NORTHPOINT
CONSULTING GROUP, INC.

TECHNICAL MEMORANDUM

To: Lake County Community Development Department

From: Annjanette Dodd, PhD, CA PE #77756 Exp. 6/30/2023

Date: Revised November 2, 2021

Subject: Ordinance 3106 Hydrology Report – UP 20-92 Bar X Farms, LLC
18655, 19395, 20103, and 20333 S Hwy 29, Middletown, (Cultivation APNs: 014-250-07 and 14; Non-cultivation APNs: 014-250-05 and 10)

INTRODUCTION AND PURPOSE

On July 27, 2021, the Lake County Board of Supervisors passed an Urgency Ordinance (Ordinance 3106) requiring land use applicants to provide enhanced water analysis during a declared drought emergency. Ordinance 3106 requires all projects that require a 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, and
- Cumulative impact of water use to surrounding areas due to the project.

The purpose of this Technical Memorandum (TM) is to provide the information required by Ordinance 3106 for UP 20-92, Bar X Farms, LLC. In addition to this TM, a Groundwater Availability Analysis and a Cumulative Groundwater Impact analysis were conducted by Chico Environmental dated April 12, 2021 and July 2, 2021, respectively. These analyses were submitted to the Lake County Community Development Department. The analyses, which were prepared by a licensed Professional Geologist, concluded that there is sufficient water for the proposed project and that the project would not affect downgradient groundwater users or other well users in the vicinity of the project.

Ordinance 3106 also requires a Drought Management Plan (DMP) depicting how the applicant proposes to reduce water use during a declared drought emergency. The DMP for this project has been submitted as a separate document.

PROJECT LOCATION

The project is located 18655, 19395, 20103, and 20333 S Hwy 29, Middletown, Lake County, California (Cultivation APNs: 014-250-07 and 14; Non-cultivation APNs: 014-250-05 and 10). The project site is located approximately 1.8 miles northeast of Middletown and approximately 2.3 miles southwest of the Hidden Valley Lake community. The project site is Bar X Ranch, an existing cattle ranch that has been actively farmed for over 100-years for cattle grazing and hay production.

PROPOSED PROJECT

The project proposes commercial cannabis operations in two phases. Phase 1 would consist of development of outdoor cannabis gardens for cultivation of 62.1 acres of outdoor canopy within eight (8) garden areas. Phase 2 would consist of converting one of the outdoor cultivation areas into permanent greenhouses for mixed-light cultivation, reducing the total canopy to 57.0 acres, and constructing a 60,000 sq. ft. commercial processing building. Details are summarized in Table 1, Table 2, and Figure 1.

Table 1. Phase 1 - Summary of Cannabis Canopy

APN	Garden Name	Cultivation Type	Canopy Area (sq. ft.)	Canopy Area (acres)
014-250-07	Center Garden	Outdoor	60,000	1.4
014-250-07	West Center Garden	Outdoor	110,000	2.5
014-250-07	Riverside Garden	Outdoor	835,000	19.2
014-250-07	Northwest Garden	Outdoor	85,000	2.0
014-250-07	East Center Garden	Outdoor	455,000	10.4
014-250-14	Pasture Garden	Outdoor	845,000	19.4
014-250-14	Southwest Garden #1	Outdoor	150,000	3.4
014-250-14	Southwest Garden #2	Outdoor	165,000	3.8
		Total	2,705,000	62.1

Table 2. Phase 2 - Summary of Cannabis Canopy

APN	Garden Name	Cultivation Type	Canopy Area (sq. ft.)	Canopy Area (acres)
014-250-07	Center Garden	Outdoor	60,000	1.4
014-250-07	West Center Garden	Outdoor	110,000	2.5
014-250-07	Riverside Garden	Outdoor	835,000	19.2
014-250-07	Northwest Garden	Outdoor	85,000	2.0
014-250-07	East Center Garden	Outdoor	455,000	10.4
014-250-14	Pasture Garden	Mixed Light	621,600	14.3
014-250-14	Southwest Garden #1	Outdoor	150,000	3.4
014-250-14	Southwest Garden #2	Outdoor	165,000	3.8
		Total	2,481,600	57.0

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 gallons (gpd) per plant more than reported by Bauer et. el. (2015), who reported up to 5.0 (gpd) per plant (18.9 Liters/day/plant). Using the more conservative estimate of 6.0 gpd, and assuming there are approximately 500 plants per acre of canopy (CDFA, 2017), the demand is 3,000 gpd (2.1 gallons per minute [gpm]) per acre of canopy; this use rate is consistent with the Water Use Management Plan section (Section 16.2) of the project's Property Management Plan. The total estimated water demand is as follows:

- Daily
    - Phase 1 – 186,300 gpd (130.4 gpm)
    - Phase 2 – 171,000 gpd (119.7 gpm)
- Yearly (cultivations season ranges between 120 and 180 days)
    - Phase 1 – 68.6 to 102.9 acre-feet (AF)
    - Phase 2 – 63.0 to 94.5 (AF)

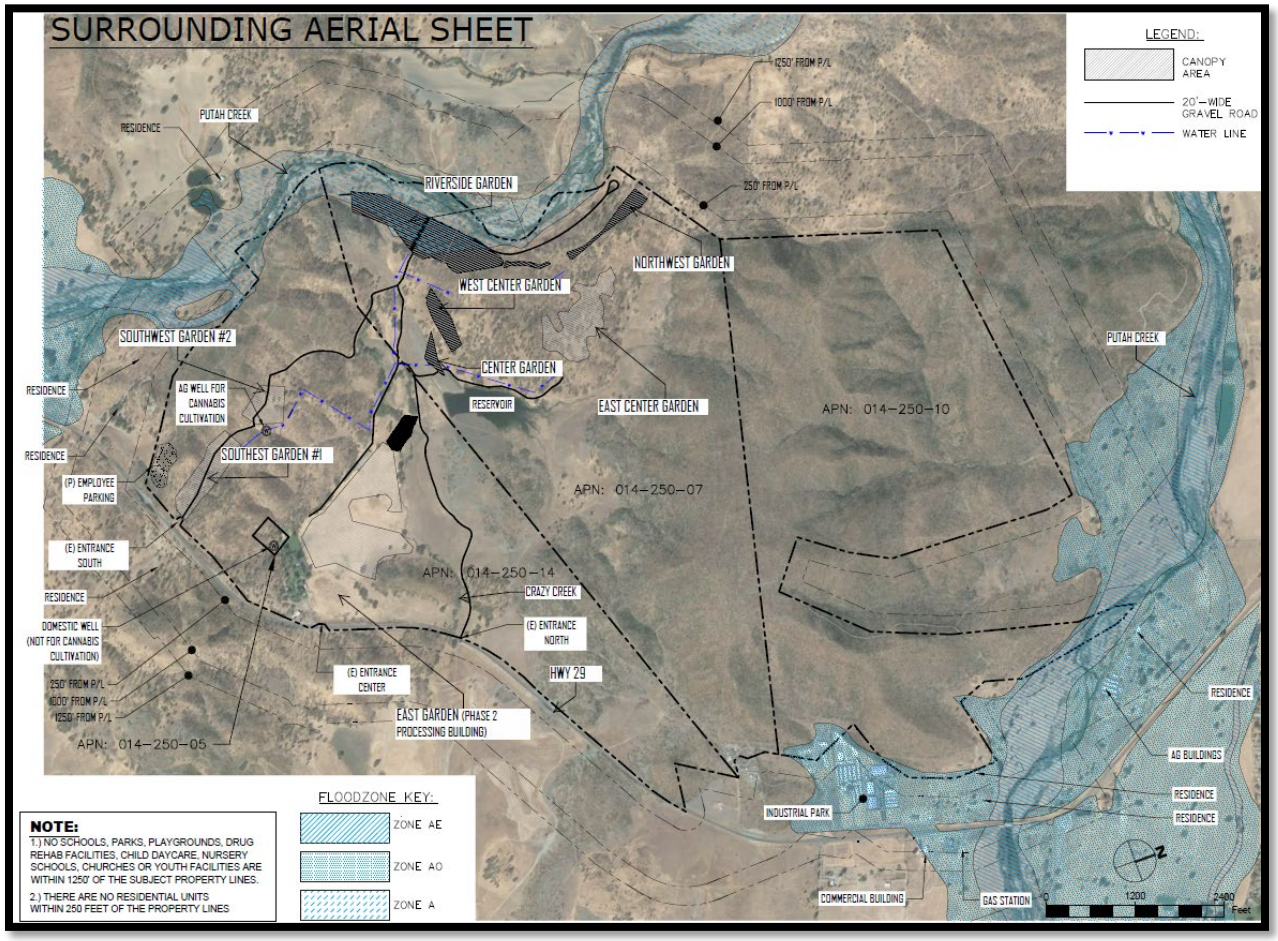


Figure 1. Proposed Site Map

WATER SOURCE AND SUPPLY

There is one (1) existing, permitted groundwater well that will be used for cultivation (Lat/Long 38.76947, -122.59708). The well is approximately 215 feet deep and was drilled in January 2021. The well is screened at two water bearing intervals, 40 and 60 feet and 180 and 220 feet below the ground surface (bgs). During the drilling of the well, the depth of first water was at 60 feet bgs and the static water level was estimated to be 30 feet bgs (Attachment 1 – Well Completion Report). Using USGS topography (https://apps.nationalmap.gov/viewer/), the surface elevation at the well is approximately 1,110 feet; the elevations of the screened areas range from approximately 1,050 to 1,070 feet and 890 to 930 feet. The initial and static water level elevations are approximately 1,060 feet and 1,080 feet, respectively.

When the well was drilled, it was determined to have a yield of 800 gpm (1290.4 acre-feet per year). The potential daily demand of 130.4 gpm represents 16.3% of the well yield and between 4.9-8.0% of the annual potential well production in acre-feet.

A 4-hour well pump test was conducted on October 19 and 20, 2021 by Pollack and Sons Pump (Attachment 1). The pump test was conducted with the existing 75 HP pump with a maximum pump rate of 625 gpm. The static water level at the beginning of the test was 34 feet bgs. During the test, the water level dropped to 140 feet bgs where it remained for the duration of the pump test. The well sustained a production capacity of 625 gpm throughout the entire 4-hours. After 24-hours, the water level returned to 34 feet bgs. Pollack and Sons Pump reported that the well could produce more water with a larger pump installed. It should be noted that this test was conducted during an extreme drought, at the end of a dry season. The test results validate the yield reported on the Well Completion Report for the well.

IRRIGATION AND WATER STORAGE

Irrigation for the cultivation operation will use water supplied by the existing well. The irrigation water would be pumped (using an existing 75 HP pump) from the well, via PVC piping, to approximately 27, 5,000-gallon water storage tanks (135,000 gallons of storage) located on a ridge adjacent to Southwest Garden #2, and then delivered to the individual gardens via an above ground, gravity water distribution system. Drip irrigation systems will be used at each garden. The drip lines will be sized to irrigate the cultivation areas at a rate slow enough to maximize absorption and prevent runoff. Drip irrigation systems, when done properly, conserve water compared to other irrigation techniques.

GROUNDWATER BASIN INFORMATION AND HYDROGEOLOGY

The Groundwater Availability Analysis by Chico Environmental, dated April 12, 2021, mistakenly attributed the well location to the Coyote Valley Groundwater Basin. However, after review of the well log, the groundwater basin water-bearing formations, and the groundwater basins mapped by the California Department of Water Resources (DWR), it was later corrected in the July 2, 2021, letter by Chico Environmental and confirmed herein – the well is located in a groundwater basin situated between the Collayomi Valley Groundwater Basin (Basin #5-19), to the west, and the Coyote Valley Groundwater Basin (Basin #5-018) to the east. (Figure 2)

The Collayomi Valley Groundwater Basin includes both Collayomi Valley and Long Valley in the headwater area of the Putah Creek watershed. A mixture of Serpentinized ultramafic rocks and Franciscan Formation borders the basin to the north, east, and south. Nearly all groundwater throughout the Collayomi Basin

occurs in Quaternary alluvium deposited as alluvial fans of shallow grade and in the gravel channels of Putah Creek, St. Helena Creek, and their tributaries. The maximum depth of the alluvial fill is approximately 350 feet. The fill consists of deposits of clay and silt, with localized areas of channelized gravel. Near Putah Creek, shallow deposits of fine sand and cobbles are present. There is no evidence of any well-defined aquifer of any great areal extent within the basin. The major source of recharge to the basin is from percolation of streamflow from the segments of Putah Creek, Dry Creek, and St. Helena Creek that are within the basin. Some recharge is derived from infiltration of rainfall and irrigation return flows. The direction of groundwater flow is to the north where it discharges into Putah Creek. Spring groundwater levels in the basin range between 3 and 15 feet bgs. These levels have remained generally constant over the last 40 years. Spring to summer drawdown ranges between 5 and 20 feet. Groundwater levels appear to completely recover each wet season and there does not appear to be any increasing or increasing trend in groundwater levels. The estimated storage capacity is 29,000 AF, with a usable storage capacity of 7,000 AF. According to the Lake County Groundwater Management Plan (CDM, 2006), surface water and groundwater agricultural demand, in the Collayomi Basin, during an average year is 412 AF per year; 266 AF of which is supplied from groundwater. The majority of the wells in the valley range in depths between 25 feet and 325 feet, with a few wells at depths down to 525 feet. Irrigation well yields range between 2 and 1,000 gpm. (CDM 2006 and California DWR 2003, 2021)

The Coyote Valley Groundwater Basin includes the Coyote Valley, a northwest-southeast trending valley along Putah Creek. The valley is approximately 5 miles long and up to 2.5 miles in width. Serpentinized ultramafic rocks border the basin to the south and west. The aquifer system is comprised mostly of Holocene alluvium made up of floodplain and channel deposits of Putah creek and alluvial fan deposits in the southwest portion of the valley. The alluvial fill is primarily comprised of poorly stratified sand and gravel with limited fine-grained material, and ranges in thickness from between 100 and 300 feet (CDM, 2006). Groundwater within the upper 100-feet of the formation is largely unconfined and wells drilled in this layer produce an average of 1,000 gpm. Groundwater recharge is mainly from Putah Creek with lesser amounts from precipitation on the alluvial plain and side-stream runoff. The general direction of groundwater flow is towards the southeast. Groundwater levels are shallow in the spring, decrease over the summer, and recover during the winter. Water levels range between 10 and 15 feet bgs, on average, in the spring and these levels have been generally stable throughout the valley. Spring to summer drawdown in the western areas of the basin range between 20 and 25 feet. The estimated storage capacity is 29,000 AF, with a usable storage capacity of 7,000 AF. According to the Lake County Groundwater Management Plan, dated 2006, surface water and groundwater agricultural demand, in this basin, during an average year is 4,073 AF per year; of this, 671 AF is supplied from groundwater. The majority of the wells in the valley range in depth between 15 feet and 485 feet. (CDM 2006 and California DWR 2003, 2021)

Neither of these basins have been identified by the California Department of Water Resources (DWR) as critically overdrafted basins. 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 into one of four categories high-, medium-, low-, or very low-priority. Both the Collayomi Valley and Coyote Valley Groundwater Basins were ranked as very low-

priority basins by the CASGEM ranking system. (DWR, 2021)

As discussed above, the groundwater well is a groundwater basin situated between the Collayomi and Coyote Valley Groundwater Basins. Groundwater throughout the Collayomi and Coyote Valley Groundwater Basins primarily occurs in alluvium formations comprised of clay, silt, sand, and gravel deposits. The water-bearing formation in the Collayomi Groundwater Basin is comprised of clay and silt, with localized areas of channelized gravel. The water-bearing formations in the Coyote Valley Groundwater Basin are the Holocene Alluvium, the primary water bearing unit consisting of course sand and gravel, and the Plio-Pleistocene Volcanics and Cache Formation consisting of gravel, silt, sand and water-laid tuffs. The major source of recharge to these two basins is from percolation of streamflow from Putah Creek and its tributaries. Some recharge is derived from infiltration of rainfall and irrigation return flows.

The project well is drilled through (in order of increasing depth), clay, shale, sandstone, and hard grey rock - indicating that it is in its own water-bearing unit. Although the project's well yield and depth are consistent with wells in both the Collayomi and Coyote Valley Groundwater Basins, the well is clearly located outside of the alluvial areas and in distinct geologic formations units of Jurassic shale and sandstone (Figure 3). From the well pump test conducted in October 2021 to validate the well productivity (Attachment 1), it appears the dominant water-bearing formation of the well is within the deeper sandstone.

Water well driller's reports maintained by the California DWR and published on the DWR Well Completion Report Map Application were reviewed to identify additional wells located in the same water-bearing formation as the project's well. The scope of the California DWR research encompassed the available records for wells located within Sections 29 and 30 of Township 11 North (T11N), Range 6 West (R06W) and Sections 2, 25, 26,27 34, 35 of T11N, Range 7 West (R07W), Mount Diablo Basin and Meridian within 1 to 2 miles of the property boundary. This resulted in 102 reports, of which, only four (4) corresponded to locations potentially within the same geologic formation as the project's well (Figure 4), the remainder reports were for wells within the described water-bearing formations of the Collayomi and Coyote Valley Groundwater Basins. Two of the four reports were for abandoned wells located on the Bar X Ranch. Of the remaining two reports, one well was drilled into varying layers of shale/sandstone, screened at an elevation similar to the project's well, and was reported to have a yield of 200 gpm (Attachment 1 – WCR2003-010038).

There is a domestic groundwater well located on APN 014-250-05 (Figure 1). The well has been used to supply domestic water to the housing area on the ranch for several years. Details regarding the well yield and dimensions are unknown. On October 2, 2020, Chico Environmental submitted a Well Completion Report Form to California DWR, but no records were found by DWR regarding this well. This domestic well will not be used for irrigation of cannabis.

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 assumed to be the area associated with the geologic units of the formation in which it is situated. 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 documented literature values, assuming the water-bearing formation is comprised of sandstone. The results are summarized below.

- Aquifer Area: 980 acres
- Static Groundwater Level: 34 feet bgs (October 2021 pump test)
- Aquifer Depth: 215 feet bgs (source well log)
- Aquifer Thickness: 181 feet
- Specific Yield (Sandstone): 5% - 30% (Heath, 1983, Freeze and Cherry, 1979 and Morris and Johnson, 1967)
- Estimated Theoretical Storage Capacity: 8,869 AF – 53,214 AF

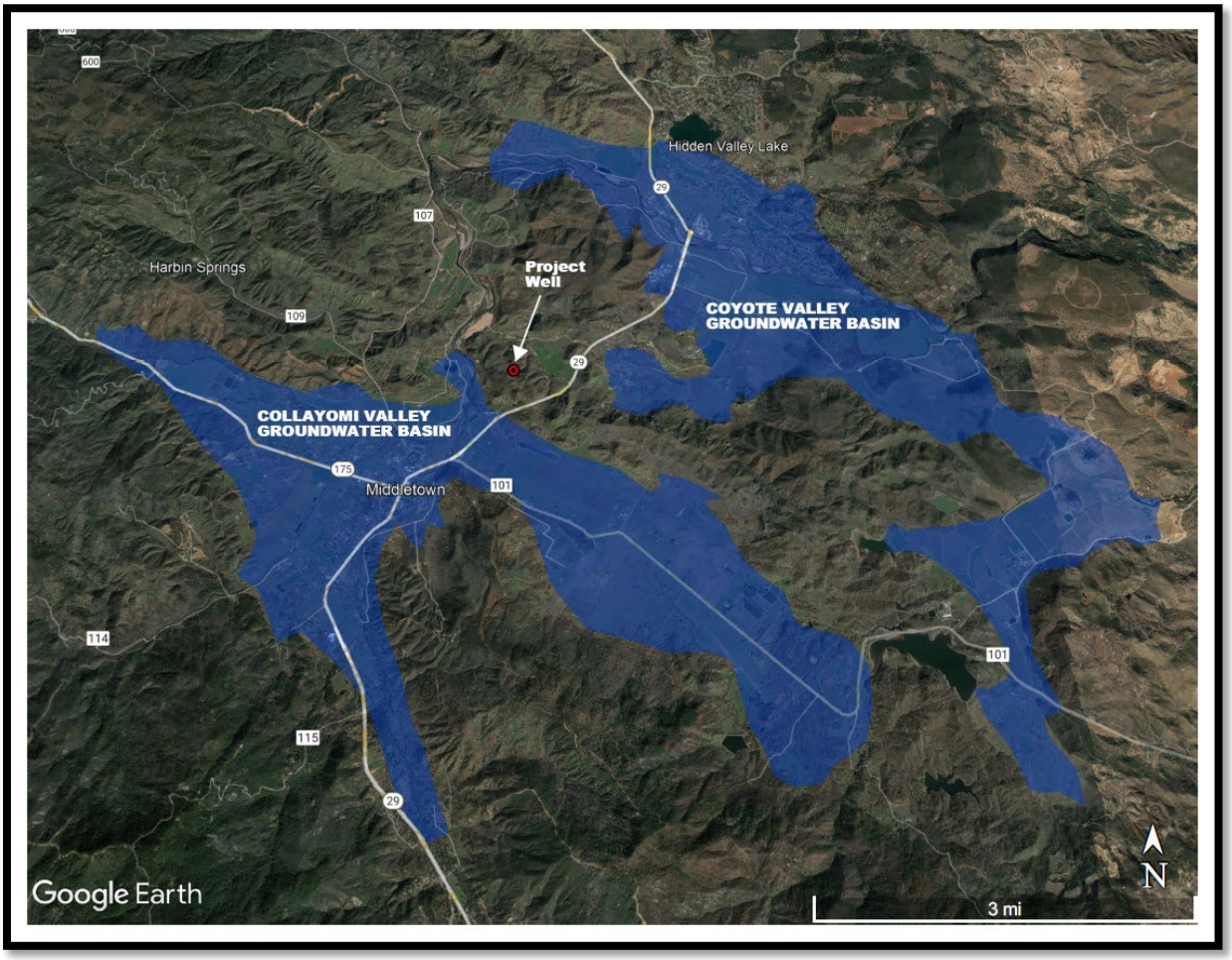


Figure 2. Project Well Location and Mapped Groundwater Basins

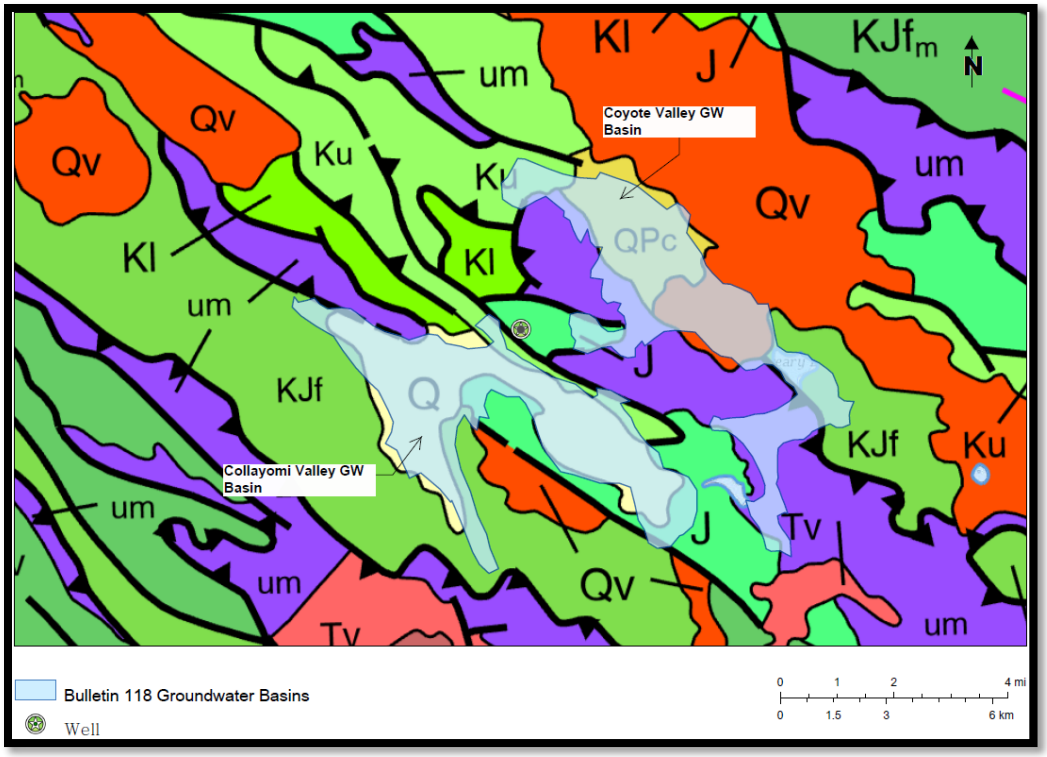


Figure 3. Geologic Map of California (J=Jurassic Shale and sandstone)

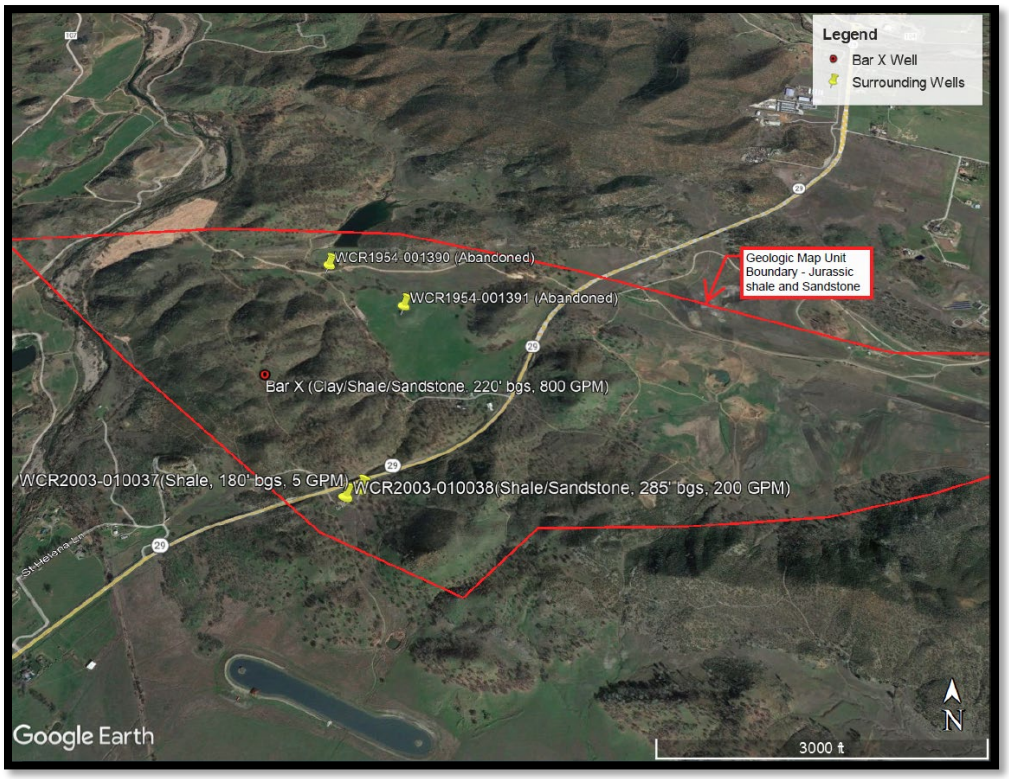


Figure 4. Surrounding Wells in the Same Geologic Unit

GROUNDWATER SOURCE RECHARGE RATE

Annual groundwater 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). The CN is an empirical parameter used to predict runoff or infiltration from excess rainfall. 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
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 well. The recharge in the surrounding groundwater basins is derived mainly from Putah Creek and its tributaries. The well and project are both located within the Crazy Creek Watershed, a tributary to Putah Creek. Thus, the recharge area is assumed to be the area of the Crazy Creek watershed within the Bar X Ranch. This is likely a conservative estimate because Putah Creek and additional areas of the Crazy Creek Watershed could both contribute to the recharge area. The approximate area of recharge, 758 acres, was delineated using USGS StreamStats (https://streamstats.usgs.gov/ss/) and is shown in Figure 5.

Soils are classified into four HSGs (A, B, C, and D) according to the soils 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 (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

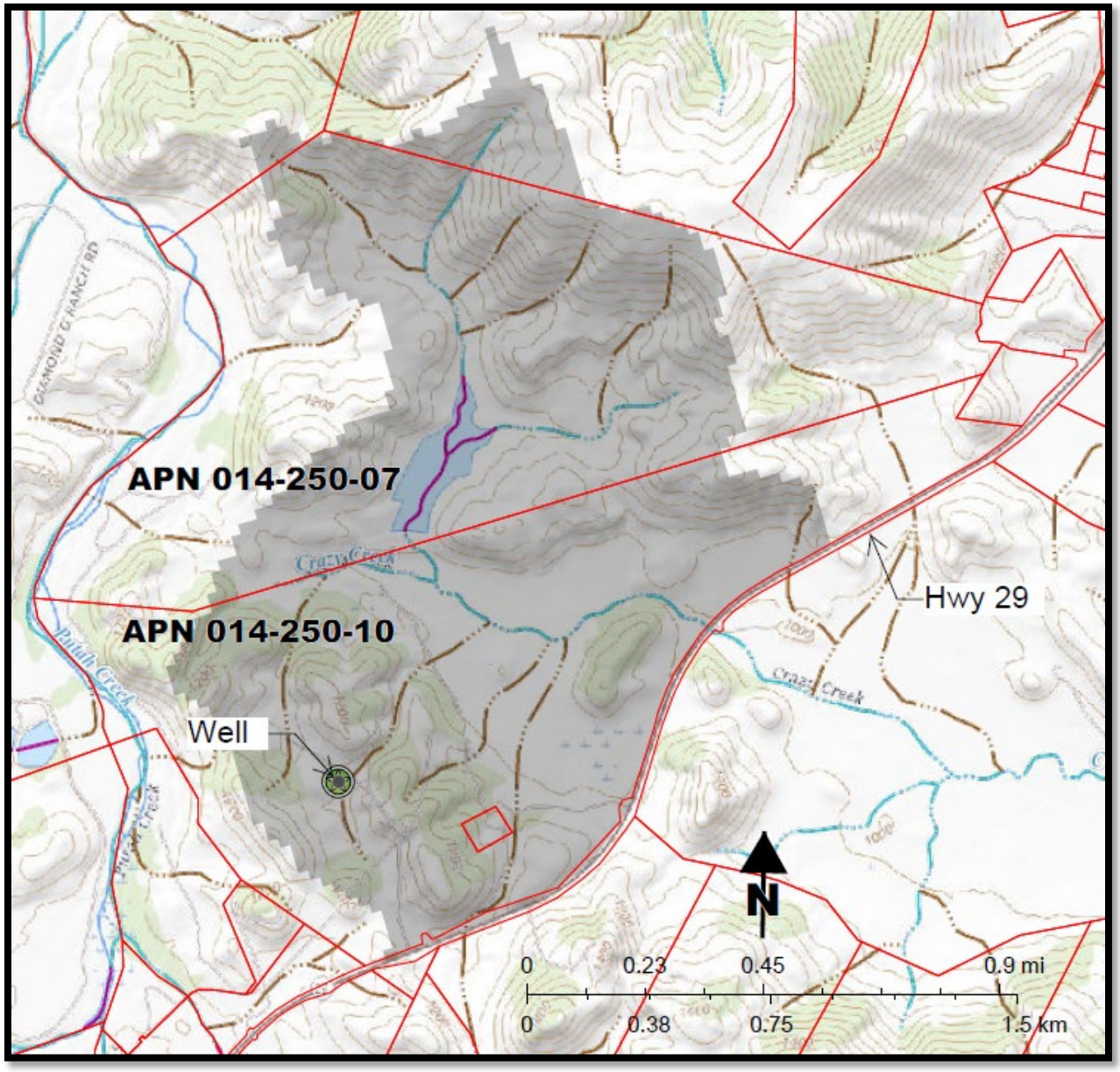


Figure 5. Recharge Area (Shaded Area = upper Crazy Creek Watershed)

The recharge area is comprised of two HSGs: 109 acres (14%) HSG C and 649 acres (86%) HSG D (Attachment 3). The area is dominated by HSG D. The land use is a combination of pasture/rangeland in fair condition (50% to 75% ground cover and not heavily grazed) and undeveloped with a cover type of brush in fair condition (50% to 75% ground cover). The CNs and areas are summarized in Table 3. The weighted CN for the recharge area is 78.

Table 3. Land Use and Curve Numbers

Land Use	HSG	CN	Area (acres)	Weighted CN
Pasture/Range (fair)	C	79	73	78
	D	84	120	
Brush (fair)	C	70	36	
	D	77	529	

The PRISM Climate Group gathers climate observations from a wide range of monitoring networks and provides time series values of precipitation for individual locations (https://prism.oregonstate.edu/explorer/). Using the annual precipitation from 1895 to 2020, as predicted by PRISM, the annual average precipitation over this period is 39.9 inches and the minimum precipitation over this period is 8.2 inches (Attachment 4).

Using the above information, and assuming that 50% of the initial abstraction infiltrates and the remainder is evapotranspiration (0.28 inches or 17.7 AF), the estimated annual recharge over the recharge area of 758 acres is 184 AF during an average year and 148 AF during a dry year (Table 4).

Table 4. Estimated annual recharge over the recharge area of the project's well.

Recharge Area (acres)	P (inches)	CN	S (inches)	I_a (inches)	Q (inches)	Recharge = $P - Q - 0.5*I_a$ (inches)	Recharge (AF)
758	8.2	78	2.82	0.56	5.6	2.3	148
758	39.9	78	2.82	0.56	36.7	2.9	184

CUMULATIVE IMPACT TO SURROUNDING AREAS

The maximum annual water demand of the proposed project would occur during Phase 1 and could be up to 102.9 AF per year; depending on the length of the cultivation season. The demand during Phase 1 is approximately 56% and 70% of the annual recharge during an average and dry year, respectively. Due to a reduction in canopy area, the demand would reduce to 94.5 AF per year during Phase 2, or approximately 51% and 64% of the annual recharge during an average and dry year, respectively. Overall, the project would need 1.6 inches of rainfall to infiltrate into the recharge area to meet the project's demand. The recharge area used to estimate annual recharge is less than the Bar X Ranch total area, which is approximately 1,600 acres, and does not include potential recharge from Putah Creek, which has a contributing area of 62 square miles upstream of the Bar X Ranch. Thus, the recharge estimate provided herein is likely low. Even so, there is sufficient recharge on an annual basis to meet the project's demand, even during dry years.

The project's water source is located within a water-bearing formation that is not included in California's Groundwater Bulletin 118. Additionally, the groundwater source is in an area with numerous mapped local faults and contacts between geologic units which can serve as conduits for water and may explain the well's high productivity. A conservative estimate of the storage capacity of the water-bearing formation is approximately 8,869 AF. The annual project demand is only 3% of the estimated storage capacity.

Although there are several wells located in the adjacent Collayomi and Coyote Groundwater Basins, there is only one well that may be within the same water-bearing formation as the project's well, located approximately 0.4 miles southeast (Figure 4). This well was drilled in October 2003 and was shown to have a yield of 200 gpm, however, the well diameter of 4.5-inches is much smaller than the project's well diameter of 14-inches. Thus, the nearby well's productivity would be limited by the smaller well diameter. The source well has an estimated yield of 800 gpm, which was confirmed by a well pump test conducted in October 2021 during a period drought. Using the existing well pump to pump at 625 gpm, the well can supply the daily irrigation needs in under 5-hours.

In addition to the proosed project, there are two projects proposed that may have the potential to result in a cumulative impact to the surrounding area. These two proposed projects are the Diamond J Ranch cannabis cultivation project and the Guenoc Valley development project (Figure 5 and Figure 6). Diamond J Ranch is located approximately 2.5 miles northeast of Bar X Ranch and is within the Coyote Valley Groundwater Basin (Figure 5). Therefore, the two properties are not hydrogeologically connected, and the proposed project will not have a hydrogeologic effect on the Diamond J Ranch (Chico Environmental, 2021b).

The Guenoc Valley project is located over 3 miles to the southeast of Bar X Ranch (Figure 6). According to the Environmental Impact Report for the Guenoc Valley project (AES, 2020), 1,340 acres (approximately 8% of the project site) are located within the Coyote Valley Basin and 100 acres (approximately 1%) is located within the Collayomi Valley Groundwater Basin. The majority of the project (over 90%) is located outside of these basins, east of the Coyote Valley Groundwater Basin, which separates Bar X Ranch from Guenoc Valley. Therefore, the Bar X Ranch is not hydrogeologically connected to the Guenoc Valley project and the proposed project will not have a hydrogeologic effect on the Guenoc Valley project.

Therefore, proposed cannabis cultivation project, in combination with the Diamond J project and Guenoc Valley project, would not have a cumulative impact on groundwater.

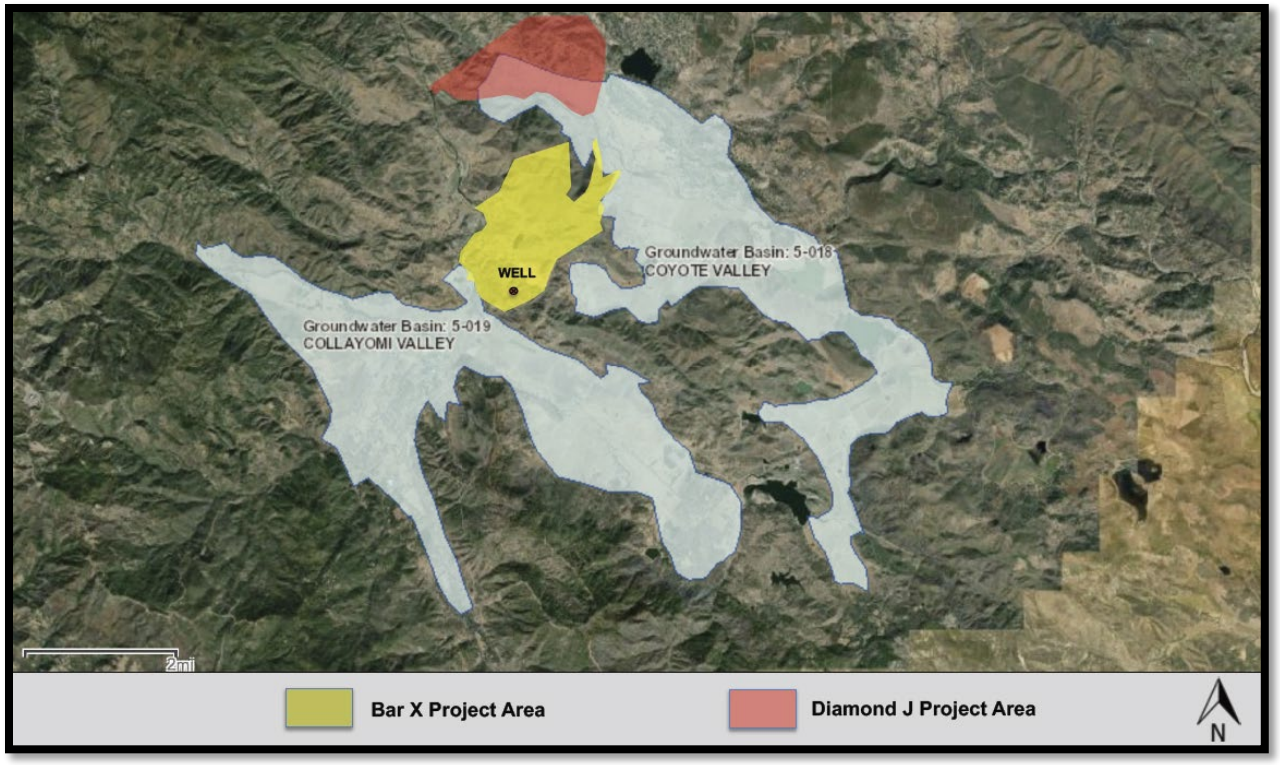


Figure 6. Bar X Project Area and Diamond J Project Area (Source: Chico Environmental (2021b), Attachment 2)

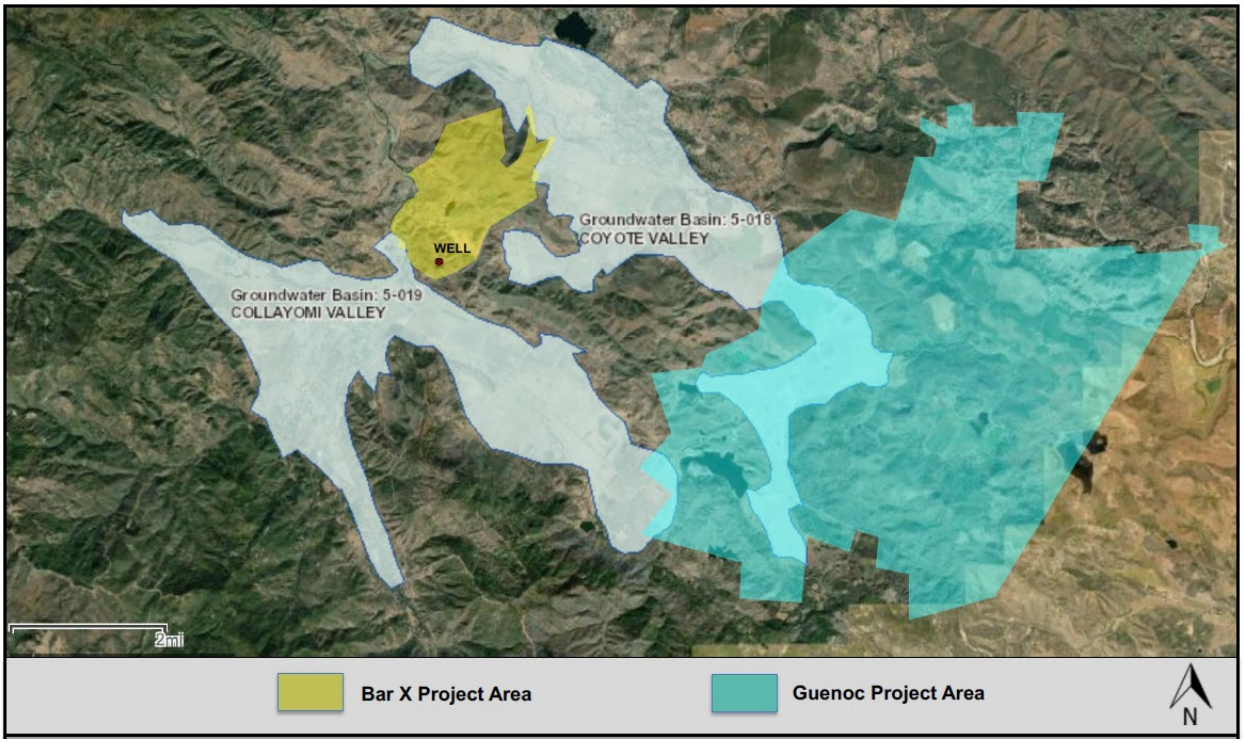


Figure 7. Bar X Project Area and Guenoc Project Area (Source: Chico Environmental (2021b), Attachment 2)

Since the project's water source is in a water-bearing formation with little background information and the recharge rate is an estimate determined using an approximation of the recharge area and the *in-situ* characteristics of the water source; it is recommended that the project applicant monitor water levels in the well. The purpose of the monitoring is to evaluate the functionality of the well to meet the long-term water demand of the proposed project and validate the annual recharge of the water-bearing formation. Water level monitoring is required by the Lake County Zoning Ordinance. Ordinance Article 27 Section 27.11(at) 3.v.e. requires the well to have a water level monitor. Recommendations for well water level monitoring are provided below.

Seasonal Static Water Level Monitoring: The purpose of seasonal monitoring of the water level in the well is to provide information regarding long-term groundwater elevation trends. It is recommended that the water level in the well 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 well during extraction is to evaluate the performance of the well to determine the effect of the pumping rate on the water source during each cultivation season. This information 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 the well water level. 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.

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 shall be prepared and submitted to the County, for review and approval, demonstrating how the project will mitigate the impacts in the future, including, for example, additional water sources and possibly a reduction in cultivation, if a reduction in water availability has occurred.

Since the project is not hydrogeologically connected to the Diamond J project or the Gueonoc Valley project, the project's demand is only 8.0% of the annual well production, the annual project demand is

only 0.2% to 3% of the aquifer storage capacity, and there is sufficient recharge to meet the project's demand during average and dry years, with required monitoring and reporting and the requirement of a revised Water Management Plan for review and approval, the proposed project water use would not have a cumulative impact on the surrounding area.

QUALIFICATIONS OF AUTHOR

I have a PhD in Water Resources Engineering. In addition, I am a registered Professional Engineer with the State of California with 30-years of experience practicing and teaching Water Resources Engineering, including over 15 years of teaching, practicing, and modeling surface and groundwater hydrology.

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. This report has been prepared solely for the client and any reliance on this report by third parties shall be at such party's sole risk.

ATTACHMENTS

1. Project's Well Completion Report (WCR), Project's Well Pump Test, WCR2003-010038
2. Chico Environmental Memorandum
3. NRCS Soil Survey Results
4. PRISM Climate Precipitation 1895 to 2020

REFERENCES

Analytical Environmental Services (AES). (2020). Draft Environmental Impact Report Guenoc Valley Mixed Use Planned Development Project. February 2020.

Bauer S, Olson J, Cockrill A, van Hattem M, Miller L, Tauzer M, et al. (2015). Impacts of Surface Water Diversions for Marijuana Cultivation on Aquatic Habitat in Four Northwestern California Watersheds. PLoS ONE 10(9): e0137935. https://doi.org/10.1371/journal.pone.0137935

CDFA (2017) CalCannabis Cultivation Licensing Program Draft Program Environmental Impact Report. State Clearinghouse #2016082077. Prepared by Horizon Water and Environment, LLC, Oakland, California. 484 pp.

California DWR (2003). California's Groundwater Bulletin 118 Update 2003. October 2003. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/Statewide-Reports/Bulletin_118_Update_2003.pdf

California DWR (2003). California's Groundwater Bulletin 18, Update 2003. October 2003.

California DWR (2021). California's Groundwater. https://water.ca.gov/programs/groundwater-management/bulletin-118

CDM (2006). Lake County Water Inventory Analysis. Prepared for the Lake county Watershed Protection District. March 2006. http://www.lakecountyca.gov/Assets/Departments/WaterResources/Groundwater+Management/Lake+County+Water+Inventory+and+Analysis+w+Appendices.pdf

CDM (2006). Lake County Groundwater Management Plan. Prepared for the Lake county Watershed Protection District. March 2006. http://www.lakecountyca.gov/Assets/Departments/WaterResources/IRWMP/Lake+County+Groundwater+Managment+Plan.pdf

Chico Environmental. (2021a). Groundwater Availability Analysis for Bar X Farms. April 12, 2021.

Chico Environmental. (2021b). Bar X Farms Cumulative Groundwater Impacts. July 2, 2021.

Freeze, R.A. and Cherry, J.A. (1979) Groundwater. Prentice-Hall, Inc., Englewood Cliffs.

Gupta, R.S. (2008). Hydrology and Hydraulic Systems, 3rd Edition. Waveland Press, Long Grove IL.

Heath, R.C. (1983). Basic ground-water hydrology, U.S. Geological Survey Water-Supply Paper 2220, 86p.

Morris, D.A. and A.I. Johnson. (1967). Summary of hydrologic and physical properties of rock and soil materials as analyzed by the Hydrologic Laboratory of the U.S. Geological Survey, U.S. Geological Survey Water-Supply Paper 1839-D, 42p.

Natural Resources Conservation Service, NRCS. (1986) Urban Hydrology for Small Watersheds. USDFA NRCS Technical Release 55. June 1986. https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf

ATTACHMENT 1

PROJECT'S WELL COMPLETION REPORT

PROJECT'S WELL PUMP TEST

WCR2003-010038

BAR X FARMS, LLC

COUNTY OF LAKE
HEALTH SERVICES DEPARTMENT
Division of Environmental Health
922 Bevins Court, Lakeport, CA 95453-9739
Telephone 707/ 263-1164 FAX: 263-1681

Denise Pomeroy
Health Services Director

Erin Gustafson
Public Health Officer

Jasjit Kang
Environmental Health Director

SEAL WITHOUT WITNESS

Permit Number: WE 550146

Site Address: 20333 S. State Hy 29 Middletown CA 95461

Assessor's Parcel No: 014 - 250 - 141

Owner Name: Jed Morris

Date: 1-15-21

REASON FOR SEAL WITHOUT WITNESS:

☐ **Emergency Seal – Explain:** _____

☒ **Inspector unable to witness**

☐ **Other:** _____

IMPERMEABLE LAYER in which annular space terminates:

2' **at a depth of** 22' **feet.**

SEALANT USED: Bentonite Clay with Concrete cap.
METHOD OF PLACEMENT: Poor down Hole Mix Concrete cap.

I hereby certify that I have installed the annular seal in accordance with the provisions of the Lake County Well Ordinance and unless otherwise specified in the Lake County Well Ordinance, with the California Department of Water Resources Bulletin 74-81 or as modified by subsequent revisions or supplements.

DRILLING CONTRACTOR SIGNATURE: _____

COMPANY: Will Peterson Well Drilling **LICENSE NO:** 1009053

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

File Original with DWR

Page 1 of 1

Owner's Well Number 2

Date Work Began 1-4-21 Date Work Ended 1-15-21

Local Permit Agency LAKE County Environmental Health

Permit Number WE-5501 Permit Date 11-19-20

State of California

Well Completion Report

Refer to Instruction Pamphlet

No. XXXXXXX

DWR Use Only – Do Not Fill In

State Well Number/Site Number

Latitude N Longitude W

APN/TRS/Other

Geologic Log

Orientation ● Vertical ○ Horizontal ○ Angle Specify

Drilling Method Mud Rotary Drilling Fluid Bentonite

Depth from Surface Feet	to Feet	Description: Describe material, grain size, color, etc
0	18	Brown clay
18	50	Black Shale
50	80	Sandstone
80	220	Hard Grey Rock

Total Depth of Boring 220 Feet

Total Depth of Completed Well 215 Feet

Well Owner

Name Jed Morris

Mailing Address P.O. Box 82

City Middletown State CA Zip 95461

Well Location

Address 20333 S. State Hy 29

City Middletown County LAKE

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

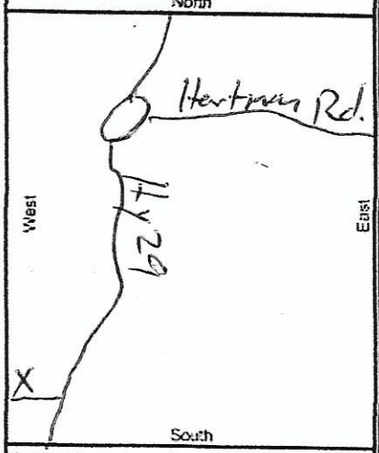
Datum ___ Dec. Lat. ___ Dec. Long. ___

APN Book 014 Page 250 Parcel 141

Township ___ Range ___ Section ___

Location Sketch

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



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

Activity

● New Well

○ Modification/Repair

○ Deepen

○ Other ___

○ Destroy

Describe procedures and materials under "DESTRUCTION"

Planned Uses

● Water Supply

☐ Domestic ☐ Public

☑ Irrigation ☐ Industrial

○ Cathodic Protection

○ Dewatering

○ Heat Exchange

○ Injection

○ Monitoring

○ Remediation

○ Sparging

○ Test Well

○ Vapor Extraction

○ Other ___

Water Level and Yield of Completed Well

Depth to first water 60 (Feet below surface)

Depth to Static Water Level 30 (Feet) Date Measured 1-14-21

Estimated Yield* 300+ (GPM) Test Type Air-lift

Test Length 21HRS (Hours) Total Drawdown ___ (Feet)

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	40	17½"		PVC	½"	14"	Blank	
40	60	17½"		PVC	½"	14"	Perf.	1035
60	180	17½"		PVC	½"	14"	Blank	
180	220	17½"		PVC	½"	14"	Perf.	035

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	1	Concrete	SEAL
1	22	Bentonite	
22	220	#16 Pea	Gravel pack

Attachments

☐ Geologic Log

☐ Well Construction Diagram

☐ Geophysical Log(s)

☐ Soil/Water Chemical Analyses

☐ Other ___

Attach additional information, if exists.

Certification Statement

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

Name Will Peterson Well Drilling (Person, Firm or Corporation)

P.O. Box 654 Kelseyville CA 95451

Address City State Zip

Signed [signature] 1-17-21

C-57 Licensed Water Well Contractor Date Signed

1009053 C-57 License Number

DWR 188 REV 1/2005

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

POLLACK & SONS PUMP

707.987.0917
19280 Deer Hill
Hidden Valley Lake
CA., 95467

"Your one stop water shop 24 hours"
Iron and Chlorine Removal
Softeners • Filters • Pumps • Tanks

(BAR X)

Name HIDDEN VALLEY OWNERS (TOM) Phone 315-1764

Address 20333 Hwy 29 City MIDDLETOWN

10-19-21

State CA Zip 95461 Date 10-20-21

WATER ANALYSIS

Hardness (lime) gpg. . . . . Iron (rust) ppm

Manganese ppm. . . . . PH (acid)

Gal Per Min. . . . 625 GPM . . . (WITH EXISTING PUMP)

Well Depth. . . . 220 . . . . . Casing Size 14" PVC

Static Level. . . 34' . . . . . .

Before Pumping. . 34' . . . . . .

After Pumping 2 HRS. . . . . 4 HRS. 140' . . . . . 24 HRS. 34' . . .

Water Supply Garden ☒ Private Well ☐

EXISTING EQUIPMENT

75 HP TURBN

COMMENTS/RECOMMENDATIONS

WILL PRODUCE MORE GPM WITH LARGER PUMP

ORIGINAL
File with DWR

APR 27 2004

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 824920

DWR USE ONLY — DO NOT FILL IN
11N/07W-35M
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Page ___ of ___
Owner's Well No. ___
Date Work Began 10-3-03 Ended 10-7-03
Local Permit Agency Health Dept.
Permit No. 2257 Permit Date 9-29-03

WCR2003-010038
https://cadwr.app.box.com/v/WellCompletionReports/file/461871465580

GEOLOGIC LOG

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

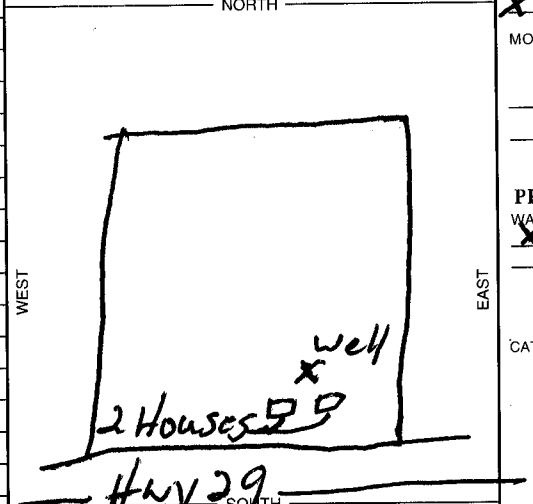
DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	285	Franciscan varying layers of shale, sandstone shale w/ lots of quartz

TOTAL DEPTH OF BORING 285 (Feet)
TOTAL DEPTH OF COMPLETED WELL 285 (Feet)

WELL LOCATION

Address 20104 Hwy 29
City Middletown
County Lake
APN Book 014 Page 280 Parcel 10
Township 11N Range 7W Section 35
Latitude ___ DEG. ___ MIN. ___ SEC. NORTH
Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH



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

ACTIVITY (✓)

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

PLANNED USES (✓)

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

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 60 (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED 10-7-03
ESTIMATED YIELD 200 (GPM) & TEST TYPE air lift
TEST LENGTH 2 (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
** May not be representative of a well's long-term yield.*

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	20	9"	X				PVC	4½	160	
20	165	7"	X				"	"	"	
165	185	7"		X			"	"	200	.032
185	245	7"	X				"	"	160	
245	285	7"		X			"	"	200	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20	X			
20	285			5/16 Pea	

JUN 18 2004

ATTACHMENTS (✓)

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

CERTIFICATION STATEMENT

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

NAME Larry Herman Drilling (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 13011 Hwy 29 CITY Lower Lake STATE Ca ZIP 95457
Signed Larry Herman (WELL DRILLER/AUTHORIZED REPRESENTATIVE) DATE SIGNED 10-7-03 C-57 LICENSE NUMBER 465071

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ATTACHMENT 2

CHICO ENVIRONMENTAL MEMORANDUM

July 2, 2021

Lake County Community Development Department
Attn: Eric Porter, Associate Planner
255 N Forbes Street
Lakeport, 95453

RE: Bar X Farms Cumulative Groundwater Impacts

Dear Mr. Porter:

Chico Environmental has prepared a Report of Findings – Groundwater Availability Analysis for the Bar X Farms, Middletown, Lake County, CA. The report dated April 12, 2021, states:

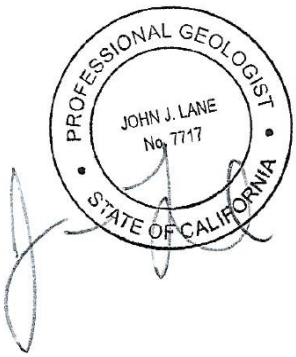
Groundwater pumped for irrigation on the Bar X Farms will not be used for export out of the County.

The expected annual water use for the full buildout would be 3,000 gallons per day per acre (64 acres) within the 120-day growing season for a total 23,040,000 gallons or 70.7 acre-feet. The well yield is 800 gallons per minute and will be monitored by a flow through meter.

It is Chico Environmental's opinion that the newly completed well is of sufficient yield to irrigate the 64 acres of cannabis at Bar X Farms. The newly installed well at the Bar X farm is not in the Coyote Valley Groundwater Basin (see attached Figure 1). Additionally, groundwater pumping at Bar X Farms will not have a hydrogeologic effect on the Diamond J Ranch as the two properties are not hydrologically connected (Figure 2). Therefore, there are no cumulative effects from groundwater pumping at the Bar X Farm.

If you have any questions, please do not hesitate to contact us regarding this document.

Sincerely,



CHICO ENVIRONMENTAL
John Lane
Principal Geologist

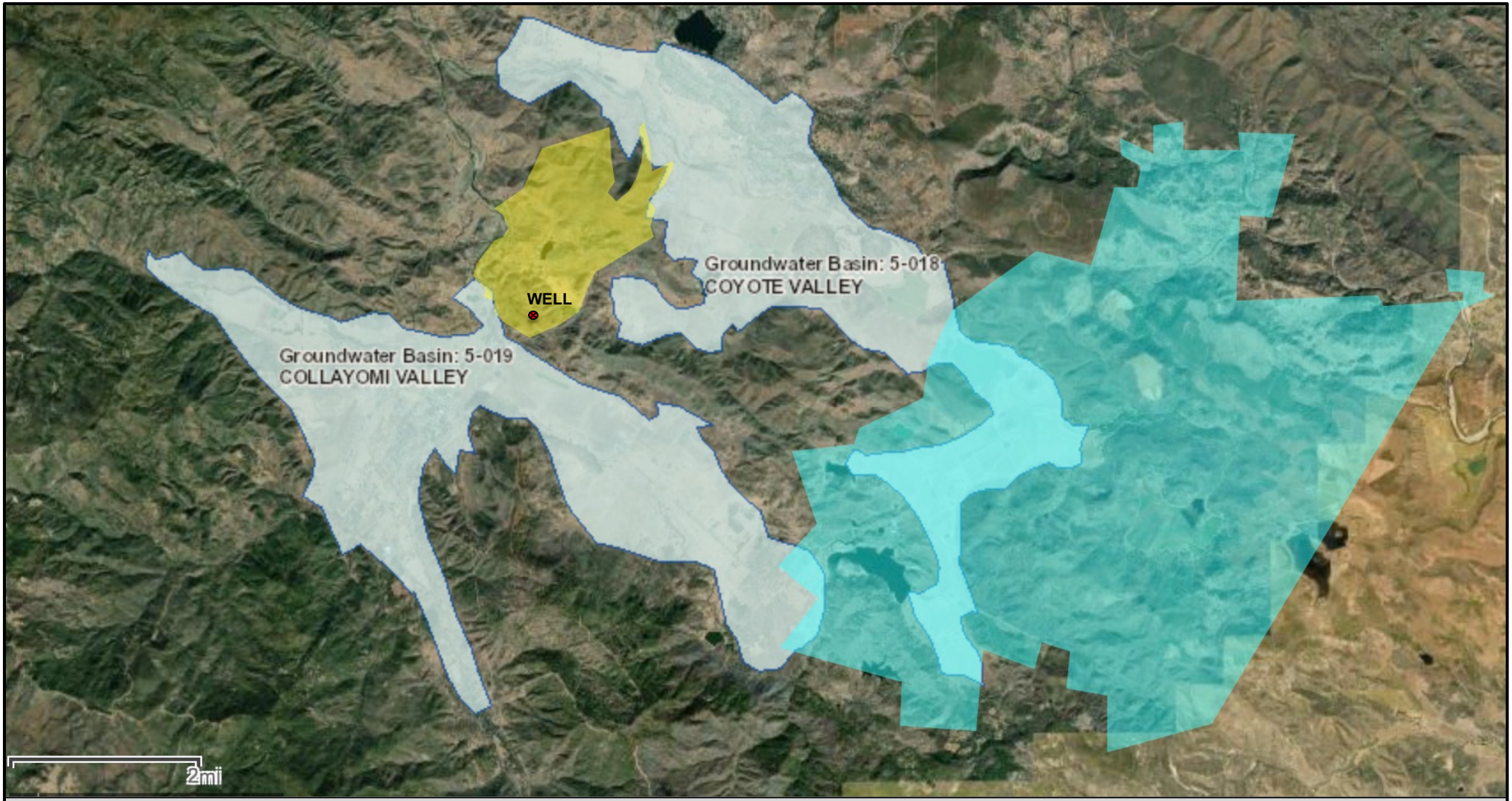


FIGURE 1: GROUNDWATER BASIN MAP- BAR X and GUENOC
LAKE COUNTY, CA

CHICO environmental

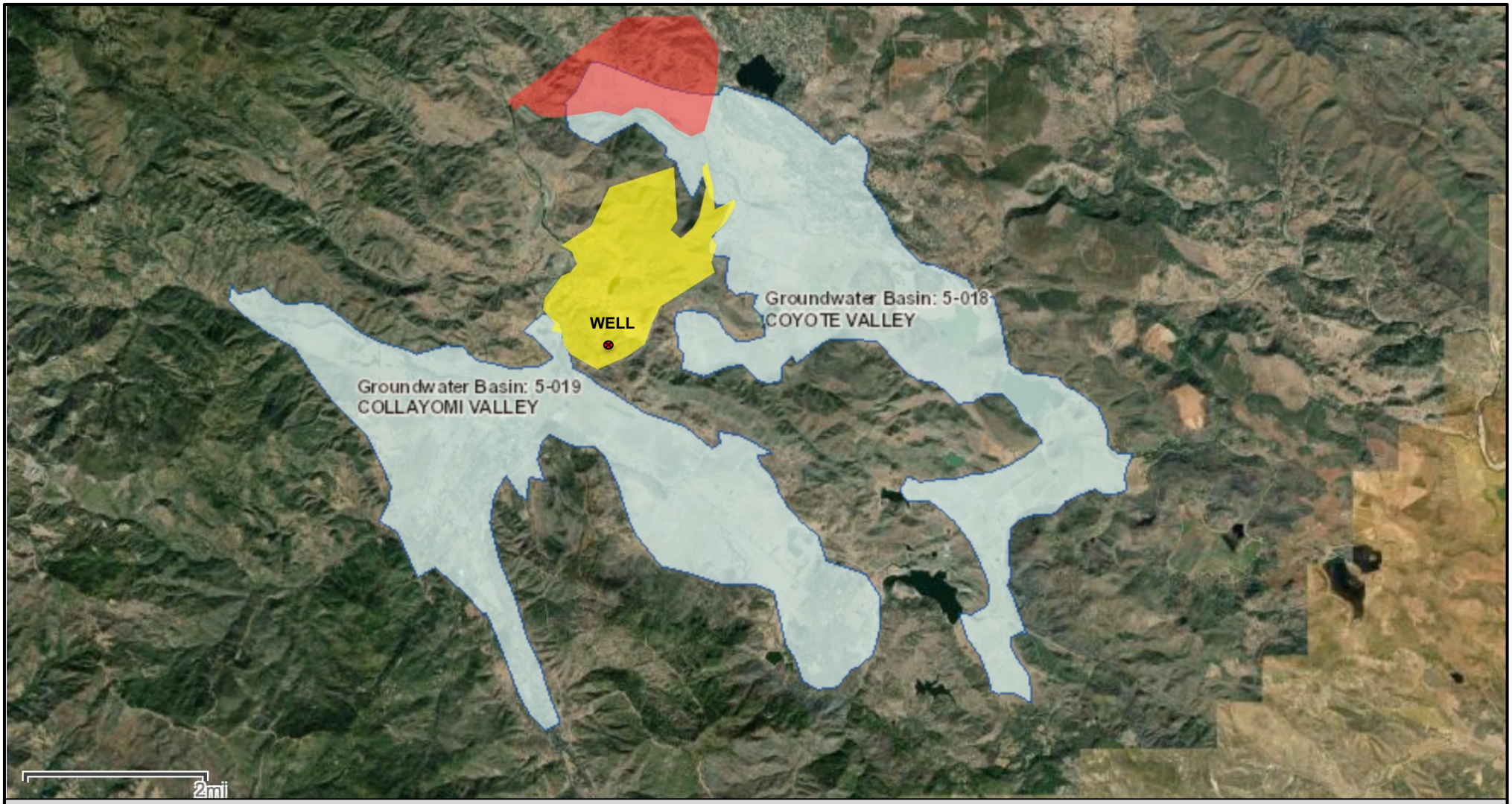


FIGURE 2: GROUNDWATER BASIN MAP- BAR X AND DIAMOND J
LAKE COUNTY, CA

CHICO environmental

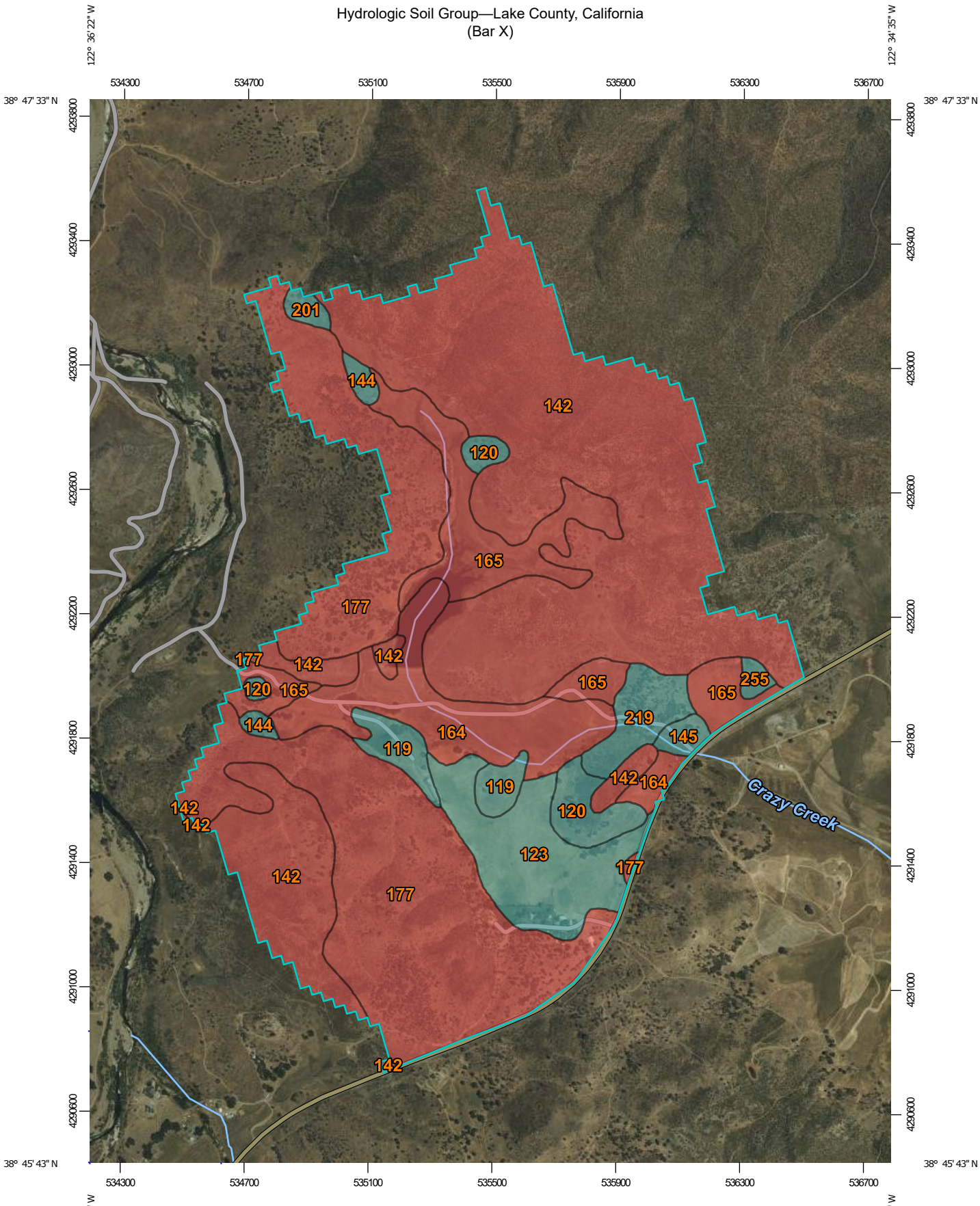
ATTACHMENT 3

NRCS SOIL SURVEY RESULTS

HYDROLOGIC SOIL GROUPS

BAR X FARMS, LLC

Hydrologic Soil Group—Lake County, California
(Bar X)



Map Scale: 1:16,700 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

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 17, Jun 1, 2020

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

Date(s) aerial images were photographed: Jul 2, 2019—Jul 5, 2019

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
119	Bressa-Millsholm loams, 8 to 15 percent slopes	C	14.8	2.0%
120	Bressa-Millsholm loams, 15 to 30 percent slopes	C	16.7	2.2%
123	Cole clay loam, drained	C	47.9	6.3%
142	Henneke-Montara-Rock outcrop complex, 10 to 50 percent slopes, MLRA 15	D	314.4	41.5%
144	Jafa loam, 2 to 5 percent slopes	C	4.7	0.6%
145	Jafa loam, 5 to 15 percent slopes	C	4.0	0.5%
164	Maxwell clay loam, 0 to 2 percent slopes	D	59.0	7.8%
165	Maxwell clay loam, 2 to 8 percent slopes	D	61.2	8.1%
177	Millsholm-Bressa loams, 30 to 50 percent slopes	D	214.4	28.3%
201	Sanhedrin-Kekawaka-Speaker complex, 15 to 30 percent slopes	C	3.1	0.4%
219	Sobrante-Guenoc-Hambright complex, 15 to 30 percent slopes	C	15.6	2.1%
255	Yorkville variant clay loam, 2 to 8 percent slopes	C	2.5	0.3%
Totals for Area of Interest			**758.3**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 4

PRISM PRECIPITATION 1895-2020

BAR X FARMS, LLC

PRISM Time Series Data
Location: Lat: 38.7755 Lon: -122.5911 Elev: 1191ft
Climate variable: ppt
Spatial resolution: 4km
Period: 1895 - 2020
Dataset: AN81m
PRISM day definition: 24 hours ending at 1200 UTC on the day shown
Grid Cell Interpolation: On
Time series generated: 2021-Aug-27
Details: http://www.prism.oregonstate.edu/documents/PRISM_datasets.pdf

Date	ppt (inches)
1895	49.43
1896	54.81
1897	32.15
1898	21.98
1899	50.43
1900	33.37
1901	35.84
1902	54.04
1903	36.84
1904	65.25
1905	31.88
1906	55.3
1907	50.3
1908	25.84
1909	65.4
1910	24.13
1911	42.17
1912	30.36
1913	39.16
1914	45.87
1915	56.19
1916	42.12
1917	21.95
1918	29.69
1919	33.82
1920	41.97
1921	34.27
1922	38.58
1923	19.3
1924	28.73
1925	36.52
1926	47.74
1927	42.45
1928	30.12
1929	23.68
1930	22.6

	ppt (inches)
Average	39.9
Minimum	8.2

1931	35.53
1932	18.27
1933	32.28
1934	26.53
1935	34.36
1936	34.81
1937	47.36
1938	42.39
1939	19.52
1940	72.37
1941	65.77
1942	49.8
1943	31.83
1944	41.04
1945	44.93
1946	21.6
1947	25.18
1948	35.85
1949	26.39
1950	51.22
1951	43.72
1952	51.64
1953	33.97
1954	45.33
1955	42.93
1956	38.71
1957	46.42
1958	50.67
1959	30.7
1960	45.66
1961	29.78
1962	44.64
1963	46.4
1964	43.42
1965	38.78
1966	37.33
1967	46.11
1968	44.72
1969	58.69
1970	61.64
1971	28.07
1972	29.93
1973	61.35
1974	37.06
1975	38.09
1976	13.28
1977	30.34

1978	43.96
1979	50.55
1980	40.06
1981	50.44
1982	58.87
1983	85.64
1984	29.59
1985	26.82
1986	50.58
1987	37.27
1988	26.25
1989	26.2
1990	22.34
1991	32.67
1992	41.47
1993	46.74
1994	27.9
1995	72.83
1996	61.18
1997	37.15
1998	58.41
1999	33.21
2000	37.43
2001	44.81
2002	38.79
2003	40.49
2004	38.68
2005	52.08
2006	43.63
2007	22.39
2008	30.36
2009	29.19
2010	53.95
2011	32.99
2012	48.88
2013	8.18
2014	39.36
2015	19.51
2016	48.4
2017	57.43
2018	31.52
2019	58.91
2020	15.05