

# HYDROGEOLOGIC ASSESSMENT REPORT

11795 North Drive Clearlake CA  
APN 010-019-10, 010-019-14, and 010-019-15

Prepared For:

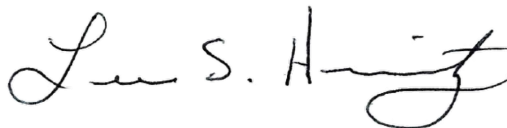
Akwaaba, LLC  
11795 North Drive  
Clearlake CA 95422

July 25, 2022

Prepared By:

**HURVITZ ENVIRONMENTAL SERVICES INC.**

105 Morris Street, Suite 188  
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Lee S. Hurvitz, PG #7573 CHG #1015  
Certified Hydrogeologist



Project No. 5205.01

July 25, 2022

Akwaaba, LLC  
11795 North Drive  
Clearlake CA 95422

Re: Hydrogeologic Assessment Report  
11795 North Drive  
Clearlake CA 95422  
APN 010-019-10, 010-019-14, and 010-019-15  
Hurvitz Environmental Project No. 5205.01

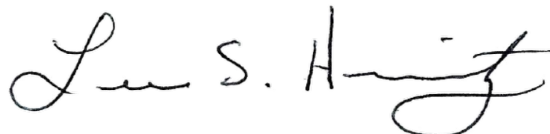
Akwaaba, LLC,

Hurvitz Environmental Services, Inc. (HES) is pleased to submit this Hydrogeologic Assessment Report for the above referenced property. HES prepared this Report in accordance with the Lake County Cannabis Ordinance. The purpose of this Report was to outline the site's proposed water usage rates and water conveyance systems as well as to evaluate whether or not the project water supply can adequately meet the proposed water demands without creating aquifer overdraft.

Based on the information and assessments contained herein, we conclude that the wells discharge capacity and rate of recharge are sufficient to sustainably provide for the projected annual water use at the site. The quantity of groundwater to be used for the project is unlikely to result in significant declines in regional groundwater availability or depletion of groundwater resources over time. The potential for the project water-use to cause well interference or impacts to creeks or nearby Clear Lake and Borax Lake are also considered to be minimal.

We appreciate the opportunity to provide you with these services. Please do not hesitate to contact us should you have any questions or comments regarding this report or our recommendations.

Sincerely,  
HURVITZ ENVIRONMENTAL SERVICES, INC



Lee S. Hurvitz, PG# 7573 CHG #1015  
Certified Hydrogeologist



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## **1.0 INTRODUCTION AND SCOPE OF SERVICES**

We understand that Akwaaba Farms LLC, (the Applicant) is applying to Lake County for approval to develop approximately 2-acres for cannabis cultivation, including 73,560 ft<sup>2</sup> of outdoor cannabis canopy and 9,720 ft<sup>2</sup> of mixed light cultivation (the Project). The proposed Project will occur at the property identified as 11795 North Drive, Clearlake, CA, Assessor's Parcel Numbers (APN) 010-019-10, 010-019-14, and 010-019-15, (the Site). According to the Lake County Cannabis Ordinance, development of property with the intent to cultivate cannabis requires a Hydrogeologic Assessment Report. Therefore, on behalf of the Applicant, Hurvitz Environmental Services (HES) conducted a Hydrogeologic Assessment Study and prepared this Report in accordance with the Lake County requirements.

This Hydrogeologic Assessment Report includes the following elements:

- Estimates of existing and proposed water uses for the property.
- Characterization of local geologic and hydrogeologic conditions including defining water sheds and sub-basins.
- Review and analysis of an 8-hour well yield and recharge test.
- Well Completion Report assessment.
- Aquifer storage and recharge assessment.
- Severe drought condition assessment.
- Assess potential for well interference between the project well and neighboring wells and between the project well and nearby Clear Lake and Borax Lake.
- Discussion on proposed methods for water level and water usage monitoring.



## 2.0 SITE DESCRIPTION

The Site is located in unincorporated Lake County, California, approximately 4.5 miles northwest of the City of Clearlake on the Sulphur Bank Ridge, a large peninsula that extends out into Clear Lake on the south east side of the Lake. Access to the property is obtained off of Highway 20 north of Clearlake, then south on Sulphur Bank Road to North Drive (**Plate 1 – Site Location Map**). The Lake County Assessor's Office identified the Site as three separate parcels APN 010-019-10 (8.65 acre), 010-019-14 (9.64 acre), and 010-019-15 (88.66), a total of 106.95 acres. Cultivation activities are only proposed on parcel APN 010-019-15 (Cultivation Parcel). The site lies in the Mayacama Mountains of the California Coast Ranges. The Site is located on a mountain ridge and consists of undeveloped property vegetated with oak chaparral forest and grassland. The cultivation parcel is on hydrologic watershed divide (**Plate 2 – USGS Topographic Map**) and contains an existing barn and water well (**Plate 3 – Site Plan**). There are no watercourses on the Cultivation Parcel. The Site is within the jurisdiction of the Central Valley Regional Water Quality Control Board. Site photographs are presented in **Appendix A** and the Engineering Design Plans for the proposed Project are presented in **Appendix B**.

### 2.1 USGS 7.5 MINUTE QUADRANGLE MAPS

HES reviewed the United States Geological Survey (USGS) Clearlake Oaks and Clearlake Highlands 7.5-Minute Quadrangle Maps, 2015, (**Plate 2 – USGS Topographic Map**). The Cultivation Parcel is located on the top of a ridge on the Sulphur Bank Peninsula. Precipitation run-off flows off the cultivation property to the north and south into Clear Lake and to the south and east into Borax Lake. The peak elevation on the Cultivation Parcel, is approximately 1,895 feet above mean sea level (MSL). The lowest elevation on the Cultivation Parcel is approximately 1,535 feet MSL at the western most edge of the parcel.

### 2.2 GEOLOGICAL CONDITIONS

HES reviewed the Geologic Map and Structure Section of the Clear Lake Volcanics, Northern California<sup>1</sup>. According to the map reviewed, the site lies within a geologic region composed generally of Franciscan Complex (*KFJ*) basement rocks. These rocks are a mixture of marine chert, greenstone, greywacke, shale and metamorphic rocks of blueschist grade. In addition, the top of the ridge contains a serpentinite deposit (*Jsp*) which intruded along a fault zone. The serpentinite deposit is of Jurassic or older age and contains serpentized mafic and ultramafic rocks.

Review of the project Well Completion Report (**Appendix C**) for the project irrigation well shows that the subsurface lithology consists of shale, chert, greenstone and sandstone which are all characteristic of Franciscan Complex rocks.

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<sup>1</sup> USGS 1995 Geologic Map and Structure Section of the Clear Lake Volcanics, Northern California, B.C. Hearn, Jr, J.M. Donnelly-Nolan, and F.E. Goff.

## 2.3 REGIONAL GROUNDWATER

According to [www.ecoatlas.com](http://www.ecoatlas.com)<sup>2</sup> the Cultivation Parcel is situated on a watershed divide with the northern two-thirds of the site located in the Schindler Creek-Frontal Clear Lake Sub-watershed (HUC-12-180201160308) and the southern 1/3 of the site located in the Burns Valley Frontal Clearlake Sub-watershed (HUC-12-180201160309.) on the south, (**Plate 2 – USGS Topographic Map**).

The Site is not in a designated Lake County groundwater basin<sup>3</sup> and is not located in a California State priority groundwater basin<sup>4</sup>. Review of the project Well Completion Report (**Appendix C**) for the Cultivation Parcel well shows that groundwater is contained in a sandstone layer located between 520 to 660 feet below ground surface (bgs).

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<sup>2</sup> EcoAtlas has been developed through funding from the US Environmental Protection Agency and the California State Water Resources Control Board.

<sup>3</sup> Camp Dresser and McKee Inc., California Department of Water Resources, Lake County Groundwater Management Plan, California Department of Water Resources, March 2006.

<sup>4</sup> California Department of Water Resources. 2003. Bulletin No. 118-2003, California's Groundwater. Division of Resources Planning.

### 3.0 SITE DEVELOPMENT AND WATER USE

The proposed Project will consist of a total of 83,280 ft<sup>2</sup> (~1.91-acres) of cannabis cultivation. The Project will be developed with two (2) areas of outdoor cannabis cultivation totaling 73,560 ft<sup>2</sup> of canopy, and an area of mixed light cultivation in 18 low hoop houses (540 ft<sup>2</sup> each) totaling 9,720 ft<sup>2</sup> of canopy. The proposed outdoor cannabis plants will be grown in an imported organic soilless growing medium (composed mostly of composted forest material) in aboveground fabric pots. Cannabis irrigation water will be pumped from the Project irrigation well to four (4) 5,000-gallon water storage tanks as shown on **Plate 3 – Site Plan** and in **Appendix B – Engineered Site Plan**. From the storage tanks the water will be distributed to the cultivation areas. To conserve water resources the proposed cultivation operation will utilize drip irrigation systems, have soil moisture monitors, and will irrigate in the morning to minimize evaporation losses. Discussions on the Project irrigation well construction and yield are presented in Section 3.4 and 3.5 of this Report. The approximate location of the proposed outdoor cultivation area, well, and other site features are also shown on **Plate 3 – Site Plan** and in **Appendix B – Engineered Site Plan**.

The estimated annual water-use for the approximate 1.91-acre Project (outdoor cultivation, mixed light cultivation and employees) is 1,298,753 gallons, which is approximately 3.98 acre-feet of groundwater/year.

The Project plans do not involve any water diversions, or imported water so all Project water will be derived from the Project irrigation well. Details on the Projects water usage, including breakdowns of average and peak monthly usage, are presented in **Table 1 – Total Project and Site Water Usage**.

#### 3.1 CULTIVATION WATER USAGE

The applicant plans to cultivate 73,560 ft<sup>2</sup> (1.68 acre) of outdoor canopy and 9,720 ft<sup>2</sup> (0.22 acre) of mixed light cultivation between April and November. The Applicant has not had any specific experience growing cannabis at this location but is working with experienced cannabis cultivators and is designing the system to use the least amount of water possible.

It is our understanding that a cannabis water usage rate of 2 acre-feet/acre/year for outdoor cultivation and 4 acre-feet/acre/year for indoor or mixed light cultivation is generally consistent with northern California averages. However, the indoor cultivation rate is based on year-round cultivation and the Applicant plans to only perform mixed light cultivation for 8-month a year or approximately 66.7% of the year. Therefore, for the purposes of this Assessment we will assume that the mixed light irrigation rate will be 66.7% of the average 4.0 acre-feet/acre/year. Using these estimated irrigation rates, the Projects outdoor cultivation will require a total of 1,094,859 gallons/year (3.36 acre-ft) and the mixed light cultivation will require 191,166 gallons (0.59 acre-feet). For a total cultivation water usage of 3.95 acre-ft/year of as detailed on **Table 1 – Total Project and Site Water Usage**.

### 3.2 RESIDENTIAL WATER USE

There are no residential buildings on the Cultivation Parcel and there are no immediate plans for residential development onsite. Therefore, residential water use was not a factor in this Assessment.

### 3.3 EMPLOYEE WATER USAGE

For the purpose of this Assessment, we estimate that the Project will require an average of four (4) full time, seasonal employees throughout the growing season (244 days). Potable water for farm workers will come from the Project irrigation well. Using the Napa County Water Availability Guidance Document<sup>5</sup> estimate of 15 gallons of water utilized per day per agricultural worker on site we calculated the annual employee water usage as follows:

$$4 \text{ (seasonal employees)} \times 15 \text{ gallons/day (daily water use)} \times 244 \text{ days/year} =$$

**14,640 gallons/year for Employee Groundwater Use**

### 3.4 TOTAL PROJECT WATER USAGE

The annual project water use estimate is:

$$1,094,859 \text{ gallons (outdoor cultivation)} + 191,166 \text{ gallons (mixed light cultivation)} + 14,640 \text{ gallons (employee)} =$$

**1,300,665 gallons or 3.99 acre-feet/year = Total Site Water Usage**

**TABLE 1 – TOTAL PROJECT AND SITE WATER USAGE**

Source	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Total
	-----Gallons-----													acre-ft
Outdoor Cultivation	0	0	0	110,000	120,000	130,000	145,000	150,000	150,000	145,000	144,859	0	1,094,859	3.36
Mixed Light Cultivation	0	0	0	12,000	15,000	20,000	25,000	33,000	33,000	30,000	23,166	0	191,166	0.59
Seasonal Employees	0	0	0	1,830	1,830	1,830	1,830	1,830	1,830	1,830	1,830	0	14,640	0.04
<b>TOTAL USAGE</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>123,830</b>	<b>136,830</b>	<b>151,830</b>	<b>171,830</b>	<b>184,830</b>	<b>184,830</b>	<b>176,830</b>	<b>169,855</b>	<b>0</b>	<b>1,300,665</b>	<b>3.99</b>

Based on these estimates for onsite water use it appears that average water use during the growing season for the entire Project would be **5,331 gallons/day** (1,300,665 gallons / 244 days). During the peak cultivation season (August - September), the applicant will use a daily maximum of approximately **6,060 gallons/day**.

<sup>5</sup> Water Availability Analysis (WAA) Guidance Document, Napa County, Adopted May 12, 2015.

### 3.5 SITE WELL INFORMATION

The Project irrigation well is located along the ridge top as shown on **Plate 3 – Site Plan** and in **Appendix B – Engineered Site Plan**. The Well Completion Report and well yield test data are presented in **Appendix C & D**, respectively.

The Project irrigation well was installed in November 2020 and is constructed with a 5-inch diameter PVC well casing installed to a total depth of 660 feet below ground surface (bgs). The Well Completion Report shows that the well is screened with 80-feet of slotted sections from 580 to 660 feet bgs. The water bearing zone is composed of sandstone. At the time the well was drilled the estimated well yield was 80 gallons per minute (gpm.). During the wells construction the first water was encountered at 580 bgs, however when a subsequent well yield test was performed in 2021, the static water was detected at 600 feet bgs. Since the water table is below the top of the screened well section it indicates that the aquifer is not under confining pressure and is therefore considered to be unconfined.

On June 1, 2021 a well yield test was conducted on the Project irrigation well by Will Peterson Well Drilling (**Appendix D – Well Yield Test**). Prior to starting the test, the initial static water level was measured at 600-feet bgs. The Project irrigation well was pumped for 8-hours at a constant rate of 12 gpm. Drawdown in the well stabilized at 604 feet bgs after only 30 minutes of pumping. Water levels in the well remained at 604 feet bgs for the remainder of the 8-hour test. Recharge was measured after the pumping ceased and within 5 minutes the water level in the well had recovered 100%.

Results of the well yield test indicate the Project irrigation well is capable of producing 12 gpm for at least 8-hours without overdrawing the aquifer. The specific capacity for the Project irrigation well, calculated from the well yield test, was 3.0 gpm/foot of drawdown (12 gpm/4 feet drawdown). The average daily water demand at the site over the cultivation season (April-Nov) is expected to be **5,331** gallons/day. Pumping the Project irrigation well at a rate of 12 gpm would require 444 minutes (7 hours 24 minutes) of pumping a day to produce that volume of water. The peak daily water demand of **6,060** gallons/day would require approximately 505 minutes (8 hours and 25 minutes) of pumping.

## 4.0 WATER BALANCE INFORMATION

### 4.1 PRECIPITATION

Precipitation, primarily as rainfall is the major source of inflow to the fractured Franciscan bedrock aquifer at this site. Though there are no climate stations on site or in the immediate vicinity, we estimate that the seasonal precipitation for the site is 38-inches/year<sup>6</sup>. Based on this precipitation rate it can be reasonably expected that approximately 3.17 acre-feet of rain falls on every acre of the site annually, or 339 acre-feet over the entire 106.95-acre site.

### 4.2 GROUNDWATER STORAGE

As discussed in Section 3.5 of this Report, the Well Completion Report information indicated that the well screen interval of the Project irrigation well was 80-feet. It can be reasonably assumed that this screen interval is consistent with aquifer thickness for this area. In addition, information contained in the 2006 Lake County Water Inventory and Analysis<sup>7</sup> provided specific yields ranges between 3% - 8% for this area. Thus, for the purpose of this Assessment we conservatively assumed a specific yield of 5% and have assessed the Site aquifer storage as follows:

$$\begin{aligned} &\text{Aquifer Thickness (80-feet) x Specific Yield (0.05)} \\ &\text{x Project Parcels (106.95-acres) =} \\ &\textbf{\underline{Estimated Aquifer Storage = 427.8 acre-feet}} \end{aligned}$$

### 4.3 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-feet 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, drainage ditches).

For this Site, the fractured Franciscan aquifer is considered unconfined (see section 3.5) and drainage features that border the Site have likely eroded through some of the overlying layers and are contributing to the recharge of the Site's aquifer through the creek bottoms. However, it is also likely that a portion of the rain water falling directly on the Site infiltrates the ground surface and migrates downward through the soil matrix until it recharges the aquifer. To estimate the groundwater recharge at the Site we first assumed that the recharge to the aquifer is primarily through rainfall and that all rainfall accumulated within the 106.95-acre site. Therefore, the annual precipitation available for recharge onsite can be estimated using the following data and equation.

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<sup>6</sup> <http://rainharvestcalculator.com/Rainfall/CA/Middletown/95461> based on 5-year average (2013-2017)

<sup>7</sup> Lake County Water Inventory and Analysis, California Department of Water Resources, March 2006.

106.95 acres x 3.17 feet (annual precipitation on the Cultivation Parcel) =  
**Estimated Annual Precipitation Onsite = 339 acre-feet**

However, this estimate does not account for surface run-off, stream underflow, and evapo-transpiration that occurs in all watersheds. According to the USGS, the long-term average precipitation that recharges groundwater in these northern California regions is approximately 15% but can be as low as 1.67%. Since this site aquifer is deep and the Site topography is steep, we conservatively estimate that the long-term average precipitation that recharges groundwater within the entire site is low, at approximately 4%. Therefore, using this recharge rate we can recalculate the groundwater recharge onsite using the following equation.

339 acre-feet (annual precipitation onsite) x 0.04 (long term average for recharge) =  
**Estimated Average Groundwater Recharge = 13.56 acre-feet/year**

The total site groundwater usage is estimated to be **3.98 acre-feet/year** and the groundwater recharge is estimated to be **13.56 acre-feet/year**. Therefore, the applicant will have sufficient water to meet their demands without creating overdraft conditions.

#### **4.4 DROUGHT CONDITIONS**

The recharge assessment was based on a recent 5-year average for rainfall in the region (2013-2017). However, this average, while lower than the 30-year average, did not account for severe drought conditions as we have seen over the past 3 years (2019-2022). If we were to assume drought conditions by using a value of 50% of the 5-year average rainfall used above, and assume that the groundwater recharge rate of 4%, we can estimate the potential drought condition or low-end value for annual aquifer recharge as follows.

339 acre-feet (average precipitation onsite) x 0.5 (drought factor) x 0.04 (conservative long-term average for recharge) =

**Estimated Severe Drought Value for Groundwater Recharge = 6.78 acre-feet/year**

## 5.0 PUMPING INFLUENCE TO SURROUNDING PROPERTIES

To evaluate potential well pumping impacts to surface water bodies or wells on other properties, the potential lateral extent of pumping from the Project irrigation well was estimated. Using the well construction and testing data discussed in section 3.5, and the relationship between specific capacity and aquifer transmissivity we estimated the lateral extent of pumping influence.

Transmissivity was estimated for an unconfined aquifer, using the relationship of Specific Capacity (yield/drawdown) x the coefficient of 1,500 (unconfined)<sup>8</sup>. To develop the slope of the drawdown curve from the pumping well, the value of  $\Delta s$  (drawdown over one log graph cycle) was calculated for a distance-drawdown relationship, where  $T = 528Q/\Delta s$ <sup>9</sup>. The analysis is shown on the attached semi-log plot, **Appendix E – Radius of Pumping Influence**.

The specific capacity for the Project irrigation well was calculated to be 3 gpm/foot drawdown (12 gpm/ 4 feet drawdown) as discussed in Section 3.5. Using this data and applying it to the site, we calculated a zone of pumping influence extending approximately 280-feet from the Project irrigation well, as shown in **Appendix E – Radius of Pumping Influence**. There are no neighboring wells, properties or water-bodies within 280-feet of the Project irrigation well as shown on **Plate 3 – Site Plan** and in **Appendix B – Engineered Site Plan**.

While Clear Lake is located approximately 1,200-feet north of the Project irrigation well and Borax Lake is located 2,300-feet southeast of the well, neither appear to within the estimated radius of pumping influence and are therefore not considered a concern to this assessment. Further, recharge to the aquifer beneath the site appears sufficient to meet the projects anticipated water demand.

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<sup>8</sup> Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, (Appendix 16D)

<sup>9</sup>Groundwater and Wells, Second Edition, Fletcher G. Discoll, 1986, published by Johnson Division, St. Paul Minnesota, 1089p. (Equation 9.11)



## **6.0 WATER QUALITY**

HES did not perform water testing as part of this Hydrogeologic Assessment Report however, review of the State Geotracker Database determined that there are no contaminated sites identified within 1,000 feet of the Project irrigation well. However, we do recommend that prior to the well being used as a potable water source it should be tested for naturally occurring contaminants including arsenic, boron, nitrates and coliform bacteria.

## 7.0 CONCLUSIONS

The Site is located in the Franciscan Complex within an unconfined aquifer consisting primarily of fractured sandstone. Recharge to the groundwater likely occurs primarily from direct precipitation and percolation as well as from stream flow from nearby creeks and Lakes. The estimated groundwater usage for the entire site including cultivation and employees is approximately **3.98 acre-feet/year**. Average annual recharge available to the site aquifer is estimated at 13.56 acre-feet/year. Based on well yield test data collected at the site, it appears that the aquifer storage and recharge area are sufficient to provide for sustainable annual water use at the site and within the area.

In summary:

Estimated Project Irrigation Water Use – 3.95 acre-feet/year

Site Worker Water Use - 0.04 acre-feet/year

Total Estimated Site Water Use - 3.99 acre-feet/year

Estimated Annual Recharge – 13.56 acre-feet/year

Estimated Recharge During Severe Drought – 6.78 acre-feet/year

Irrigation Well Sustainable Pumping rate – 12 gpm

Peak Daily Water Demand for Site – 6,060 gallons/day

- The quantity of groundwater to be used for the project compared to the average quantity of available groundwater indicates that pumping for the proposed project is unlikely to result in significant declines in groundwater elevations or depletion of groundwater resources over time.
- The horizontal and vertical separations between the project wells and the nearest neighboring properties are sufficient to not result in well interference. Potential impacts to nearby ephemeral watercourses and Lakes are also not considered a concern to this assessment.

## **8.0 LIMITATIONS**

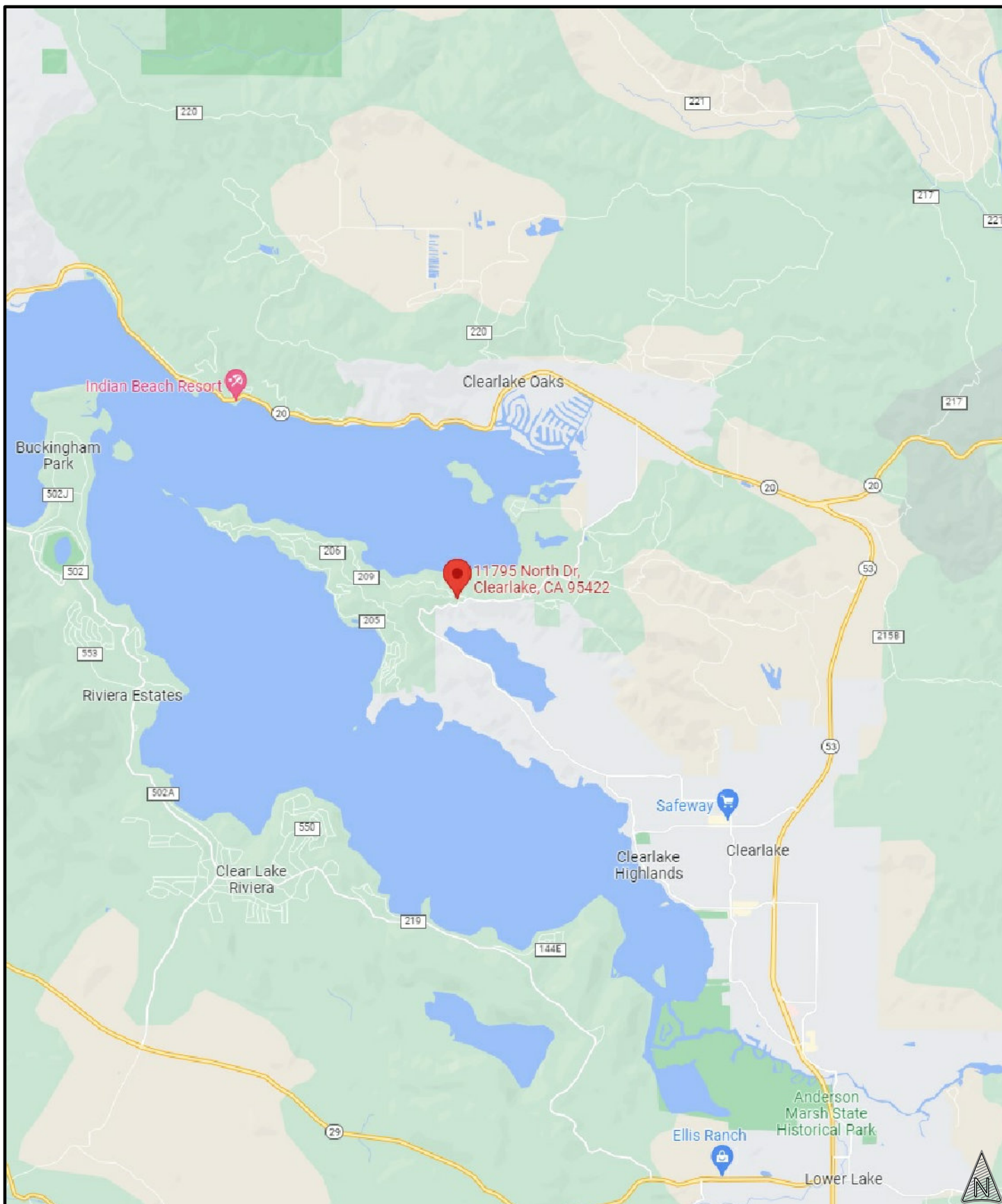
HES is not responsible for the independent conclusions, opinions or recommendations made by others based on the records review, site inspection, field exploration, laboratory test data and interpretations presented in this report.

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. Hydrogeologic interpretations are based on the drillers' reports made available to us through the California Department of Water Resources, available geologic maps and hydrogeologic 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 hydro-geological 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 of a type or at a location not investigated.

This study is not intended to assess if any soil contamination, waste emplacement, or groundwater contamination exists by subsurface sampling through the completion of soil borings and the installation of monitoring wells. The scope of work, determined by the client, did not include these activities.

This Report is for the exclusive use of Akwaaba Farms, its affiliates, designates and assignees and no other party shall have any right to rely on any service provided by Hurvitz Environmental Services without prior written consent.



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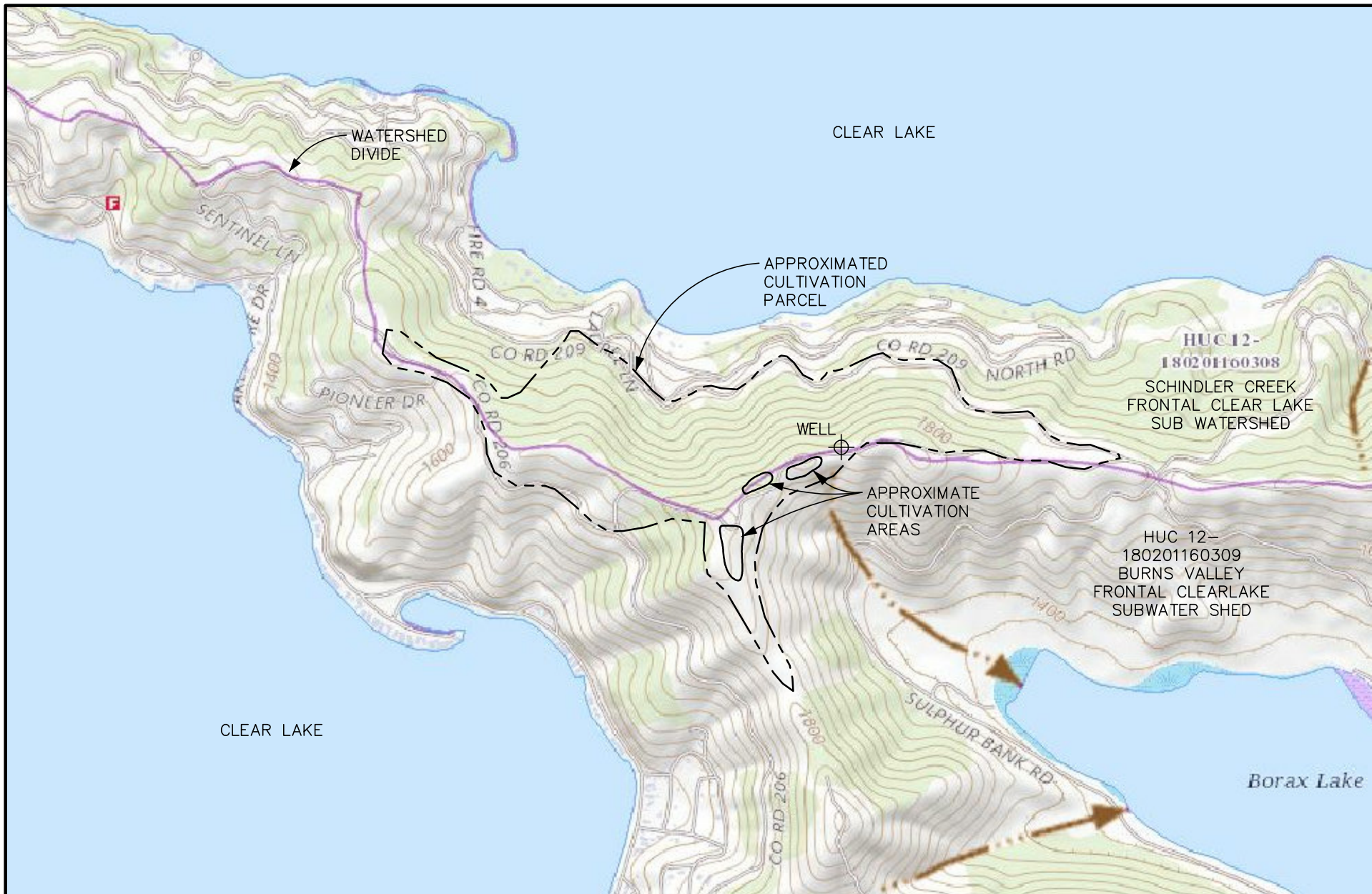
## SITE LOCATION MAP

11795 NORTH DR  
 CLEARLAKE, CALIFORNIA 95422

JOB NUMBER:  
 5205.01

DATE:  
 7/20/22

PLATE:  
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## USGS TOPOGRAPHIC MAP

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 2





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## SITE PLAN

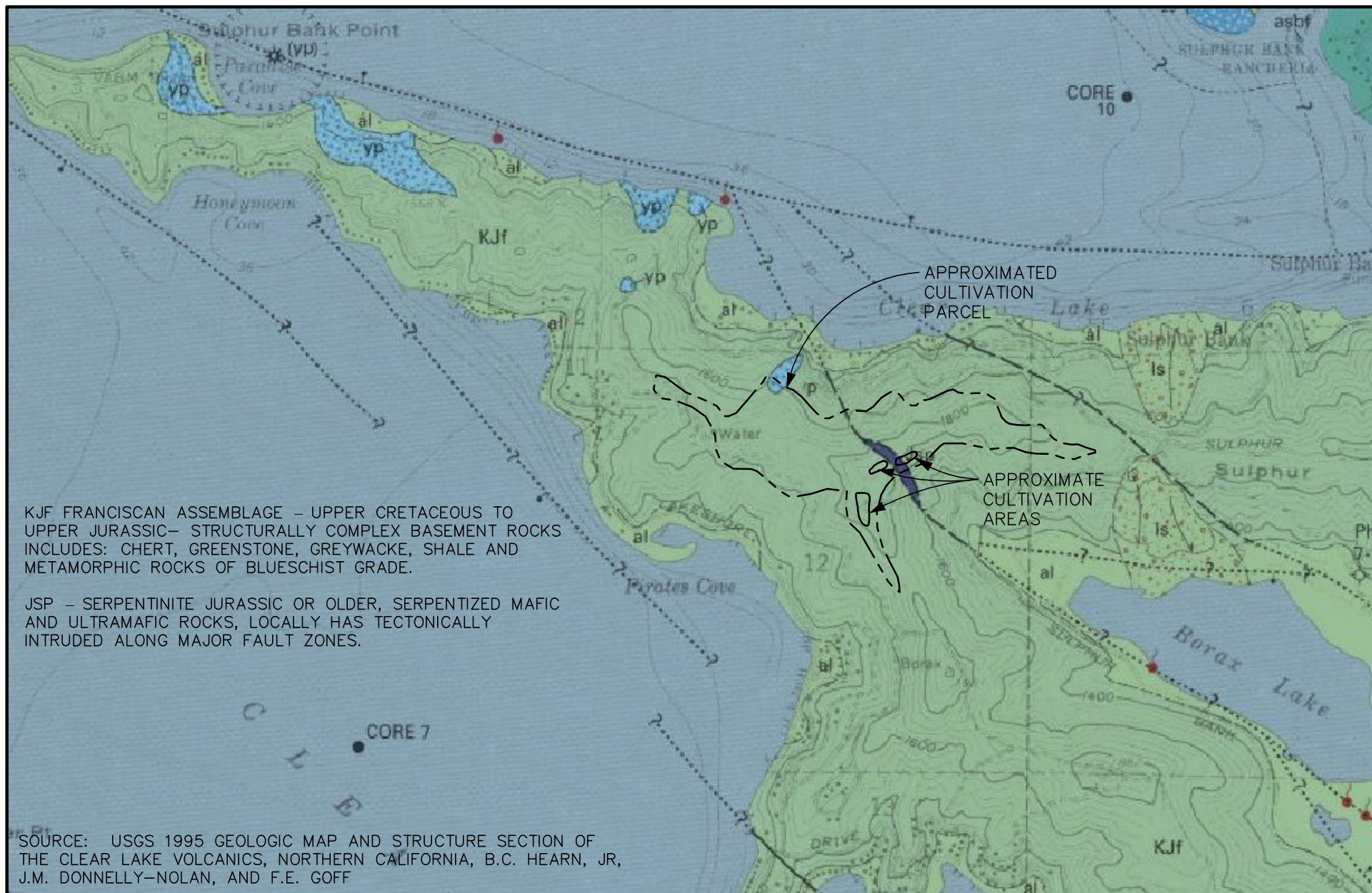
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SEBASTOPOL, CA 95472  
PH: 707.824.1690  
FX: 707.824.2675  
HURVITZ.ENVIRONMENTAL@GMAIL.COM  
CA PG# 7573

## **GEOLOGIC MAP**

11795 NORTH DR  
CLEARLAKE, CALIFORNIA 95422

JOB NUMBER:  
5205.01

DATE:  
7/20/22

PLATE:  
4

**APPENDIX A**  
**SITE PHOTOGRAPHS**





Access Road and Proposed Cultivation Areas "L" and "K" (west view)



Access Road and Proposed Cultivation Area "J" (west view)





Proposed Cultivation Area "J" (southeast view)

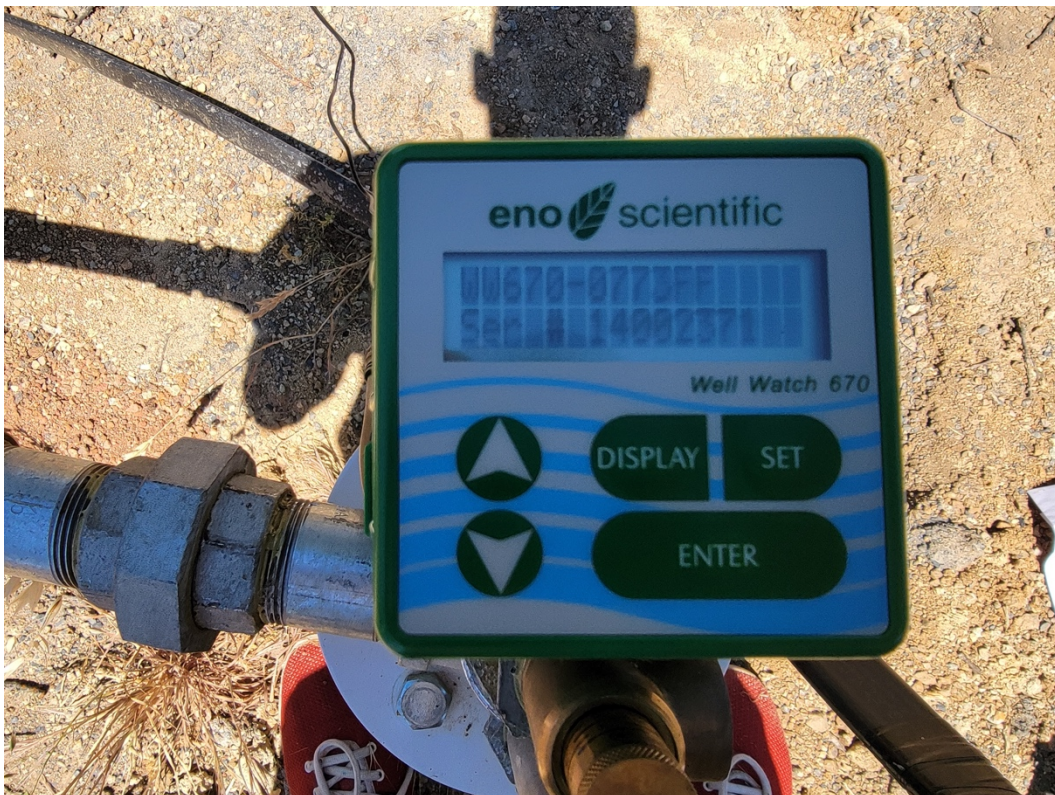


Proposed Drying & Harvest Storage Area/Existing Metal Barn (south view)





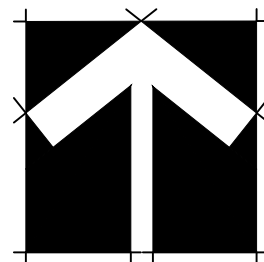
Existing Onsite Groundwater Well



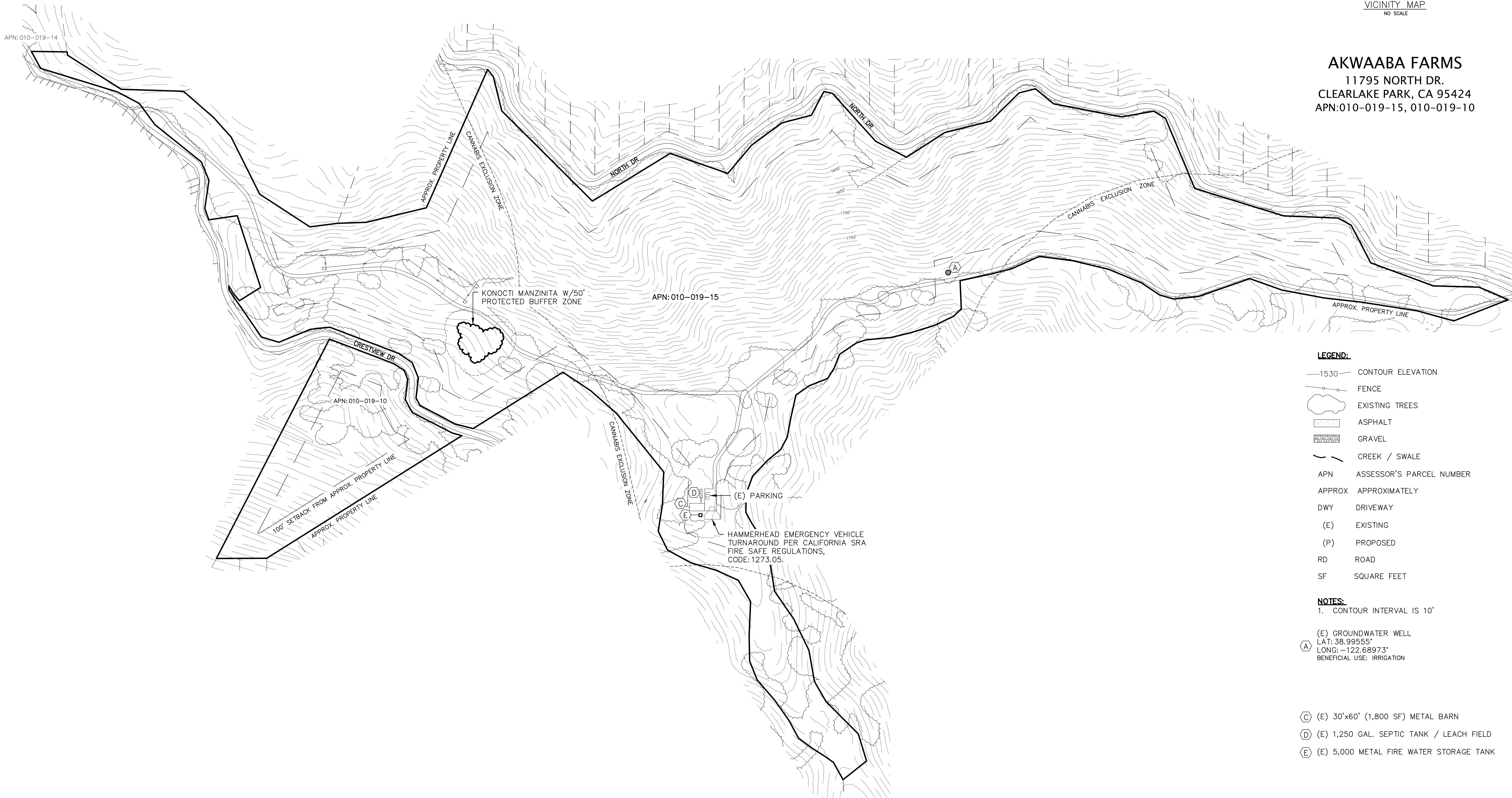
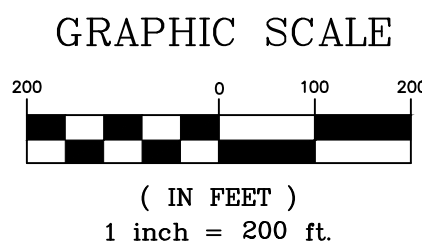
ENO Scientific Well Watch 670 Sonic Water Level Meter on Groundwater Well

**APPENDIX B**  
**ENGINEERED SITE PLAN**

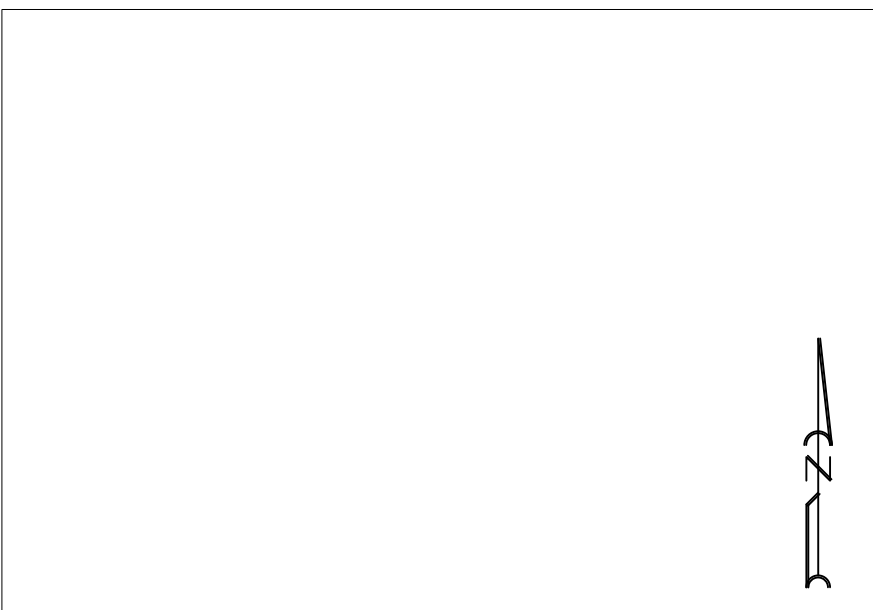




EXISTING CONDITIONS SITE PLAN



- LEGEND:**
- 1530 CONTOUR ELEVATION
  - FENCE
  - EXISTING TREES
  - ASPHALT
  - GRAVEL
  - CREEK / SWALE
  - APN ASSESSOR'S PARCEL NUMBER
  - APPROX APPROXIMATELY
  - DWY DRIVEWAY
  - (E) EXISTING
  - (P) PROPOSED
  - RD ROAD
  - SF SQUARE FEET
- NOTES:**
- CONTOUR INTERVAL IS 10'
- (E) GROUNDWATER WELL  
LAT: 38.99555°  
LONG: -122.68973°  
BENEFICIAL USE: IRRIGATION
- (C) (E) 30'x60' (1,800 SF) METAL BARN  
(D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD  
(E) (E) 5,000 METAL FIRE WATER STORAGE TANK



**AKWAABA FARMS**  
11795 NORTH DR.  
CLEARLAKE PARK, CA 95424  
APN:010-019-15, 010-019-10

Revisions:  
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**REALM ENGINEERING**  
CIVIL ENGINEERING, SURVEYING & PLANNING  
1767 MARKET STREET SUITE C  
REDDING, CA. 96001  
530-526-7493

PLANS PREPARED UNDER THE SUPERVISION OF:  

REGISTERED PROFESSIONAL ENGINEER  
JASON B. VANE  
No. 67800  
EXP. 06/30/21  
CIVIL  
STATE OF CALIFORNIA

EXISTING CONDITIONS SITE PLAN  
  
APNs: 010-019-15, 010-019-10 & 010-019-14  
11795 NORTH DRIVE  
CLEARLAKE, CA 95422  
LAKE COUNTY

PLOTTED BY:  
---

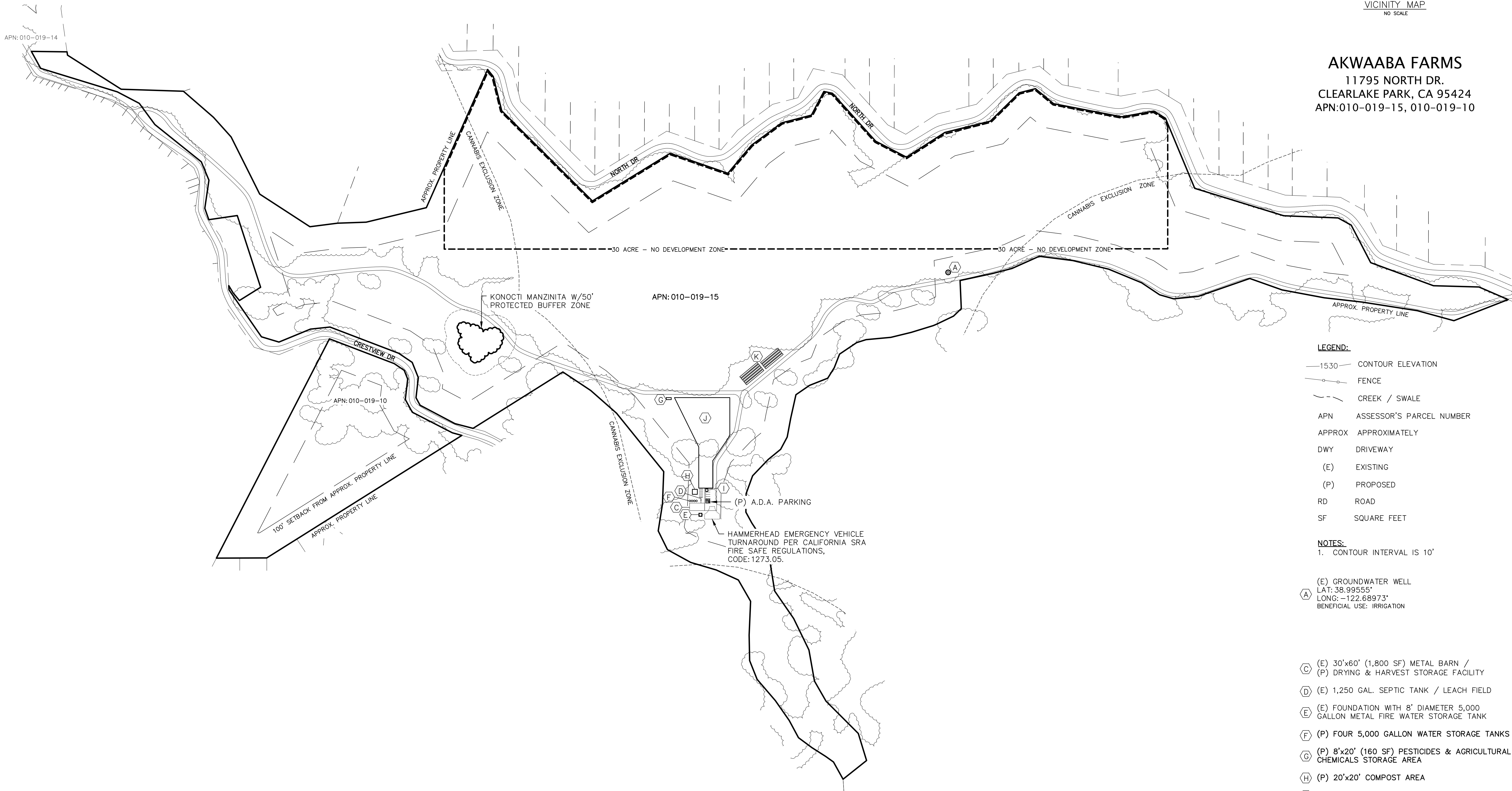
DATE PLOTTED:  
6/01/21

SCALE OF DRAWING:  
SEE PLAN

JOB NUMBER:

CADD FILE:

SHEET:  
  
1



VICINITY MAP  
NO SCALE

**AKWAABA FARMS**  
11795 NORTH DR.  
CLEARLAKE PARK, CA 95424  
APN:010-019-15, 010-019-10

**LEGEND:**

- 1530 CONTOUR ELEVATION
- FENCE
- CREEK / SWALE
- APN ASSESSOR'S PARCEL NUMBER
- APPROX APPROXIMATELY
- DWY DRIVEWAY
- (E) EXISTING
- (P) PROPOSED
- RD ROAD
- SF SQUARE FEET

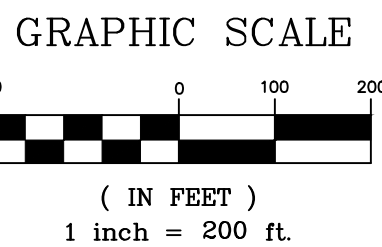
**NOTES:**

- CONTOUR INTERVAL IS 10'

(A) GROUNDWATER WELL  
LAT: 38.99555°  
LONG: -122.68973°  
BENEFICIAL USE: IRRIGATION

- (C) (E) 30'x60' (1,800 SF) METAL BARN /  
(P) DRYING & HARVEST STORAGE FACILITY
- (D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD
- (E) (E) FOUNDATION WITH 8' DIAMETER 5,000  
GALLON METAL FIRE WATER STORAGE TANK
- (F) (P) FOUR 5,000 GALLON WATER STORAGE TANKS
- (G) (P) 8'x20' (160 SF) PESTICIDES & AGRICULTURAL  
CHEMICALS STORAGE AREA
- (H) (P) 20'x20' COMPOST AREA
- (I) (P) DESIGNATED REFUSE AREA
- (J) (P) 43,560 SF OUTDOOR CULTIVATION / CANOPY  
AREA
- (K) (P) NINE 6'x90' (540 SF) MIXED-LIGHT CANOPY  
AREAS (LOW HOOPS)

**PROPOSED CONDITIONS  
SITE PLAN- PHASE I**



**Revisions:**

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**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 - PHASE I**

APNs:010-019-15, 010-019-10 & 010-019-14  
11795 NORTH DRIVE  
CLEARLAKE, CA 95422  
LAKE COUNTY

**PLOTTED BY:**

**DATE PLOTTED:**

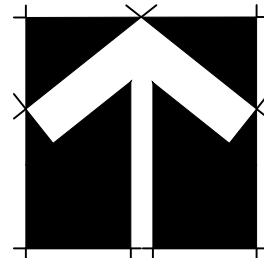
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**SEE PLAN**

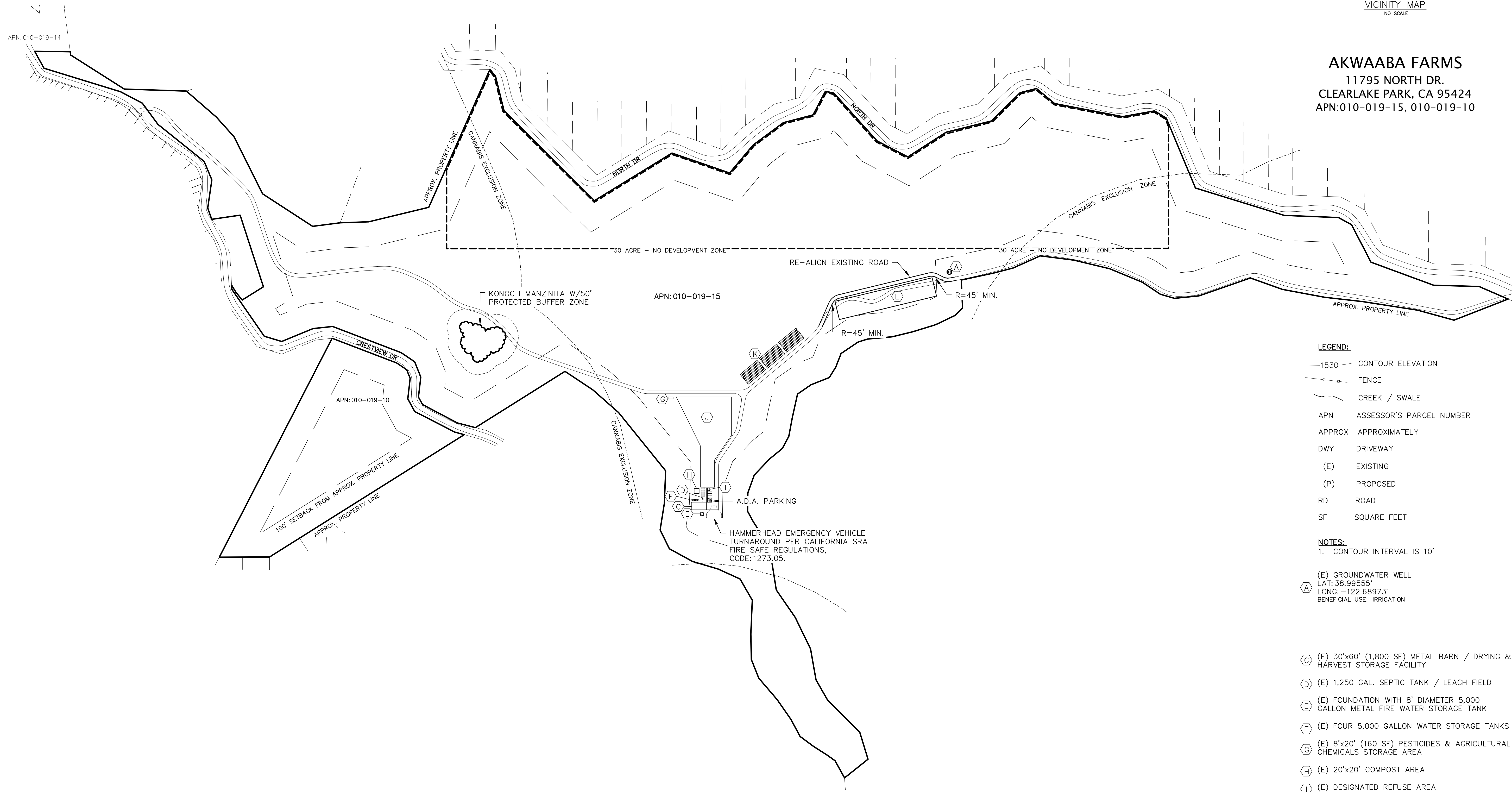
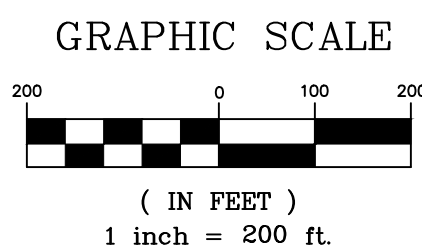
**JOB NUMBER:**

**CADD FILE:**

**SHEET:**



PROPOSED CONDITIONS  
SITE PLAN— PHASE II



- LEGEND:**
- 1530— CONTOUR ELEVATION
  - FENCE
  - / — CREEK / SWALE
  - APN ASSESSOR'S PARCEL NUMBER
  - APPROX APPROXIMATELY
  - DWY DRIVEWAY
  - (E) EXISTING
  - (P) PROPOSED
  - RD ROAD
  - SF SQUARE FEET
- NOTES:**
- CONTOUR INTERVAL IS 10'
- (E) GROUNDWATER WELL  
LAT: 38.99555°  
LONG: -122.68973°  
BENEFICIAL USE: IRRIGATION
- (C) (E) 30'x60' (1,800 SF) METAL BARN / DRYING & HARVEST STORAGE FACILITY
- (D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD
- (E) FOUNDATION WITH 8' DIAMETER 5,000 GALLON METAL FIRE WATER STORAGE TANK
- (F) (E) FOUR 5,000 GALLON WATER STORAGE TANKS
- (G) (E) 8'x20' (160 SF) PESTICIDES & AGRICULTURAL CHEMICALS STORAGE AREA
- (H) (E) 20'x20' COMPOST AREA
- (I) (E) DESIGNATED REFUSE AREA
- (J) (E) 43,560 SF OUTDOOR CULTIVATION / CANOPY AREA
- (K) (P) EIGHTEEN 6'x90' (540 SF) MIXED-LIGHT CANOPY AREAS (LOW HOOPS)
- (L) (P) 75'x400' (30,000 SF) OUTDOOR CULTIVATION / CANOPY AREA



**AKWAABA FARMS**  
11795 NORTH DR.  
CLEARLAKE PARK, CA 95424  
APN:010-019-15, 010-019-10

Revisions:

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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 - PHASE II

APNs: 010-019-15, 010-019-10 & 010-019-14  
11795 NORTH DRIVE  
CLEARLAKE, CA 95422  
LAKE COUNTY

PLOTTED BY:  
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DATE PLOTTED:  
6/01/21

SCALE OF DRAWING:  
SEE PLAN

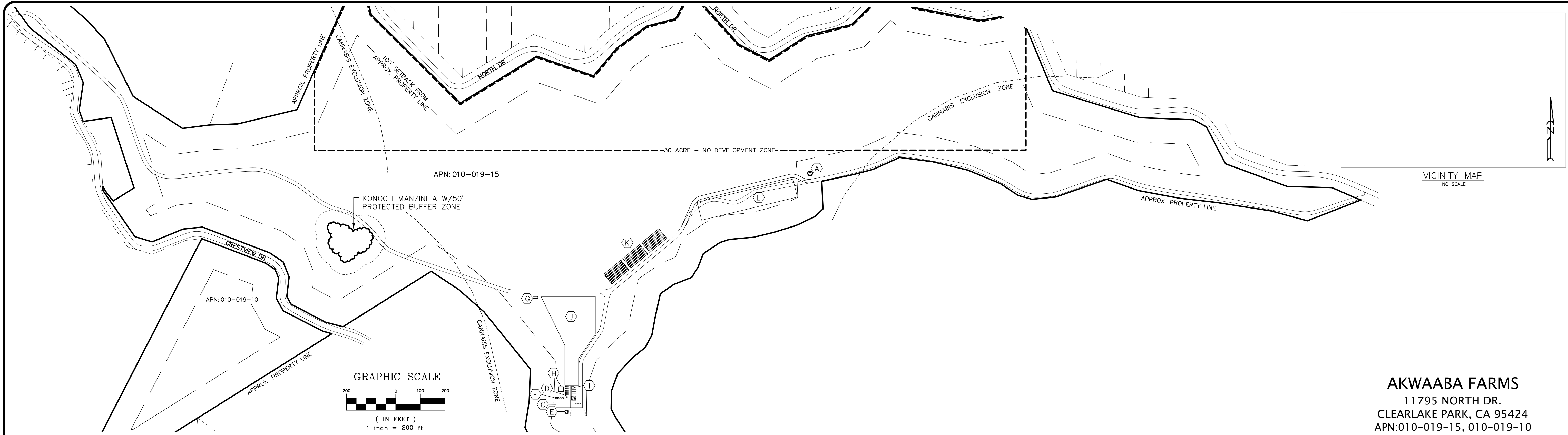
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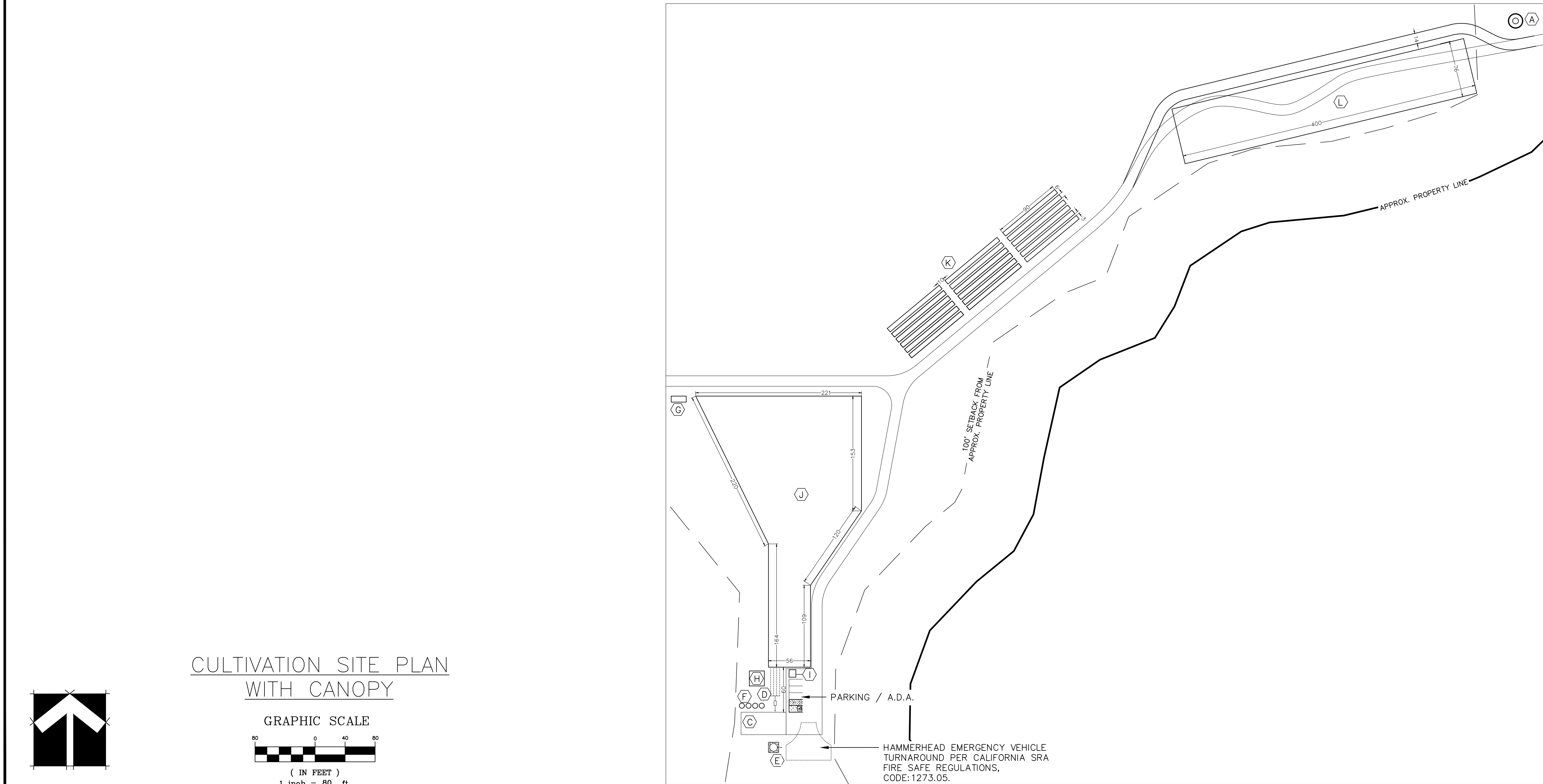
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**AKWAABA FARMS**  
11795 NORTH DR.  
CLEARLAKE PARK, CA 95424  
APN:010-019-15, 010-019-10



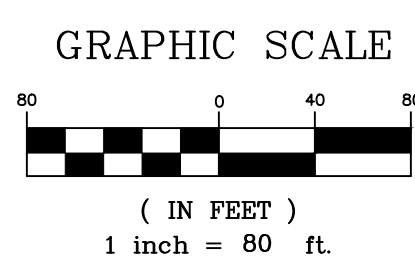
- LEGEND:**
- 1530 CONTOUR ELEVATION
  - FENCE
  - CREEK / SWALE
  - APN ASSESSOR'S PARCEL NUMBER
  - APPROX APPROXIMATELY
  - DWY DRIVEWAY
  - (E) EXISTING
  - (P) PROPOSED
  - RD ROAD
  - SF SQUARE FEET

**NOTES:**  
1. CONTOUR INTERVAL IS 10'

(E) GROUNDWATER WELL  
LAT: 38.99555°  
LONG: -122.68973°  
BENEFICIAL USE: IRRIGATION

- (C) (E) 30'x60' (1,800 SF) METAL BARN / DRYING & HARVEST STORAGE FACILITY
- (D) (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD
- (E) FOUNDATION WITH 8' DIAMETER 5,000 GALLON METAL FIRE WATER STORAGE TANK
- (F) (E) FOUR 5,000 GALLON WATER STORAGE TANKS
- (G) (E) 8'x20' (160 SF) PESTICIDES & AGRICULTURAL CHEMICALS STORAGE AREA
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- (K) (E) EIGHTEEN 6'x90' (540 SF) MIXED-LIGHT CANOPY AREAS (LOW HOOPS)
- (L) (E) 75'x400' (30,000 SF) OUTDOOR CULTIVATION / CANOPY AREA

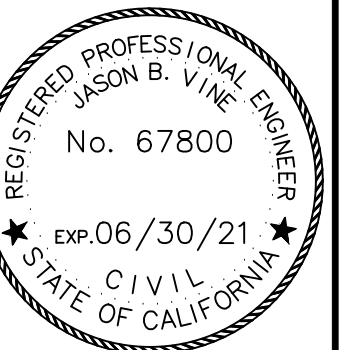
## CULTIVATION SITE PLAN WITH CANOPY



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

APNs: 010-019-15, 010-019-10 & 010-019-14  
11795 NORTH DRIVE  
CLEARLAKE, CA 95422  
LAKE COUNTY

PLOTTED BY:

DATE PLOTTED:

SCALE OF DRAWING:

JOB NUMBER:

CADD FILE:

