NORTHPOINT
CONSULTING GROUP, INC.

TECHNICAL MEMORANDUM

To: Lake County Community Development Department

From: Annjanette Dodd, PhD, CA PE #77756 Exp. 6/30/2025
Wyeth Wunderlich, MS Geology

Date: Revised May 19, 2023 (supersedes any Technical Memorandum prepared prior to this date)

Subject: Ordinance 3106 Hydrology Report and Drought Management Plan – UP 21-17, Seigler Springs North Cultivation Project 11615 and 11625 Seigler Springs North Road, Kelseyville CA 95451 (Cultivation APNs: 115-007-03, 115-007-06)

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 21-17, Seigler Springs North Cultivation Project (project). Ordinance 3106 also requires a Drought Management Plan depicting how the applicant proposes to reduce water use during a declared drought emergency, this plan is included as part of this TM.

PROJECT LOCATION

The project is located at 11615 and 11625 Seigler Springs North Road, Kelseyville CA 95451 (Cultivation APNs: 115-007-03 and 115-007-06). The site is accessed by private driveway off Seigler Springs North Road, approximately 11 miles southeast of Kelseyville, CA (Figure 1).

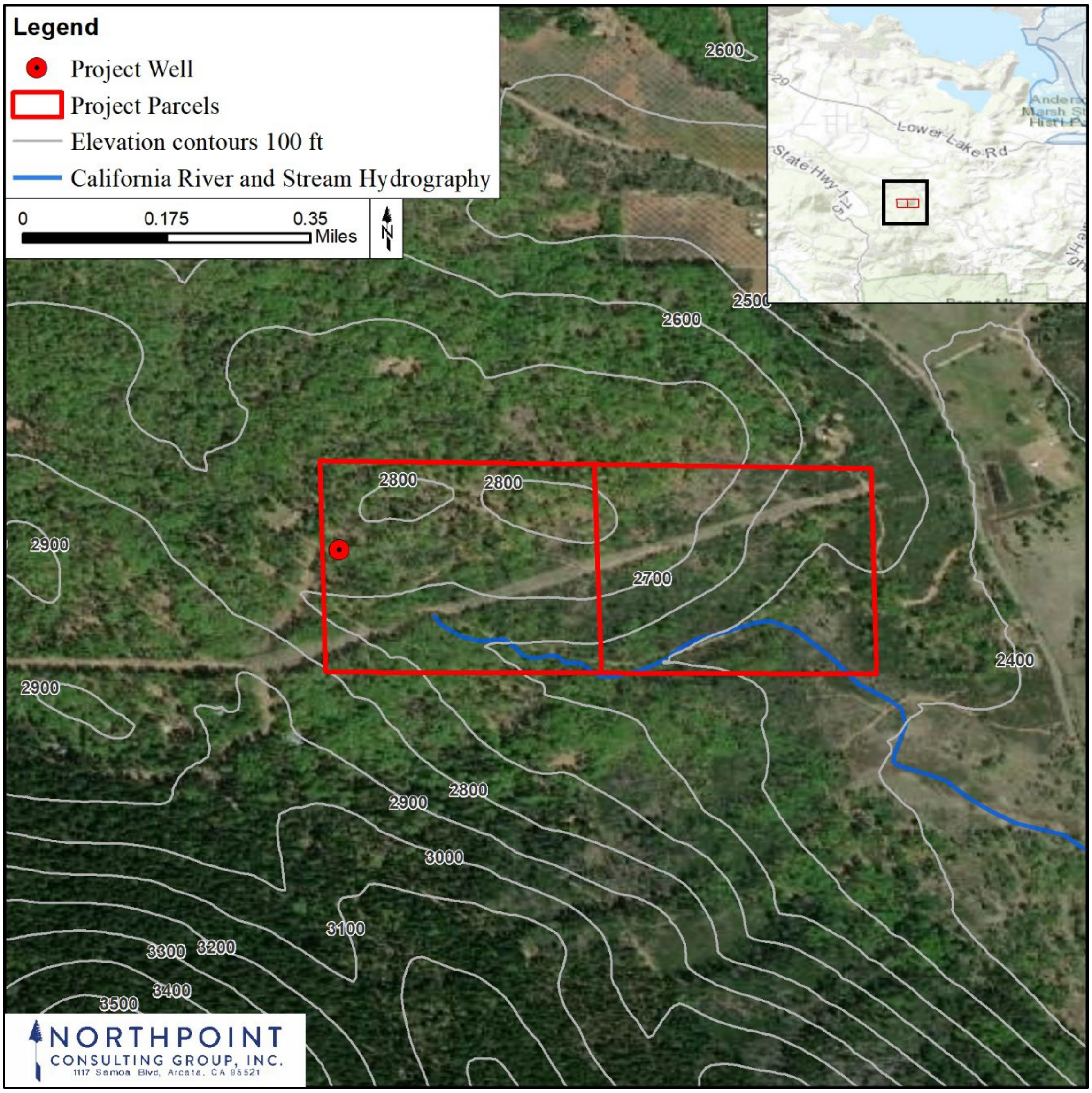

Figure 1: Property Location

Proposed Project

The proposed project is to permit commercial cannabis cultivation in accordance with the Lake County Zoning Ordinance (Article 27). The project property is 84.6 acres and is comprised of two APNs: 115-007-03 (42.5 acres) and 115-007-06 (42.1 acres). The proposal is for 4.0-acres of outdoor canopy area. The proposal is to cultivate in outdoor full sun or in temporary hoop houses using light deprivation with a cultivation period of approximately 150 to 180 days. The proposal also includes the development of onsite storage facilities appurtenant to cultivation, as well as appropriate irrigation infrastructure. (Figure 2)

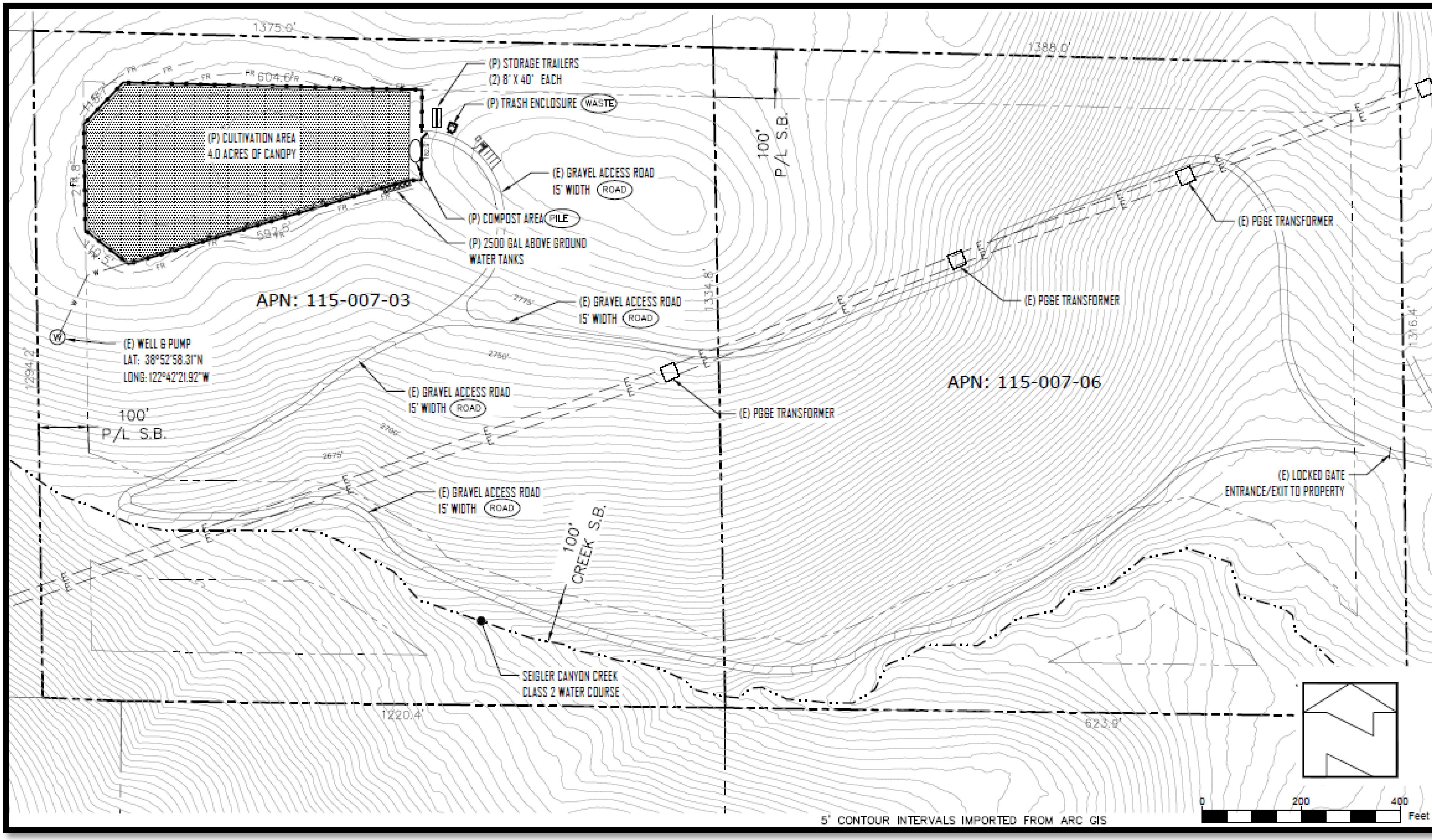

Figure 2: Proposed Project Site Map

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. 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 (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 Estimated Water Use Section (Section 16.0) of the project's Property Management Plan. The total estimated irrigation water demand per development phase, is as follows:

- Demand for 4.0 acres of Outdoor Canopy
    - Average Daily: 12,000 gpd.
    - Annually (cultivation 180-days/year): 2,160,000 gallons, or 6.6-acre-feet per year (AFY).

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.). The monthly estimated irrigation water demand, accounting for seasonal variation, is summarized in Table 1. All landscaping aside from proposed cannabis cultivation would be drought-tolerant landscaping, which would require little- to no-water use. Accounting for higher demand during the peak part of the season, the peak daily demand is about 15,840 gallons during summer months.

Table 1: Monthly estimated water usage (units are 1,000 gallons).

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Irrigation	0	0	0	86	194	313	400	454	475	238	0	0	**2,160**

WATER SOURCE AND SUPPLY

There is an existing well on APN 115-007-03 (Lat/Long: 38.88359, -122.70566, Attachment 1), drilled on January 20, 2021 by Will Peterson Well Drilling, that will be used to meet project water demand. The well was drilled to a depth of 440 ft below ground surface (BGS) into various layers of Clear Lake Volcanics. At the time of drilling, the depth to static groundwater was 360 ft BGS, and the well yield was estimated at 40 gpm via a 2-hour air-lift well yield test.

IRRIGATION METHOD AND WATER STORAGE

Irrigation water for proposed cannabis cultivation will be supplied by the existing groundwater well. Irrigation water will be pumped from the well via PVC plumbing to five (5) 2,500-gallon water storage tanks with a total storage capacity of 12,500 gallons. The storage provided represents approximately 0.8 to 1-days of the water demand, depending on the cultivation month. Water from the storage tanks will be plumbed to drip irrigation systems in individual gardens. 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.

The rate of pumping from the well will be limited by the type of pump installed on the well. Water will be pumped from the well to the water storage tanks with a solar powered pump. Solar deep well pumps powered by small solar power systems can pump a maximum rate of about 8 gpm. At this rate, it would take just over a day to fill up the 12,500 gallons of water storage.

GROUNDWATER BASIN INFORMATION AND HYDROGEOLOGY

The project is located on Seigler Mountain, situated between the towns of Kelseyville, Lower Lake, and Middletown in Lake County, CA (Figure 1). The project is located within the headwaters of the Seigler Springs Creek watershed. Seigler Springs Creek flows about 7.4 miles east and northeast and eventually into Cache Creek, which is a tributary to Clear Lake.

Seigler Mountain has an elevation of approximately 3,680 ft, is located within the Mayacamas Mountains of the Northern California Coast Range and corresponds to regional volcanism in the Clear Lake area. Water-bearing units at the project property correspond with Quaternary Volcanic aquifers. The Project parcel area was mapped by Hearn et al. (1995) as geologic unit '*asf*', described as "*flows of ilmenite-bearing andesite…with a maximum thickness of 250 m*" (Figure 3), suggesting a relatively deep depositional layer of andesitic volcanics. Underlying the *asf* unit is the mapped *rbp* unit, described as '*Pyroclastic deposits – White pumiceous tuff, lapilli tuff, and locally, coarse, pyroclastic breccia…Many deposits of airfall, locally onto quiet water and, in places, reqorked by water…*', suggesting geologic heterogeneity, variable degrees of tuffaceous welding, and pockets that likely serve as distinct or interconnected groundwater aquifers (Figure 3 and Figure 4).

Clear Lake Volcanics can consist of basalt, andesite, rhyolite, and other volcanic rocks in complex sequence. Groundwater aquifers associated with Clear Lake Volcanics occur primarily in fractures, joints, and within interlayer weathering zones between eruption events (CDM, 2006). Groundwater production rates in Clear Lake Volcanic aquifers vary according to factors such as the density, size, and interconnectedness of fractures and joints in the locale of a well. In Tuffaceous volcanic deposits, aquifer productivity can vary with the degree of welding that occurred at the time of deposition (Christensen, 2003). According to the Lake County California Statewide Groundwater Elevation Monitoring System (CASGEM), dated March 2012, 64,701 acres (7.6%) of Lake County land area is comprised of Clear Lake Volcanic geology. From these areas, an estimated 8.1% of Lake County groundwater demand is supplied from volcanic aquifers. Basement rock underlying Clear Lake Volcanic units is generally comprised of marine sedimentary or metasedimentary origin (e.g., Franciscan Formation). In the project area, basement rock unit is mapped as '*Jsp'* – interpreted as Jurassic-aged (or older) Serpentinized mafic and ultramafic rocks, some of which have locally intruded along major fault zones (Figure 4).

A review of Well Completion Report (WCR) Geologic Logs and Well test metrics from the Statewide Well Completion Report Map Application ([Well Completion Report Map Application (arcgis.com)]) revealed four Public Land Survey System (PLSS) sections with substantial overlap with the mapped *asf* geologic unit: PLSS Sections M12N08W13, -14, and -23, and -24. Most wells, including multiple high yielding wells with yields in excess of 100 gpm, were drilled in the vicinity and into volcanic aquifers similar to that of the project well. According to the Well Completion Report Section statistics, there are a total of 47 wells in the four PLSS Sections; however, these Sections -23 and – 24 extend beyond the mapped *asf* geologic unit. According to Section statistics for wells drilled in the four sections that overlap with the mapped *asf* geologic unit, the average and maximum well depths are 314 ft BGS and 760 ft BGS, respectively (Attachment 4).

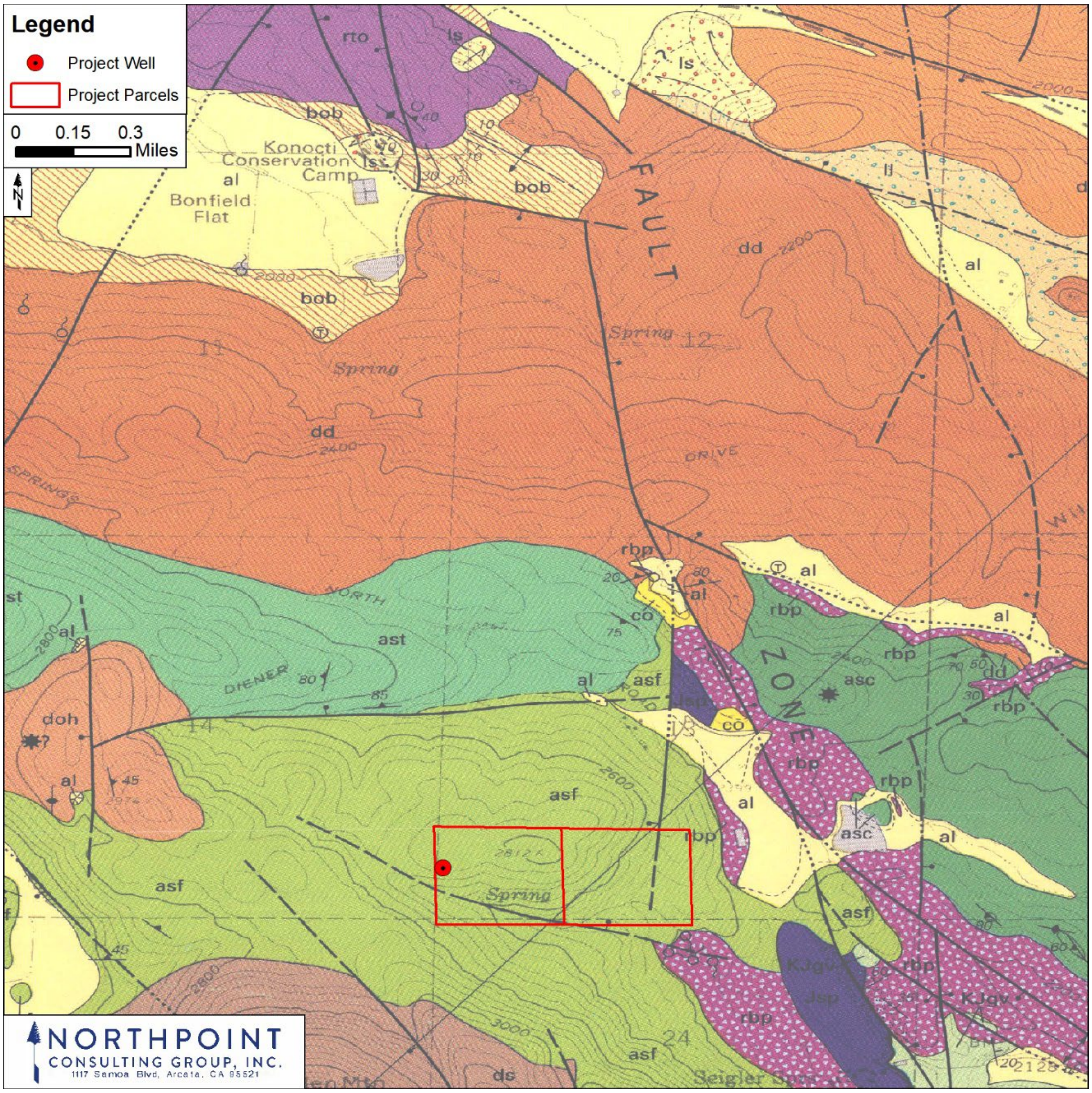

Figure 3: USGS 7.5-Minute Geologic Map of the Lower Lake area (Hearn et al., 1995) with the project parcels and well locations. The geologic units on which the parcels are mapped as 'asf' interpreted as 'flows of ilmenite-bearing andesite…with a maximum thickness of 250 m'.

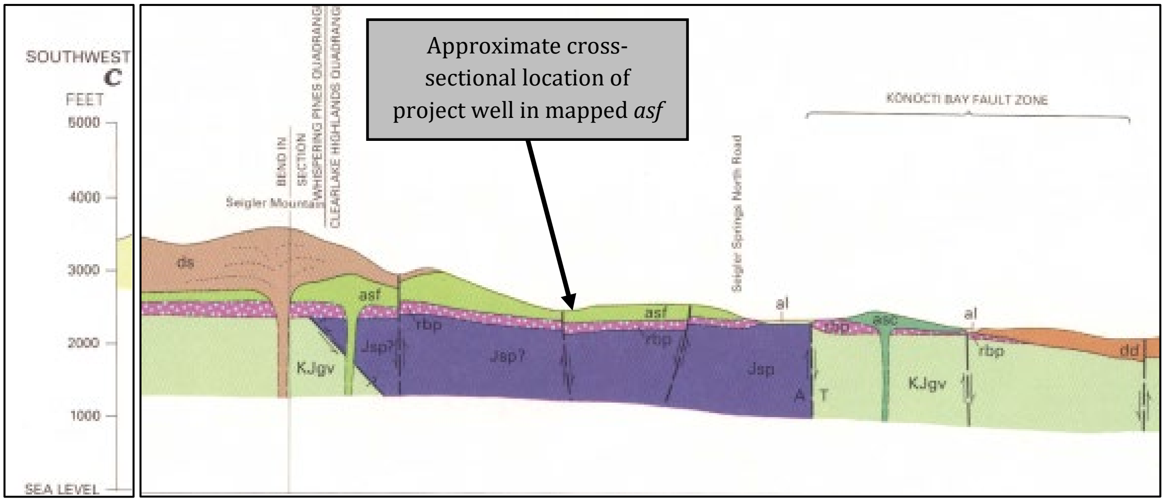

Figure 4: Approximate cross-sectional location of Project Well along Hearn et al. (1995) Cross Section C-C'

According to Hearn et al. (1995), the mapped extent of the water-bearing *asf* unit is approximately 670 acres. The aquifer storage capacity of the *asf* and underlying *rbp* volcanic geologic units can be estimated by multiplying the volume of the aquifer by the specific yield of the volcanic aquifer. The aquifer thickness is estimated as the difference between the average depth of wells from reviewed WCRs (within the *asf* unit) and the average depth to static groundwater table (Attachment 4). A specific yield value of 7% for volcanic aquifers was used, based on similar calculations for the estimation of groundwater storage in nearby volcanic aquifers (CDWR, 2003; EBA, 2016). The estimated storage capacity of the *asf* geologic unit is approximately 5,250 AF and was determined as follows:

<u>Volcanic Aquifer of Geologic Unit 'asf'</u>

- Aquifer Area (Hearn et al, 1995): 670 acres
- Average Depth of Wells: 314 ft BGS
- Average Depth to Static Water Level: 202 ft BGS
- Average Aquifer Thickness: 112 ft
- Specific Yield: 7%
- Estimated Groundwater Storage: 5,250 AF

The project is not located within a delineated California Bulletin 118 groundwater basin. The nearest mapped groundwater basins are Lower Lake Basin (#5-30) and the Big Valley Basin (#5-15), located approximately 3.7 miles northeast and 5.4 miles northwest, respectively. The groundwater storage in these two basins is largely derived from unconsolidated Quaternary alluvium - water-bearing units distinct from the depositional volcanic and Quaternary Volcanic geologic units mapped in the region of the project property.

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 with 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 conditions. 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. In this analysis the recharge area over the project parcels (84.56 acres) and the recharge area draining to the project location determined using the delineation tool from USGS StreamStats (StreamStats (usgs.gov), 129.7 acres) were both assessed. To be conservative, the more conservative estimate of recharge over the parcel area was used. The entire 84.56 acres of project parcel land area is pervious as observed on aerial imagery (Figure 1, Figure 5).

Soils are classified into four HSGs ("A", "B", "C", and "D") according to the expected infiltration rate of each of the mapped soil units; where HSG "A" has the greatest infiltration rate and HSG "D" has the lowest infiltration rate. HSGs are based on soil type and are determined from the NRCS Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm).

The project parcel recharge area of 84.56 acres is comprised of HSG "C" - indicating a moderately high runoff potential (Figure 5, Attachment 2). The land use was classified as brush, or a shrubland, in fair condition. The CN for the recharge area is 70.

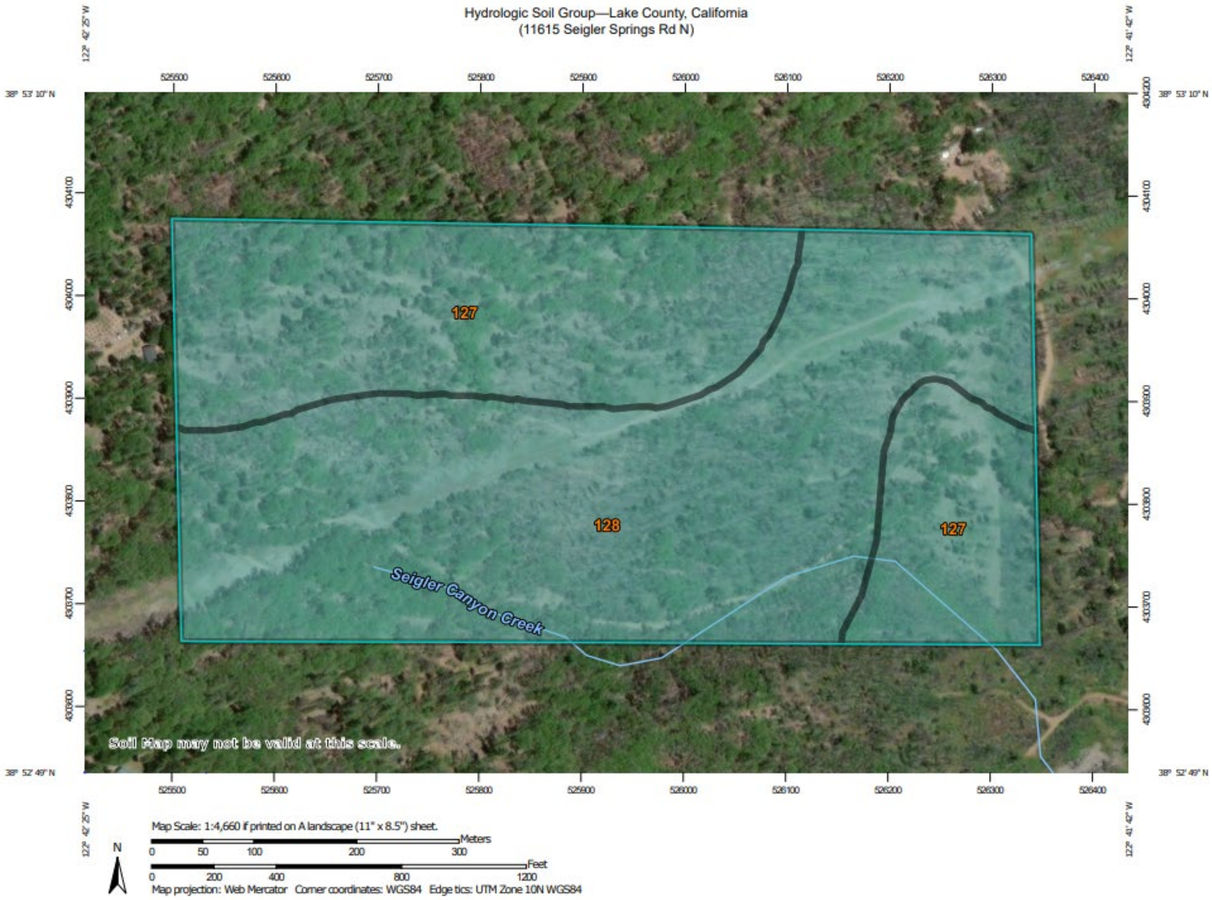

Figure 5: The 84.56-acre project parcel and recharge area (APNs: 115-007-03 and 115-007-06).

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 50.3-inches and the minimum precipitation over this period is 9.1-inches.

Using the above information, and assuming that 100% of the initial abstractions result in evapotranspiration, the estimated annual recharge over the recharge area of 84.56 acres is 30.1 AFY during an average year and 22.3 AFY during a dry year (Table 2).

Table 2. 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 = $P - Q - I_a$ (inches)	Recharge (AF)
84.56	9.1	70	4.3	0.86	5.4	3.2	22.3
84.56	50.3	70	4.3	0.86	45.5	4.4	30.1

CUMULATIVE IMPACT TO SURROUNDING AREAS

The annual water demand of the proposed project is estimated to be 6.6 AFY. The estimated an annual recharge over the project area is approximately 30.1 AFY and 22.3 AFY during average and dry years, respectively, indicating sufficient recharge to meet the project's water demand. Although determined for humid basins in the east, the USGS estimated long-term average recharge to be between 10 and 66 percent of precipitation (USGS Fact Sheet 2007-3007). Over the project parcel's 84.56-acre recharge area, this would equate to 6.4 – 42.1 AFY annual recharge during a dry year and 35.4 – 234.0 AFY annual recharge during an average year. The estimates in Table 2 fall within these ranges for a dry year and below the lower end for an average year. To be conservative, using a recharge value of 6.4 AFY to represent a drought year and 35.4 AFY to represent an average year, assuming a drought year occurs on average every 5-years, the 5-year average annual recharge would be 29.4 AFY over the 84.56-acre recharge area – which is sufficient to meet the project's demand.

According to the Lake County Water Inventory and Analysis (2006), the countywide annual groundwater demand from Clear Lake Volcanics is estimated at 3,860 AF. The proposed project represents less than 0.1% of this demand. The estimated groundwater storage in the *asf* andesitic geologic unit from which the project well sources groundwater, as mapped by Hearn et al. (1995), as 5,250 AF. These estimates are supported by numerous high-yielding wells drilled into similar Clear Lake Volcanics in PLSS Sections M12N08W-13, -14, and -23, and -24. The average well yield reported in well WCRs in the four sections is 53 gpm.

Assessment of potential impacts to nearby domestic water wells was conducted by review of adjacent parcel development or buildings that are likely to be served by a well, and location and review of available WCRs. The parameters noted from the WCRs associated with the nearest wells, as observed using the most recent Google Earth aerial imagery are summarized in Table 3. Although there is not a WCR associated with APN 115-007-05, it was assumed there is a well over 2,500 ft east of the project well.

Table 3: Nearby APNs with buildings likely served by domestic wells.

Assessor Parcel Number (APN)	Distance to Nearest Likely Well (ft)	PLSS Section/# Domestic Wells in PLSS Section	Date Drilled	PLSS Section Average Domestic Well Depth (ft)	Depth to Water Table (ft bgs)	WCR Geologic Log Water-Bearing Rock Unit	Estimated Well Discharge (gal/min)
Project Well, 115-007-03	0	M12N08W13/ 14	2/1/2022	253	360	Black Volcanic Rock	40
115-005-02	320 ft NW	M12N08W14/ 14	12/1/1987	297	350	Lava Rock	10
115-007-01	1,200 ft N	M12N08W13/ 14	5/11/2007	253	325	Broken Black Volcanic Rock	40
114-031-08	1,200 ft S	M12N08W24/ 18	8/29/1991	346	550	Very hard gray rock with green volcanic traces	120
115-007-05	2,530 ft E	M12N08W13/ 14	NA	253	NA	NA	NA

The well nearest to the project well is on APN 115-005-02, the located approximately 320 ft northwest of the project well. WCRs for numerous nearby wells drilled into similar volcanic rock units have been shown to be highly productive. Due to the distance from the nearest well, recharge estimates which substantially exceed the water use for the proposed project, the high productivity of groundwater wells drilled in local volcanic rock units, and the maximum pumping rate of 8.0 gpm, the proposed project is unlikely to have a significant cumulative impact on surrounding wells.

OPERATIONAL WATER MONITORING, CONSERVATION MEASURES, DROUGHT MANAGEMENT

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 Management section of the project's Property Management Plan. The Water Use Management Plan should include 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 – a water budget will be created every year and water use efficiency from the previous year will be analyzed.

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 wells 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 during extraction is to evaluate the performance of the wells 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.

Drought Management Plan / Drought 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 as determined through seasonal and operational groundwater monitoring;
- Early crop harvest, if water becomes limited;
- Install additional storage and/or implement a rainwater catchment system; and/or
- If possible, develop an alternative, legal, water source that meets the requirements of Lake County Codes and Ordinances.

Conclusion

Since there is sufficient groundwater supply and annual recharge to meet the project's demand during average and dry years, there is sufficient groundwater storage in the Clear Lake Volcanics, the project is situated in an area of low population and well densities, and with the implementation of water monitoring, reporting, conservation measures, and drought management the proposed project water use would not have a cumulative impact on the surrounding area.

Qualifications of Authors

Dr. Dodd has a PhD in Water Resources Engineering. In addition, Dr. Dodd is 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.

Mr. Wunderlich has a MS in Environmental Systems – Geology, and a BS in Ecology and Evolutionary Biology – Plant Sciences. Mr. Wunderlich has more than 5 years of experience conducting data-driven empirical and modeling assessments of hydrogeologic systems.

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. Well Information
2. NRCS Soil Survey Results
3. PRISM Climate Precipitation 1895 to 2020
4. Well Completion Report Summary for PLSS Sections

REFERENCES

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Attachment 1:
Well Information

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

File Original with DWR

Page 1 of 1

Owner's Well Number 1

Date Work Began 1-20-21 Date Work Ended 2-1-22

Local Permit Agency LAKE County Environmental Health

Permit Number WE-5743 Permit Date 10-9-21

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 Air Rotary Drilling Fluid —

Depth from Surface Feet	to Feet	Description (Describe material, grain size, color, etc)
0	20	Red & Tan Clay
20	60	Volcanic Ash & Red Volcanic Rock
60	240	Volcanic Ash & Black Volcanic Rock
240	440	Black Volcanic Rock

Total Depth of Boring 440' Feet

Total Depth of Completed Well 440' Feet

Well Owner

Name Seigler Springs Holding LLC

Mailing Address 637 Lindaro St. STE 204

City San Rafael State CA Zip 94901

Well Location

Address 11615 Seigler Springs N. Rd

City Kelseyville County Lake

Latitude 115 007 03 N Longitude ___ W (Deg. Min. Sec.)

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

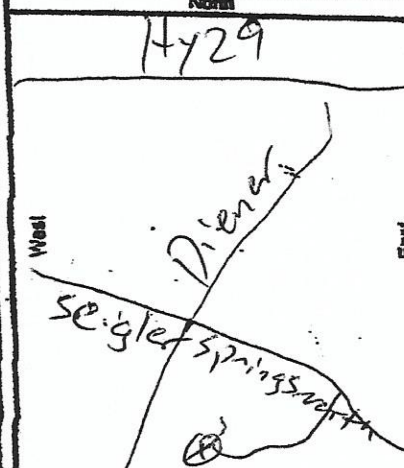
APN Book 115 Page 007 Parcel 03

Township ___ Range ___ Section ___

Location Sketch

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

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 and complete.

Activity

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

Planned Uses

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

Water Level and Yield of Completed Well

Depth to first water 380 (Feet below surface)

Depth to Static Water Level 360 (Feet) Date Measured 1-31-22

Estimated Yield* 40 (GPM) Test Type Air Lift

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

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

Casings

Depth from Surface Feet	to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)
0	380	9"	F480	PVC	1/4	4.5	Blank	
380	440	9"	F480	PVC	1/4	4.5	Perf	.032

Annular Material

Depth from Surface Feet	to Feet	Fill	Description
0	1	Seal	Concrete
1	20	Seal	Bentonite
20	440	Filter	Pea Gravel

Attachments

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

Attach additional information, if it exists.

Certification Statement

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

Name Will Peterson Well Drilling
Person, Firm or Corporation

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

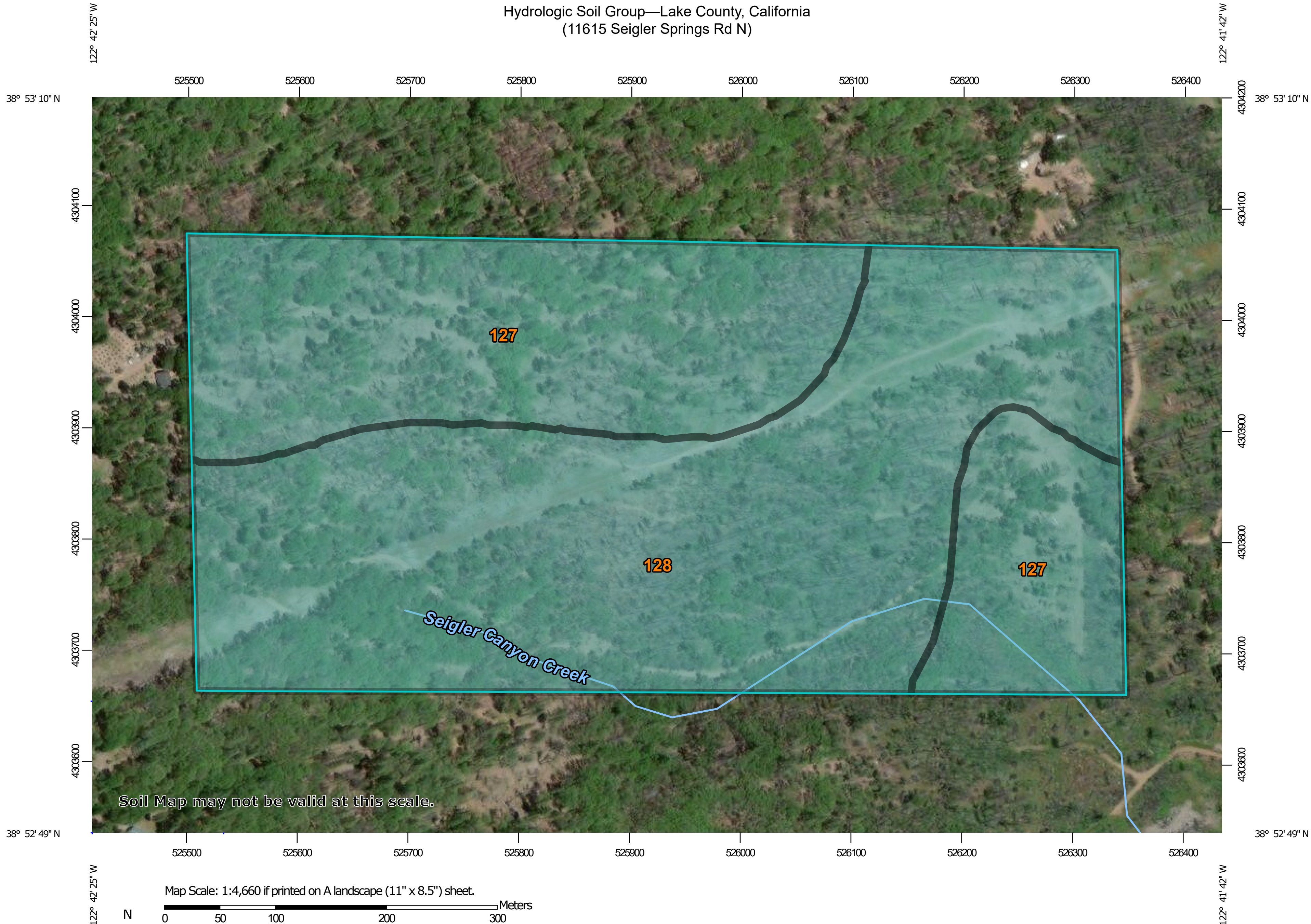
Signed [signature] 2-1-22 1009053
C-57 Licensed Water Well Contractor Date Signed C-57 License Number

DWR 188 REV 1/2006

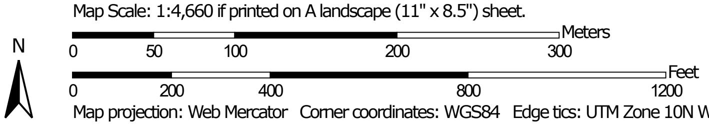
IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Attachment 2:
NRCS Soil Survey Results

Hydrologic Soil Group—Lake County, California
(11615 Seigler Springs Rd N)



Map Scale: 1:4,660 if printed on A landscape (11" x 8.5") sheet.



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.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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 18, Sep 6, 2021

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

Date(s) aerial images were photographed: Sep 18, 2016—Nov 4, 2017

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
127	Collayomi-Aiken-Whispering complex, 5 to 30 percent slopes	C	35.0	41.4%
128	Collayomi-Aiken-Whispering complex, 30 to 50 percent slopes	C	49.6	58.6%
Totals for Area of Interest			**84.6**	**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 3: PRISM Climate Precipitation 1895 to 2020

	A	B	C	D	E	F	G
1	PRISM Time Series Data						
2	Location: Lat: 38.8833 Lon: -122.7035 Elev: 2697ft						
3	Climate variable: ppt						
4	Spatial resolution: 4km						
5	Period: 1895 - 2020						
6	Dataset: AN81m						
7	PRISM day definition: 24 hours ending at 1200 UTC on the day shown						
8	Grid Cell Interpolation: On						
9	Time series generated: 2022-Feb-03						
10	Details: http://www.prism.oregonstate.edu/documents/PRISM_datasets.pdf						
11	Date	ppt (inches)					
12	1895	63.11		**Average**	**50.3**		
13	1896	70.99		**Min**	**9.05**		
14	1897	43.9					
15	1898	31.85					
16	1899	65.54					
17	1900	43.18					
18	1901	46.11					
19	1902	74.21					
20	1903	47.21					
21	1904	84.38					
22	1905	41.73					
23	1906	69.16					
24	1907	65.04					
25	1908	35.16					
26	1909	79.96					
27	1910	31.75					
28	1911	50.48					
29	1912	40.65					
30	1913	51.91					
31	1914	58.41					
32	1915	74.86					
33	1916	50.95					
34	1917	28.66					
35	1918	36.97					
36	1919	44.18					
37	1920	55.52					
38	1921	44.2					
39	1922	44.63					
40	1923	24.57					
41	1924	36.95					
42	1925	50.63					
43	1926	59.76					
44	1927	54.91					
45	1928	39.09					
46	1929	31.36					

	A	B	C	D	E	F	G
47	1930	27.05					
48	1931	43.95					
49	1932	24.16					
50	1933	43.04					
51	1934	34.59					
52	1935	43.63					
53	1936	41.61					
54	1937	62.12					
55	1938	55.9					
56	1939	27.61					
57	1940	89					
58	1941	86.95					
59	1942	62.88					
60	1943	39.6					
61	1944	49.6					
62	1945	54.33					
63	1946	25.18					
64	1947	31.44					
65	1948	41.34					
66	1949	33.48					
67	1950	57.12					
68	1951	54.26					
69	1952	59.42					
70	1953	40.85					
71	1954	58.42					
72	1955	52.3					
73	1956	51.51					
74	1957	65.93					
75	1958	67.27					
76	1959	42.56					
77	1960	59.27					
78	1961	40.03					
79	1962	52.5					
80	1963	55.89					
81	1964	53.2					
82	1965	49.08					
83	1966	48.86					
84	1967	51.57					
85	1968	51.47					
86	1969	66.08					
87	1970	73.05					
88	1971	33.41					
89	1972	33.82					
90	1973	77.59					
91	1974	49.99					
92	1975	53.31					

	A	B	C	D	E	F	G
93	1976	19.29					
94	1977	39.13					
95	1978	52.95					
96	1979	63.61					
97	1980	50.69					
98	1981	69.69					
99	1982	75.18					
100	1983	111.46					
101	1984	35.82					
102	1985	33.78					
103	1986	58.46					
104	1987	48.61					
105	1988	32.86					
106	1989	33.07					
107	1990	29.5					
108	1991	40.98					
109	1992	52.39					
110	1993	54.9					
111	1994	36.45					
112	1995	85.52					
113	1996	76.45					
114	1997	43.88					
115	1998	75.28					
116	1999	46.43					
117	2000	47.48					
118	2001	55.68					
119	2002	49.67					
120	2003	50.89					
121	2004	45.92					
122	2005	66.37					
123	2006	54.52					
124	2007	33.36					
125	2008	38.61					
126	2009	34.56					
127	2010	69.34					
128	2011	37.31					
129	2012	58.28					
130	2013	9.05					
131	2014	51.13					
132	2015	30.5					
133	2016	61.84					
134	2017	64.54					
135	2018	38.05					
136	2019	70.41					
137	2020	15.81					

Attachment 4:
Well Completion Report Summary for PLSS Sections

	A	B	C	D	E
1	**Section and WCR Document**	**Well Depth**	**Depth to Static Water Level**	**Geologic Material**	**Estimated Discharge (gpm)**
2	12N08W13_1089145.pdf	360	279	Variable color Volcanic Rock.	40
3	12N08W13_135270.pdf	130	20	Volcanics.	30
4	12N08W13_WCR2021-002884.pdf	505	420	Shale, serpentinite, and volcanics.	12
5	12N08W13_405494.pdf	305	88	Volcanics.	50
6	12N08W13_1093128.pdf	160	36	"Rock with Clay"	100
7	12N08W13_493677.pdf	200	NA	Serpentinite.	NA
8	12N08W13_51823.pdf	400	140	Grey rock and white chalk like rock.	NA
9	12N08W13_1093116.pdf	410	279	Volcanics.	6.5
10	12N08W13_0950538.pdf	345	189	Volcanics.	26
11	12N08W13_405501.pdf	245	100	Volcanics and Sandstone.	100
12	12N08W13_116553Y.pdf	404	180	Clay, hard grey rock, Volcanics.	19
13	12N08W13_445146.pdf	190	105	Volcanics	400
14	12N08W13_405490.pdf	140	15	Sands and clays.	100
15	12N08W14_11453.pdf	150	60	Volcanics.	29
16	12N08W14_713384.pdf	210	125	Volcanics.	150
17	12N08W14_349828.pdf	200	85	Volcanics.	12
18	12N08W14_E0274148.pdf	500	302	Volcanics.	60
19	12N08W14_245347.pdf	348	318	Volcanics.	10
20	12N08W14_406867.pdf	160	NA	NA	NA
21	12N08W14_713304.pdf	300	160	Volcanics.	275
22	12N08W14_713834.pdf	420	300	Volcanics.	50
23	12N08W14_E0242689.pdf	440	320	Volcanics.	75
24	12N08W14_756196.pdf	470	330	Volcanics.	50
25	12N08W14_210938.pdf	260	218	Volcanics.	17
26	12N08W14_713836.pdf	240	NA	NA	NA
27	12N08W14_263679.pdf	365	100	Volcanics.	10
28	12N08W14_406862.pdf	140	100	Volcanics.	20
29	12N08W14_264348.pdf	180	40	Volcanics.	2
30	12N08W24_105203.pdf	135	10	Volcanics.	30
31	12N08W23_84543.pdf	550	480	Volcanics.	15
32	12N08W23_135260.pdf	538	480	Volcanics.	37
33	12N08W23_211540.pdf	760	550	Volcanics.	120
34	12N08W23_94232.pdf	113	33	Volcanics.	60
35	12N08W23_65491.pdf	104	50	Volcanics.	80
36	12N08W23_134452.pdf	150	95	Volcanics.	10
37	12N08W23_228047.pdf	410	290	Volcanics.	50
38	12N08W23_177932.pdf	660	590	Volcanics.	15

	A	B	C	D	E
39	12N08W23_147884.pdf	120	90	Volcanics.	NA.
40	12N08W23_91756.pdf	123	19	Volcanics.	28
41	12N08W23_1093068.pdf	220	150	Volcanics.	10
42	12N08W23_134452.pdf	150	95	Volcanics.	10
43	12N08W23_302067.pdf	270	200	Volcanics.	30
44	12N08W23_705621.pdf	340	275	Volcanics.	20
45	12N08W23_84518.pdf	345	275	Volcanics.	20
46	12N08W23_236826.pdf	295	200	Volcanics.	25
47	12N08W23_302021.pdf	340	270	Volcanics.	20
48	12N08W23_211566.pdf	580	480	Volcanics.	60
49	12N08W23_367362.pdf	345	170	Clays, sands, and boulders.	7
50	**AVERAGES**	**314**	**202**		**53**