

LINDBERG GEOLOGIC CONSULTING

**David N. Lindberg, CEG
Post Office Box 306
Cuttan California 95534
(707) 442-6000**

July 25, 2022

Project No: 0471.00

Healing Sun, MBC

Attention: Mr. Leif Stafslie

Post Office Box 331

Whitethorn, California 95589

Subject: Hydrogeologic Isolation of Existing Well from Surface Waters
Healing Sun MBC, 1000 Eubanks Road, Whitethorn, California
APN: 220-082-020, WCR2020-014622

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 this well could affect surface waters in nearby water courses. Creeks in the vicinity of this well drain to Painter Creek and an ephemeral tributary of Eubank Creek (Figure 1). A California-Certified Engineering Geologist visited this site on June 13, 2022 to observe the subject well and local site conditions. Based on our professional experience, our observations, and research, 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 wetlands and or other surface waters in the vicinity. We understand that water from this well will be used 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 the applicant can supply that information.

According to the Humboldt County WebGIS, this parcel 220-082-020 (Figure 2) encompasses approximately 110 acres. Based on our on-site GPS measurements, the subject well is located approximately at latitude 40.08557° north, and longitude 123.96578° west ($\pm 9'$). As reported by the driller, this well is in Section 28, T4S, R2E, HB&M (Figures 1 and 2). A circle around the well, with a radius of approximately 1,000 feet is presented on Figures 1 through 3.

Based on the Humboldt County WebGIS mapping, this well is more than 650 feet northwest of Painter Creek, the nearest mapped surface waters. The site well is more than 1,500 feet southeast of the ephemeral tributary of Eubank Creek. Painter Creek originates from a spring on the subject parcel approximately 1,500 feet northeast of the site well at elevation 1,240 (Figure 1). Based on interpolation from the USGS Briceland (1969) topographic quadrangle map (Figure 1), and the Humboldt County WebGIS, well elevation is approximately 1,374 feet above sea level. At the nearest point to this well, the elevation of Painter Creek is approximately 1,140 feet and the ephemeral tributary of Eubank Creek is approximately 960 feet. The elevation of the bottom of the well is approximately 1,174 feet which is 37 feet higher than Painter Creek (650' to SE), and 214 feet higher than the ephemeral tributary of Eubank Creek (~1,500' to NW) at their nearest points on the Humboldt County WebGIS map.

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Only one spring is mapped in Section 28, and it is located approximately 1,500 feet northeast of the site well, at an elevation of 1,240 feet as discussed above (Figure 1). No other springs are mapped on Section 28 of the Briceland quadrangle map. Beyond Section 28, the nearest mapped spring appears to approximately 2.2 miles southeast in Section 34, at elevation 1,140 feet, on parcel 220-202-002. We observed no other mapped springs in Section 28, or in any other contiguous sections.

This well was drilled by Fisch Drilling, Hydesville, California, in October 2020, under county permit #18/19-1012. Fisch Drilling is a licensed well-drilling contractor (C-57 #683865). Fisch Drilling submitted the well completion report (DWR 188) on October 14, 2020 (attached). Fisch Drilling estimated the yield of the completed well at 6 gallons per minute on October 14, 2020. Based on Fisch's four-hour air lift pump test, the total drawdown was reported at 152 feet. The well location is shown approximately on the attached figures.

Borehole diameter as reported by the driller is 10-inches. Total drilled depth is 200 feet. Blank 5.563-inch PVC well casing was installed from grade to 40 feet. A bentonite surface sanitary seal was installed in the annulus around the 5.563-inch well casing per County regulations from grade to 20 feet. From 40 to 200 feet the well is screened with slotted PVC well screen (0.032" slots). From 20 feet to 200 feet the annulus was backfilled with 3/8-inch pea gravel. Depth to first water was reported as 48 feet below grade, and depth to static water in the completed and developed well was reported to be 45 feet bgs when the driller conducted the pump test on October 14, 2020.

On the geologic map (Figure 4), by McLaughlin et al., (2000), this area is underlain by the early Tertiary to late Cretaceous, rocks of the Coastal belt of the Franciscan Complex. Rocks at the well site are identified as "co2", *mélange*; "Subequal amounts of shattered sandstone and argillite with much clayey, penetratively sheared rock that exhibits generally irregular topography lacking well-incised sidehill drainages". *Mélange* is underlain by "co4", intact sandstone and argillite; "Exhibits sharp crested topography with a regular, well-incised system of sidehill drainage." Age range of the Coastal belt is late Eocene to late Cretaceous based on the paleontologic and isotopic age range of rocks in the *mélange* and on inferred range in age of penetrative shearing. Components of the Central belt *mélange* include: cm2 *mélange*-subequal amounts of metasandstone and meta-argillite. Exhibits irregular topography that lacks well incised sidehill drainages but is less lumpy than unit cm1". Shear foliation in the greenstone is mapped as striking northwest and dipping northeast. East of the subject parcel an "approximately located" fault traverses from south to north.

Materials reported on the geologic log of the driller's well completion report (WCR2020-014622 attached) include three feet of "top soil" over 13 feet of "soft brown sandstone". From a depth of 16 to 34 feet, the driller logged "shale". The shale was in turn underlain by 54 feet (34' to 88') of "blue sandstone", which appears to be the water bearing unit in this well. From 88 feet to 157 feet the driller logged "sandstone shale mix", and from 157 feet to total depth, "soft shale" was logged.

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We interpret the “shale” section of this profile from 16 to 34 feet to be an aquitard; a material of low permeability and transmissivity. Materials below 43 feet, the blue sandstone, and “sandstone shale mix” appear to be the water-bearing aquifer materials, having higher permeability and transmissivity. At the location of the subject well, the elevation of the water-bearing aquifer unit is thus approximately 1,329 feet.

Below the three feet of topsoil, the earth materials encountered in the boring are likely the sandstone and argillite mélange, and the intact sandstone mapped by McLaughlin et al, (2000). Sheared and folded sandstone materials may be expected to have a moderate to high hydraulic conductivity and can constitute a significant aquifer. We interpret the underlying sequence of materials described by the driller (shale and sandstone), as lithologies within the Coastal Belt of the Franciscan Complex. The sandstone is likely to have a significantly higher hydraulic conductivity than the shale in this profile, making the sandstone, in our interpretation, the water bearing unit in this well.

A geologic cross section of the area after McLaughlin et al, shows the structural and stratigraphic relationships between the local geologic units (Figure 5). The coastal belt mélange unit co2 is shown dipping to the northeast; unit co4 is mapped with southwest dipping overturned bedding at a locality in the southeast quarter of Section 28 (Figure 4). Southwest of the well co4 is also shown to dip east northeast on McLaughlin’s map. On-site, no attitudes could be observed in the sandstone or mélange because bedrock is mantled with soil and hillslope colluvium and obscured by vegetation. We interpret the faults in the coastal belt Franciscan Complex to be hydrologic boundaries of minimal permeability due to comminution (grinding and shearing along the fault planes) which effectively separate portions of the Franciscan units from each other, and limit groundwater flow between these fault-bound units.