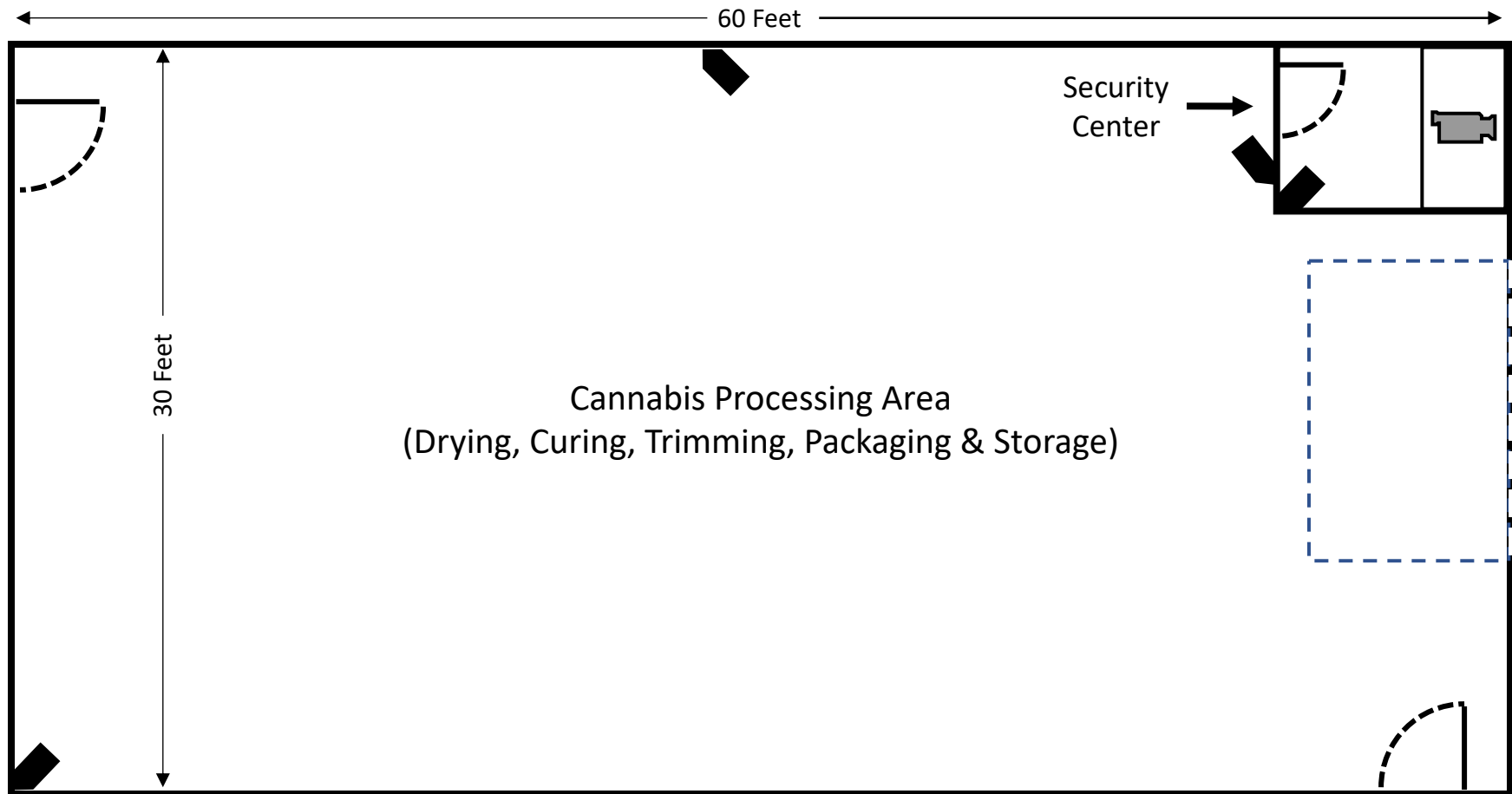
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
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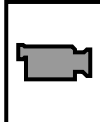




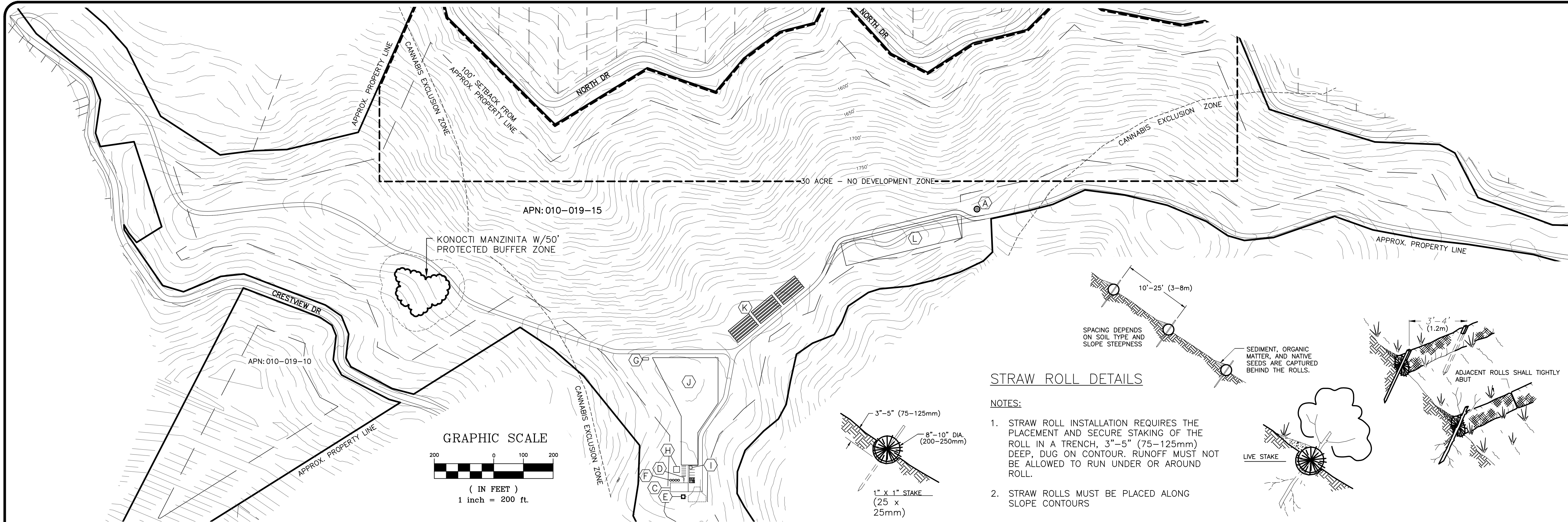
# Proposed Processing Facility/Building Layout (Existing Metal Barn)



 Waterproof Surveillance Cameras with 1080p resolution and a 90° field of view. (Arrow indicates direction of view)

 Video Surveillance Monitoring and Recording Station





### STRAW ROLL DETAILS

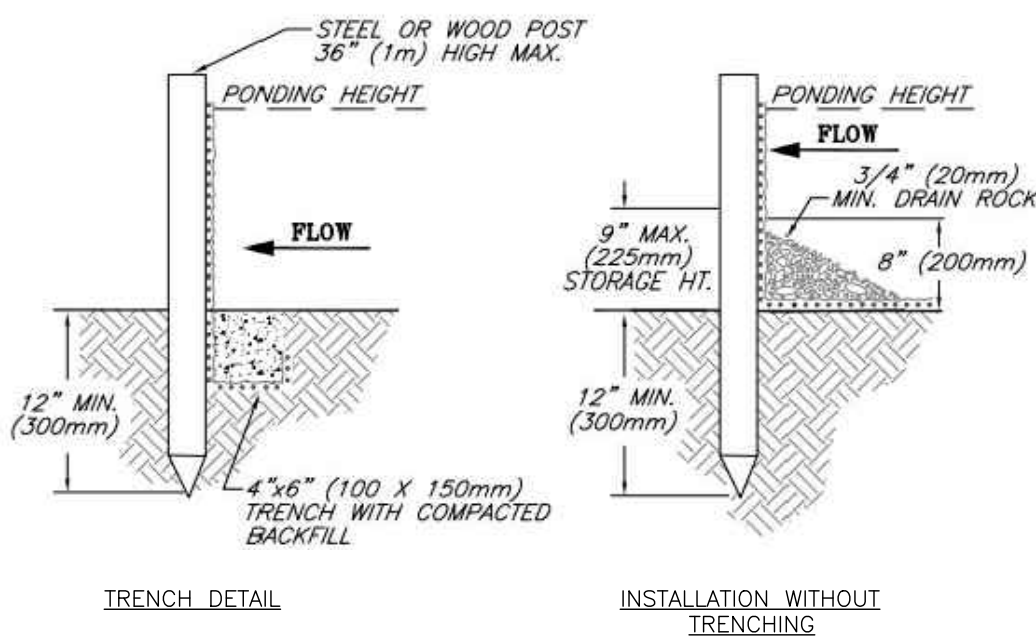
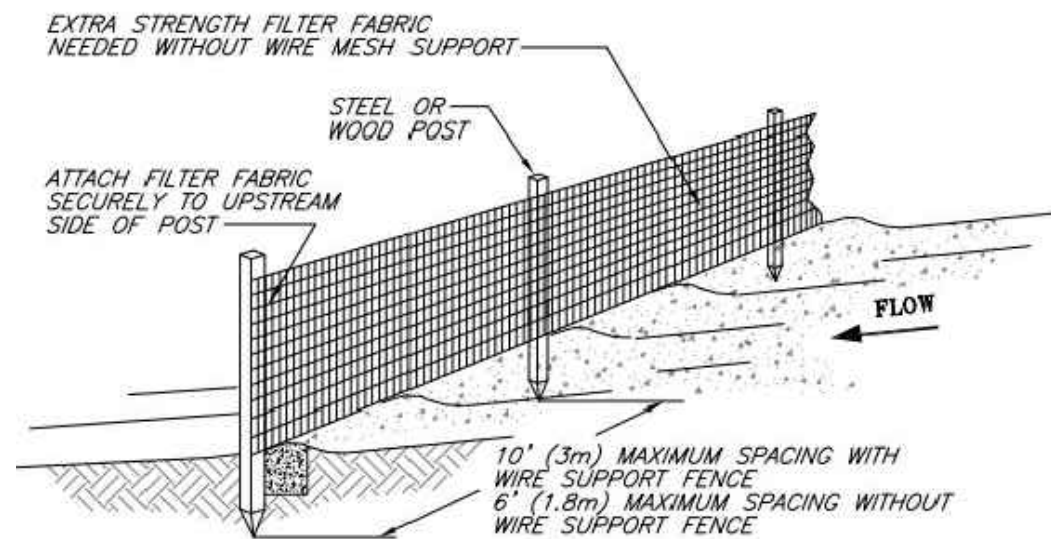
#### NOTES:

- STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3'-5" (75-125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
- STRAW ROLLS MUST BE PLACED ALONG SLOPE CONTOURS

