Attachment 5

Global Interactive Solutions
Ordinance 3106 Hydrology Report and Drought Management Plan

Lead Agency:

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1. INTRODUCTION

1.1. PURPOSE

The purpose of this report is to present the assessment and requirements of Ordinance 3106. On July 27, 2021, the Lake County Board of Supervisors passed an Ordinance 3106, an Urgency Ordinance requiring land use applicants to provide enhanced water analysis during a declared drought emergency. Ordinance 3106 requires all projects that require a California Environmental Quality Act (CEQA) analysis of water use include the following items in a Hydrology Report prepared by a licensed professional experienced in water resources:

- Approximate amount of water available for the project's identified water source,
- Approximate recharge rate for the project's identified water source,
- Cumulative impact of water use to surrounding areas due to the project, and
- A Drought Management Plan (DMP) depicting how the applicant proposes to reduce water use during a declared drought emergency.

1.2. PROJECT LOCATION AND SITE DESCRIPTION

The project is located at 1780 State Hwy 53, Clearlake, Lake County, California (APN 010-055-24) northeast of the City of Clearlake, east of State Highway 53. The site has an existing residence and a vineyard that has been in operation for over 20 years (before 2003, per Google Earth imagery).

The site is accessed off of State Hwy 53. The topography of the property is in an area of low foothills located northeast of Burns Valley. An unnamed ephemeral tributary to Burns Valley Creek runs through the site eventually into Burns Valley Creek, flowing southwest, and eventually into Clear Lake. The elevation ranges from approximately 1,440 feet to 1,580 feet above mean sea level.

1.3. PROPOSED PROJECT

The project is proposed in two stages, with Stage 2 representing future buildout.

Stage 1: The project proposes up to 130,680 square feet (sq. ft.) (3.0 acres) of outdoor cannabis cultivation with ancillary propagation for immature plants in six (2) 36 ft x 96 ft greenhouses or hoophouses, up to 6,912 sq. ft., and a 6,000 sq. ft. ancillary processing building (supporting on-site activities only) with break room and employee restrooms (Appendix A – Site Plans). The Stage 1 proposal includes four (4) 3,000-gallon and four (4) 5,000-gallon water tanks (Appendix A – Site Plans).

Stage 2: The project proposes to reduce the outdoor cannabis cultivation will be reduced to 87,120 sq. ft. (2.0 acres), up to 20,736 sq. ft. of mixed light cultivation in six (6) 36 ft x 96 ft greenhouses, up to 20,736 sq. ft. of nursery in six (6) 36 ft x 96 ft greenhouses. Stage 2 includes the 6,000 sq. ft. processing referenced under Stage 1. In addition to the water storage referenced under Stage 1, Stage 2 includes the development of a 2,520 sq. ft. pole barn housing three, 12,000-gallon nutrient water storage pools (Appendix A – Site Plans).

2. WATER SOURCE AND SUPPLY

There is an existing groundwater irrigation well (Lat/Long: 38.983794, -122.612098) that would be used for cultivation irrigation. The estimated yield reported on the Well Completion Report (WCR) for each well is 300+ gallons per minute (gpm) after a 10-hour air lift test (Appendix B). A well production test was conducted by Cal-Tech Pump in December 2019, the yield during the test was recorded at 217 gpm, which is the maximum output of the pump installed in the well. The static water level during the test was recorded at 98 ft bgs (Appendix C).

3. WATER DEMAND AND STORAGE

3.1. Existing Water Demand

The property has a history of intensive agricultural use. The property has been operated as a vineyard for over 20 years, the current vineyard area is about 13 acres (Google Earth, 2023), which is less than historical vineyard cultivation (Google Earth). According to the Lake County Water Inventory Analysis, the average annual water demand for vineyards in Lake County is 0.5 acre-feet (AF) per acre per year or 6.5 AF per year (AFY).

In addition to the existing vineyard demand, there is an existing residence on site. According to the Environmental Protection Agency (EPA, https://www.epa.gov/watersense/how-we-use-water), the average American family uses 300 gallons of water per day, which equates to an annual demand of 109,500 gallons or 0.33 AF. Thus, the total annual existing demand is approximately 6.8 AF.

3.2. Project Water Demand

The CalCannabis Environmental Impact Report (CDFA, 2017) uses 6.0 gallons per day per plant as an estimated water demand for cannabis cultivation. This is 1.0 gallon (gpd) per plant more than reported by Bauer et. al. (2015), who reported up to 5.0 (gpd) per plant (18.9 Liters/day/plant). Using the more conservative estimate of 6.0 gpd (CDFA, 2017), the demand is 3,000 gpd (2.1 gallons per minute [gpm]) per acre of canopy. The estimate of 6.0 gpd is a largely conservative estimate for a large outdoor plant, measured in the driest period of the season. Another estimate that is used for outdoor cultivation 1.2 to 14.7 gallons per canopy square foot per year (Ascent, 2017) which equates to 290-3,560 gpd per acre of canopy. Annual demand is estimated here using the most conservative estimate of 3,560 gpd per acre of canopy.

This is an average daily demand over the cultivation period which is lower during seedling/vegetative states and higher during the flowering period. Assuming 65% of the time the cultivation is in the vegetative state and 35% it is in the flowering state and the water use during the flowering period is about 1.7 times the water used during the vegetative state, the total estimated irrigation water demand is summarized in Table 1 and Table 2, for Stage 1 and Stage 2, respectively. To be conservative, nursery irrigation demand is assumed equal to mixed light irrigation demand.

Table 1. Stage 1 estimated projected monthly water use based on vegetative (65% or 117 days) and flowering (35% or 63 days) over a 180-day outdoor cultivation season.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Irrigation (1,000 gal)	0	0	0	128	265	256	265	394	441	176	0	0	1,925

Table 2. Stage 2 estimated projected monthly water use based on vegetative (65% of total # days) and flowering (35% of total # da7s) over a 180-day outdoor cultivation season and a 300-day mixed light and nursery cultivation season (assuming two-runs).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Outdoor Irrigation (1,000 gal)	0	0	0	85	177	171	177	263	294	117	0	0	1,283
Mixed-Light & Nursery Irrigation (1,000 gal)	0	0	84	81	90	140	113	84	81	119	140	0	933
Total	0	0	84	167	266	311	290	347	375	237	140	0	2,216

The estimated irrigation water demand reported above are average daily rates over the course of the growing season; however, seasonal water demand likely varies in response to temporal and environmental variables (e.g., climate, temperature, relative humidity, wind, plant age and size, etc.).to temporal and environmental variables (e.g., temperature, relative humidity, wind, plant age and size, etc.).

The project proposes two full-time and up to four seasonal employees. Employee demand is assumed to be equivalent to sanitary sewer generation for factories without shower facilities, which, according to the Lake County Rules and Regulations for On-Site sewage Disposal (Lake County, 2010), is 15 gallons per day, per person. The employee demand is summarized in Table 3. The estimated irrigation water demand reported above is an average daily rate over the course of the growing season; however, seasonal water demand likely varies in response to temporal and environmental variables (e.g., temperature, relative humidity, wind, plant age and size, etc.).

Table 3. Estimated projected monthly employee water demand (1,000 gallons).

Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
0.9	0.8	0.9	1.8	1.9	0.9	1.9	1.9	0.9	1.9	0.9	0.9	15.6

3.1. Total Water Demand

The total water demand, existing demand plus the project demand, is summarized in Table 4.

Table 4. Estimated annual residential, vineyard, employee, and cannabis irrigation demand.

Source	**Stage 1** (AF)	**Stage 2** (AF)
Residential	0.33	0.33
Vineyard	6.5	6.5
Employee	0.05	0.05
Cannabis	5.9	6.8
Total	**12.8**	**13.7**

3.2. Proposed Project's Irrigation Method and Water Storage

Stage 1: The project proposes to use the existing groundwater well to fill 32,000 gallons of water storage tanks. The maximum daily cannabis irrigation demand would occur August through September at about 14,700 gallons per day, therefore, the storage represents about 2.2 days of water storage during peak demand. Water from the storage tanks will be piped to drip irrigation systems to the cultivation areas. Drip lines will be sized to irrigate the cultivation areas at a slow rate to maximize absorption and prevent runoff. Drip irrigation systems, when implemented properly, conserve water compared to other irrigation techniques.

Stage 2: The project proposes to use the existing groundwater well to fill 32,000 gallons of water storage tanks and three, 12,000 gallon above ground pools, totaling 68,000 gallons of water storage for cannabis irrigation. The maximum daily cannabis irrigation demand would occur August through September at about 12,500 gallons per day, therefore, the storage represents about 5.4 days of water storage during peak demand. Water from the storage tanks and ponds will be piped to drip irrigation systems to the cultivation areas. Drip lines will be sized to irrigate the cultivation areas at a slow rate to maximize absorption and prevent runoff. Drip irrigation systems, when implemented properly, conserve water compared to other irrigation techniques.

3.1. Groundwater Basin Information

The project's water source is located in the Burns Valley (Basin #5-17)[1] Groundwater Basin (BVGB) (Figure 1). The Burns Valley Creek watershed spans the BVGB. The BVGB is within the Burns Valley watershed. The Franciscan Formation borders the BVGB on the north, Clear Lake borders the BVGB to the southwest, and the Cache Formation borders the BVGB on the south and east. The valley is drained by Burns Valley Creek, flowing southwest, and eventually into Clearlake. There are three water bearing formations in the BVGB, The Quaternary Alluvium ('al'), Quaternary Terrace Deposits ('tb'), and the Cache Formation ('QTc')[1] (Figure 1 and Figure 2). The Quaternary Alluvium is in the valley lowlands in the southern end of the valley are composed of silt, sand, and gravel with a thickness up to 50 feet. Groundwater in this formation is unconfined and typically provides water for domestic use. Quaternary Terrace Deposits have been deposited on the sides of the alluvial plain in the

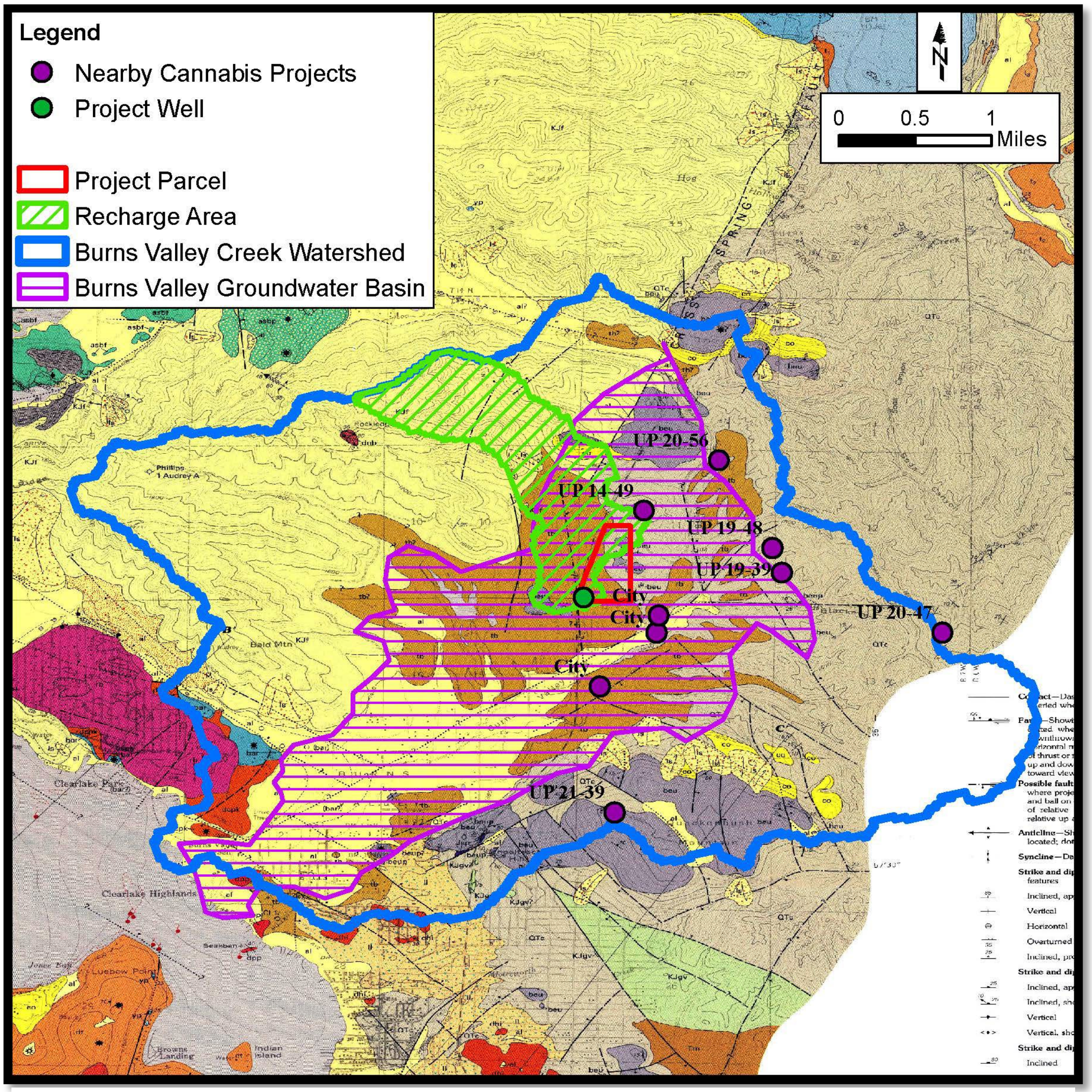

Figure 1. Geologic map of the Burns Valley Groundwater Basin including the Burns Valley Creek Watershed, the project recharge area, location of the project wells, and nearby cannabis projects.

[1] Burns Valley Groundwater Basin, Basin #5-17

BVGB. The terrace deposits are approximately 15 feet above the valley floor and slope up the valley to a similar elevation as the foothill exposures of the Cache Formation. The Cache Formation underlies the alluvial and terrace deposits in the basin and consists of siltstone, sandstone, and tuff, and has a maximum thickness of 200 feet. The Cache formation has low permeability and provides water to wells with yields ranging from 30 to 335 gpm. (DWR, 2004) [1]

The BVGB has not been identified by the California Department of Water Resources (DWR) as a critically overdrafted basin. Critically overdrafted is defined by DWR as, “A basin subject to critical overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." In addition, as part of the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, DWR created the CASGEM Groundwater Basin Prioritization statewide ranking system to prioritize California groundwater basins in order to help identify, evaluate, and determine the need for additional groundwater level monitoring. California’s groundwater basins were classified

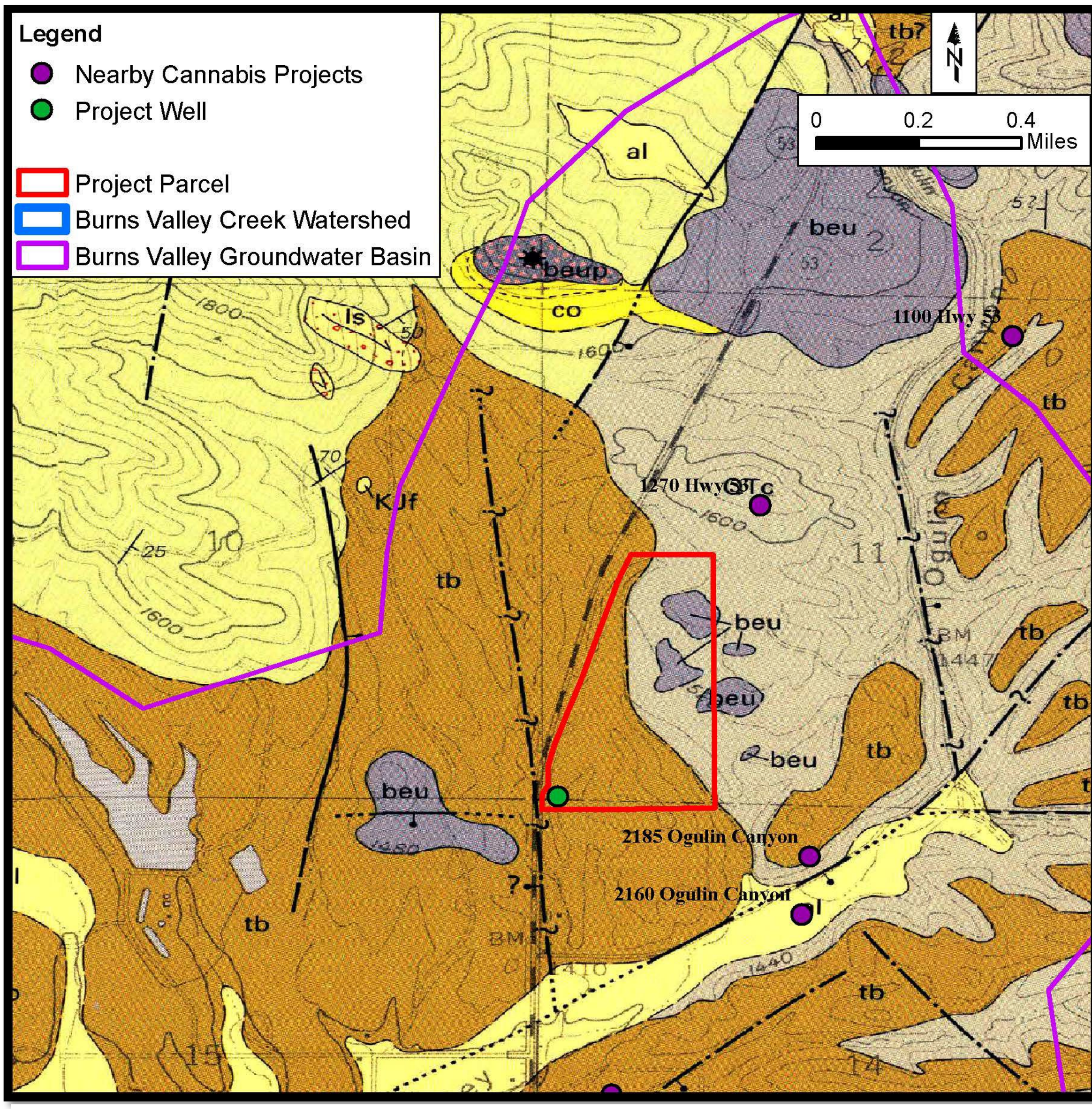

Figure 2. Local geology of project area. 'QTc' = Cache Formation, 'tb' = nonmarine terrace deposits, and 'al' = alluvium (Source: Hearn et al. 1995).

into one of four categories high-, medium-, low-, or very low-priority. The BVGB is ranked as very low-priority basins by the CASGEM ranking system[2]. The very low ranking, with a ranking score of zero (0), indicates that groundwater use in the basin does not significantly impact the groundwater basin. As part of the prioritization, DWR did not identify any documented groundwater level declines in the BVGB.

4. GEOLOGY AND HYDROGEOLOGY

The geology of the property is mapped predominantly 'tb' – terrace deposits of Burns Valley (Pleistocene) – sand and gravel predominantly composed of chert and greenstone clasts reworked from the Cache Formation and rare cobbles of early basaltic rocks, underlain by the '*QTc*' – Cache Formation (Pleistocene and Pliocene) – siltstone, sandstone, conglomeratic sandstone and tuff. There are a few mapped faults dissecting the property in the region of the Cross Spring fault zone. (Figure 1 and Figure 2)

The irrigation water source is an existing groundwater irrigation well. The well was drilled in March 2021 (Appendix B), to a depth of 220 ft below ground surface (bgs) through 2 ft of soil, 61 ft of clay, 63 ft to 118 ft bgs of black volcanic rock, 118 ft to 130 ft bgs of fractured volcanic, 130 ft to 195 ft bgs black hard fractured basalt, and 195 ft to 220 ft bgs of light green soft rock. Depth to first water was noted in the geologic log at 118 ft bgs, static water level was recorded at 90 ft bgs. The well is screened from 115 ft to 195 ft bgs, within fractured volcanic/basalt.

According to the geologic log from the project's WCR, the water bearing unit of the well is comprised primarily of volcanic/basalt, which is consistent with the Cache Formation water bearing unit. Based on this, groundwater in the project well is likely within a confined aquifer consistent with the locally mapped sedimentary sandstone and shale units. The well is located near/adjacent to mapped historic geologic structural faults, although they are not mapped as active faults as per the California Geological Survey Fault Activity Map of California[3].

Cal-Tech Pump conducted a well production test in December 2019 at a rate of 217 gpm (Appendix D). After pumping at 217 gpm for two hours, the water level dropped only 4 feet, indicative of a high producing well with fast recovery (high transmissivity).

5. GROUNDWATER RECHARGE AND STORAGE CAPACITY

According to DWR (2004), almost all of the groundwater of the BVGB is derived from rain that falls within the 2.5 square mile Burns Valley watershed drainage area.

5.1. GROUNDWATER RECHARGE

The annual recharge can be estimated using a water balance equation, where recharge is equal to precipitation (P) less runoff (Q) and abstractions that do not contribute to infiltration (e.g., evapotranspiration). A simple tool that can be used to estimate runoff and abstractions, that uses readily available data, is the Natural Resources Conservation Service (NRCS) Curve Number (CN) Method (NRCS, 1986). Determination of the CN depends on the watershed's soil and cover conditions, cover type, treatment, and hydrologic condition. The CN Method runoff equation is

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S}$$

Where,

Q = runoff (inches), P = rainfall (inches), S = potential maximum retention after runoff begins (inches) and,

[2] California Department of Water Resources Groundwater Basin Prioritization
[3] California Fault Activity Map of California, California Geological Survey

I_a = initial abstraction (inches).

The initial abstraction (I_a) represents all losses before runoff begins, including initial infiltration, surface depression storage, evapotranspiration, and other factors. The initial abstraction is estimated as $I_a = 0.2S$. S is related to soil and cover conditions of the watershed through the CN, determined as $S = 1000/CN - 10$. Using these relations, the runoff equation becomes:

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

The CN is estimated based on hydrologic soil group (HSG), cover type, condition, and land use over the area of recharge, which is estimated as the area of the watershed contributing to the wells. Although groundwater is derived from the entire Burns Valley watershed, to be conservative, the recharge area is the contributing drainage area upstream of the well location or 584.2 acres (Figure 1), and was delineated using USGS topography.

Soils are classified into four HSGs (A, B, C, and D) according to the soil's ability to infiltrate water; where HSG A has the highest infiltration potential and HSG D has the lowest infiltration potential. HSGs are based on soil type and are determined from the NRCS Web Soil Survey[4].

The recharge area is comprised of one HSGs: HSG B, C, and D (Appendix E). The area is dominated by HSG C. The land use is undeveloped with a cover type of vineyards/cannabis, and brush/grass. The CNs and weighted CN for the recharge area are summarized in Table 5.

Table 5. Curve Numbers for the project recharge area.

Soil Group	Land Cover	Condition	Area (acres)	CN	Weighted CN
B	Brush/Grass	Fair	17.5	56	75
C	Vineyard/Cannabis	Good	153	79	
C	Brush/Grass	Fair	195.7	70	
D	Brush/Grass	Fair	218	77	

The PRISM Climate Group[5] gathers climate observations from a wide range of monitoring networks and provides time series values of precipitation for individual locations. Using the annual precipitation from 2000 to 2023, as predicted by PRISM, the annual average precipitation over this period is 27.7 inches and the minimum precipitation over this period is 6.5 inches.

Using the above information, the estimated annual recharge over the recharge area is summarized in Table 6 for a dry year and an average year.

Table 6. Estimated annual recharge over the recharge area.

Recharge Area (acres)	P (inches)	CN	S (inches)	I_a (inches)	Q (inches)	Recharge = $P - Q - 0.5*I_a$ (inches)	Recharge (AF)
584.2	6.5	75	3.4139	0.68	3.68	2.50	121.5
584.2	27.7	75	3.4139	0.68	3.68	3.37	164.2

[4] Web Soil Survey
[5] PRISM Climate Group

The estimated recharge in Table 6 is based on the assumption that recharge is primarily from precipitation percolating or infiltrating down from the ground surface within the recharge area, however, confined aquifers are generally recharged where the aquifer materials are exposed at the surface (e.g. rock outcrop areas). Another method for estimating recharge is based on estimates determined by the USGS (USGS Fact Sheet 2007-3007). Although determined for humid basins in the east, the USGS estimated long-term average groundwater recharge to be between 10 and 66 percent of precipitation. Over the 584.2-acre recharge area this would equate to 31.7 – 209 AF during a dry year and 135 – 891 AF during an average year. The recharge estimates in Table 6 fall within these ranges for a dry year and on the lower end for an average year. To be conservative, the lowest estimate of recharge, based on 10 percent of precipitation, is used here to estimate long-term average groundwater recharge.

The PRISM Climate Group precipitation records from 2000 through 2023 indicate that lower precipitation years are typically preceded or followed by near average or above average precipitation years (Figure 3), that there were three drought periods in the last 23 years (one drought period every 7 to 8 years), and the lowest total precipitation over a three-year period occurred from 2020 to 2022. The groundwater recharge over the period 2000 through 2023, based on 10 percent of precipitation, is summarized in (Figure 4) along with the project's largest demand at full buildout. The estimated long-term average recharge, over a 7-year period, assuming three drought years (6.5 inches of precipitation) and four average years (27.7 inches of precipitation), is approximately 90.7 AFY over the 584.2-acre recharge area. The average recharge, based on 10% of precipitation, over the last 23 years was 135 AFY.

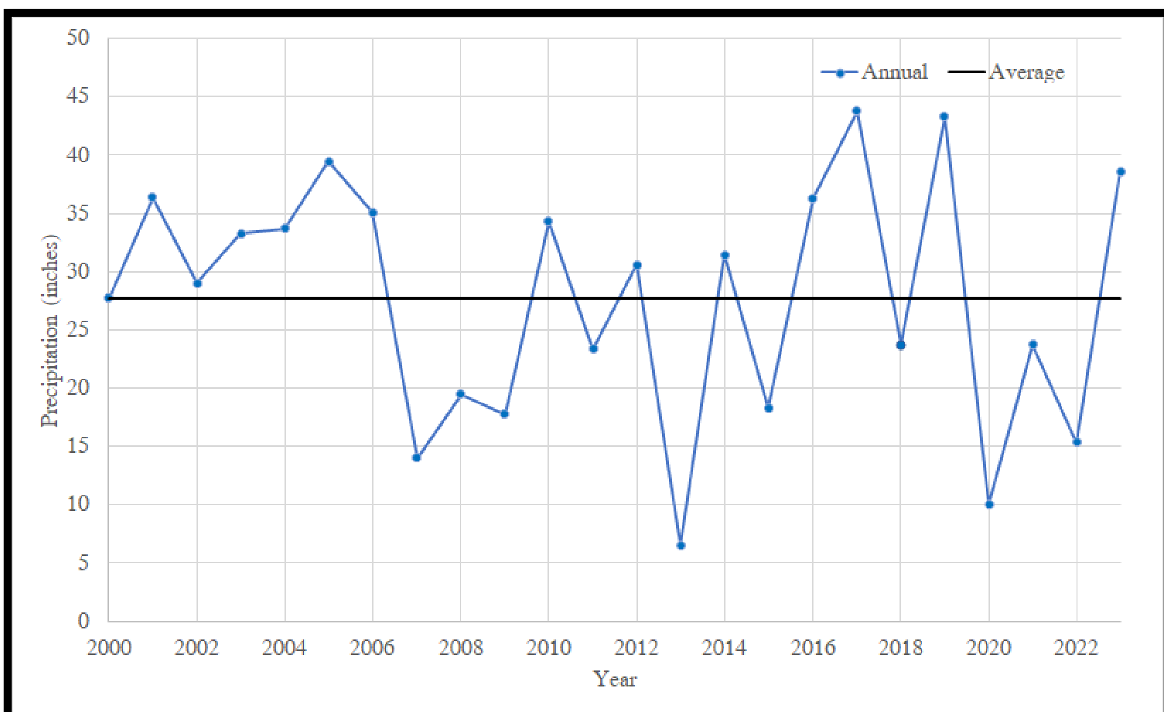

Figure 3. PRISM Climate Group precipitation from 2000 through 2023.

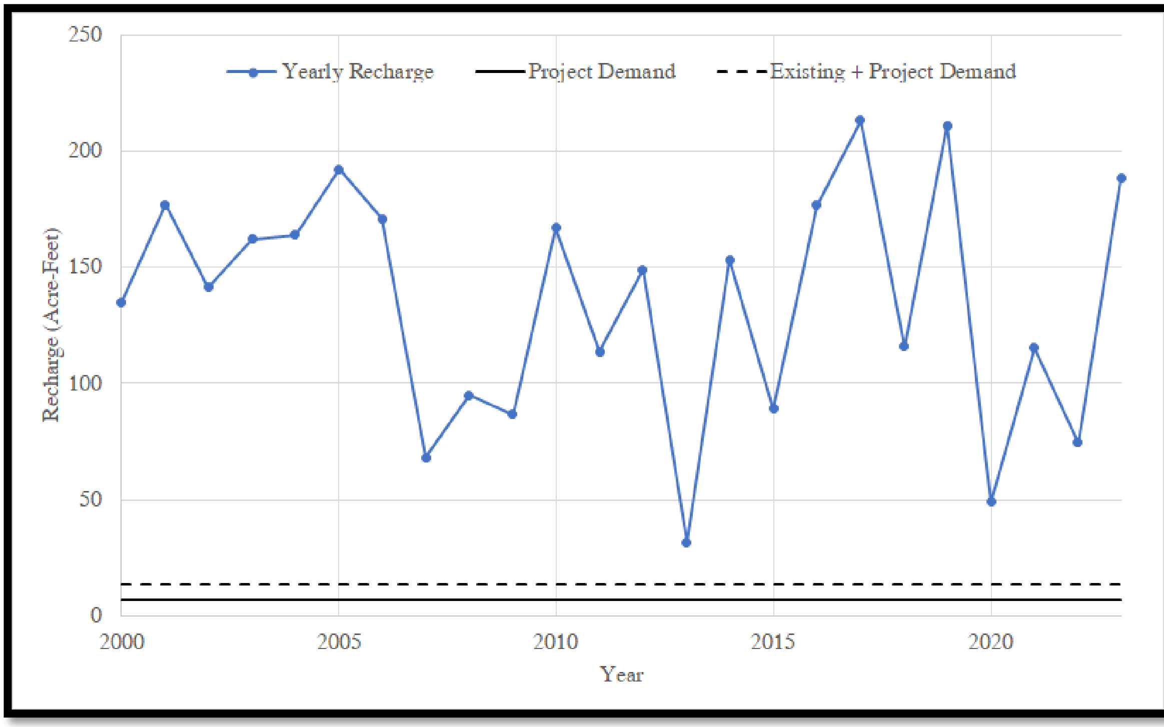

Figure 4. Annual recharge generated over the recharge area based on 10% of the annual precipitation.

5.2. Groundwater Storage

5.2.1. Storage Beneath Project Parcels

The aquifer acts as a storage reservoir that gains water during the rainy season. The depletion in the reservoir depends on the storage capacity of the reservoir. The theoretical storage capacity of the water source's water-bearing formation can be estimated by multiplying the volume of the aquifer by the specific yield. The area of the water-bearing formation is associated with the BVGB. However, to be conservative, only the project's recharge area is used to estimate the contributing storage area. The thickness is estimated as the difference in the static groundwater level and the maximum aquifer depth. A range in values for the specific yield (effective porosity) was obtained from literature values for shale/stone, ranging between 0.09% to 0.9% (Heath, 1983 and Morris and Johnson 1967). Although the water bearing formation is a confined aquifer, well yields in the formation are indicative of higher end range of specific yields, however, to be conservative, the average log-value is used here. The results are summarized below.

- Aquifer Area: 64.2 acres (project's parcel area)
- Static Groundwater Level: 90 ft bgs (source: project's well log)
- Aquifer Depth: 220 ft bgs (source: project's well log)
- Aquifer Thickness: 130 ft
- Specific Yield: 0.0028
- Approximate Storage Capacity: 23.4 AF

5.2.2. Groundwater Basin Storage and Recharge

The estimated storage capacity of the alluvial formation of BVGB is 4,000 AF, with a usable storage capacity of 1,400 AF. However, the deeper Cache Formation, from which the project draws water, has between 50,000 and 75,000 acre-feet of storage (Upson and Kunkel, 1955). According to DWR, groundwater in the BVGB is derived from rain that falls within the 12.5 square mile Burns Valley Watershed drainage area. The recharge over this 12.5 square mile area, based on 10% of the precipitation, is approximately 430 AFY and 1,850 AFY during a drought year and average year, respectively. Based on rainfall data, a drought occurs once every 7 to 8 years and can last up to three years, the average recharge over a 7-year period, assuming three drought years and four average years, the long-term average recharge would be 1,240 AFY.

6. IMPACTS TO SURROUNDING AREAS

6.1. GROUNDWATER USE AND TRENDS IN THE BVGB

Review of Google Earth Imagery shows extensive agricultural development, in the form of walnut/pear orchards and vineyards, in the BVGB since at least 1985. According to the Lake County Water Demand Forecast, the average annual water demand for vineyards and walnut/pear orchards in Lake County is 0.5 acre-feet per acre and 2.2 acre-feet per acre, respectively. Using current Google Earth imagery, there are roughly 450 acres of existing vineyards and 150 acres of orchards in the BVGB. Orchard production in the valley has decreased over time. Accounting for existing vineyards and orchards, the approximate agricultural demand in the valley is about 555 acre-feet per year which is supplied via existing groundwater wells. The estimate of existing agricultural demand of 555 acre-feet per year is likely a high estimate because most of the orchards and some of the vineyards are likely being dry farmed.

The northern residential district of the City of Clearlake relies on groundwater wells as the main source of water. The Highlands Mutual Water Company supplies the majority of residents in the lower part of the BVGB. According to the Lake County Agency Formation Commission 2021 Report on Clearlake Water Providers (ClearlakeH20 MSR-SOI 2021EDIT-2. cl docx (lakelafco.org)), the Highlands Mutual Water Company serves 6,072 people with water via 2,568 services connections using water drawn from Clear Lake. Approximately 120 residential parcels are not served by HMWC and are assumed to rely on groundwater wells. According to the Environmental Protection Agency (EPA, https://www.epa.gov/watersense/how-we-use-water), the average American family uses 300 gallons of water per day, which equates to an annual demand of 40 acre-feet per year for 120 residences.

The main sources of groundwater in the BVGB are within the Quaternary Alluvium Formation and the Lower Lake Formation. The Quaternary Alluvium dominates the southwestern portion of the BVGB, where both residential development and well development are most dense. The alluvium has a thickness of up to 50 feet; groundwater in this formation is unconfined and typically provides water for domestic use. Wells screened in unconfined aquifers are more directly influenced by lack of rain than those screened in deeper, confined aquifers. The Lower Lake Formation underlies the alluvial deposits in the BVGB. This formation has low permeability and provides water to wells at up to a few hundred gallons per minute and is the dominant source of agricultural water demand in the BVGB. Note that the existing vineyards and the existing and proposed cannabis projects are located outside of the alluvial valley in the northern half of the BVGB.

Well production loss in the Alluvium Formation, within wells screened in the shallower, unconfined aquifer, are more directly influenced by lack of rain and were effected during the drought of 2020 through 2022. It is likely that shallow groundwater in the southern portion of the BVGB is hydrologically coupled to surface water levels in Clear Lake. As a result of the drought, surface water levels in the lake recorded in 2021 and 2022 were the lowest on record since 2000, which would have a direct impact on shallow groundwater well production (Figure 5). Lake levels have recovered with recent rainfall amounts in 2023.

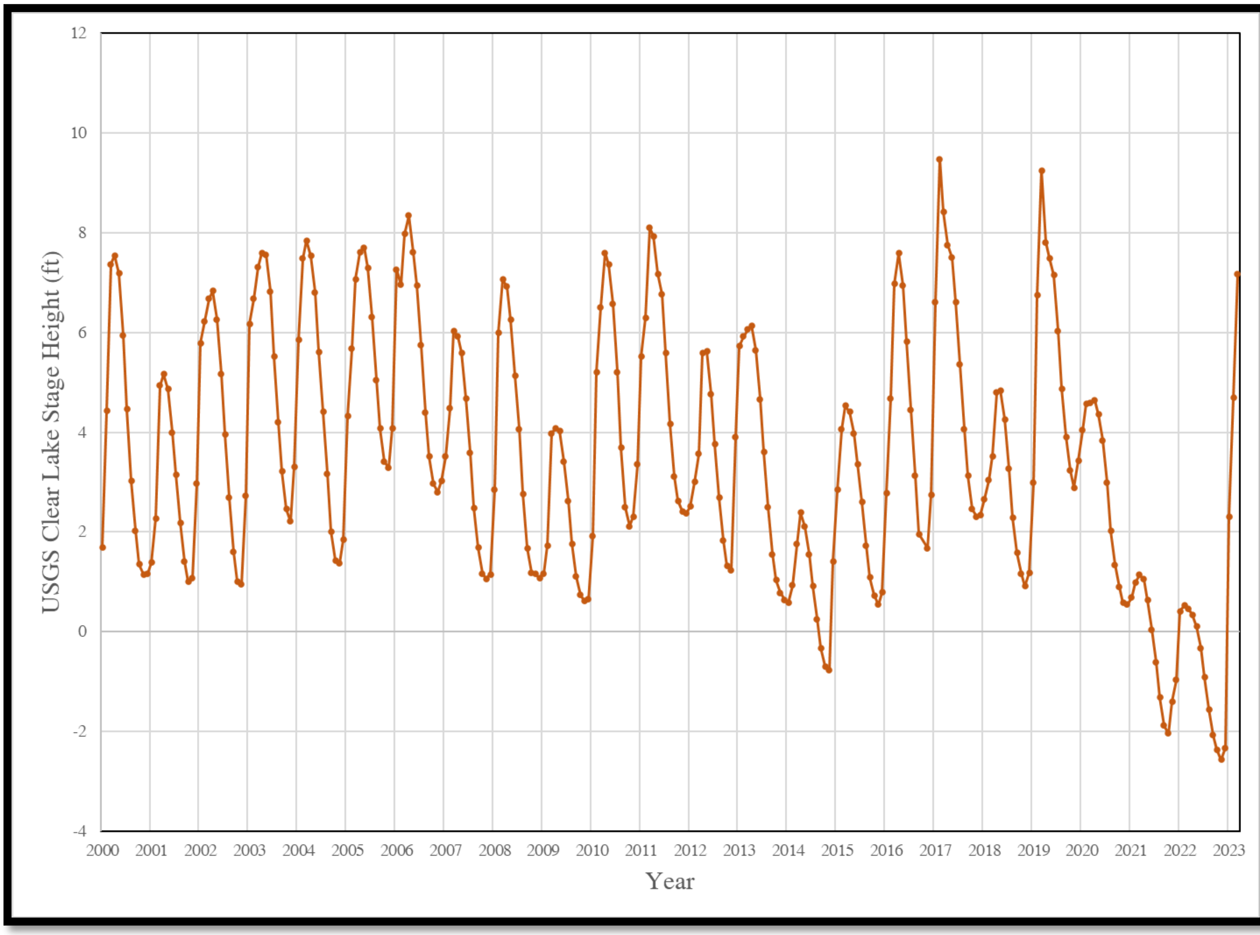

Figure 5. Clear Lake stage height 2000 through early 2023 (USGS Gage 11450000)

6.2. Future Groundwater Use

As discussed above, the current groundwater agricultural demand in the BVGB is roughly 555 acre-feet per year. Approximately 225 acre-feet is from existing vineyards in the upper portion of the BVGB and 330 acre-feet is from orchards located within the lower portion the BVGB. The current residential demand, located in the central portion of the BVGB, is approximately 40 acre-feet per year. A summary of proposed cannabis projects and the approximate annual water demand is provided in Table 7. All the proposed projects are located in the upper portion of the BVGB east of State Highway 53 (Figure 1).

To assess the potential for additional cannabis cultivation within the BVGB, not included in Table 7, a parcel inventory analysis was completed (Figure 6 and Table 8) to identify those parcels that meet requirements for potential cannabis cultivation with an approved permit from Lake County or the City of Clearlake (City).

The Lake County Zoning Ordinance allows 1-acre of outdoor canopy for each 20 acres of parcel size for these zones. There are 40 parcels that are within or intersect the BVGB with a cumulative parcel area of about 1920 acres (total parcel area, not the intersected area, was used for conservativeness). Of these parcels, 10 parcels or 596 acres are existing vineyards and 13 parcels, or 1078.8 acres, have proposed cultivation shown in Table 7. Excluding these parcels, there are approximately 250 acres of base zoning that could be eligible for outdoor cultivation with a county permit. Thus, there is the potential for up to an additional 12.5 acres of potentially new outdoor cultivation (the County allows only 1-acre of cultivation for each 20 acres of parcel area). However, accounting for existing development, steep topography, oak tree areas, waterbody setbacks, flood zones, residential setbacks, and parcel setbacks, there is limited area for development and only approximately 10 acres of new outdoor cultivation would likely be possible. The increased irrigation demand could be up to approximately 20 acre-feet per year assuming 3,560 gallons per day per acre for 180 days.

Table 7. Approximate water demand of proposed cannabis projects within the BVGB (information obtained from the City of Clearlake and Lake County websites and CEQAnet Database). Refer to Figure 1 for approximate locations.

Location (jurisdiction)	**APN(s)**	**UP #**	**Status**	**Parcel Area (acres)**	**Cultivation (Acres)**	**Approximate Annual Demand (acre-feet)**
1756 Ogulin Canyon Road (County)	010-055-46	19-48	Expired	46.5	n/a	n/a
2050 Ogulin Canyon Road (County)	010-053-01, 02	n/a	Pending	302.4	15.0	29.8
1270 Highway 53 (County)	010-055-26, 27	19-49	Approved	105.6	5.0	5.5
1020 Junction Plaza (County)	010-055-45	19-39	Approved	49.5	1.7	3.3
1850 Ogulin Canyon Road (County)	010-053-03 010-011-01	20-47	Approved	Not in BVGB		
19073 E State Highway 20 (County)	010-009-21	21-12	Pending	Not in BVGB		
1100 Highway 53 (County)	010-055-39, 40, 41	20-56	Pending	288.4	14	27.5
1780 Highway 53 (County) Global Interactive Solutions	010-055-24	??	Pending	62.4	1.9	4.1
3000 Highway 53 (County)	010-053-28	21-39	Pending	164.7	8	15.7
2185 Ogulin Canyon Road (City)	010-044-17	n/a	Approved	21.3	0.5	1.8
2160 Ogulin Canyon Road (City)	010-044-21	n/a	Approved	9.6	0	n/a
2560 Highway 53 (City)	010-048-05	n/a	Approved	15.4	1.3	4.3
2250 Ogulin Canyon Road (City)	010-044-19	n/a	Approved	13.0	0.4	1.6
				Total	47.8	93.6

Table 8. Base zones designations, total areas associated with each base zone designation, parcel count, and base zone eligibility for potential cannabis cultivation within the BVGB.

Zone	**Description**	**Total Parcel Area (acres)***	**# of Parcels**
RL	Rural Lands	1105.9	18
RR	Rural Residential	677.3	18
Split	Combined Zoning (Dominant Zones are A and RL)	136.5	4
City	Cannabis District	242	23
*This is the total area of the parcel, not just the portion within the BVGB			

The City of Clearlake Zoning Ordinance allows for mixed-light/indoor cultivation in the BVGB, with a City Cannabis Permit, on 23 parcels with a total area of 242 acres. Accounting for the proposed projects listed in Table 7, existing development, steep topography, waterbody setbacks, and flood zones, only approximately 18 to 20 acres of this area could have the potential for mixed-light/indoor cultivation. The increased irrigation demand could be up to approximately 65.6 acre-feet assuming 3,560 gallons per day per acre for 300 days.

The total potential demand from both the County and City for cannabis cultivation could be up to 179.2 acre-feet per year, which includes the proposed projects listed in Table 7 and a conservative (high) estimate of total potential cultivation. This does not account for the fact that the project at 2050 Ogulin Canyon Road is replacing a 13.6-acre hops farm that utilized approximately 36.4 acre-feet per year of water, and the proposed Global Interactive Solutions project is replacing approximately 4.3 acres of vineyards that utilized about 2.2 acre-feet per year of water, creating a net potential cannabis demand of 140.6 acre-feet per year.

Thus, the total potential agricultural demand within the BVGB is the existing demand of approximately 555 acre-feet, plus the proposed net demand of 140.6 acre-feet which totals approximately 695.6 acre-feet per year, with residential demand, the total groundwater demand is approximately 735.6 acre-feet per year. The dominant demand in the BVGB is associated with residential development and orchards in the lower part of BVGB and vineyards in the upper part of the BVGB.

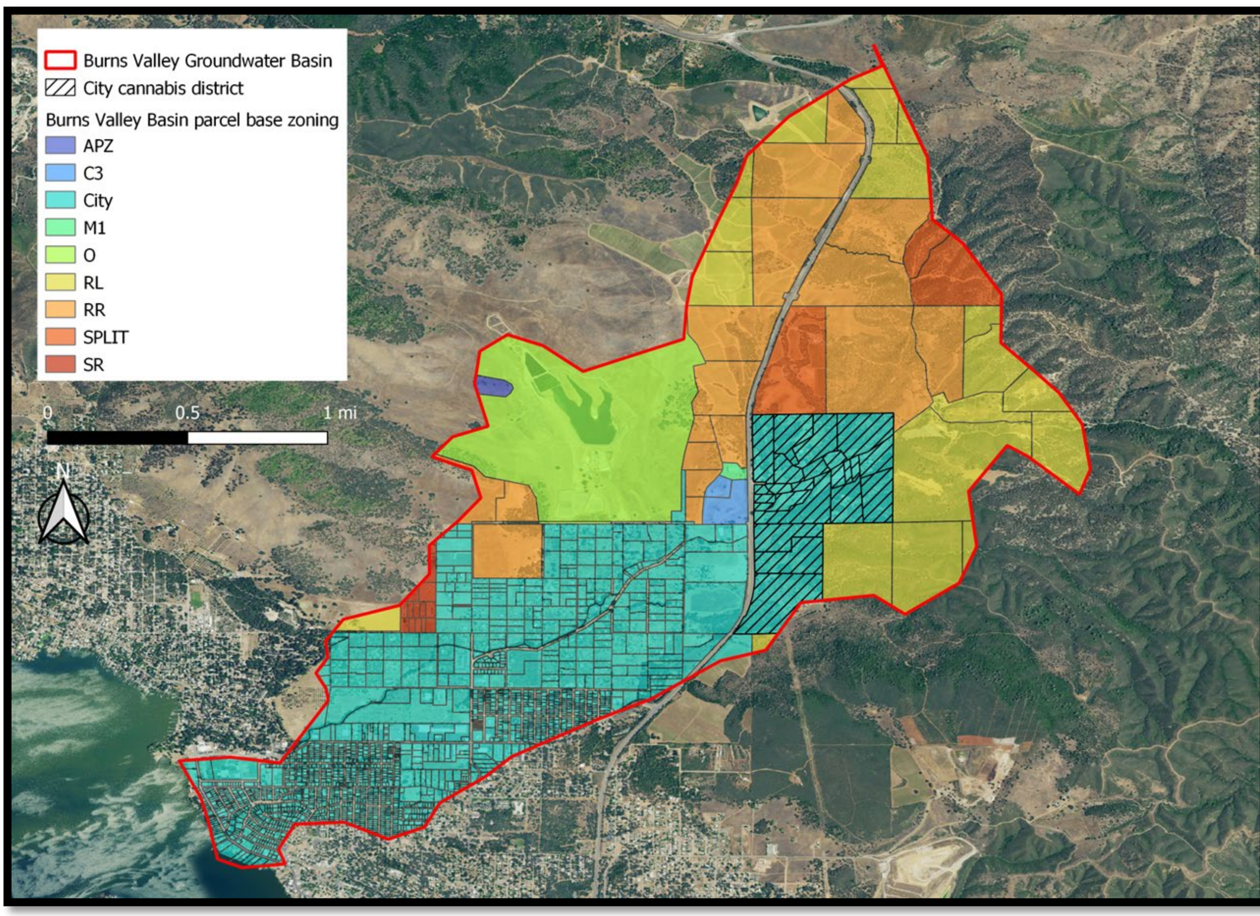

Figure 6. City of Clearlake Cannabis District and Lake County parcel base zoning designations.

6.3. Surrounding Wells

The project is located in a rural area, northeast of Clearlake. WCR's maintained by the California Department of Water Resources (DWR) on the WCR Map Application were reviewed (Figure 7, Figure 8, Appendix D). Wells are mapped on the WCR Map Application by Public Land Survey System (PLSS). Wells recorded in the WCR Map Application within the four (4) PLSS sections surrounding the project or within approximately 1-mile radius of the project well and north of Pond Road in PLSS M13N07W15 are mapped in Figure 7 and Figure 8 and summarized in Appendix D. The average depth and average yield of these wells is 243 ft and 215 gpm, respectively. The five (5) closest neighboring, offsite wells within the BVGB are shown in Figure 9.

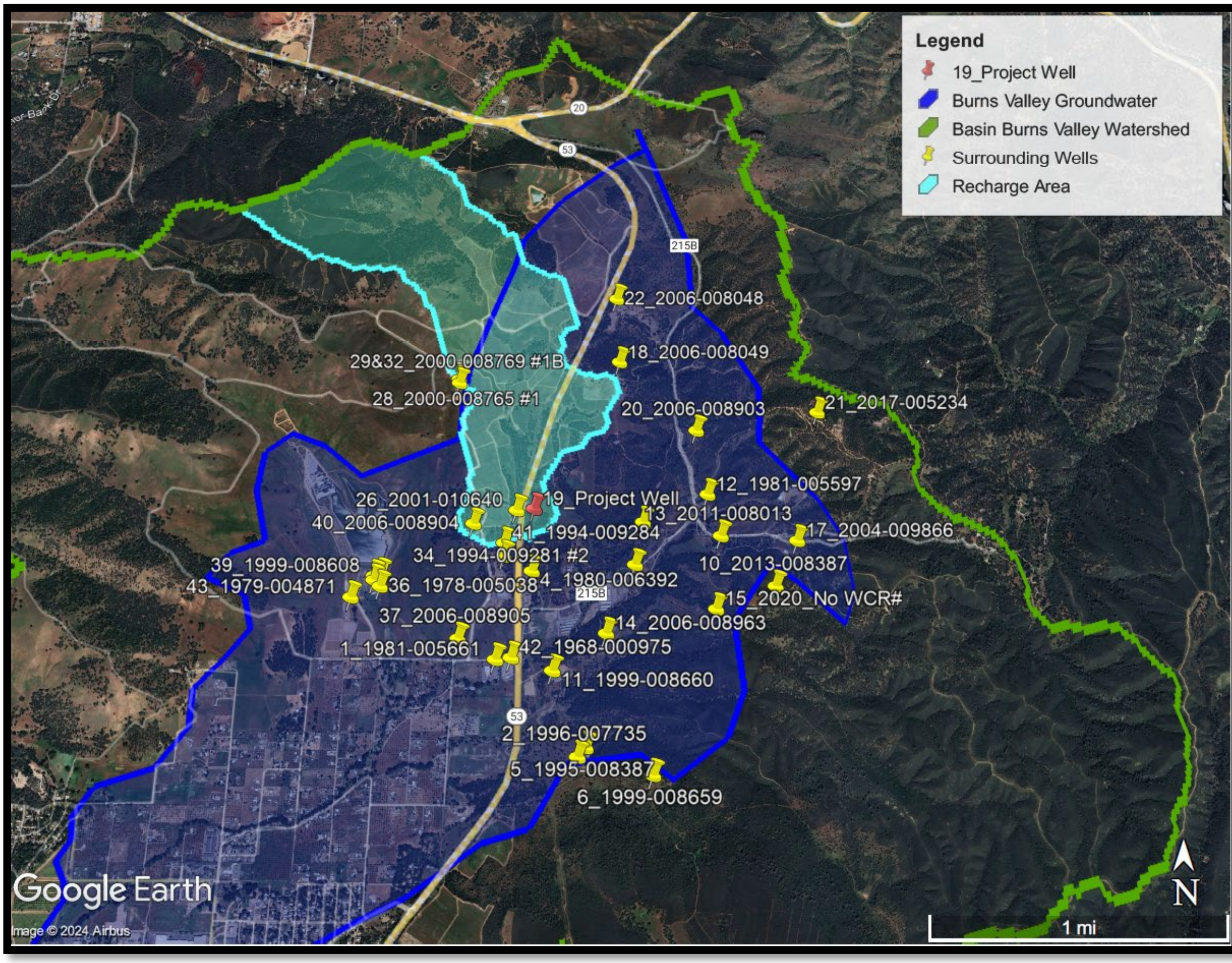

Figure 7. Groundwater wells in PLSS Sections surrounding the project's well (Appendix D). The locations are approximate as interpreted from the WCRs.

6.4. Project's Well

The project's well is a high-yielding groundwater well that has been used for vineyard irrigation for over 20 years. The maximum daily cannabis demand is about 14,700 gallons and 12,500 gallons, which occurs during summer months (July through September) during Stages 1 and 2, respectively. The pumping rate required to meet the maximum daily demand during Stage 1 in 12-hours is 20.4 gpm, this represents only 9.4% of the well yield (217 gpm, based on the maximum pump output, refer to Appendix C). The proposed cannabis irrigation

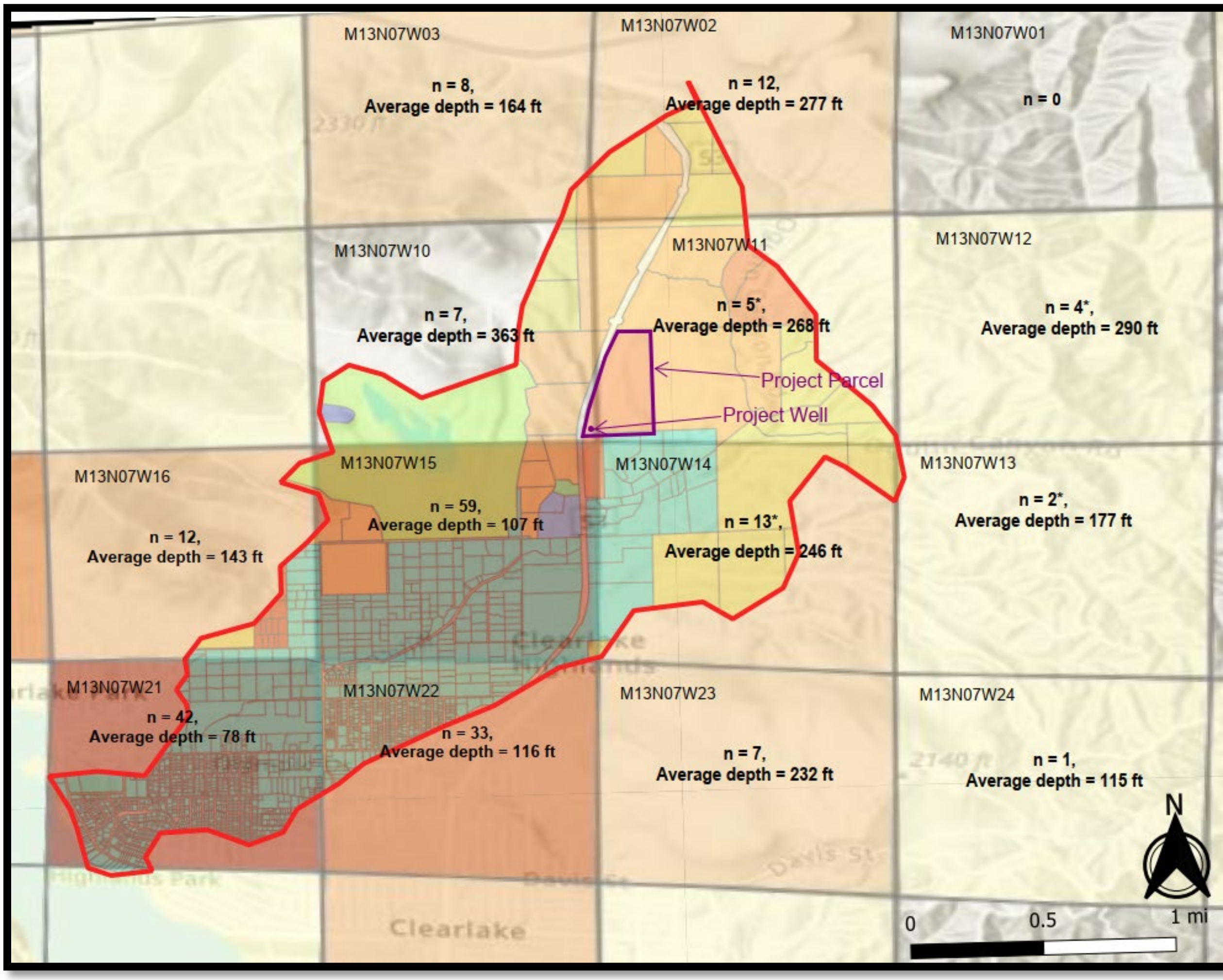

Figure 8. Map of # (n) of WCRs within each PLSS section and average well depth. The BVGB is outlined in red. (*used updated WCRs)

water storage represents over 2 to 5 days of the maximum daily demand, providing sufficient recovery time for the well.

A radius of influence evaluation was conducted on the project well using the Theis equation. The Theis equation was developed to model the response of a confined aquifer to pumping (Fetter, 2001). Using the Theis equation, the drawdown at a specific distance from each well can be estimated based on the project's maximum daily cannabis irrigation pumping demand, 20.4 gpm, over a duration of 12 hours. The pump test was used to estimate the transmissivity (T) of the well using the Cooper-Jacob Method for confined aquifers (Gupta, 2017); 6648 ft^2/day.

The drawdown from the project's well after 12-hours of pumping at 20.4 gpm, for various distances from the well, is provided in Figure 9. Calculations are provided in Appendix F. Due to the high productivity of the well and high transmissivity in the aquifer, the radius of influence is very small and is estimated to be less than 15 feet. The radius of influence is the distance where the modeled cone of depression from groundwater extraction under these conditions is negligible (less than 6-inches). The estimated location of the nearest well is 340 feet to the west of the project well (Figure 10). The nearest well is also an irrigation well that is drilled to a depth of

260 feet with an estimated yield of 650 gpm (per WCR2001-010640). None of the nearby wells are within the modeled cone of depression.

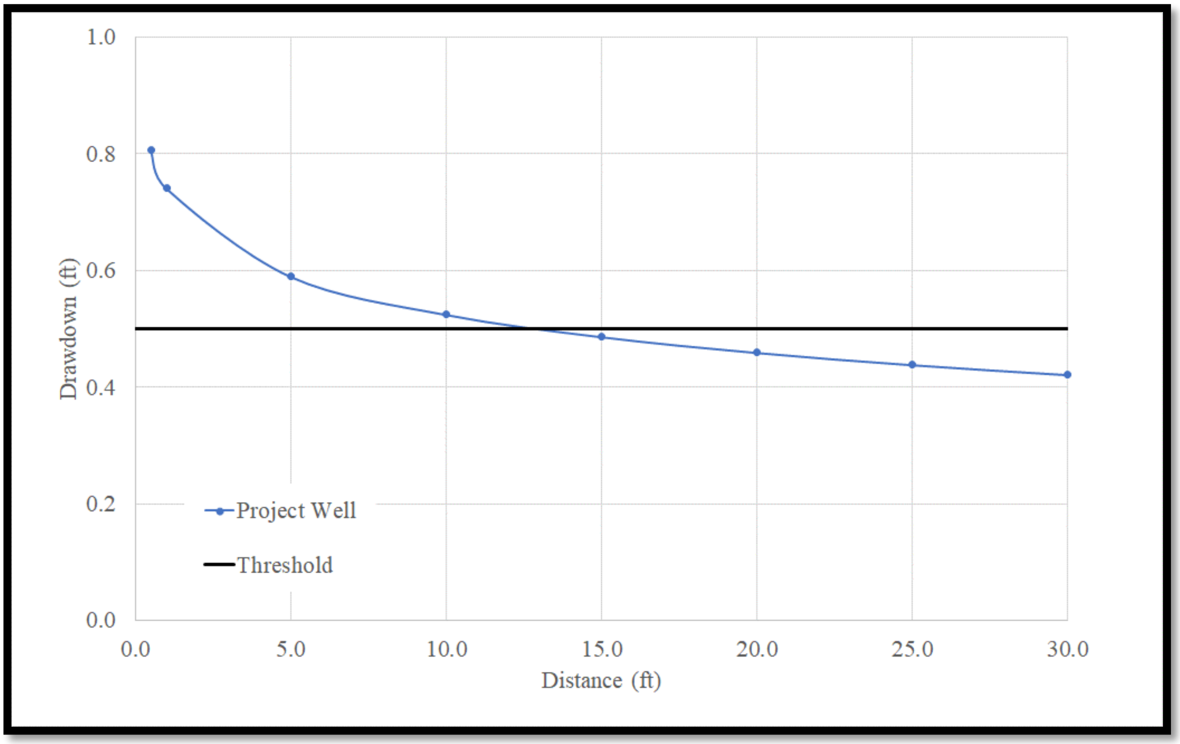

Figure 10. Estimated radius of influence (distance) associated with the project's well (Threshold = 6-inches).

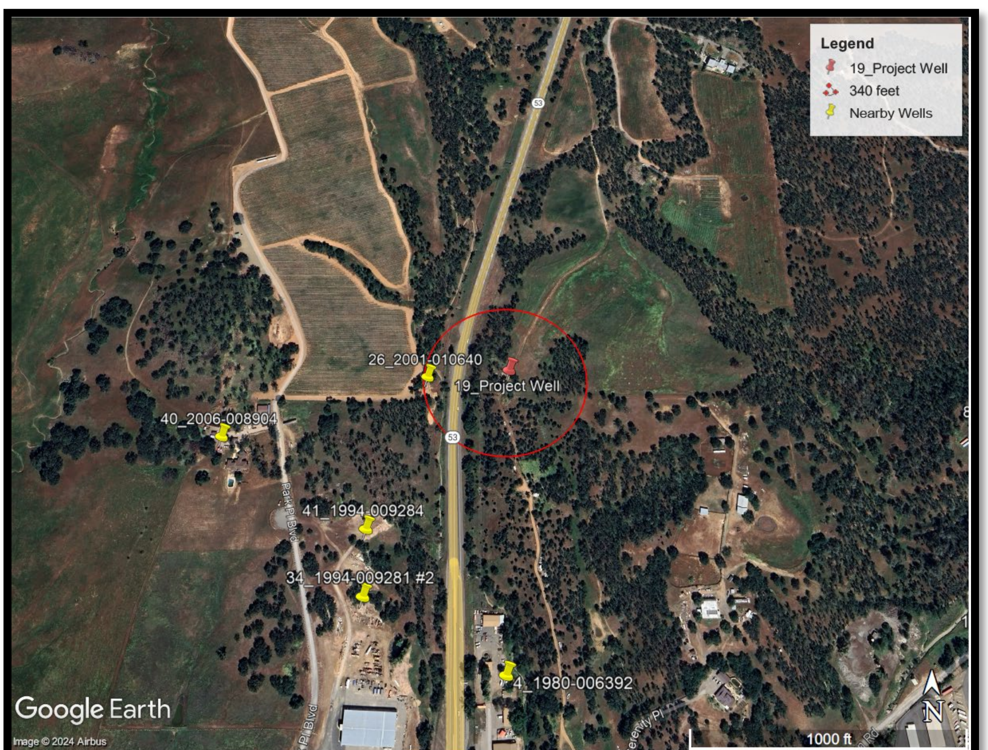

Figure 9. Wells in the vicinity of the project's well. The closest well is 340 feet to the west.

6.1. Surface Water

The closest surface water bodies are unnamed ephemeral streams that are tributary to Burns Valley Creek. One is approximately 250 feet to the west and the other is approximately1,200 feet to the east. The screened interval of the well starts at an elevation of 1,375 feet and ends at an elevation of 1,295 ft, well below the elevations of the ephemeral streams (Figure 11). The project well extracts water from the confined Cache Formation water bearing unit, well below surface water, and are not likely hydrologically connected to the creeks.

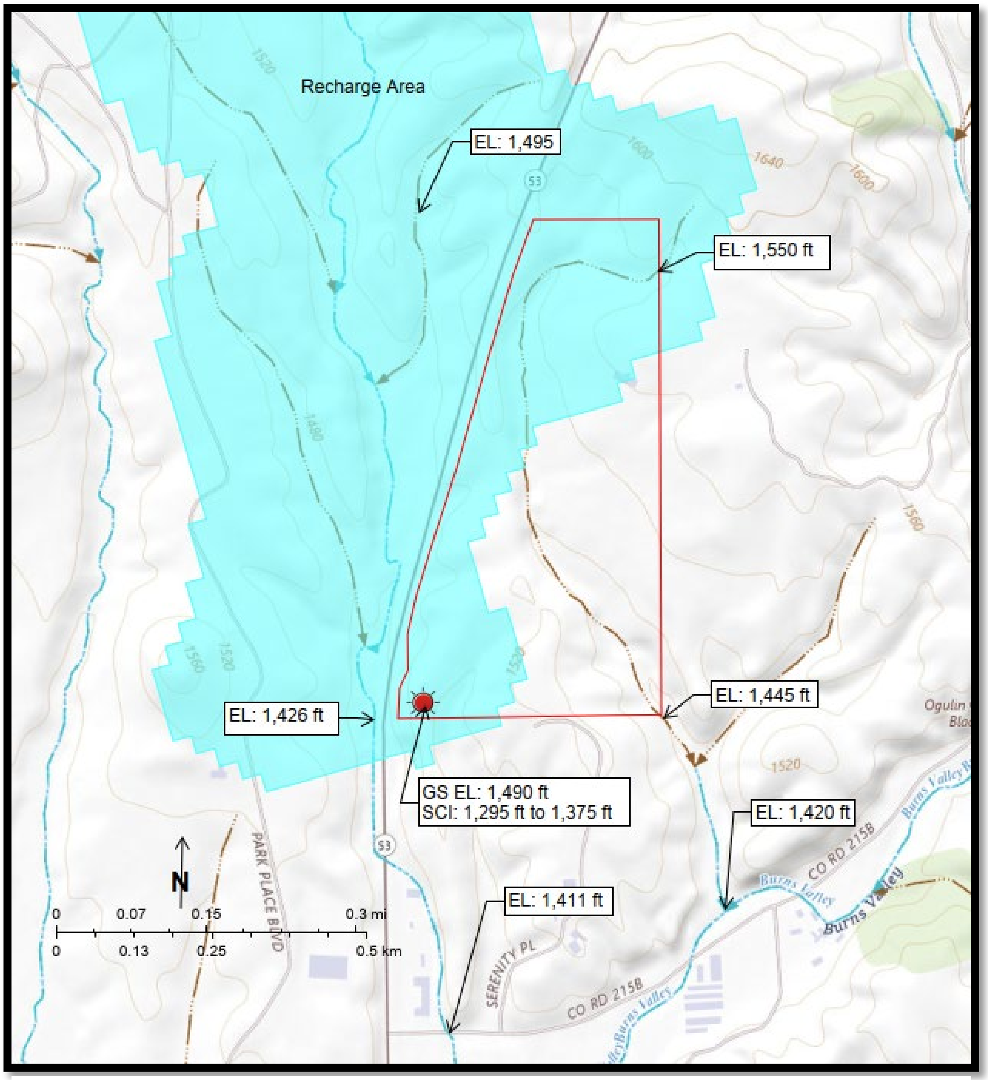

Figure 11. Screen well interval (SCI) elevations compared to ground surface (GS) elevations and surface water (EL) elevations.

7. OPERATIONAL WATER MONITORING, CONSERVATION MEASURES, AND DROUGHT MANAGEMENT

7.1. STANDARD OPERATIONAL MEASURES

Standard operational procedures are recommended, regardless of whether the project is in an area experiencing drought conditions, including ongoing water monitoring and conservation measures that would reduce the overall use of water. These measures should be incorporated into the Water Use section of the project's Property Management Plan. Water Use includes information on water sources and metering, estimated water use, water conservation, and the irrigation system. Recommended on-going water conservation measures include, but may not be limited to, the following:

- No surface water diversion;
- Selection of plant varieties that are suitable for the climate of the region;
- The use of drip irrigation (instead of spray irrigation);
- Cover drip lines with straw mulch or similar to reduce evaporation;
- Water application rates modified from data from soil moisture meters and weather monitoring;
- Shutoff valves on hoses and water pipes;
- Daily visual inspections of irrigation systems;
- Immediate repair of leaking or malfunctioning equipment; and
- Water use metering and budgeting.

In addition to water use metering, water level monitoring is also required by the Lake County Zoning Ordinance. Ordinance Article 27 Section 27.11(at) 3.v.e. requires the wells to have a meter to measure the amount of water pumped as well as a water level monitor. In addition to the above measures, well water level monitoring and reporting shall be performed as follows:

Seasonal Static Water Level Monitoring: The purpose of seasonal monitoring of the water level in the well(s) is to provide information regarding long-term groundwater elevation trends. It is recommended that the water level in the wells be measured and recorded once in the Spring (March/April), before cultivation activities begin, and once in the fall (October) after cultivation is complete. (note: The California Statewide Groundwater Monitoring Program (CASGEM) monitors semi-annually around April 15 and October 15). Records shall be kept, and elevations reported to the County as part of the project's annual reporting requirements. Reporting shall include a hydrograph plot of all seasonal water level measurements to-date, beginning with the initial measurement. Seasonal water level trends will aid in the evaluation of the recharge rate of the well. For example, if the water level measured during the Spring remains relatively constant from year to year, then the water source is recharging each year.

Water Level Monitoring During Extraction: The purpose of monitoring the water level in the project well(s) during extraction is to evaluate the performance of the well(s) to determine the effect of the pumping rate on the water source during each cultivation season. This information shall be used to determine the capacity and yield of the well to aid the cultivators in 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 well water levels. Records shall be kept, and elevations reported to the County as part of the project's annual reporting requirements. Reporting shall include a hydrograph plot of the water level measurements during the cultivation season and compared to prior seasons.

Measuring a water level in a well can be difficult and the level of difficulty will depend on site-specific conditions. As part of the well monitoring program, the well owner/operator shall work with a well expert to determine the appropriate methodology and equipment to measure the water level in their well(s) as well as who will conduct the monitoring and recording of the well level data. The methodology of the well monitoring program shall be described and provided in the project's annual report to the County.

The groundwater level monitoring protocol is recommended to provide a framework for the early detection and response if there is groundwater depletion or inadequate recharge. Thus, in addition to monitoring and reporting, an analysis of the water level monitoring data shall be provided and included in the project's annual report, demonstrating whether use of the 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, including a revised water budget, shall be prepared and submitted to the County, for review and approval, demonstrating how the project will operate and mitigate the impacts in the future, including changes in operation, if necessary.

7.2. Drought Management/Emergency Water Conservation Measures

Drought can reduce both water availability and water quality necessary for productive farming, ranches, and grazing lands, resulting in significant negative direct and indirect economic impacts to the farm. As discussed above, recommended project monitoring will help detect if seasonal groundwater depletion is occurring, which is especially important during periods of drought. In addition, project reporting requires a revised Water Management Plan that demonstrates how the project will operate to address groundwater depletion.

To plan and prepare for drought conditions, the project will follow recommendations for monitoring, planning, and preparedness provided by the National Integrated Drought Information System - https://www.drought.gov/sectors/agriculture.

In addition to the above ongoing conservation measures, water metering, and reporting, during times of drought emergencies or water scarcity, the project will implement the following additional measures, as needed or appropriate to the site, to reduce water use and ensure both success and decreased impacts to surrounding areas:

- Install additional water storage and/or implement a rainwater catchment system;
- 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;
- Cover the soil and drip-lines with removable plastic covers or similar to reduce evaporation;
- Irrigate only in the early morning hours or before sunset;
- Cover plants with shaded meshes during peak summer heat to reduce plant water needs; and/or
- Use a growing medium that retains water in a way to conserve water and aid plant growth. Organic soil ingredients like peat moss, coco coir, compost and other substances like perlite and vermiculite retain water and provide a good environment for cannabis to grow.

In the event the well cannot supply the water needed for the project, the following measures may be taken:

- Reduce the amount of cultivation and/or length of cultivation season;
    - The amount of cultivation would be determined based on available water
    - Early crop harvest, if water becomes limited
- Install additional storage and/or implement a rainwater catchment system, installation of a rainwater catchment pond could provide additional storage and catchment area if the existing groundwater source becomes depleted; and/or
- If possible, develop an alternative, legal, water source that meets the requirements of Lake County Codes and Ordinances.

8. SUMMARY AND CONCLUSIONS

- The project property has an existing groundwater well that has been use to irrigate vineyards for over 20 years. The total well yield reported on the WCR is 300+gpm, however, the pump installed limits the rate to a maximum of 217 gpm or 350 AFY.
- The existing demand, including vineyards and the residence, is approximately 6.8 AFY. The proposed maximum project water demand, including existing demand and the employee use, is 13.7 AFY (Stage 2 – full buildout). The maximum daily cannabis irrigation demand is estimated at 14,700 gpd (Stage 1), would occur June through September. The overall demand is 3.9% of the project well yield.
- The project proposes 2 to 5 days of cannabis irrigation water storage during the highest demand period June through September, during Stages 1 and 2, respectively.
- According to the geologic log from the project's WCR, the water bearing unit of the well is comprised primarily of fractured volcanic/basalt consistent with the Cache Formation water bearing unit. Wells drilled in this formation have yields up to 450 gpm.
- The long-term average recharge, based on the most conservative estimates presented herein (based on 10% of precipitation per USGS Fact Sheet 2007-3007), is approximately 31.7 AFY during a dry year and 135 AFY during an average year over a recharge area of 584.2 acres. Both of which are sufficient to meet the project's demand.
- The average recharge, based on 10% of the precipitation, over the last 23 years was 135 AFY, which is sufficient to meet the project's demand.
- The estimated groundwater storage beneath the project parcel, over an area of 64.2 acres, is 23.4 AF. The project's groundwater supply, both recharge and storage, is sufficient to meet the project's demand.
- The estimated storage capacity of the alluvial formation of BVGB is 4,000 AF, with a usable storage capacity of 1,400 AF. However, the deeper Cache Formation, from which the project draws water, has between 50,000 and 75,000 acre-feet of storage. Based on rainfall data, a drought occurs once every 7 to 8 years and can last up to three years, the average recharge over a 7-year period, assuming three drought years and four average years, the long-term average recharge in the BVGB would be 1,240 AFY.
- The total potential agricultural demand within the BVGB is the existing demand of approximately 555 acre-feet, plus net proposed, 140.6 acre-feet, is approximately 695.6 acre-feet per year, with residential demand, the total groundwater demand is approximately 735.6 acre-feet per year. The dominant demand in the BVGB is associated with residential development and orchards in the lower part of BVGB and vineyards in the upper part of the BVGB. The long-term average recharge, including drought years, is sufficient to meet this demand. In addition, the projected overall demand (735.6 acre-feet per year) represents only 53% of the BVGB alluvial storage and less than 2% of the deeper Cache Formation storage.
- The project area and surrounding area has had a historical use of vineyard and hops irrigation demand. The wells in the vicinity of the project area are primarily used for irrigation and have an average depth of 243 ft and average yield of 215 gpm.
- Drawdown was estimated using the Theis equation. The radius of influence is estimated to be less than 15 feet, which is the distance where the modeled cone of depression from groundwater extraction under these conditions is negligible. None of the nearby wells are within the modeled cone of depression. In addition, since the project proposes approximately 2 to 5 days of water storage during peak cannabis irrigation, the project well would have approximately 2 to 5 days, or more, to recover, depending on the pumping and irrigation schedule.
- The project wells extract water from the confined Cache Formation water bearing unit, at elevations well below Burns Valley Creek and are not likely hydrologically connected to the creek.

Since the recorded and tested yields of the project's well are much greater than the project's demand; the project proposes 2 to 5 days of water storage during peak cannabis irrigation; the long-term average annual recharge exceeds the project's annual demand; the aquifer storage below the project area and within the overall aquifer is sufficient to meet the project's demand and cumulative future basin demand, the project is required to comply with the County's groundwater monitoring and reporting requirements, the potential drawdown due to the project is unlikely to result in appreciable drawdown of off-site wells, and the project wells are not likely hydrologically connected to Burns Valley Creek; the project would have sufficient water and would not have a significant impact on the surrounding area.

9. LIMITATIONS

The study of groundwater hydrology is very complex and often relies on limited data, especially in rural areas. Recommendations and conclusions provided herein are based on professional judgment made using information of the groundwater systems and geology in Lake County, which is limited and allows only for a general assessment of groundwater aquifer conditions and recharge. NorthPoint Consulting Group, Inc. is making analyses, recommendations, and conclusions based on readily available data, including studies and reports conducted by other professionals, Lake County, the State of California, and other consultants hired by the project proponent to prepare technical studies for the proposed project. If additional information or data becomes available for the project area, the recommendations and conclusions presented herein may be subject to change.

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APPENDIX A: SITE PLANS

GLOBAL INTERACTIVE SOLUTIONS LLC

MAJOR USE PERMIT

APN: 010-055-24

VICINITY MAP
NOT TO SCALE

DIRECTIONS TO SITE:
FROM OLYMPIC DRIVE & CA-HWY 53 NORTH

-TURN LEFT ONTO CA-HWY 53 FROM OLYMPIC DRIVE (APPROX. 2 MILES)

-TURN RIGHT ONTO PRIVATE ROAD ON-SITE (APPROX. .2 MILES)

PROJECT DESCRIPTION:

GLOBAL INTERACTIVE SOLUTIONS LLC IS SEEKING APPROVAL OF A MAJOR USE PERMIT FOR A-TYPE 3 OUTDOOR CULTIVATION, A-TYPE 3B MIXED-LIGHT CULTIVATION, A-TYPE 4 NURSERY STOCK CULTIVATION, AND TYPE 13 SELF-TRANSPORT DISTRIBUTION FROM THE LAKE COUNTY COMMUNITY DEVELOPMENT DEPARTMENT/PLANNING COMMISSION. THE PHASED DEVELOPMENT PROJECT WILL BE LOCATED AT 1780 STATE HWY 53, CLEARLAKE, CA - LAKE COUNTY - APN 010-055-24.

PHASE 1:

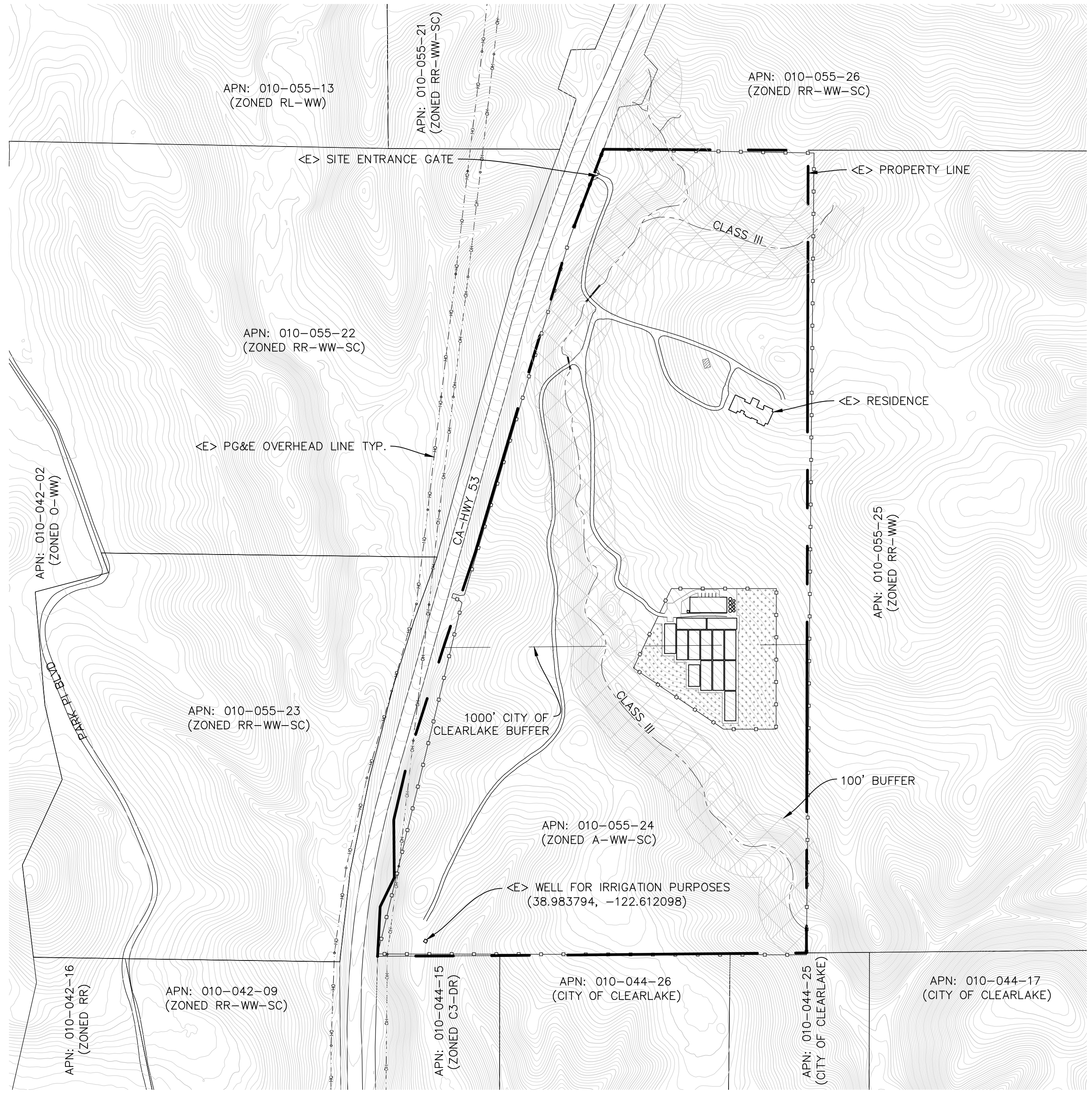
- DEVELOPMENT OF THREE (3) ACRES OF OUTDOOR CULTIVATION AREA AND IRRIGATION WATER STORAGE TANKS.
- CONSTRUCTION OF A 50'X 120'(6,000 SQUARE FEET) BUILDING FOR CANNABIS PROCESSING ACTIVITIES.
- CONSTRUCTION OF PARKING FACILITIES AND IMPROVEMENT OF THE EXISTING DRIVEWAY ACCESS.

PHASE 2:

- REDUCTION OF THE OUTDOOR CULTIVATION AREA FROM THREE (3) TO TWO (2) ACRES.
- DEVELOPMENT OF 20,736 SQUARE FEET OF MIXED LIGHT CULTIVATION IN GREENHOUSES/HOOP HOUSES.
- DEVELOPMENT OF 20,736 SQUARE FEET OF NURSERY IN GREENHOUSES/HOOP HOUSES.
- CONSTRUCTION OF A 36'X 70'(2,520 SQUARE FEET) POLE BARN OVER THREE 12,000 GALLON ABOVE GROUND NUTRIENT POOLS FOR KOI FISH - TO BE USED FOR WATER STORAGE AND FOR THE PRODUCTION OF ORGANIC FERTILIZER.

THE FACILITIES WILL INCLUDE (SEE SITE PLANS FOR DETAILS):

- A 6'TALL SECURITY FENCE AROUND THE CULTIVATION AREA, CONSTRUCTED OF HEAVY GAUGE WIRE FENCE (OR SIMILAR), WITH STEEL GATES AND PADLOCKS.
- SECURITY CAMERAS AND LIGHTING SYSTEM.
- DRIP IRRIGATION SYSTEM, CONSISTING OF SEVERAL WATER STORAGE TANKS/ABOVE GROUND POOLS, VALVES AND FILTERS, PVC PIPE, BLACK POLYVINYL FLEXIBLE TUBES, AND DRIP EMITTERS. IRRIGATION WATER TO BE SUPPLIED VIA THE EXISTING GROUNDWATER WELL. A FIRE SUPPRESSION WATER TANK WILL BE PROVIDED IF REQUIRED.
- NUTRIENT STORAGE SHED.
- 6 PARKING SPACES INCLUDING AN ACCESSIBLE SPACE.
- TRASH ENCLOSURES, COMPOST AREA, AND A SOIL STORAGE AREA.
- A SEPTIC TANK AND LEACH FIELD WILL BE INSTALLED TO SERVICE THE PROCESSING BUILDING UPON APPROVAL BY THE LAKE COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH. AN EXISTING WATER WELL, LOCATED IN THE SOUTHWEST CORNER OF THE SITE, WILL PROVIDE BOTH DOMESTIC AND CROP IRRIGATION WATER. CULTIVATION BE CONDUCTED EITHER IN RAISED GARDEN BEDS, IN TILLED SOIL, ON GROW TABLES, AND/OR IN GROW BAGS. POWER WILL BE SUPPLIED BY AN EXISTING PG&E SERVICE AND SMALL-SCALE SOLAR.



PLOT PLAN
22x34 SHEET: 1"=250'
11x17 SHEET: 1"=500'
0 125 250 500
N

PROJECT INFORMATION:

APPLICANT:
GLOBAL INTERACTIVE SOLUTIONS LLC
8587 TOPANGA CANYOND BLVD.
WEST HILLS, CA 91304

PROPERTY OWNER:
MICHAEL FRANCO
4958 ALATAR DR.
WOODLAND HILLS, CA 91364

APPLICANTS AGENT:
NORTHPOINT CONSULTING GROUP, INC
1117 SAMOA BLVD.
ARCATA, CA 95521
(707) 798-6438

SITE ADDRESS:
APN: 010-055-24
1780 CA-HWY 53
CLEARLAKE, CA 95422

TREES TO BE REMOVED = NONE

EARTHWORK QUANTITIES = 0 CY FILL

WATER = PRIVATE
SEWER = PRIVATE

PROPERTY SIZE = ±64.2 ACRES

ZONING = A-WW-SC

GENERAL PLAN DESIGNATION-1 = A
GENERAL PLAN DESIGNATION-2 = CR

PHASE 1:
PROPOSED OUTDOOR CANOPY AREA = 130,680 SF (3.0 AC)

PHASE 2:
PROPOSED OUTDOOR CANOPY AREA = 87,120 SF (2.0 AC)

PROPOSED MIXED LIGHT CANOPY AREA = 20,736 SF (.48 AC)

PROPOSED NURSERY STOCK = 20,736 SF (.48 AC)

GENERAL NOTES:

1. DRAWING SCALE AS NOTED. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS.
2. THIS IS NOT A BOUNDARY SURVEY. BOUNDARY INFORMATION DEPICTED HAS BEEN OBTAINED FROM LAKE COUNTY 2015 GIS DATA. AND ASSESSOR MAP DATA.
3. THERE ARE NO NEARBY SCHOOLS, SCHOOL BUS STOPS, PLACES OF WORSHIP, PUBLIC PARKS OR TRIBAL RESOURCES WITHIN 1,000 FEET OF THE PROPOSED CULTIVATION AREA.
4. THERE ARE NO RESIDENCES ON ADJOINING PARCELS WITHIN 200 FEET OF THE PROPOSED CULTIVATION AREAS.
5. ANY EXISTING DEVELOPMENT CONSTRUCTED WITHOUT THE BENEFIT OF COUNTY REVIEW WILL BE SUBJECT TO THE LAKE COUNTY BUILDING DEPARTMENT UPON APPROVAL OF THE USE PERMIT.
6. CLASSIFICATION OF WATERCOURSES AS IDENTIFIED IN THE BIOLOGICAL ASSESSMENT.

SHEET INDEX:

DRAWN BY | REVISIONS | DATE

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

GLOBAL INTERACTIVE SOLUTIONS LLC - MAJOR USE PERMIT
1780 CA-HWY 53 CLEARLAKE, CA 95422
PLOT PLAN, VICINITY MAP, & PROJECT NOTES

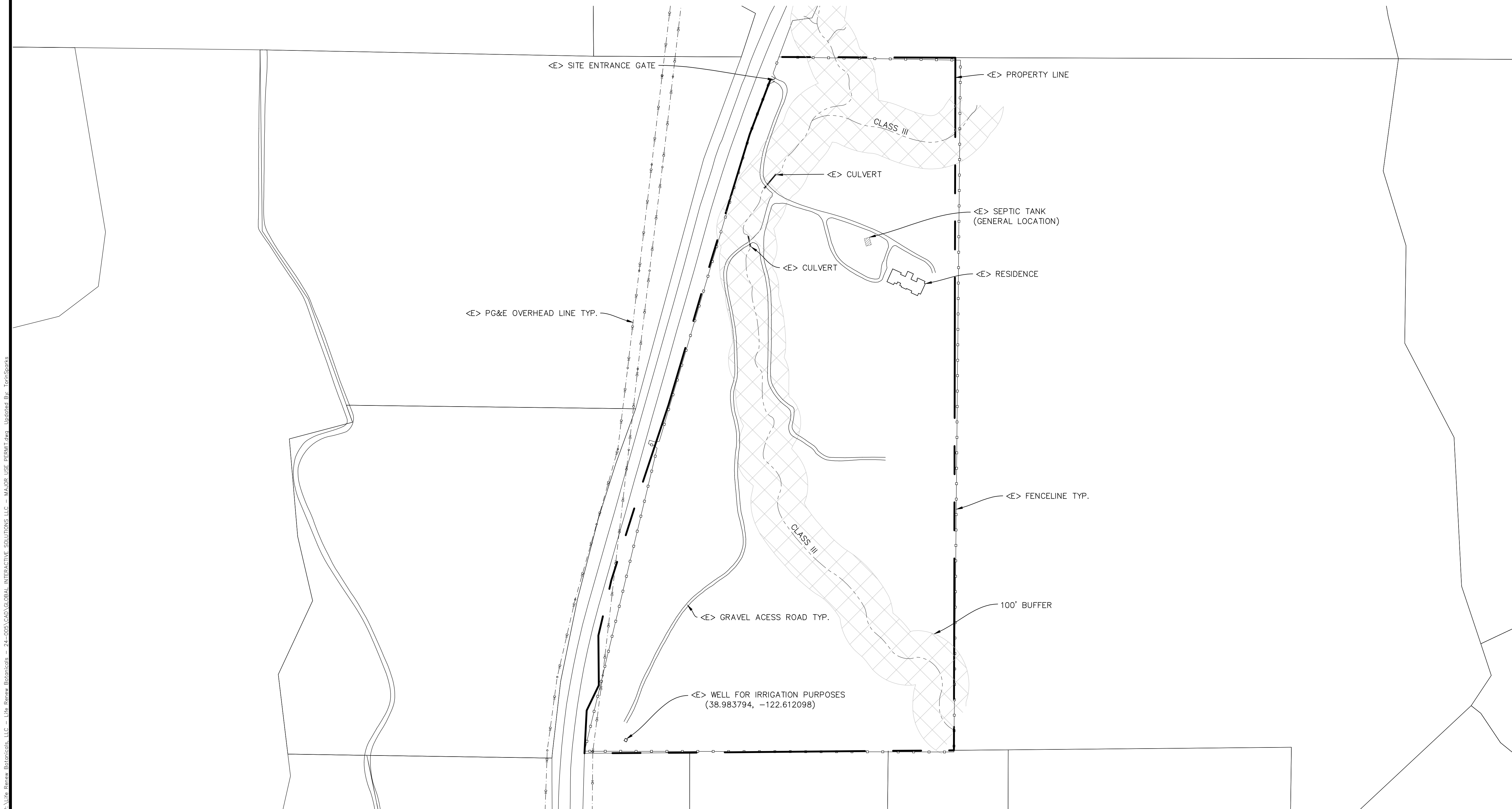
PROJ. MGR.: AD
DRAWN BY: TS
DATE: 7/26/24
SCALE: AS SHOWN

SHEET
C0
24-005

GLOBAL INTERACTIVE SOLUTIONS LLC

EXISTING CONDITIONS

APN: 010-055-24



EXISTING SITE PLAN

22x34 SHEET: 1"=200'
11x17 SHEET: 1"=400'

0 100 200 400

N

DRAWN BY | REVISIONS | DATE

NORTHPOINT
CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

GLOBAL INTERACTIVE SOLUTIONS LLC - MAJOR USE PERMIT
1780 CA-HWY 53 CLEARLAKE, CA 95422
EXISTING CONDITIONS

PROJ. MGR.: AD
DRAWN BY: TS
DATE: 7/26/24
SCALE: AS SHOWN

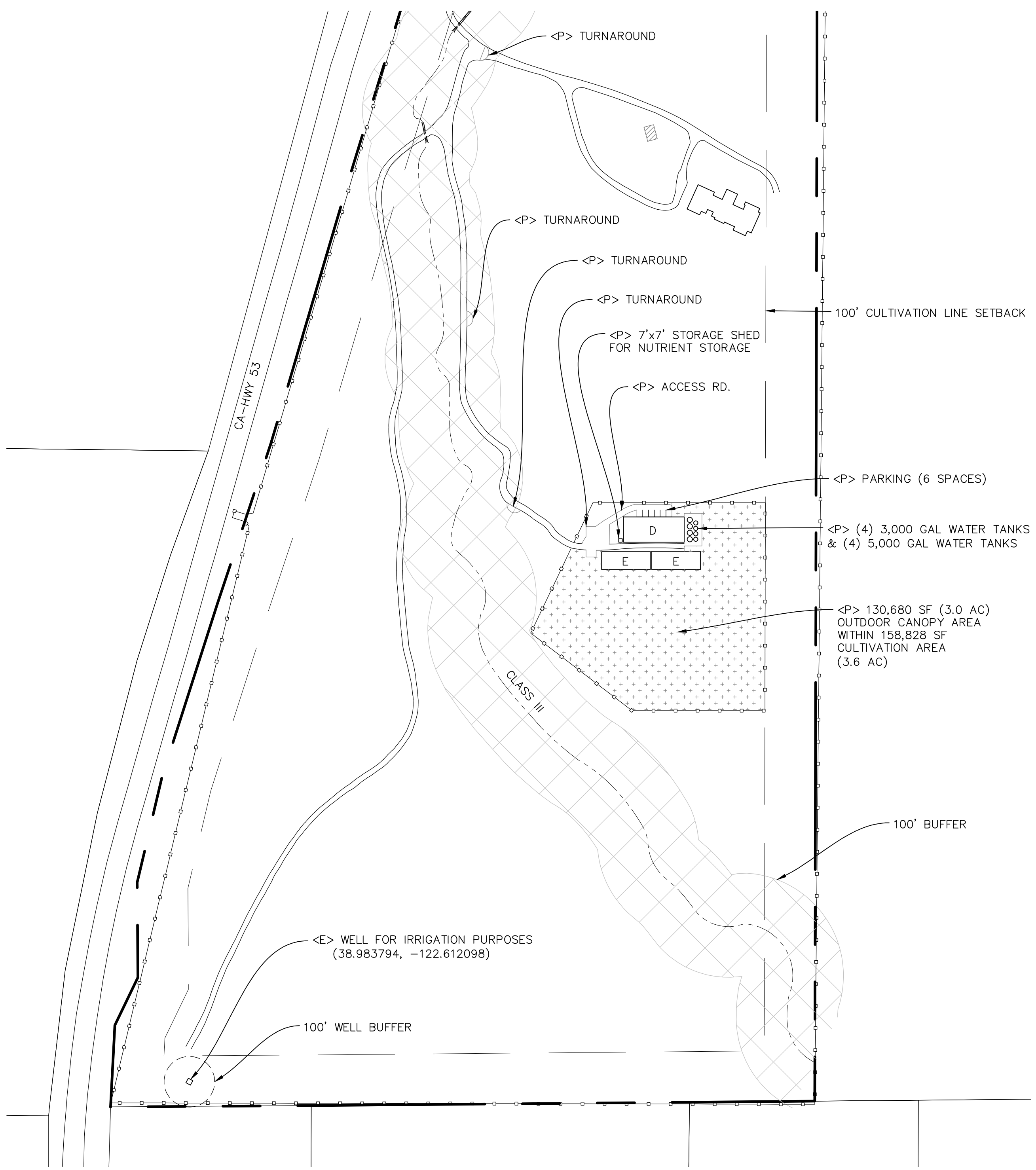
SHEET
C1
24-005

August 21, 2024 - 14:09 Dwg Name: P:\Life Renew Botanicals, LLC - Life Renew Botanicals - 24-005\CAD\GLOBAL INTERACTIVE SOLUTIONS LLC - MAJOR USE PERMIT.dwg Updated By: TorinSparks

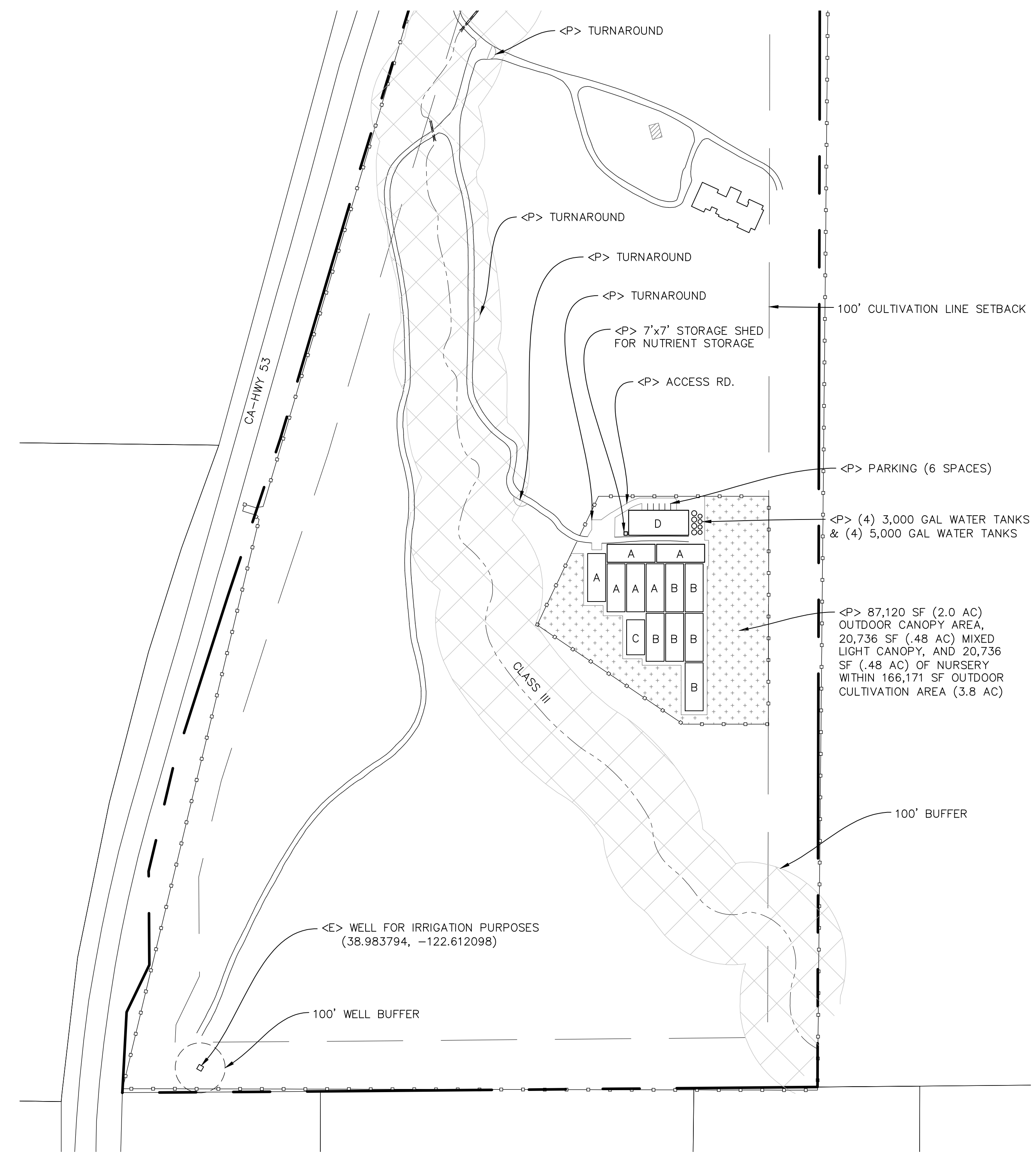
GLOBAL INTERACTIVE SOLUTIONS LLC

PHASE 1 & 2 PROPOSED SITE PLAN

APN:010-055-24



PHASE 1



PHASE 2

PROPOSED SITE PLAN

22x34 SHEET: 1"=150'
11x17 SHEET: 1"=300'

0 75 150 300

N

LEGEND

A: 36'x96' GREENHOUSE/HOOPHOUSE FOR MIXED LIGHT CULTIVATION
B: 36'x96' GREENHOUSE/HOOPHOUSE FOR NURSERY
C: 36'x70' POLE BARN FOR NUTRIENT WATER POOLS
D: 50'x120' ANCILLARY PROCESSING FACILITY
E: 36'x96' ANCILLARY PROPAGATION
– PROPOSED OUTDOOR CULTIVATION AREA

DRAWN BY
REVISIONS
DATE

NORTHPOINT CONSULTING GROUP, INC.
1117 Samoa Blvd., Arcata, CA 95521

GLOBAL INTERACTIVE SOLUTIONS LLC - MAJOR USE PERMIT
1780 CA-HWY 53 CLEARLAKE, CA 95422
PHASE 1 & 2 PROPOSED SITE PLAN

PROJ. MGR.: AD
DRAWN BY: TS
DATE: 7/26/24
SCALE: AS SHOWN

SHEET
C2
24-005

APPENDIX B: PROJECT WELL COMPLETION REPORT

QUADRUPLICATE
For Local Requirements

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 761881

Page ___ of ___
Owner's Well No. 10-003-33
Date Work Began 3-16-01 Ended 3-22-01
Local Permit Agency LAKE COUNTY HEALTH DEPT
Permit No. WE2010 Permit Date 8-3-2000

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

GEOLOGIC LOG

ORIENTATION (✓) ✓ VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DRILLING METHOD ROTARY AIR FLUID ___

DEPTH FROM SURFACE Ft. to Ft.		DESCRIPTION Describe material, grain size, color, etc.
0	2	SOIL
2	63	CLAY
63	118	VOLCANIC BLACK ROCK
118	130	FRACTURED VOLCANIC (100gpm)
130	195	BLACK HARD FRACTURED BASALT (200gpm)
195	220	LITE GREEN SOFT

RECEIVED
APR 02 2001
LAKE COUNTY
ENVIRONMENTAL HEALTH

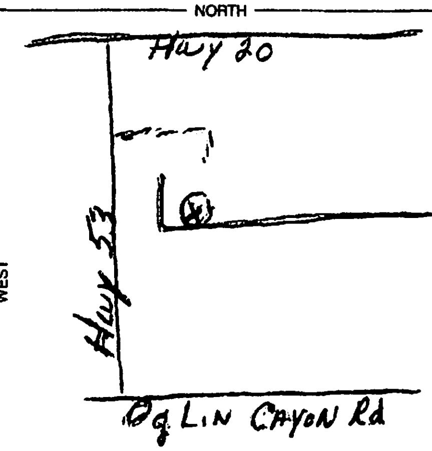
TOTAL DEPTH OF BORING 220 (Feet)
TOTAL DEPTH OF COMPLETED WELL 220 (Feet)

WELL LOCATION

Address 1780 STATE HWY
City CLEAR LAKE CALIF.
County LAKE
APN Book ___ Page ___ Parcel 10-003-33
Township ___ Range ___ Section ___
Latitude ___ NORTH Longitude ___ WEST
DEG. MIN. SEC.

LOCATION SKETCH

NORTH



WEST EAST
SOUTH

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

ACTIVITY (✓)

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

PLANNED USES (✓)

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

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 118 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL 90 (Ft.) & DATE MEASURED 3-22-01
ESTIMATED YIELD 300+ (GPM) & TEST TYPE AIR LIFT
TEST LENGTH 10 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
* *May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	24'	14 3/4	✓				Steel	10"	.250	—
+1½	115	9 3/4	✓				Steel	8"	.250	—
115	195	9 3/4		✓			Steel	8"	.250	2 ROWS ¼ x 1

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	24	✓			

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 CANEPA AND SONS DRILLING INC
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

13760 MONO WAY SONORA CALIF. 95370
ADDRESS CITY STATE ZIP

Signed C. Mark Horsley 3/23/01 425949
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

APPENDIX C: WELL PUMP TEST RESULTS

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: Dottie Bates
C/O: Lake County Planning Consultants
Sufyan Hamouda
Ph: **262-720-8313**

Site: 1780 Hwy 53, Clearlake
Project: Well Inspection
Escrow #:
Email: mrsdottiebates@gmail.com

Start Date: 12-16-2019

Technician: Scott

WELL DEPTH	CASING SIZE	STATIC LEVEL	PUMP TYPE	PUMP SETTING	MAX PUMP OUTPUT	TOTAL DRAWDOWN	DEAD HEAD	AMPS	VOLTAGE
Unknown	10" Steel	98'	Submersible	3" Galv.	217 Gpm	101'	N/A	24	480V 3 Ph

DATE	TIME	TECH	WATER LEVEL	GAL.PER MINUTE	WATER COLOR	WATER METER	COMMENTS
12/16/19	2:23PM	SB	98'	217	Clear / cold	46,775,300	Start Pump Test
"	2:25	"	99'	"	"		
"	2:32	"	99'	"	"		
"	2:50	"	100'	"	"		
"	3:08	"	100'	"	"		
"	3:30	"	100'	"	"		
"	3:55	"	100'	"	"		
"	4:23	"	101'	"	"	46,801,400	End Test

Water Quality Sample Taken: Home Owners, Bacteria
Pump Broke Suction During Test: No
Total Pumping Time: 2 Hours
Estimated Total Volume Pumped: 26,100 Gallons
Well Yield At Time / Date Of Test: 217 Gallons Per Minute

NOTES & RECOMMENDATIONS:

Well casing is above grade and is equipped with a well seal. Well discharged clear sediment free water for the duration of the test. There is a 3 phase pump panel with disconnect switch at the well site to power on & off the well. Well pump is run manually to fill the storage tanks over by the house site.

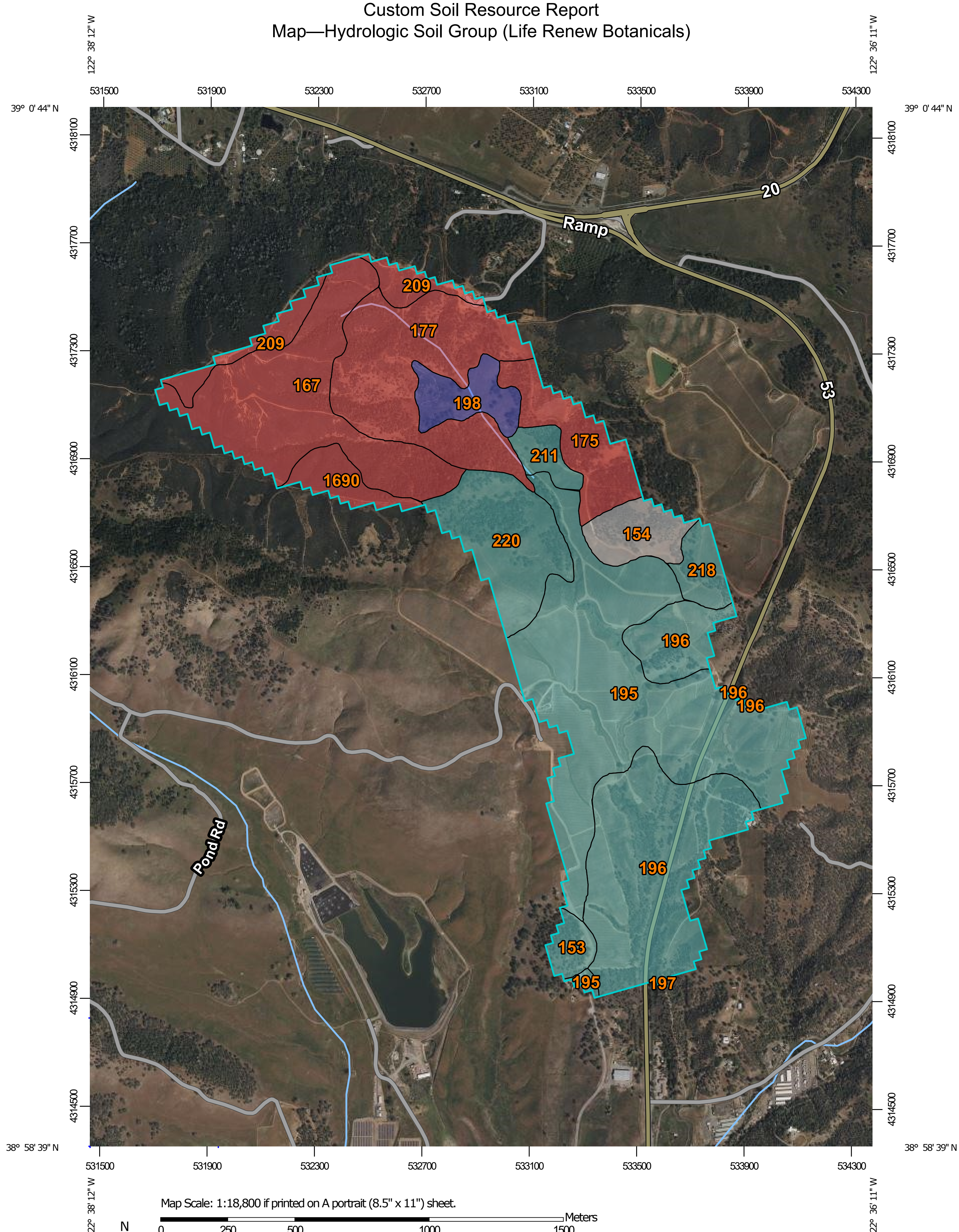
APPENDIX D: NEIGHBORING WELL COMPLETION REPORTS

Section	**M13N07W14**	South and southeast of project well								
Mapping Note	**ID#**	**WCR #**	**Legacy**	**Year**	**Uses**	**WCR Address**	**Actual APN**	**Completed Depth (ft)**	**Yield (gpm)**	
Mapped	1	WCR1981-005661	228689	1981	Industrial	2510 Old 53		361	30	
Mapped	2	WCR1996-007735	445212	1996	Domestic	2511 Hwy 53	010-048-09	190	18	
Duplicate, Not Mapped	~~3~~	~~WCR2006-008902~~	~~1093074~~	~~2006~~	~~Not Checked~~	~~2050 Ogulin~~	~~010-053-02~~	n/a	n/a	
Mapped	4	WCR1980-006392	84076	1980	Domestic	Ogulin Rd & Hwy 53		110	20	
Mapped	5	WCR1995-008387	555494	1995	Domestic	2511 Hwy 53	10-048-09	183	30	
Mapped	6	WCR1999-008659	705609	1999	Irrigation	2580 Hwy 53	010-048-10	240	245	
Does not exist	~~7~~	~~WCR2007-008038~~	~~1093138~~	~~2007~~	~~Domestic~~	~~2050 Ogulin~~	~~010-053-01~~	~~n/a~~	n/a	
Mapped	8	No WCR Not Given		2021	Irrigation	2185 Ogulin	010-044-17	375	80	
Does not exist	8a	WCR2007-008044	1080452	2007	Domestic	2185 Ogulin	010-044-17	n/a	n/a	
Old don't know	~~9~~	~~WCR1776-003338~~	~~241~~	~~Unknown~~	~~Unknown~~	~~Unknown~~	~~Unknown~~	n/a	n/a	
Mapped	10	WCR2013-008387	963040	2013	Irrigation	2050 Ogulin	010-053-01	358	200	
Mapped	11	WCR1999-008660	705610	199	Irrigation	Wrong as 2580 Hwy 53	010-048-05	230	14	
Mapped	12	WCR1981-005597	13363	1981	Domestic	Ogulin Rd	010-055-48	70	15	
Mapped	13	WCR2011-008013	950518	2011	Domestic	2050 Ogulin	010-053-01	240	60	
Mapped	14	WCR2006-008963	1096367	2006	Domestic	2250 Ogulin	010-044-19	200	30	
Mapped	15	Not Given	Not Given	2020	Irrigation	2050 Ogulin	010-053-01	340	300	
Mapped	16	Not Given	Not Given	2021	Dom&Irr	2160 Ogulin	010-044-21	300	100	
Mapped	17	WCR2004-009866	1075331	2004	Domestic	2122 Ogulin	010-053-02	114	60	
Section	**M13N07W11**	North and Northeast of project well					Average	237	86	
Mapping Note	**ID#**	**WCR #**	**Legacy**	**Year**	**Uses**	**WCR Address**	**Actual APN**	**Completed Depth (ft)**	**Yield (gpm)**	
Mapped	18	WCR2006-008049	1089142	2006	Domestic	1270 Hwy 53	010-055-26	380	6	
Mapped	19 Project Well	WCR2001-009466	761881	2001	Irrigation	1780 State Hwy	010-055-24	220	300	
Mapped	20	WCR2006-008903	1093075	2006	Domestic	1750 Ogulin	010-055-47	107	50	
Mapped	21	WCR2017-005234	e0345527	2017	Domestic	1756 Ogulin	010-055-47	372	50	
Mapped	22	WCR2006-008048	1089141	2006	Domestic	1000 Hwy 53	010-055-27	260	100	
Section	**M13N07W10**	Northwest of project well					Average	268	101	
Mapping Note	**ID#**	**WCR #**	**Legacy**	**Year**	**Uses**	**WCR Address**	**Actual APN**	**Completed Depth (ft)**	**Yield (gpm)**	
Test Hole	23	WCR1999-008580	822361	1999	Test Hole	1015 State Hwy 53		n/a	n/a	
Test Hole	24	WCR2006-008058	937876	2006	Test Hole	895 St hwy 53		n/a	n/a	
Test Hole	25	WCR1999-008578	822359	1999	Test Hole	835 St hwy 53		n/a	n/a	
Mapped	26	WCR2001-010640	761871	2001	Irrigation	1615 st hwy 53	010-055-23	260	650	
Mapped	27	WCR2014-005728	951434	2014	Irrigation	2485 Old Hwy 53 (sewer	010-042-02	208	n/a	Yield not given
Mapped	28	WCR2000-008765	746349	2000	Irrigation	1015 State Hwy 53	010-055-13	400	700	
Mapped	29 (duplicate of 32)	WCR2000-008769	761868	2000	Irrigation	1015 State Hwy 53	010-055-13	380	2000	
Abandoned	30	WCR2007-008487	938046	2007	Abandoned	895 St hwy 53		n/a	n/a	
Test Hole	31	WCR1999-008577	822358	1999	Test Hole	815 st hwy 53		n/a	n/a	
Mapped	32 (duplicate of 29)	WCR2000-008810	785091	2000	Irrigation	1015 State Hwy 53	010-055-13	n/a	n/a	
Mapped	33	WCR2000-008764	746348	2000	Irrigation	815 st hwy 53	010-055-15	500	75	

Section	M13N07W15	Northwest of project well					Average	350	856	
								Completed	Yield	
Mapping Note	**ID#**	**WCR #**	**Legacy**	**Year**	**Uses**	**WCR Address**	Actual APN	Depth (ft)	(gpm)	
Mapped	34	WCR1994-009281	493673	1994	Public/Irrigation	Hwy 53&old53	010-042-09	200	1000	
Mapped	35	WCR1973-002196	20868	1973	Domestic/other	Treatment Plant		165	20	
Mapped	36	WCR1978-005038	104985	1978	Domestic/other	Treatment Plant		85	20	
Mapped	37	WCR2006-008905	1093076	2006	Domestic	2525 Park Place	010-042-13	160	75	
Destroyed	38	WCR1999-008642	719754A	1999	Destroyed	Treatment Plant (replaced well)		n/a	n/a	
Mapped	39	WCR1999-008608	713856	1999	Domestic	2485 Old Hwy 53 (sewer	010-042-02	200	10	
Mapped	40	WCR2006-008904	1093077	2006	Domestic	2025 Park Place	010-042-13	300	40	
Mapped	41	WCR1994-009284	493685	1994	Public/Irrigation	Hwy 53 & Old Hwy 53	010-042-09	255	350	
Mapped	42	WCR1968-000975	11421	1968	Domestic	Hwy 53 & Old Hwy 53		63	n/a	Yield not given
Mapped	43	WCR1979-004871	56440	1979	Domestic	Treatement Plant Road		208	13	
							Average	182	191	
							Overall Average	243	215	

APPENDIX E: WEB SOIL SURVEY-HYDROLGIC SOIL GROUP

Custom Soil Resource Report
Map—Hydrologic Soil Group (Life Renew Botanicals)



Map Scale: 1:18,800 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 250, 500, 1000, 1500

Feet: 0, 500, 1000, 2000, 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lake County, California
Survey Area Data: Version 20, Aug 28, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 26, 2022—May 31, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group (Life Renew Botanicals)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
153	Konocti-Hambright complex, 15 to 30 percent slopes	C	7.8	1.3%
154	Konocti-Hambright-Rock outcrop complex, 30 to 75 percent slopes		17.7	3.0%
167	Maymen-Etsel-Mayacama complex, 20 to 60 percent slopes	D	83.4	14.3%
175	Maymen-Millsholm-Bressa complex, 30 to 50 percent slopes	D	28.9	4.9%
177	Millsholm-Bressa loams, 30 to 50 percent slopes	D	74.2	12.7%
195	Phipps complex, 5 to 15 percent slopes	C	150.9	25.8%
196	Phipps complex, 15 to 30 percent slopes	C	107.6	18.4%
197	Phipps complex, 30 to 50 percent slopes	C	0.2	0.0%
198	Pomo-Bressa loams, 15 to 50 percent slopes	B	17.5	3.0%
209	Skyhigh-Millsholm loams, 15 to 50 percent slopes	D	18.7	3.2%
211	Skyhigh-Sleeper-Millsholm association, 1 to 35 percent slopes, MLRA 15	C	9.1	1.6%
218	Sobrante-Guenoc-Hambright complex, 2 to 15 percent slopes	C	11.3	1.9%
220	Sobrante-Hambright-Guenoc complex, 30 to 50 percent slopes	C	44.0	7.5%
1690	Maymen-Etsel-Snook complex, 30 to 75 percent slopes, low ffd	D	12.8	2.2%
Totals for Area of Interest			**584.2**	**100.0%**

Rating Options—Hydrologic Soil Group (Life Renew Botanicals)

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

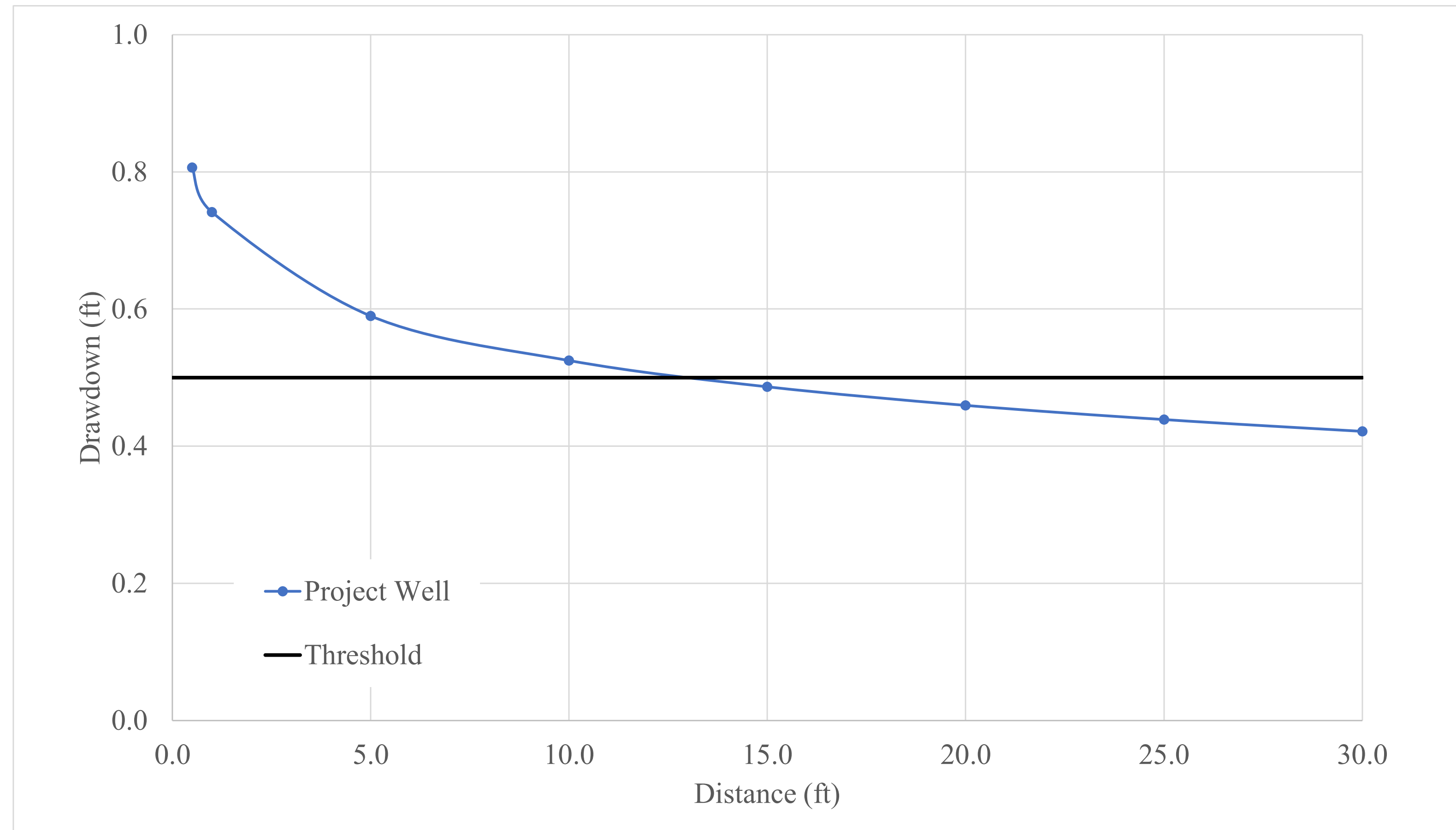
APPENDIX F: THEIS EQUATION DRAWDOWN CALCULATIONS FOR THE PROJECT WELLS

	Project Well								Notes:
Storativity or Storage Coefficient	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	Storativity - Average of Multiple Sources (see below)
T (ft^2/day)	6648.3	6648.3	6648.3	6648.3	6648.3	6648.3	6648.3	6648.3	Using T = 2.3*Q/(4pi*drawdown during pump test) (Gupta)
Project Q (gpm)	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	Based on 24 hour storage refill rate during maximum daily demand
Q (ft^3/d)	3927	3927	3927	3927	3927	3927	3927	3927	conversion ft^3/d = 0.00519481 gpm
Time (days)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
r (ft)	0.5	1	5	10	15	20	25	30	
u	0.00000	0.00000	0.00000	0.00001	0.00002	0.00003	0.00005	0.00007	Fetter (2001) Equation 5.10
w(u)	17.1557	15.7694	12.5506	11.1643	10.3534	9.7780	9.3317	8.9671	Fetter (2001) Equation 5.11: W(u) ~ -0.5772-ln(u)+u-u^2/(2*fact2)
Drawdown [h-ho] (ft)	0.8	0.7	0.6	0.5	0.5	0.5	0.4	0.4	Fetter (2001) Equation 5.11
Drawdown [h-ho] (in)	9.7	8.9	7.1	6.3	5.8	5.5	5.3	5.1	

Sources: Applied Hydrogeology, Fourth Edition, C.W. Fetter. 2001
Groundwater Wells, Second Edition, F.G. Driscoll 1986. (https://sehydrogeology.com/using-specific-capacity-monitor-well-performance/#:~:text=The%20Specific%20Capacity%20of%20a,penetrated%20by%20the%20well%20screens.)

Storativity - Confined Aquifer (Sources)

	Minimum	Maximum	Average	
	0.00005	0.005	**0.001058**	Average of all six estimates of Storativity
	0.00001	0.0001		
Well #1 (using 2nd Source below)	0.00013	Aquifer Thickness*0.000001		
Thickness (Available Drawdown)	130	(Well Depth - Static Water Level on WCR)		



Source: http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm

aquifer (or aquitard) thickness [L].

The typical storativity of a confined aquifer, which varies with specific storage and aquifer thickness, ranges from 5×10^{-5} to 5×10^{-3} (Todd 1980).

Specific storage is the volume of water that a unit volume of aquifer (or

Source: https://www.sciencedirect.com/topics/earth-and-planetary-

from the expansion of water and compaction of the aquifer, both of which are exceedingly small. For confined aquifers the storativity generally ranges between 0.0001 and 0.00001, and for leaky confined aquifers it is in the range of 0.001. One method to estimate storativity for confined aquifers is to multiply the aquifer thickness by 0.000001. The small storativity for confined aquifers means that to obtain a sufficient supply from a well there must be a large pressure change throughout a wide area. This is not the case with unconfined aquifers because the water derived is not related to expansion and compression but comes instead from gravity drainage and dewatering of the aquifer.