In our professional opinion, based on our experience, observations, and review of pertinent and available information, this well has a low potential of having any direct connection to surface waters. First water was encountered at 48 feet. 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 because the bentonite-sealed surface casing isolates the topsoil, brown sandstone, and shale materials from the deeper blue sandstone aquifer. When considered with the stratigraphy and geologic structure, distances (horizontal and vertically) from the nearest surface waters, depth of the producing zone of this well (~45 to 157 feet), as well as its position relative to the nearest adjacent watercourses in Painter Creek or the ephemeral tributary of Eubank Creek, we conclude that the depth of the surface seal is sufficient to preclude the potential for hydraulic connectivity with surface waters. Thus, the water source from which this well draws appears to be a confined subsurface aquifer not connected to any unconfined near-surface aquifer(s). This well appears, in our professional opinion, likely to be hydraulically isolated from nearby wells, surface waters, springs or wetlands.

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In our professional opinion, it appears the aquifer tapped by the subject well is recharged by rainwater infiltrating in areas proximal to the well. As noted, the “Water Level and Yield of Completed Well” section of the Well Completion Report estimated the yield of this well at 6 gallons per minute (gpm) on October 14, 2020, after a four-hour air-lift pump test. At a rate of 6 gpm, this well might potentially produce 8,640 gallons per day. As noted on the well completion report, this capacity may not be representative of this well’s long-term yield. Additional pump testing would be necessary to estimate the sustainable long-term yield of the site well.

In our opinion the subject well does not appear to be hydrologically connected to, or capable of influencing surface water flows in the nearest streams Painter Creek, or the ephemeral tributary of Eubank Creek. This well appears to be hydrologically isolated from the spring on-site, and any ephemeral wetlands. Given the horizontal and vertical distances between the water-producing zone in the subject well, and the surface waters of the nearest watercourses, the potential for hydrologic connectivity between surface waters and groundwater in the bedrock aquifer appears low. Further, given the limiting condition of 18 feet of low-transmissivity shale above the water-bearing blue sandstone unit, the water-producing zone is likely hydrologically isolated from, and not demonstrably connected to any other aquifer(s) in the surrounding coastal belt Franciscan deposits.

On the Briceland USGS topographic quadrangle map, the nearest mapped spring is northeast at an elevation of approximately 1,240 feet, and no closer than approximately 1,500 feet (Figure 1) on the subject parcel. There do not appear to be any other significant mapped or unmapped natural springs or wetlands within 1,000 feet of parcel containing this subject well.

We researched the California Department of Water Resources (DWR) database to determine if there were other wells within 1,000 feet of the subject well on our client’s property. Well WCR2017-1087876 is a domestic well on the same parcel as the subject well, and is shown on Figures 1, 3 and 7. There is also a domestic well (WCR2017-1087875) that is more than 2,700 feet to the north on APN: 220-081-012. On parcel 220-171-002, there is another domestic well WCR2017-005582 (legacy well #01878774), which is more than 3,500 feet southwest of the subject well. Apart from the domestic well on-site, we could not find any other wells, domestic or agricultural, within 1,000 feet of the subject well.

The Natural Resources Conservation Service’s, online Web Soil Survey, shows the subject well to be located within the Sproulish-Canoecreek-Redwohly soil complex (#574, Figure 7), which is characterized by the NRCS as well-drained. The Web Soil Survey unit description of the Sproulish-Canoecreek-Redwohly soil complex is attached to this report. Mean annual precipitation in the area is listed as 60 to 100 inches per year. Capacity of the most limiting layer to transmit water (Ksat) is described as moderately low to high (0.060 to 2.00 in/hr). If ten percent of 60 inches of precipitation is absorbed by the soils and does not flow across the surface to local watercourses, then approximately 55 acre-feet, or 18 million gallons, of water per year may be expected to percolate into the regolith, to recharge the aquifer below this 110-acre subject property.

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On the 28th of March, 2022, California Governor Newsome issued executive order N-7-22 relating to the ongoing drought in California. In his executive order, the governor outlined several 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”*. Your well at 1000 Eubanks Road, Whitethorn, is not within a basin subject to the Act, and there has been no Groundwater Sustainability Agency established with authority over the area where your permitted well is sited.

Further, order N-7-22 states that counties, cities, and other public agencies have been prohibited from issuing permits for new groundwater wells (or alteration of 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”*. Note that this Order, and that cited in the preceding paragraph, 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.”* Well WCR2020-014622 is not likely to interfere with the production and functioning of nearby wells, as there are none. Nor is well WCR2020-014622 likely to cause subsidence that might adversely impact or damage nearby infrastructure, as there is no significant public infrastructure nearby.

Based on our professional experience, observations, and research, it is our opinion the well at 1000 Eubanks Road has a low likelihood of being hydrologically connected to nearby surface waters or wells in any manner that might adversely affect wetlands, wells, or surface waters in the vicinity.

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

Sincerely,

David N. Lindberg, CEG
Lindberg Geologic Consulting

DNL:sll

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Attachments:

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

State of California Well Completion Reports:

WCR2018-014622

WCR #1087876

WCR #1087874

WCR #1087875

Web Soil Survey, NRCS Unit Descriptions:

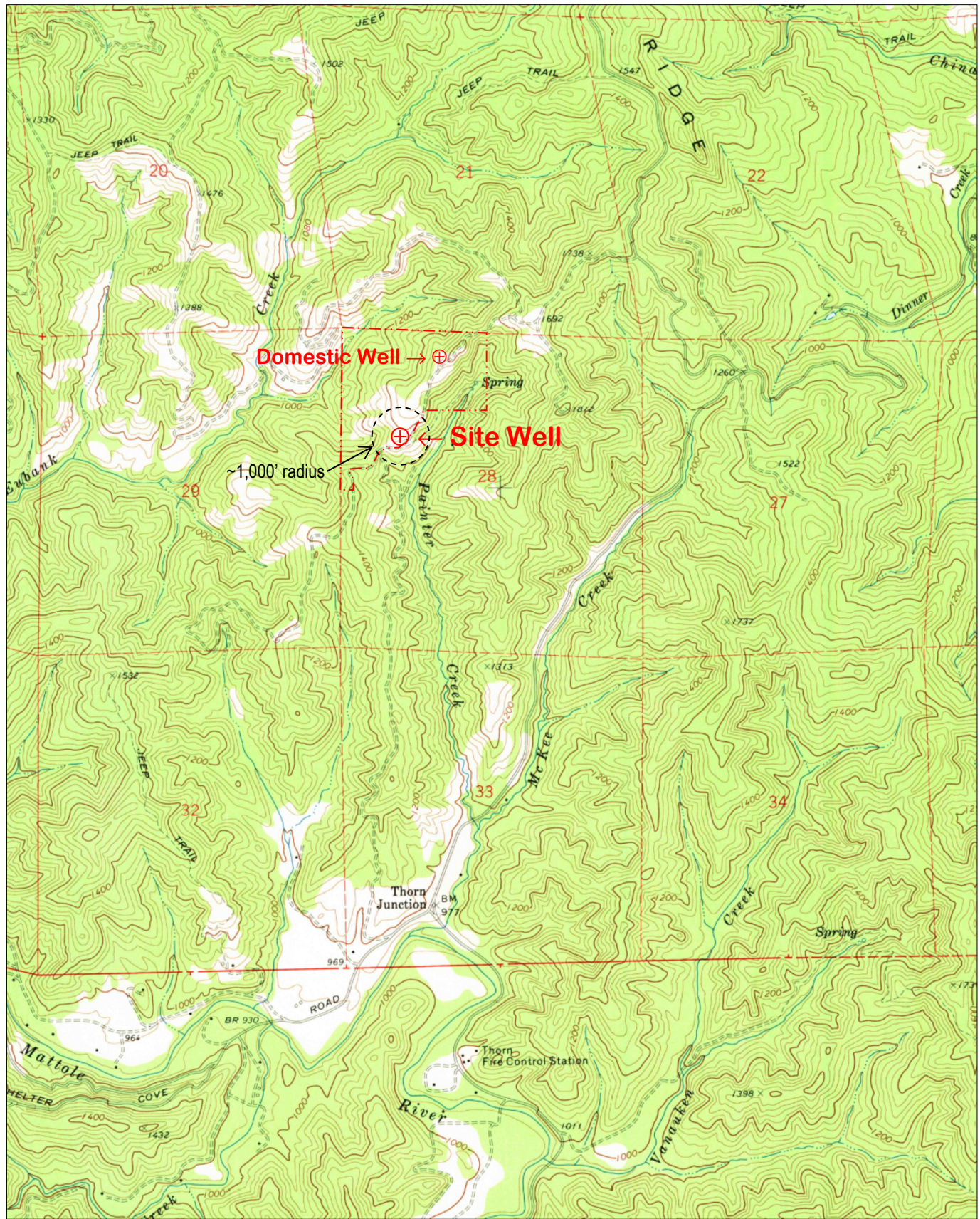
Sproulish-Canoecreek-Redwohly complex, 30 to 50 percent slopes.