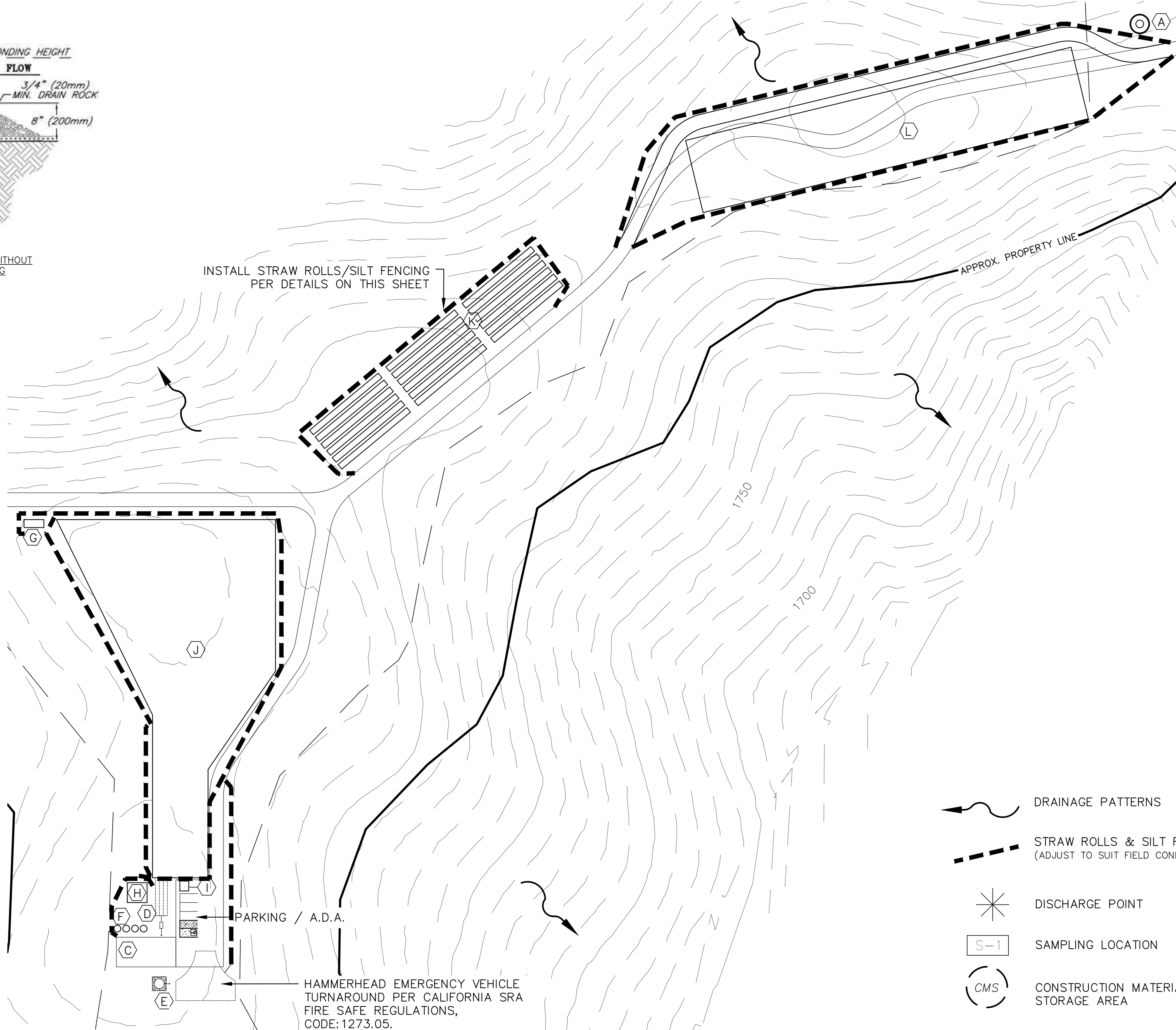
### SILT FENCE DETAILS

#### NOTES:

- SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
- INSPECT & REPAIR FENCE AFTER EACH STORM EVENT & REMOVE SEDIMENT WHEN NECESSARY.
- REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.



INSTALL STRAW ROLLS/SILT FENCING PER DETAILS ON THIS SHEET



#### EROSION & SEDIMENT CONTROL NOTES:

- CONTRACTOR IS TO IMPLEMENT BEST MANAGEMENT PRACTICES (BMPs) TO CONTROL EROSION CONTROL AND REDUCE THE OFF-SITE DISCHARGE OF SEDIMENT TO THE MAXIMUM EXTENT PRACTICABLE.
- EROSION CONTROL BMPs SHALL BE IN PLACE AND MAINTAINED ALL YEAR ROUND.
- HE CONTRACTOR SHALL FOLLOW THE GUIDELINES FROM THE "CALIFORNIA STORMWATER BMP HANDBOOK" FOR THE MEASURES SHOWN OR STATED ON THESE PLANS.
- CONTRACTOR MUST ENSURE THAT THE CONSTRUCTION SITE IS PREPARED PRIOR TO THE ONSET OF ANY STORM.
- ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL DISTURBED AREAS ARE STABILIZED. CHANGES TO THIS EROSION AND SEDIMENT CONTROL PLAN SHALL BE MADE TO MEET FIELD CONDITIONS ONLY WITH THE APPROVAL OF OR AT THE DIRECTION OF THE QUALIFIED SWPPP PRACTITIONER (QSP).
- THIS PLAN MAY NOT COVER ALL THE SITUATIONS THAT ARISE DURING CONSTRUCTION DUE TO ANTICIPATED FIELD CONDITIONS. VARIATIONS MAY BE MADE TO THE PLAN IN THE FIELD SUBJECT TO THE APPROVAL OF OR AT THE DIRECTION OF A REPRESENTATIVE OF LAKE COUNTY.
- ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CHECKED BEFORE AND AFTER ALL STORMS TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.
- CONTRACTOR SHALL MAINTAIN A LOG AT THE SITE OF ALL INSPECTIONS OR MAINTENANCE OF BMPs, AS WELL AS, ANY CORRECTIVE CHANGES TO THE BMPs OR EROSION AND SEDIMENT CONTROL PLAN.
- THE CONTRACTOR SHALL INSTALL THE STABILIZED CONSTRUCTION ENTRANCE PRIOR TO COMMENCEMENT OF GRADING. LOCATION OF THE ENTRANCE MAY BE ADJUSTED BY THE CONTRACTOR TO FACILITATE GRADING OPERATIONS. ALL CONSTRUCTION TRAFFIC ENTERING THE PAVED ROAD MUST CROSS THE STABILIZED CONSTRUCTION ENTRANCE.
- ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE SWEEPED AT THE END OF EACH WORKING DAY OR AS NECESSARY.
- ANY LOOSE GROUND FROM EXCAVATING GRADING OPERATIONS SHALL BE SECURED PRIOR TO ANY RAIN EVENT. STRAW OR TARP ALL DISTURBED OR EXCAVATED GROUND.
- CONTRACTOR SHALL PLACE GRAVEL BAGS AROUND ALL NEW DRAINAGE STRUCTURE OPENINGS IMMEDIATELY AFTER THE STRUCTURE OPENING IS CONSTRUCTED. THESE GRAVEL BAGS SHALL BE MAINTAINED AND REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETED.
- AS A MINIMUM, ALL GRADED AREAS AND EXPOSED SOIL WITHIN THE PROJECT SHALL BE SEED PER THE REQUIREMENTS OF LAKE COUNTY.
- DUST GENERATION MUST BE MINIMIZED AND A WATER TRUCK MUST BE AVAILABLE ON-SITE FOR ADEQUATE DUST CONTROL.

### AKWAABA FARMS

11795 NORTH DR.  
CLEARLAKE PARK, CA 95424  
APN:010-019-15, 010-019-10

#### LEGEND:

- 1530 CONTOUR ELEVATION
- FENCE
- CREEK / SWALE
- APN ASSESSOR'S PARCEL NUMBER
- APPROX APPROXIMATELY
- DWY DRIVEWAY
- (E) EXISTING
- (P) PROPOSED
- RD ROAD
- SF SQUARE FEET

#### NOTES:

- CONTOUR INTERVAL IS 10'

(E) GROUNDWATER WELL  
LAT: 38.99555°  
LONG: -122.68973°  
BENEFICIAL USE: IRRIGATION

- (E) 30'x60' (1,800 SF) METAL BARN / DRYING & HARVEST STORAGE FACILITY
- (E) 1,250 GAL. SEPTIC TANK / LEACH FIELD
- (E) FOUNDATION WITH 8' DIAMETER 5,000 GALLON METAL FIRE WATER STORAGE TANK
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- (E) 75'x400' (30,000 SF) OUTDOOR CULTIVATION / CANOPY AREA

#### Revisions:

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**APPENDIX C**  
**WELL COMPLETION REPORT**

File Original with DWR

Page 1 of 1

Owner's Well Number: 1

Date Work Began 11-19-20 Date Work Ended 11-24-20

Local Permit Agency LAKE County Environmental Health

Permit Number NE5481 Permit Date 11-18-20

# State of California Well Completion Report

Refer to instruction Page No. 1

No. XXXXXX

**DWR Use Only - Do Not Fill In**

State Well Number		Site Number	
N		W	
Latitude		Longitude	
APN/TRS/Other			

Geologic Log		
Orientation	<input checked="" type="radio"/> Vertical	<input type="radio"/> Horizontal
Drilling Method	Air Rotary	
Drilling Fluid		
Depth from Surface	Feet	Description
0	200	Brown Shale
200	250	Red/Green Chert
250	420	Brown/Black Shale with Sandstone stringers
420	480	Chert
480	520	Green Stone/Black Shale
520	660	Sandstone

Total Depth of Boring 665 Feet

Total Depth of Completed Well: 660 Feet

**Well Owner**

Name Quincy Jackson

Mailing Address P.O. Box 777

City Clearlake, CA State CA Zip 95424

**Well Location**

Address 11945 North Drive

City Clearlake, CA County LAKE

Latitude 39° 10' N Longitude 122° 15' W

Datum NAD 83 Dec. Lat. 39.1667 Dec. Long. -122.2500

APN Book 010 Page 019 Parcel 15

Township 39N Range 12E Section 15

**Location Sketch**  
(Sketch must be hand-drawn after form is printed)

North

West East

South

**Activity**

☒ New Well

☐ Modification/Repair

☐ Deepen

☐ Other

☐ Destroy

**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 580' (Feet below surface)

Depth to Static Water Level 580' (Feet) Date Measured 11-23-20

Estimated Yield 80 (GPM) Test Type Air Lift

Test Length 2 HRS (Hours) Total Drawdown 0 (Feet)

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

Casings								Annular Material		
Depth from Surface	Borehole Diameter	Type	Material	Wall Thickness	Outside Diameter	Screen Type	Slot Size	Depth from Surface	Fill	Description
0	40	9"	F480	PVC	1/4"	5"	Blank	0	1	Concrete
40	580	7 1/4"	F480	PVC	1/4"	5"	Blank	1	22	Bentonite
580	660	7 1/4"	F480	PVC	1/4"	5"	Perf.	22	660	5/16" Gravel Pack

**Attachments**

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other

**Certification Statement**

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

Name Will Peterson Person, Firm, or Corporation Will Peterson

Address P.O. Box 695 City Kelseyville State CA Zip 95451

Signed Will Peterson Date Signed 11-24-20 C-57 License Number 1009053

C-57 Licensed Water Well Constructor

**APPENDIX D**  
**WELL YIELD TEST**

# WILL PETERSON WELL DRILLING

Quincy Jackson  
11795 North Drive  
Clearlake Park. CA 95424

6/1/2021

To whom this may concern,

The static water level was 600' below surface before test began. The static level dropped to 604' for a drawn down of 4' after 30 minutes @ 12 GPM.

We pumped 12 GPM for 8 hours. During the test the static never went past 604' below the surface. Once the pump was stopped the well recharged the static to 600' below surface in 5 minutes.

The static was rechecked 24 hours from the end of the test and static level was at 600' below surface.

Feel free to call us with any questions at (707) 277-0103 or (707) 272-1121.

Sincerely,

Will Peterson Well Drilling  
Lic#1009053



PO Box 695  
Kelseyville, CA  
95451

PHONE (707) 277-0103  
FAX (707) 277-0103  
EMAIL William.peterson707@yahoo.com  
WEBSITE [www.willpetersonwelldrilling.com](http://www.willpetersonwelldrilling.com)

**APPENDIX E**  
**RADIUS OF INFLUENCE PLOTS**



## Appendix C - Radius of Pumping Influence

11795 North Drive, Clearlake, CA

