021	2020	WE-5335	140	40-140	NA	
12N06W19	NA	20701	1977	NA	100	40-100	Sandstone	2 Miles E of Hwy 29 on Spruce Grove Road
12N06W19	012-067-26	007871	2019	WE-5149	70	30-70	Soil, Gravel, & Shale	
12N06W19	012-067-29	141018	1981	NA	152	116-152	"Gray Rock"	
12N06W19	012-067-25	486016	1992	WE-712	174	54-174	Shale	
12N06W30	012-047-17	302018	1989	NA	138	95-138	Volcanic Rock & Sandstone	
12N06W30	NA	121731	1978	NA	Dry Hole			3 Miles NE of Spruce Grove Road
12N06W30	012-047-02	0313904	2016	WE-4699	180	120-180	Volcanic Rock	
12N06W30	012-047-09	486019	1992	WE-676	330	290-0330	Volcanic Rock	
12N06W30	012-046-01	0950528	2011	WE-2823	Dry Hole			
12N06W30	012-047-19	302016	1989	NA	170	130-170	NA	
12N06W30	012-056-51	134477	1978	NA	80	40-75	Sand & Rock	
12N06W30	012-056-50	134462	1978	NA	80	40-80	Brown Sand & Sandstone	
12N06W30	012-012-90	236856	1983	NA	200	160-200	Volcanic Rock & Ash	
12N06W30	012-012-73	824927	2003	WE-2260	240	40-140	Shale & Sandstone	
12N06W30	012-046-03	555477	1995	WE-1176	230	210-230	Volcanic Rock & Shale	
12N06W30	012-047-04	756186	2002	WE-2187	350	290-330	Basalt	
12N06W30	NA	121732	1978	NA	Dry Hole			3 Miles NE of Spruce Grove Road
12N06W30	012-046-06	228057	1979	NA	180	130-160	Volcanic Rock	
12N06W30	012-056-51	134478	1979	NA	160	40-150	Sand & Clay	
12N07W24	NA	56830	1972	NA	34	10-34	Gravel & Clay	S side of Spruce Grove Road
12N07W24	NA	83628	1979	NA	65	25-65	Gravel & Clay	Riata Road
12N07W24	NA	87402	1979	NA	43	10-43	Clay & Shale	Riata Road

Section	APN	Well Number	Year Drilled	Permit Number	Total Well Depth	Screen Interval (feet)	Aquifer Material	Additional Location Info (when APN is NA)
12N07W24	049-270-03	84618	1970	NA	Dry Hole			
12N07W24	049-142-03	83640	1979	NA	58	18-58	Gravel & Clay	
12N07W24	NA	12581	1971	NA	31	13-31	Gravel, Clay, & Sandstone	3 miles SE of Lower Lake
12N07W24	049-141-02	56311	1980	NA	57	22-57	Gravel & Clay	
12N07W24	NA	177904	1984	NA	140	100-140	Shale & Sandstone	1/4 Mile South of Spruce Grove Road
12N07W24	NA	56433	1979	NA	50	30-50	Gravel & Clay	Riata Road
12N07W24	NA	11462	1977	NA	57	35-45	Gravel & Clay	Riata Road
12N07W24	012-061-01	1080459	2007	WE-2566	260	40-120	Shale & Sandstone	
12N07W25	NA	122131	1976	NA	355	55-355	Volcanic Rock & Ash	6 miles SE of Lower Lake
12N07W25	NA	87464	1979	NA	Dry Hole			2 miles W of Siegler Springs Road
12N07W25	012-056-14	445183	1997	WE-1473	165	45-165	Shale & Sandstone	
12N07W25	012-056-14	713350	2000	NA	170	50-170	Shale & Sandstone	
12N07W25	049-191-08	110382	1977	NA	35	20-35	Volcanic Ash & Shale	
12N07W25	NA	184027	1986	NA	200	160-200	Volcanic Rock & Shale	Noble Ranch, 1 mile from Spruce Grove
12N07W25	NA	13654	1977	NA	205	100-200	Sandstone	6 miles SE of Lower Lake
12N07W25	NA	87997	1979	NA	50	15-50	Gravel, Clay, & Shale	Riata Road
12N07W25	012-050-23	713349	2000	NA	155	115-155	Shale & Sandstone	Riata Road

ATTACHEMENT F

NEAREST KNOWN NEIGHBORING WELL COMPLETION REPORT

*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 JUL 30 2021

Owner's Well Number 1

Date Work Began 5-7-21 Date Work Ended 5-14-21

Local Permit Agency LAKE County Environmental Health

Permit Number WE-557846 Permit Date 12-18-2020

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. XXXXXX

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ● Vertical ○ Horizontal ○ Angle Specify

Drilling Method Mud Rotary Drilling Fluid Bentonite

Depth from Surface Feet	to Feet	Description Describe material, grain size, color, etc
0	20	Red clay with volcanic boulders
20	100	Black Shale
100	140	Black Shale & Black Sandstone
140	180	Black Sandstone with gravels

Total Depth of Boring 185 Feet

Total Depth of Completed Well 178 Feet

Well Owner

Well Location

Address 12999 Spruce Grove Rd.

City Lowerlake County LAKE

Latitude ___ Deg. ___ Min. ___ Sec. N Longitude ___ Deg. ___ Min. ___ Sec. W

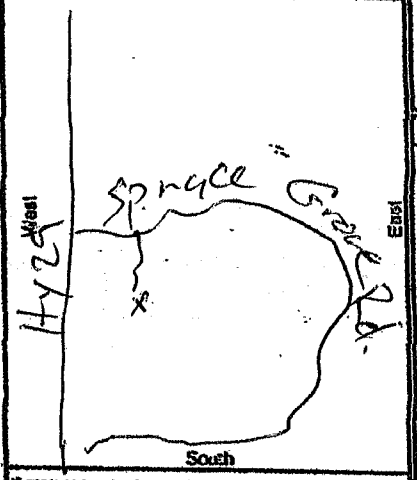
Datum ___ Dec. Lat. ___ Dec. Long. ___

APN Book 012 Page 067 Parcel 35

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 "Destruction"

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 140 (Feet below surface)

Depth to Static Water Level ___ (Feet) Date Measured 5-14-21

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	80	9"	F480	PVC	1/4"	5"	Blank	—
80	140	7 1/4	F480	PVC	1/4"	5"	Blank	—
140	180	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	SEAL
21	180	Sand	Gravel Pack

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other ___

Attach additional information, if needed

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

P.O. Box 615 Kelseyville CA 95451

Address City State

Signed [signature] 5-14-21

C-57 Licensed Water Well Contractor Date Signed

1009053 C-57 License Number

DWR 188 REV 1/2005

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM