

LINDBERG GEOLOGIC CONSULTING

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September 20, 2023

Project No: 0349.01

Mr. Kevin Dobosh
Stay Humboldt, LLC
3054 Alice Avenue
Arcata, California 95521

Subject: Hydrologic Isolation Assessment; Well e0213422 from Surface Waters
Indian Fields Road, Near Berry Summit, APN: 522-021-010

To Whom It May Concern:

As requested, Lindberg Geologic Consulting has assessed an existing permitted well on the above-referenced parcel to estimate its potential for hydrologic connectivity with any adjacent wetlands and or surface waters, and if pumping well -e0213422 might affect nearby surface waters. The nearest surface waters in the vicinity of this well are ephemeral tributaries of Supply Creek, and Minor Creek (Figure 1).

A California-Certified Engineering Geologist visited this site on September 15, 2023, to observe the subject well and local site conditions. Based on our research, observations, and our professional experience, it is our opinion the subject well has a low likelihood of being hydrologically connected to nearby surface waters in any manner that could affect adjacent springs, wetlands and or surface waters in the vicinity. We define the “vicinity” as the area within a 1,000-foot radius of the subject well (Figure 1), an area of approximately 72 acres. The proposed use of this well is to irrigate cannabis. We are not aware of the volume of water to be extracted or what the pumping schedule might be but expect that that information is provided elsewhere in the application.

Based on Humboldt County’s WebGIS and the Assessor’s Parcel Map (Figure 2), parcel 522-021-010 (Figure 2,) encompasses approximately 168 acres. Our GPS located the subject well at latitude 40.98597° north, and longitude 123.76282° west ($\pm 9'$), approximately 160 feet north of the property line. This well is in Section 08, T7N, R4E, and is 240 feet deep. The wellhead is at an elevation of approximately 3,920 feet (Figure 1) and the elevation of the bottom of the well is therefore 3,680 feet.

The Humboldt County WebGIS shows four watercourses within one mile of the well site. More than 1,400 feet to the north is an ephemeral tributary of Supply Creek. More than 2,000 feet to the southeast is another ephemeral tributary of Supply Creek. Supply Creek flows to Hoopa Valley and the Trinity River. To the south, more than 3,950 feet is a west flowing ephemeral tributary of Minor Creek. Approximately 2,370 feet southwest, is another ephemeral stream of Minor Creek. Minor Creek flows to Redwood Vally and Redwood Creek. As stated, based on interpolation from the USGS “Lord Ellis, Calif.” (1973), topographic quadrangle map (Figure 1), and the Humboldt County WebGIS, the well site elevation is 3,920 feet. The elevation of Supply Creek, almost 1,500

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feet to the north at its nearest point, is approximately 3,600 feet. The bottom elevation of well e0213422 is 3,680 feet, making Supply Creek's ephemeral headwaters 80 feet lower than the bottom of well -00213422.

Well location is shown approximately on the attached figures, and was drilled by Fisch Drilling, of Hydesville, in May 2014, under Humboldt County well permit #11/12-1065. Fisch Drilling is a licensed well-drilling contractor (C-57 #683865). Fisch Drilling submitted their attached well completion report (DWR 188) on May 14, 2014. The driller estimated a yield of 10 gpm on May 7, 2014, based on a 4-hour air lift pump test. Total drawdown during the pump test was reported as 230 feet [sic].

Again, the total drilled depth of this well is 240 feet. The borehole diameter is 10-inches throughout. From the surface to 100 feet, a 5-inch diameter blank (unslotted) PVC casing was installed. From 100- to 240-feet, 5-inch slotted PVC well screen with 0.032 milled slots was installed. Per County requirements, a bentonite surface sanitary seal was installed from the surface to 20 feet. Below the bentonite seal, from 20 to 240 feet, the driller reported filling the annulus with 3/8-inch pea gravel. The well is sealed and cased through any potential shallow subsurface aquifers in the uppermost 20 feet as required by county regulation. Depth to first water was reported at 120 feet. Depth to static water in the completed developed well was also reported to be 120 feet bgs when the driller conducted the pump test on May 7, 2014.

There are no mapped springs on the USGS "Lord Ellis, Calif. (1973)" topographic map within 1000 feet of well -e0213422 (Figure 1). The subject parcel is in the northeastern corner of the Lord Ellis topographic map. To research nearby mapped springs and ponds the three adjacent 7.5' topographic maps were researched: Hupa Mountain (1982) to the north, Hoopa (1979) to the northeast and Willow Creek (1979) to the east. No springs or ponds are mapped on these USGS maps within 1,000 feet of well -e0213422.

This parcel is located within California's Coast Range Geomorphic Province, in the Central Belt of the Franciscan Complex (McLaughlin et al., 2000), a seismically active region in which large earthquakes are expected to occur during the economic life span (70 years) of any developments on the subject property. Geologic mapping by Hardin et al., shows that the site is underlain by South Fork Mountain Schist (KJfs) of the Franciscan Complex, as presented in Figure 4.

According to the NRCS Web Soil Survey, the near-surface soils consist of very gravelly clay loam to a depth of 4 inches, clay loam from 4 to 7 inches, gravelly clay loam from 7 to 17 inches, clay loam from 17 to 33 inches, and extremely gravelly loam from 33 to 37 inches. Below 37 inches, the NRCS logged bedrock. Soils are interpreted to be uniformly distributed across that portion of the subject parcel underlain by the South Fork Mountain Schist on slopes of 9 to 30 percent.

Materials reported on the geologic log of the driller's well completion report (attached) include two feet of "Clayey Top Soil Reddish Brown". From 2 to 24 feet the driller logged "Weathered

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Shist/Clay Tan”, followed by 102 feet (24 to 126 feet) of “Weathered Schist Tan”. In the final 114 feet of the well bore, from 126 to 240 feet, the driller logged “Schist Quartz/Grey”. At the location of the subject well, the first water-bearing aquifer unit was encountered at an elevation of approximately 3,800 feet, according to the driller’s report.

Below the surface, the earth materials encountered in the boring are likely South Fork Mountain Schist, as mapped by Hardin et al., (1982). Sheared, fractured, and folded metasedimentary rock materials can have variable hydraulic conductivity, but can also, under the right conditions, constitute significant aquifers. We interpret the sequence schist as described by the driller, to be within the South Fork Mountain Schist (KJfs) of the Franciscan Complex. The lower section of the profile apparently has favorable hydraulic conductivity, making it, in our interpretation, the primary water bearing unit in well -e0213422.

A geologic cross section of the area after Hardin et al., (1982) shows the structural and stratigraphic relationships between the regional geologic units (Figure 5). The South Fork Mountain Schist is shown dipping east and bounded by thrust fault plane contacts. On-site, no dip of the rock units could be observed because they are mantled with soil and colluvium and obscured by vegetation. We interpret the faults in the subsurface to be hydrologic boundaries of reduced permeability (due to grinding and shearing along the fault planes), effectively separating the South Fork Mountain Schist from adjacent rock units and limiting groundwater flow between those fault-bound units.

Based on observations, review of pertinent and available information, and our experience in the field of engineering geology, it is our professional opinion that this well has a low potential of having any direct or significant connection to proximal surface waters. First water was reportedly encountered at 120 feet and remained static at 120 feet bgs. This well is sealed through the upper 20 feet of any potential unconfined, near-surface aquifers with which it might communicate hydraulically through the borehole.

When considered with the stratigraphy, and the underlying geologic structure, plus the distances (horizontal and vertically) from the nearest surface waters, and the depth of the producing zone of this well (120 to 24 feet), as well as the position of the well relative to the nearest surface waters in the vicinity, we conclude that the depth of the surface seal and the cased interval, is sufficient to preclude the potential for hydraulic connectivity with perennial surface waters, of which there are none closer than approximately 3,345 feet to the east in the perennial part of Supply Creek at an elevation of 2,720 feet. Thus, the water source from which this well draws appears to be a subsurface aquifer not demonstrably connected to any surface waters or unconfined, near-surface aquifer(s). This well appears, in our professional opinion, likely to be hydrologically isolated from nearby wells, surface waters, springs and wetlands.

According to the driller, the estimated yield of this well was 10 gallons per minute (gpm) on May 7, 2014. Drawdown was reported as 230-feet after Fisch Drilling’s four-hour air-lift pump test. At 10 gpm, this well could potentially produce 14,400 gallons per day. As noted in the well

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completion report, this capacity may not be representative of this well's long-term yield. Additional drawdown and recovery testing would be necessary to estimate a sustainable long-term yield of well -e0213422.

This subject well does not appear to be hydrologically connected to, or capable of influencing surface water flows in the ephemeral tributaries of Minor Creek, or Supply Creek. Nor does this well appear likely to be hydrologically connected to any local springs or ephemeral wetlands of which none are mapped. Given the horizontal distances involved, and the elevation differences between the subject well, and the surface waters of the nearest perennial watercourses, springs, and ponds, the potential for significant hydrologic connectivity between surface water and groundwater in the schist aquifer appears unlikely.

We researched the California Department of Water Resources' database to find permitted wells within 1,000 feet of the subject well. Based on the information available at the present time, there are no wells that meet that criterion. The nearest well appears to be well WCR2021-009760 at an elevation of approximately 3,720 feet on parcel 522-026-007. Well -009760 is approximately 1,030 feet southeast of the subject well and is 160 feet deep. Well -009760 is screened from 80 to 100 feet, with a depth to static water of 30 feet, and an estimated yield of 60 gallons per minute.

As groundwater mimics topography and responds to the force of gravity, in general near surface unconfined aquifers will flow down slope in a direction subparallel to topography. The ground surface slopes primarily to the southwest; thus, any near surface unconfined aquifers flow to the southwest, toward Minor Creek. When we visited the site, there appeared to be a pump and a flow meter installed in the subject well.

In our professional opinion, it appears that the aquifer tapped by the subject well is recharged by rainwater infiltrating through the soil and schistose bedrock from source areas proximal to the well site. Ephemeral streams in the vicinity of the well may also contribute recharge when they flow during runoff generating storm events.

The United States Department of Agriculture's (USDA), Natural Resources Conservation Service's (NRCS), online Web Soil Survey, shows the subject well within soils of the Burroin-Redtop complex, on slopes of 9 to 30 percent, (#445, Figure 7), which the NRCS describes as a well-drained soil. The Web Soil Survey's unit description is attached to this report. Mean annual precipitation is listed by the NRCS as 49 to 80 inches per year. Capacity of the most limiting soil layer to transmit water (Ksat) is described as moderately low to moderately high (0.14 to 0.6 in/hr) with a depth to the water table of more than 80 inches.

If during the wet season, only ten percent of the "low end" precipitation estimation of 49 inches is absorbed by the soils/bedrock and does not flow into local watercourses, or be lost to evapotranspiration, then approximately 68.6 acre-feet, or more than 22.3 million gallons of water per year (MGPY), may be expected to recharge the local aquifers below this 168-acre subject

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property. Given the same amount of precipitation (49”) and the same 10 percent partitioned to recharge, then within a 1,000-foot radius of the subject well, recharge can be estimated. Recharge within the 72 acres enclosed by a circle having a 1,000-foot radius, would be 29.4 acre-feet, and more than 9.5 MGPY. Our estimates are conservative; United States Geological Survey (USGS) researchers estimate that in northwest California, approximately 33 percent of precipitation goes to recharge (Flint, et al., 2103).

On March 28, 2022, Governor Newsom issued an executive order (N-7-22) relating to the ongoing drought in California. In executive order N-7-22, the governor outlined measures the state will undertake to avoid and ameliorate the negative impacts of the current drought. Among these measures, it was ordered that counties, cities, and other public agencies have been prohibited from approving permits for new groundwater wells (or alteration of existing wells) in basins “*subject to the Sustainable Groundwater Management Act and classified as medium- or high-priority without first obtaining written verification from a Groundwater Sustainability Agency managing the basin or area of the basin where the well is proposed*”. Well e0213422, on Indian Field Ridge, is not within a basin subject to the Act, and there has been no Groundwater Sustainability Agency established with authority over the area where this permitted well is sited.

The Governor’s order states that counties, cities, and other public agencies are prohibited from issuing permits for new groundwater wells (or altering existing wells) “*without first determining that extraction of groundwater from the proposed well is (1) not likely to interfere with the production and functioning of existing nearby wells, and (2) not likely to cause subsidence that would adversely impact or damage nearby infrastructure*”. The conditions in the Order are not applicable to “*wells that provide less than two acre-feet per year of groundwater for individual domestic users, or that will exclusively provide groundwater to public water supply systems.*”

Based on our observations, research, and engineering geologic experience, it is our professional opinion that well e0213422, located on Indian Field Ridge on APN 522-021-010, has a low likelihood of being hydrologically connected to nearby surface waters or neighboring wells in any manner that might significantly have a negative impact or effect on proximal wetlands, wells, and or surface waters.

Please contact us if you have questions or concerns regarding our findings and conclusions.

Sincerely,

David N. Lindberg, CEG
Lindberg Geologic Consulting

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Attachments:

- Figure 1: Topographic Well Site Location Map
- Figure 2: Humboldt County Assessor's Parcel Map
- Figure 3: Satellite Image of Well location
- Figure 4: Project Geologic Map
- Figure 4a: Geologic Map Explanation
- Figure 5: Geologic Cross Section
- Figure 6: Hydrogeologic Cross Section
- Figure 7: USDA - NRCS Soils Map

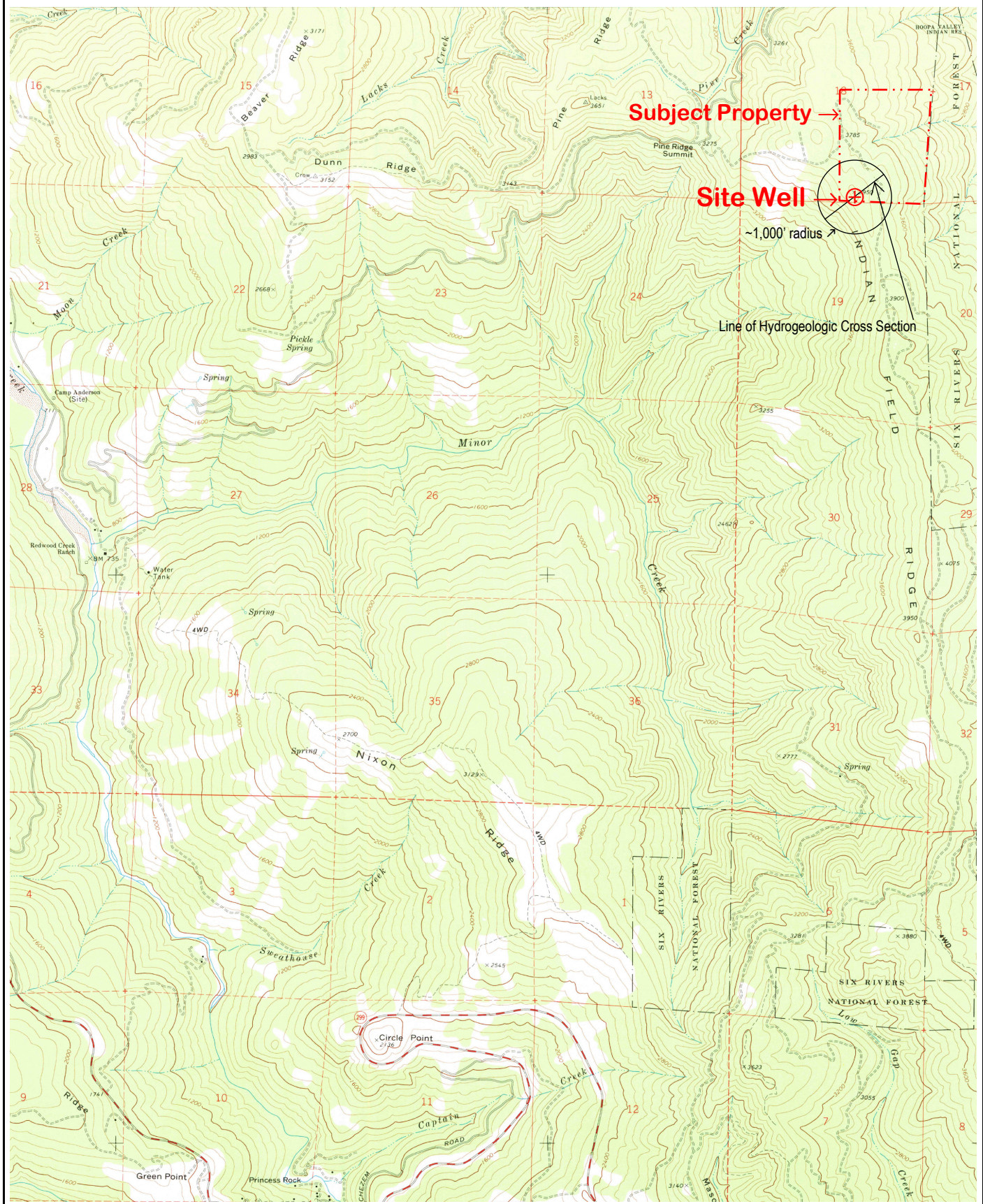
State of California Well Completion Report:
e0213422, 522-021-010 (Subject Well)

Web Soil Survey, NRCS Map Unit Description:
Burroin-Redtop complex, #445, 9 to 30 percent slopes.

Reference:

Flint et al.: Fine-scale hydrologic modeling for regional landscape applications: the California Basin Characterization Model development and performance. Ecological Process, 2013, 2:25. (doi:10.1186/2192-1709-2-25)

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 1
Post Office Box 306	Indian Field Ridge, Old Three Creeks Road, Humboldt County	September 20, 2023
Cutten, CA 95534	APN 522-021-010, Stay Humboldt LLC, Mr. Kevin Dobosh, Client	Project 0349.01
(707) 442-6000	Topographic Well Site Location Map (locations approximate)	1" = 3,700'

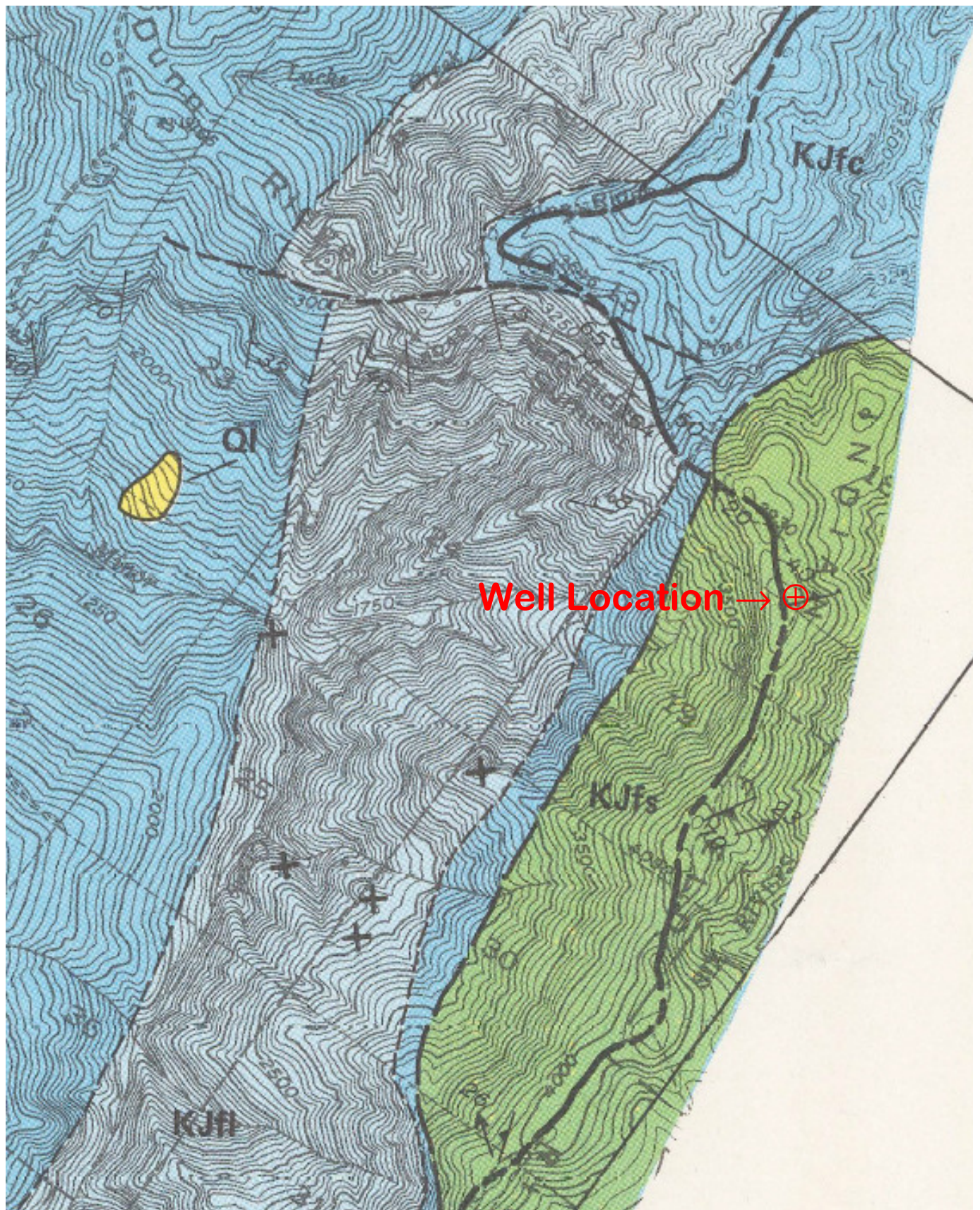


Modified from: USGS "Lord-Ellis Summit, Calif." 7.5' Quadrangle Map. 1973. N

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 3
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(707) 442-6000	Satellite Image of Well Location (all locations approximate)	1" ≈ 600'

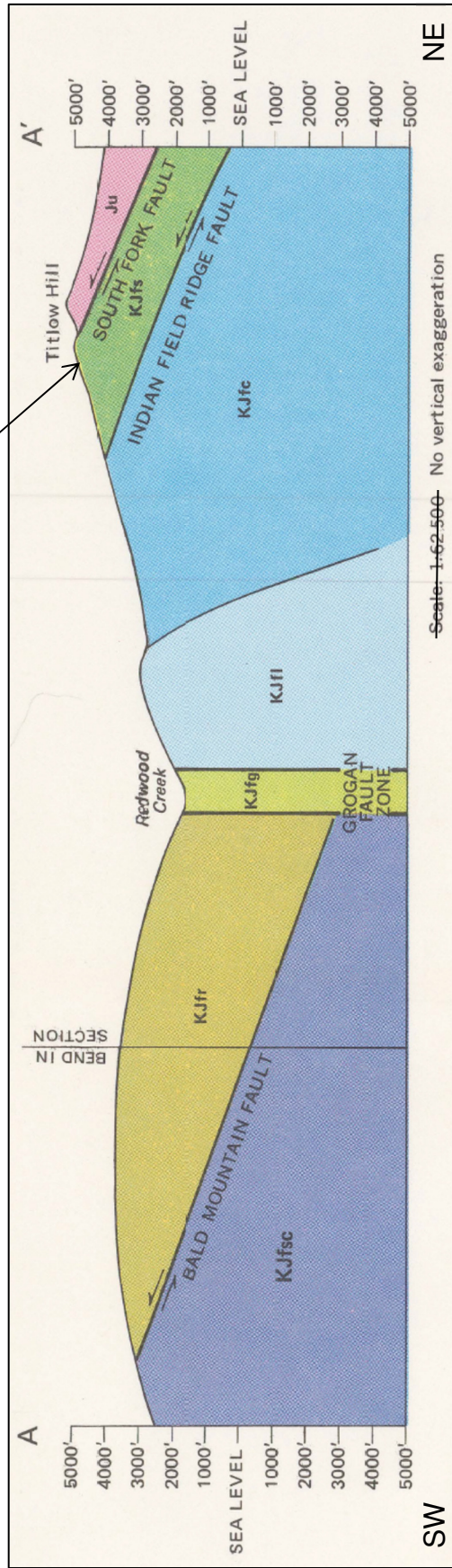


Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 4
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Cutten, CA 95534	APN 522-021-010, Stay Humboldt LLC, Mr. Kevin Dobosh, Client	Project 0349.01
(707) 442-6000	Project Geologic Map (locations approximate)	1 in. ≈ 2400 ft.



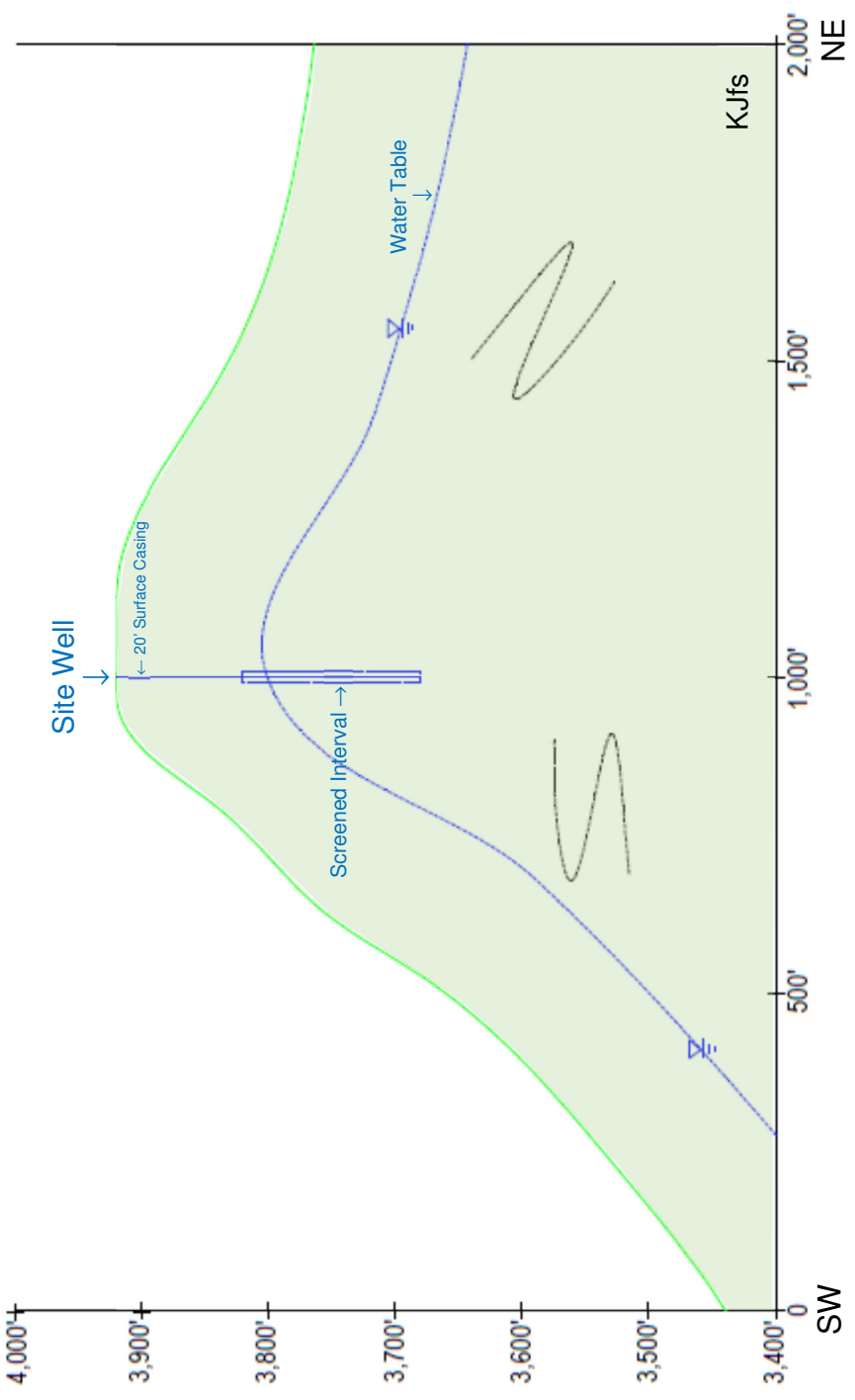
Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 5
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(707) 442-6000	Geologic Cross Section (locations approximate)	Not to Scale

Well Location



Cross Section from: Geologic Map of the Redwood Creek Drainage Basin, Humboldt County, California, (1982), Hardin, D. R., Kelsey, H. M., Morrison, S. D., and Stephens, T. A., Department of the Interior, United States Geologic Survey, Water-Resources Investigations, Open-File Report 81-496.

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 6
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(707) 442-6000	Hydrogeologic Cross Section (locations approximate)	V. E. = 2



In this vertically exaggerated (~2x) cross section, the view is looking to the northwest along the axis of Indian Field Ridge. Groundwater flow in this cross section is southwesterly and northeasterly, following topography. Groundwater is presumed to flow from recharge areas on Indian Field Ridge. This well is sited on the crest of Indian Field Ridge above Redwood Creek valley top the southwest and the South Fork Trinity River valley to the northeast. Subgrade is composed of fine-grained quartz-mica schist of the South Fork Mountain Schist (KJfs), the easternmost component of the Franciscan Complex. Groundwater is envisioned to flow through fractured South Fork Mountain Schist. Fractures in the schist are interpreted to be the primary permeability, providing preferential flow paths for the local groundwater. The driller noted that first water occurred 120 feet below the surface. Static water also occurred 120 feet below the surface. A sanitary surface seal was installed by the driller for the ground surface to the 20-foot depth. This well is cased to 100 feet below the existing ground surface and draws groundwater from the screened from 100 feet to 240 feet. Bedrock subgrade mapping (Figure 4) is from Hardin, et al., (1982).

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 7
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Cutten, CA 95534	APN 522-021-010, Stay Humboldt LLC, Mr. Kevin Dobosh, Client	Project 0349.01
(707) 442-6000	USDA – NRCS Soil Map (locations approximate)	Scale Not Determined



Humboldt and Del Norte Area, California

445—Burroin-Redtop complex, 9 to 30 percent slopes

Map Unit Setting

National map unit symbol: mg9d

Elevation: 110 to 4,100 feet

Mean annual precipitation: 49 to 80 inches

Mean annual air temperature: 50 to 59 degrees F

Frost-free period: 150 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Burroin and similar soils: 50 percent

Redtop and similar soils: 35 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burroin

Setting

Landform: Mountains

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop

Down-slope shape: Linear, convex

Across-slope shape: Convex

Parent material: Colluvium and residuum derived from schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 4 inches: very gravelly clay loam

Bt1 - 4 to 7 inches: clay loam

Bt2 - 7 to 17 inches: gravelly clay loam

Bt3 - 17 to 33 inches: clay loam

BCt - 33 to 37 inches: extremely gravelly loam

R - 37 to 47 inches: bedrock

Properties and qualities

Slope: 9 to 30 percent

Depth to restrictive feature: 20 to 39 inches to lithic bedrock

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately low to moderately high (0.14 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F005XZ021CA - Very Deep Gravelly Mesic Mountains 40-60"ppt
Hydric soil rating: No

Description of Redtop

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Colluvium and residuum derived from schist

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material
A - 0 to 9 inches: clay loam
Bt - 9 to 61 inches: clay

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F005XZ020CA - Very Deep Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Bagaul

Percent of map unit: 8 percent
Landform: Mountains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear

Across-slope shape: Linear
Ecological site: F005XB108CA - Douglas-fir-tanoak/tanoak-California hazelnut, mountain slopes, phyllite and schist, loam and very channery loam
Hydric soil rating: No

Hullygully

Percent of map unit: 7 percent
Landform: Colluvial aprons, landslides, mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Center third of mountainflank
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Humboldt and Del Norte Area, California
Survey Area Data: Version 17, Sep 2, 2022

Soil Survey Area: Six Rivers National Forest Area, California
Survey Area Data: Version 17, Sep 7, 2022