Canoecreek-Sproulish-Redwohly complex, 50 to 75 percent slopes

Lindberg Geologic Consulting
Post Office Box 306
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Engineering-Geologic Well Connectivity Assessment Report
1000 Eubanks Road, Whitethorn, California
APN 220-082-020, Healing Sun MBC, Mr. Leif Stafslien, Client
Topographic Map of Well Location (locations approximate)

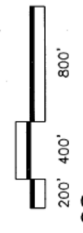
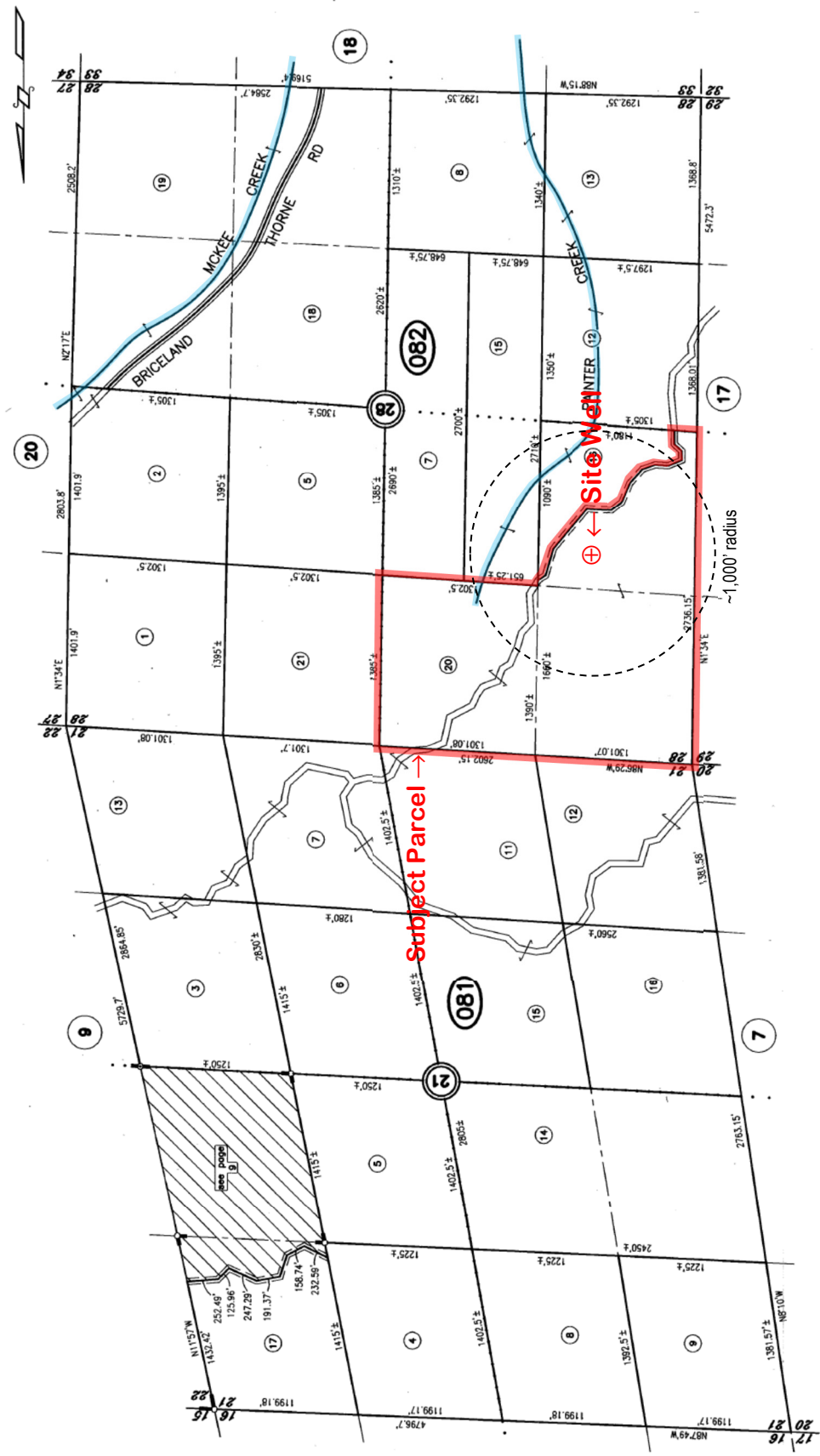
Figure 1
July 25, 2022
Project 0471.00
1" ≈ 2400



| | | |
|------------------------------|---|-----------------|
| Lindberg Geologic Consulting | Engineering-Geologic Well Connectivity Assessment Report | Figure 2 |
| Post Office Box 306 | 1000 Eubanks Road, Whitethorn, California | July 25, 2022 |
| Cutten, CA 95534 | APN 220-082-020, Healing Sun MBC, Mr. Leif Stafslien, Client | Project 0471.00 |
| (707) 442-6000 | Humboldt County Assessor's Parcel Map (locations approximate) | Scale as Shown |

220-08

SECS 21 & 28 T4S, R2E H.B.& M.



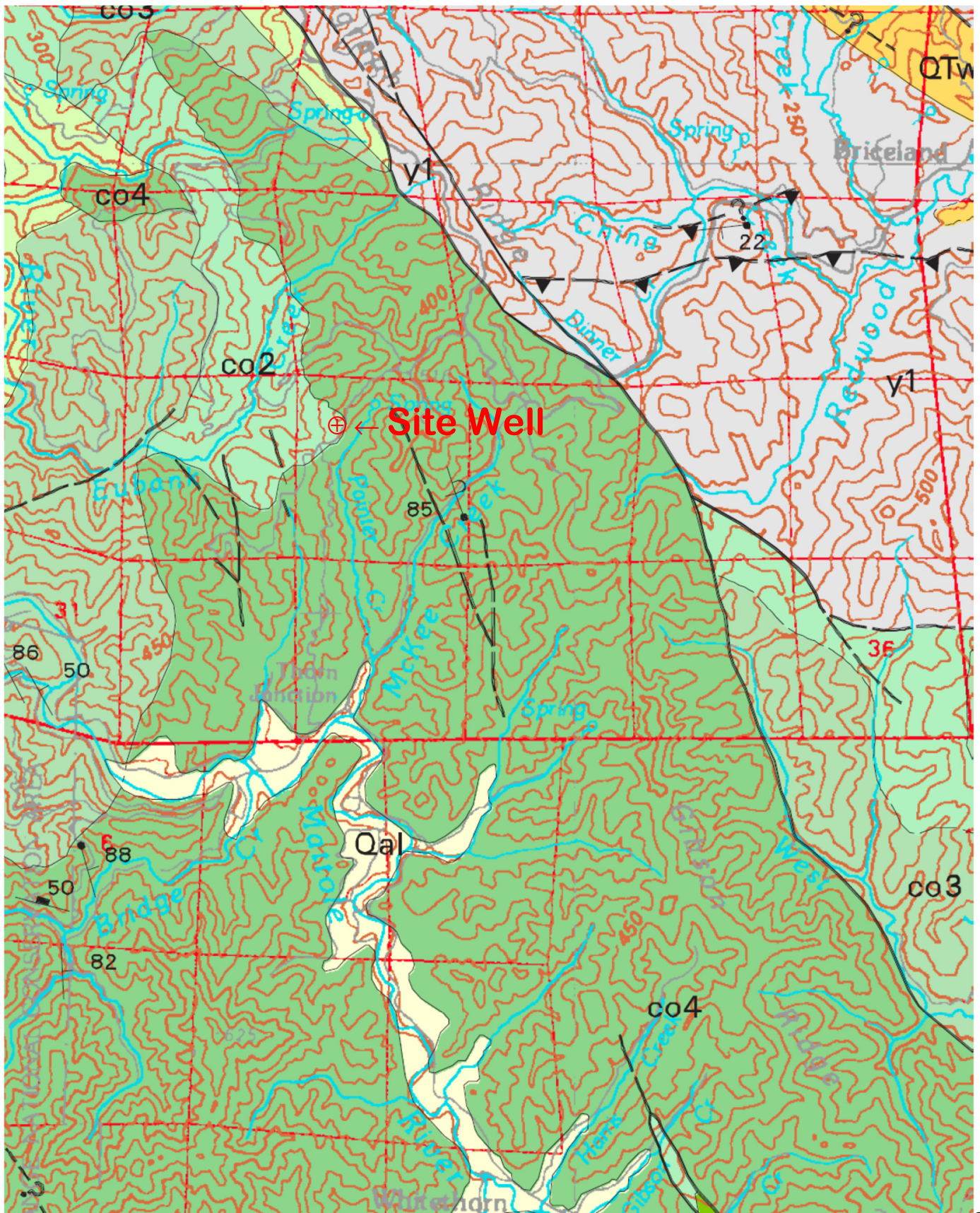
Assessor's Map Bk.220, Pg.08
County of Humboldt, CA.

NOTE - Assessor's Block Numbers Shown in Ellipses
Assessor's Parcel Numbers Shown in Circles.

| | | |
|------------------------------|---|-----------------|
| Lindberg Geologic Consulting | Engineering-Geologic Well Connectivity Assessment Report | Figure 3 |
| Post Office Box 306 | 1000 Eubanks Road, Whitethorn, California | July 25, 2022 |
| Cutten, CA 95534 | APN 220-082-020, Healing Sun MBC, Mr. Leif Stafslie, Client | Project 0471.00 |
| (707) 442-6000 | Satellite Image Site Plan (locations approximate) | 1" ≈ 300' |



| | | |
|------------------------------|---|-----------------|
| Lindberg Geologic Consulting | Engineering-Geologic Well Connectivity Assessment Report | Figure 4 |
| Post Office Box 306 | 1000 Eubanks Road, Whitethorn, California | July 25, 2022 |
| Cutten, CA 95534 | APN 220-082-020, Healing Sun MBC, Mr. Leif Stafslie, Client | Project 0471.00 |
| (707) 442-6000 | Geologic Map (locations approximate) | 1" ≈ 4100' |



DESCRIPTION OF MAP UNITS

QUATERNARY AND TERTIARY OVERLAP DEPOSITS

| | |
|-------------|--|
| Qal | Alluvial deposits (Holocene and late Pleistocene?) |
| Qm | Undeformed marine shoreline and aeolian deposits (Holocene and late Pleistocene) |
| Qt | Undifferentiated nonmarine terrace deposits (Holocene and Pleistocene) |
| Qls | Landslide deposits (Holocene and Pleistocene) |
| QTog | Older alluvium (Pleistocene and [or] Pliocene) |
| QTW | Marine and nonmarine overlap deposits (late Pleistocene to middle Miocene) |
| TI | Volcanic rocks of Fickle Hill (Oligocene) |

COAST RANGES PROVINCE

FRANCISCAN COMPLEX

-- Coastal Belt --

Coastal terrane (Pliocene to Late Cretaceous)

Sedimentary, igneous, and metamorphic rocks of the Coastal terrane (Pliocene to Late Cretaceous):

| | |
|-------------|----------------------------------|
| co1 | Melange |
| co2 | Melange |
| co3 | Broken sandstone and argillite |
| co4 | Intact sandstone and argillite |
| cob | Basaltic Rocks (Late Cretaceous) |
| col5 | Limestone (Late Cretaceous) |
| m | Undivided blueschist (Jurassic?) |

King Range terrane (Miocene to Late Cretaceous)

| | |
|------------|--|
| Krp | Igneous and sedimentary rocks of Point Delgada (Late Cretaceous) |
| m | Undivided blueschist blocks (Jurassic?) |

Sandstone and argillite of King Peak (middle Miocene to Paleocene(?)):

| | |
|-------------|---------------------------------------|
| krk1 | Melange and (or) folded argillite |
| krk2 | Highly folded broken formation |
| krk3 | Highly folded, largely unbroken rocks |
| krl | Limestone |
| krc | Chert |
| krb | Basalt |

False Cape terrane (Miocene? to Oligocene?)

| | |
|-----------|--|
| fc | Sedimentary rocks of the False Cape terrane (Miocene? to Oligocene?) |
|-----------|--|

Yager terrane (Eocene to Paleocene?)

Sedimentary rocks of the Yager terrane (Eocene to Paleocene?):

| | |
|-------------|---|
| y1 | Sheared and highly folded mudstone |
| y2 | Highly folded broken mudstone, sandstone, and conglomeratic sandstone |
| y3 | Highly folded, little-broken sandstone, conglomerate, and mudstone |
| Ycgl | Conglomerate |

-- Central belt --

Melange of the Central belt (early Tertiary to Late Cretaceous):

Unnamed Metasandstone and meta-argillite (Late Cretaceous to Late Jurassic):

| | |
|------------|--|
| cm1 | Melange |
| cm2 | Melange |
| cb1 | Broken formation |
| cb2 | Broken formation |
| cwr | White Rock metasandstone of Jayko and others (1989) (Paleogene and [or] Late Cretaceous) |
| chr | Haman Ridge graywacke of Jayko and others (1989) (Cretaceous?) |
| cfs | Fort Seward metasandstone (age unknown) |
| cls | Limestone (Late to Early Cretaceous) |

| | |
|-----------|---|
| cc | Chert (Late Cretaceous to Early Jurassic) |
| bs | Basaltic rocks (Cretaceous and Jurassic) |
| m | Undivided blueschist blocks (Jurassic?) |
| gs | Greenstone |
| c | Metachert |
| yb | Metasandstone of Yolla Bolly terrane, undivided |
| b | Melange block, lithology unknown |

-- Eastern Belt --

Pickett Peak terrane (Early Cretaceous or older)

Metasedimentary and metavolcanic rocks of the Pickett Peak terrane (Early Cretaceous or older):

| | |
|-------------|---|
| ppsm | South Fork Mountain Schist |
| mb | Chinquapin Metabasalt Member (Irwin and others, 1974) |
| ppv | Valentine Springs Formation |
| mv | Metabasalt and minor metachert |

Yolla Bolly terrane (Early Cretaceous to Middle Jurassic?)

Metasedimentary and metaigneous rocks of the Yolla Bolly terrane (Early Cretaceous to Middle Jurassic?):

| | |
|------------|---|
| ybt | Tallaferro Metamorphic Complex of Suppe and Armstrong (1972) (Early Cretaceous to Middle Jurassic?) |
| ybc | Chicago Rock melange of Blake and Jayko (1983) (Early Cretaceous to Middle Jurassic) |
| gs | Greenstone |
| c | Metachert |
| ybh | Metagraywacke of Hammerhorn Ridge (Late Jurassic to Middle Jurassic) |
| c | Metachert |
| gs | Greenstone |
| sp | Serpentinite |
| ybd | Devils Hole Ridge broken formation of Blake and Jayko (1983) (Early Cretaceous to Middle Jurassic) |
| c | Radiolarian chert |
| ybi | Little Indian Valley argillite of McLaughlin and Ohlin (1984) (Early Cretaceous to Late Jurassic) |

Yolla Bolly terrane

| | |
|-----------|---|
| yb | Rocks of the Yolla Bolly terrane, undivided |
|-----------|---|

GREAT VALLEY SEQUENCE AND COAST RANGE OPHIOLITE

Elder Creek(?) terrane

| | |
|-------------|-----------------------------|
| ecms | Mudstone (Early Cretaceous) |
|-------------|-----------------------------|

Coast Range ophiolite (Middle and Late Jurassic):

| | |
|-------------|----------------------|
| ecg | Layered gabbro |
| ecsp | Serpentinite melange |

Del Puerto(?) terrane

Rocks of the Del Puerto(?) terrane:

| | |
|-------------|--------------------------|
| dpm5 | Mudstone (Late Jurassic) |
|-------------|--------------------------|

Coast Range ophiolite (Middle and Late Jurassic):

| | |
|-------------|--|
| dpt | Tuffaceous chert (Late Jurassic) |
| dpb | Basaltic flows and keratophytic tuff (Jurassic?) |
| dpd | Diabase (Jurassic?) |
| dpsp | Serpentinite melange (Jurassic?) |
| sp | Undivided Serpentinized peridotite (Jurassic?) |

KLAMATH MOUNTAINS PROVINCE

Undivided Great Valley Sequence:

| | |
|-----------|--------------------------------------|
| Ks | Sedimentary rocks (Lower Cretaceous) |
|-----------|--------------------------------------|

GREAT VALLEY SEQUENCE OVERLAP ASSEMBLAGE

Hayfork terrane

Eastern Hayfork subterrane:

| | |
|-------------|---|
| eh | Melange and broken formation (early? Middle Jurassic) |
| ehls | Limestone |
| ehsp | Serpentinite |

Western Hayfork subterrane:

| | |
|-------------|--|
| whu | Hayfork Bally Meta-andesite of Irwin (1985), undivided (Middle Jurassic) |
| whwg | Wildwood (Chancelulla Peak of Wright and Fahan, 1988) pluton (Middle Jurassic) |
| whwp | Clinopyroxenite |
| whji | Diorite and gabbro plutons (Middle? Jurassic) |

Battlesnake Creek terrane

| | |
|-------------|---|
| rcm | Melange (Jurassic and older) |
| rcfs | Limestone |
| rcc | Radiolarian chert |
| rcis | Volcanic Rocks (Jurassic or Triassic) |
| rcic | Intrusive complex (Early Jurassic or Late Triassic) |
| rcp | Plutonic rocks (Early Jurassic or Late Triassic) |
| rcum | Ultramafic rocks (age uncertain) |
| rcpd | Blocky peridotite |

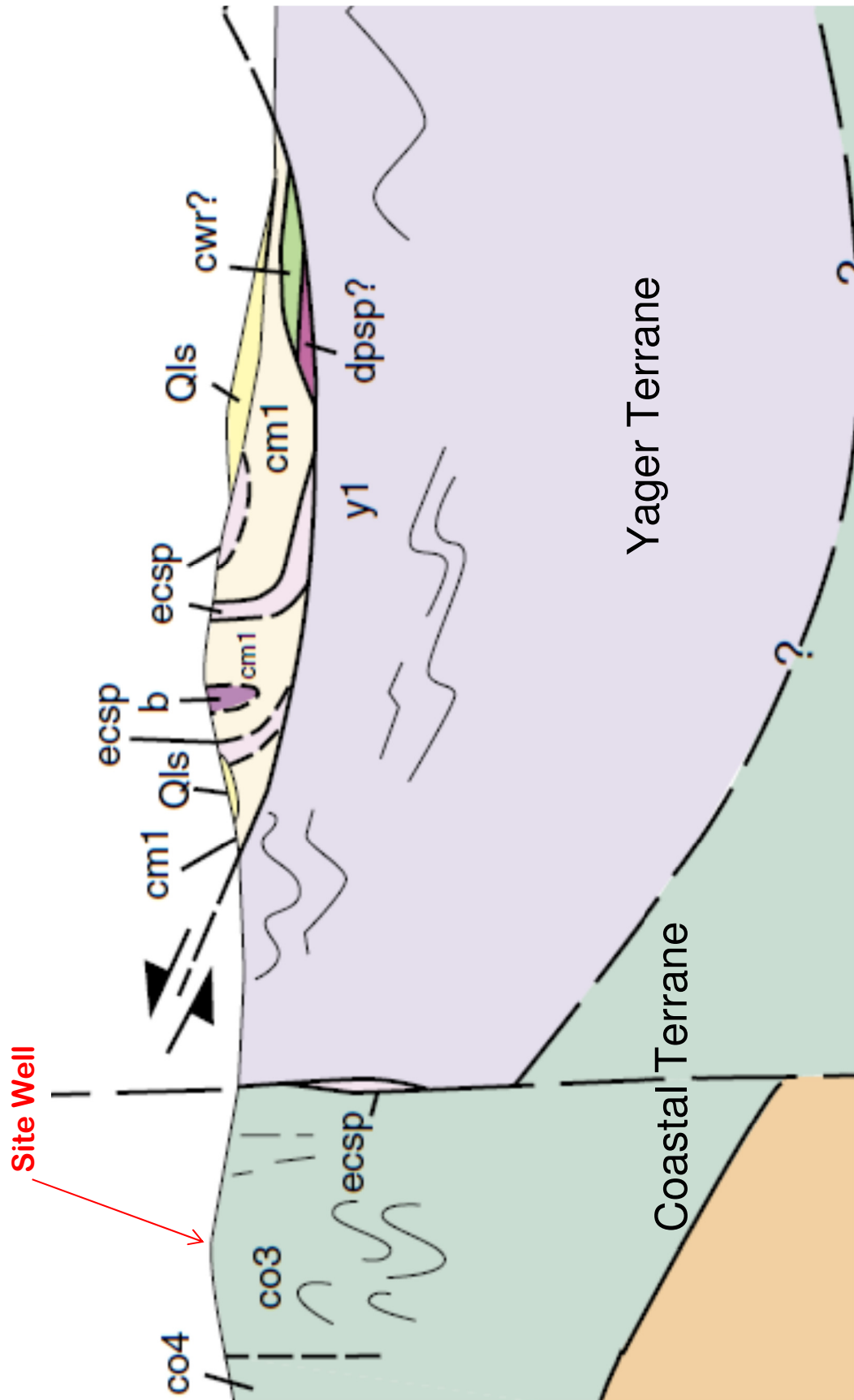
Western Klamath terrane

Smith River subterrane:

| | |
|-------------|---|
| srs | Galice? formation (Late Jurassic) |
| srv | Pyroclastic andesite |
| srgb | Glen Creek gabbro-ultramafic complex of Irwin and others (1974) |
| srpd | Serpentinized peridotite |

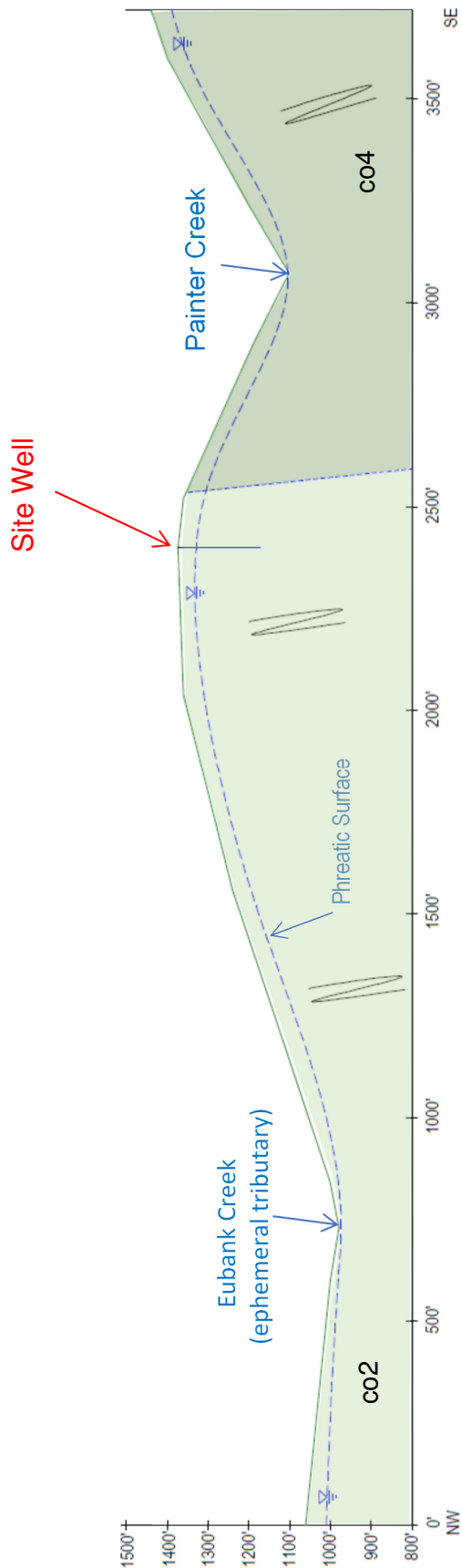
MAP SYMBOLS

| | |
|--|--|
| | Contact |
| | Fault |
| | Thrust fault |
| | Trace of the San Andreas fault associated with 1906 earthquake rupture |
| | Strike and dip of bedding: |
| | Inclined |
| | Vertical |
| | Horizontal |
| | Overturned |
| | Approximate |
| | Joint |
| | Strike and dip of cleavage |
| | Shear foliation: |
| | Inclined |
| | Vertical |
| | Folds: |
| | Synclinal or synformal axis |
| | Anticlinal or antiformal axis |
| | Overturned syncline |
| | Landslide |
| | Melange Blocks: |
| | Serpentinite |
| | Chert |
| | Blueschist |
| | Greenstone |
| | Fossil locality and number |



Modified from: McLaughlin et al., 2000.

| | | |
|------------------------------|--|-----------------|
| Lindberg Geologic Consulting | Engineering-Geologic Well Connectivity Assessment Report | Figure 6 |
| Post Office Box 306 | 1000 Eubanks Road, Whitethorn, California | July 25, 2022 |
| Cutten, CA 95534 | APN 220-082-020, Healing Sun MBC, Mr. Leif Stafslien, Client | Project 0471.00 |
| (707) 442-6000 | Hydrogeologic Cross Section of Well Location (locations approximate) | 1" ≈ 430' |



In this cross section (no V.E.), the view is upstream, or upslope toward the northeast. Surface and groundwater flow in this cross section is toward the reader, or out of the page. Groundwater is presumed to flow from recharge areas in the high ground to the northeast, to the southwest toward the domestic Mattole River (Figure 1). Bedrock subgrade is composed of mélangé with subequal amounts of sandstone and argillite (co2) and intact sandstone with argillite (co4). These deposits are one component of the Coastal Belt Franciscan Complex.

| | | |
|------------------------------|---|-----------------|
| Lindberg Geologic Consulting | Engineering-Geologic Well Connectivity Assessment Report | Figure 7 |
| Post Office Box 306 | 1000 Eubanks Road, Whitethorn, California | July 25, 2022 |
| Cutten, CA 95534 | APN 220-082-020, Healing Sun MBC, Mr. Leif Stafslie, Client | Project 0471.00 |
| (707) 442-6000 | ISDA-NRCS Soil Map of Well Location (locations approximate) | Not to Scale |



Modified from: USG-NRCS Web Soil Survey, July 21, 2022 N ≈

State of California
Well Completion Report
 Form DWR 188 Complete 12/13/2020
 WCR2020-014622

Owner's Well Number _____ Date Work Began 10/05/2020 Date Work Ended 10/14/2020
 Local Permit Agency Humboldt County Department of Health & Human Services - Land Use Program
 Secondary Permit Agency _____ Permit Number 18/19-1012 Permit Date 04/26/2019

| Well Owner (must remain confidential pursuant to Water Code 13752) | | | |
|--|--|----|-----------|
| Name | XXXXXXXXXXXXXXXXXXXX | | |
| Mailing Address | XXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXX | | |
| City | State | XX | Zip XXXXX |

| Planned Use and Activity | |
|--------------------------|--|
| Activity | <u>New Well</u> |
| Planned Use | <u>Water Supply Irrigation - Agriculture</u> |

| Well Location | | | | | |
|--------------------------------|------------------------------------|-------------------------------------|------------------------|--------------------------------------|--|
| Address <u>1000 Eubanks RD</u> | | | APN <u>220-082-020</u> | | |
| City <u>Whitethorn</u> | Zip <u>95589</u> | County <u>Humboldt</u> | Township <u>04 S</u> | | |
| Latitude <u>40 5 8.0556 N</u> | Longitude <u>-123 57 57.3732 W</u> | | Range <u>02 E</u> | | |
| Deg. Min. Sec. | Deg. Min. Sec. | | Section <u>28</u> | | |
| Dec. Lat. <u>40.085571</u> | | Dec. Long. <u>-123.965937</u> | | Baseline Meridian <u>Humboldt</u> | |
| Vertical Datum _____ | | Horizontal Datum <u>WGS84</u> | | Ground Surface Elevation _____ | |
| Location Accuracy _____ | | Location Determination Method _____ | | Elevation Accuracy _____ | |
| | | | | Elevation Determination Method _____ | |

| Borehole Information | |
|-------------------------------|--|
| Orientation | <u>Vertical</u> Specify _____ |
| Drilling Method | <u>Direct Rotary</u> Drilling Fluid <u>Air</u> |
| Total Depth of Boring | <u>200</u> Feet |
| Total Depth of Completed Well | <u>200</u> Feet |

| Water Level and Yield of Completed Well | |
|---|---|
| Depth to first water | <u>48</u> (Feet below surface) |
| Depth to Static | _____ |
| Water Level | <u>45</u> (Feet) Date Measured <u>10/14/2020</u> |
| Estimated Yield* | <u>6</u> (GPM) Test Type <u>Air Lift</u> |
| Test Length | <u>4</u> (Hours) Total Drawdown <u>152</u> (feet) |
| *May not be representative of a well's long term yield. | |

| Geologic Log - Free Form | | |
|--------------------------|--------------|----------------------|
| Depth from Surface | Feet to Feet | Description |
| 0 | 3 | top soil |
| 3 | 16 | soft brown sandstone |
| 16 | 34 | shale |
| 34 | 88 | blue sandstone |
| 88 | 157 | sandstone shale mix |
| 157 | 200 | soft shale |

JUN 01 2017

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. **1087876**

DWR USE ONLY — DO NOT FILL IN

045/02E-20

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page ___ of ___

Owner's Well No. **1**

Date Work Began **4-18-17**, Ended **4-18-17**

Local Permit Agency **Humb**

Permit No. **16/17 0837** Permit Date **3-7-17**

GEOLOGIC LOG

ORIENTATION (✓) VERTICAL HORIZONTAL ANGLE _____ (SPECIFY)

DRILLING METHOD **Rotary** FLUID _____

| DEPTH FROM SURFACE | | DESCRIPTION <i>Describe material, grain size, color, etc.</i> |
|--------------------|--------|--|
| Ft. | to Ft. | |
| 0 | 50 | Soft BRN Rock |
| 50 | 90 | HRD BRN Shaley Rock |
| 90 | 150 | HRD gry Shale |
| 150 | 160 | HRD Blk Sand Stone |
| 160 | 200 | Blue gry shale |

WELL LOCATION

Address **1000 JOHNS**

City **Whitethorne**

County **Humb**

APN Book _____ Page _____ Parcel **220 082 020**

Township _____ Range _____ Section _____

Lat _____ N Long _____ W

LOCATION SKETCH

NORTH

WEST EAST

ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR

Deepen

Other (Specify) _____

DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

USES (✓)

WATER SUPPLY

Domestic Public

Irrigation Industrial

MONITORING

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDIATION

OTHER (SPECIFY) _____

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.**

TOTAL DEPTH OF BORING **200** (Feet)

TOTAL DEPTH OF COMPLETED WELL **200** (Feet)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER **170** (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL **170** (Ft.) & DATE MEASURED **4-18-17**

ESTIMATED YIELD * **15** (GPM) & TEST TYPE **AIR LIFT**

TEST LENGTH **1** (Hrs.) TOTAL DRAWDOWN _____ (Ft.)

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

| DEPTH FROM SURFACE | BORE-HOLE DIA. (Inches) | CASING (S) | | | | | | DEPTH FROM SURFACE | ANNULAR MATERIAL | | | | | |
|--------------------|-------------------------|------------|--------|------------|-----------|------------------|----------------------------|--------------------|-------------------------|---------------------------|------|--|---------|-------------|
| | | TYPE (✓) | | | | MATERIAL / GRADE | INTERNAL DIAMETER (Inches) | | GAUGE OR WALL THICKNESS | SLOT SIZE IF ANY (Inches) | TYPE | | | |
| Ft. | to Ft. | BLANK | SCREEN | CON-DUCTOR | FILL PIPE | | | | | | | | | CE-MENT (✓) |
| 0 | 160 | | ✓ | | | F480 | 5" | Sch 160 | | | | | | |
| 160 | 200 | | | | | | | | .032 | | | | 3/8 Pea | |

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 **Bushnell Enterprises**
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS **649 Bearcreek rd** CITY **Gamb** STATE **CA** ZIP **95542**

Signed **George Bushnell** DATE SIGNED **5-24-17** 403708
C-57 LICENSED WATER WELL CONTRACTOR DATE SIGNED C-57 LICENSE NUMBER

JUN 01 2017

STATE OF CALIFORNIA
WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. **1087874**

DWR USE ONLY — DO NOT FILL IN

049/02E-29

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page ___ of ___

Owner's Well No. **1**

Date Work Began **April 15, 17** Ended **4-15-17**

Local Permit Agency **Humbt**

Permit No. **16/17 0859** Permit Date **March 10, 17**

GEOLOGIC LOG

WELL OWNER

ORIENTATION (✓) VERTICAL HORIZONTAL ANGLE ___ (SPECIFY)

DRILLING METHOD **Rotary** FLUID ___

DEPTH FROM SURFACE DESCRIPTION

| Ft. | to | Ft. | DESCRIPTION |
|-----|-----|-----|---------------|
| 0 | 10 | | TOP Soil |
| 10 | 30 | | Soft Brn Rock |
| 30 | 80 | | Blu Shale |
| 80 | 120 | | HRD gry Shale |
| 120 | 140 | | Blu Shale |

WELL LOCATION

Address **575 UBANKS RD**
 City **Ethersberg CA 9**
 County **Humbt**
 APN Book ___ Page ___ Parcel **220-171-002**
 Township ___ Range ___ Section ___
 Lat. ___ DEG. MIN. SEC. N Long. ___ DEG. MIN. SEC. W

LOCATION SKETCH

ACTIVITY (✓)

WEST EAST

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.**

- NEW WELL
- MODIFICATION/REPAIR
 - Deepen
 - Other (Specify) ___
- DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
- USES (✓)
 - WATER SUPPLY
 - Domestic Public
 - Irrigation Industrial
 - MONITORING
 - TEST WELL
 - CATHODIC PROTECTION
 - HEAT EXCHANGE
 - DIRECT PUSH
 - INJECTION
 - VAPOR EXTRACTION
 - SPARGING
 - REMEDICATION
 - OTHER (SPECIFY) ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER **120** (Ft.) BELOW SURFACE
 DEPTH OF STATIC WATER LEVEL **118** (Ft.) & DATE MEASURED **4-15-17**
 ESTIMATED YIELD * **8** (GPM) & TEST TYPE **AIR LIFT**
 TEST LENGTH **1** (Hrs.) TOTAL DRAWDOWN ___ (Ft.)
 * May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING **140** (Feet)
 TOTAL DEPTH OF COMPLETED WELL **140** (Feet)

| DEPTH FROM SURFACE Ft. to Ft. | BORE-HOLE DIA. (Inches) | CASING (S) | | | | | | DEPTH FROM SURFACE Ft. to Ft. | ANNULAR MATERIAL TYPE | | | | | |
|----------------------------------|----------------------------|------------|--|--|--|------------------|-------------------------------|----------------------------------|--------------------------|------------------------------|-------------|----------------|----------|-------------------------|
| | | TYPE (✓) | | | | MATERIAL / GRADE | INTERNAL DIAMETER (Inches) | | GAUGE OR WALL THICKNESS | SLOT SIZE IF ANY (Inches) | CE-MENT (✓) | BEN-TONITE (✓) | FILL (✓) | FILTER PACK (TYPE/SIZE) |
| 0 to 120 | 9 | ✓ | | | | | | F 480 | | | | | | |
| 120 to 140 | | ✓ | | | | " | " | " | .032 | | | | | 3/8 Per |

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 **Bushnell Enterprises**
 (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
 ADDRESS **649 Bearcreek Rd Garb CA 95542**
 CITY STATE ZIP
 Signed **[Signature]** DATE SIGNED **5-24-17** LICENSE NUMBER **03708**
 C-5 LICENSED WATER WELL CONTRACTOR

DWR USE ONLY — DO NOT FILL IN

04S102E-21

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page ___ of ___
 Owner's Well No. 2 No. 1087875
 Date Work Began 4-17-17 Ended 4-17-17
 Local Permit Agency Humbt
 Permit No. None Permit Date MARCH 10. 17

| DEPTH FROM SURFACE | | | DESCRIPTION <i>Describe material, grain size, color, etc.</i> |
|--------------------|-----|-----|--|
| Ft. | to | Ft. | |
| 0 | 20 | 20 | Soft Brn Rock |
| 20 | 80 | 80 | HRD Brn Rock |
| 80 | 120 | 120 | Blu Shale |

ORIENTATION (✓) VERTICAL _____ HORIZONTAL _____ ANGLE _____ (SPECIFY)
 DRILLING METHOD Rotary FLUID _____

TOTAL DEPTH OF BORING 120 (Feet)
 TOTAL DEPTH OF COMPLETED WELL 120 (Feet)

WELL OWNER

CITY Eubanks STATE CA ZIP 95712
 Address 575 Eubank Rd
 City Whitethorne
 County _____
 APN Book _____ Page _____ Parcel 220 081 012
 Township _____ Range _____ Section _____
 Lat _____ DEG. MIN. SEC. N Long _____ DEG. MIN. SEC. W

LOCATION SKETCH NORTH

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

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

WEST EAST

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.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 80 (Ft.) BELOW SURFACE
 DEPTH OF STATIC WATER LEVEL 80 (Ft.) & DATE MEASURED 4-17-17
 ESTIMATED YIELD 10 (GPM) & TEST TYPE Air Lift
 TEST LENGTH 1 (Hrs.) TOTAL DRAWDOWN _____ (Ft.)
 * May not be representative of a well's long-term yield.

| DEPTH FROM SURFACE Ft. to Ft. | BORE-HOLE DIA. (Inches) | CASING (S) | | | | | | DEPTH FROM SURFACE Ft. to Ft. | ANNULAR MATERIAL TYPE | | | | | |
|----------------------------------|----------------------------|------------|--|--|--|------------------|----------------------------|----------------------------------|--------------------------|---------------------------|-------------|----------------|----------|-------------------------|
| | | TYPE (✓) | | | | MATERIAL / GRADE | INTERNAL DIAMETER (Inches) | | GAUGE OR WALL THICKNESS | SLOT SIZE IF ANY (Inches) | CE-MENT (✓) | BEN-TONITE (✓) | FILL (✓) | FILTER PACK (TYPE/SIZE) |
| 0 to 80 | 9" | ✓ | | | | | | F480 | | | | | | |
| 80 to 120 | 1" | ✓ | | | | 11 | 7" | 11 | 1032 | | | | | 3/8 pea |

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 Bushnell Enterprises
 (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
 ADDRESS 649 Bearcreek rd CITY Grapes STATE CA ZIP 95542
 Signed Dennis Bushnell DATE SIGNED 5-27-17 403708
 C-57 LICENSED WATER WELL CONTRACTOR C-57 LICENSE NUMBER

Humboldt County, South Part, California

574—Sproulish-Canoecreek-Redwohly complex, 30 to 50 percent slopes, warm

Map Unit Setting

National map unit symbol: 2ml27

Elevation: 100 to 3,280 feet

Mean annual precipitation: 60 to 100 inches

Mean annual air temperature: 48 to 55 degrees F

Frost-free period: 240 to 300 days

Farmland classification: Not prime farmland

Map Unit Composition

Sproulish, warm, and similar soils: 50 percent

Canoecreek, warm, and similar soils: 20 percent

Redwohly, warm, and similar soils: 15 percent

Minor components: 15 percent

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

Description of Sproulish, Warm

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Concave, convex, linear

Parent material: Colluvium derived from mudstone and/or colluvium derived from sandstone and/or residuum weathered from mudstone and/or residuum weathered from sandstone

Typical profile

O_i - 0 to 2 inches: slightly decomposed plant material

A - 2 to 6 inches: gravelly silt loam

B_{t1} - 6 to 13 inches: paragravelly clay loam

B_{t2} - 13 to 21 inches: gravelly loam

B_{t3} - 21 to 47 inches: clay loam

B_{t4} - 47 to 63 inches: paragravelly silty clay loam

B_{t5} - 63 to 79 inches: paragravelly silty clay loam

Properties and qualities

Slope: 30 to 50 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(K_{sat}): Moderately low to high (0.06 to 2.00 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: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C

Ecological site: F004BJ101CA - Fog-influenced, low elevation slopes and footslopes

Hydric soil rating: No

Description of Canoecreek, Warm

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Colluvium and residuum derived from sandstone and mudstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material

A - 1 to 9 inches: gravelly loam

Bw1 - 9 to 15 inches: very cobbly loam

Bw2 - 15 to 31 inches: extremely cobbly loam

Bw3 - 31 to 49 inches: very cobbly sandy loam

C - 49 to 71 inches: extremely stony loamy sand

Properties and qualities

Slope: 30 to 50 percent

Surface area covered with cobbles, stones or boulders: 1.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to high (0.60 to 2.00 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 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: B

Ecological site: F004BJ102CA - Dry, steep mountain slopes

Hydric soil rating: No

Description of Redwohly, Warm

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and/or
residuum weathered from mudstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 5 inches: paragravelly loam
Bt1 - 5 to 16 inches: very paragravelly loam
Bt2 - 16 to 33 inches: extremely paragravelly loam
C - 33 to 63 inches: paragravel

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 39 inches to strongly contrasting
textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water
(Ksat): Moderately low to moderately high (0.14 to 1.42 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 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F004BJ101CA - Fog-influenced, low elevation
slopes and footslopes
Hydric soil rating: No

Minor Components

Crazycoyote

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave, convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Caperidge, warm

Percent of map unit: 4 percent

Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Canoecreek

Percent of map unit: 4 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Center third of
mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Humboldt County, South Part, California
Survey Area Data: Version 10, Sep 6, 2021

Humboldt County, South Part, California

575—Canoecreek-Sproulsh-Redwohly complex, 50 to 75 percent slopes, warm

Map Unit Setting

National map unit symbol: 2ml28

Elevation: 100 to 3,280 feet

Mean annual precipitation: 59 to 100 inches

Mean annual air temperature: 48 to 55 degrees F

Frost-free period: 240 to 300 days

Farmland classification: Not prime farmland

Map Unit Composition

Canoecreek, warm, and similar soils: 45 percent

Sproulsh, warm, and similar soils: 25 percent

Redwohly, warm, and similar soils: 15 percent

Minor components: 15 percent

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

Description of Canoecreek, Warm

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Colluvium and residuum derived from sandstone, mudstone, and conglomerate

Typical profile

Oi - 0 to 4 inches: gravelly slightly decomposed plant material

A - 4 to 13 inches: very gravelly loam

Bw1 - 13 to 30 inches: very gravelly loam

Bw2 - 30 to 47 inches: very gravelly loam

Bw3 - 47 to 61 inches: very gravelly loam

Bw4 - 61 to 71 inches: very gravelly loam

Properties and qualities

Slope: 50 to 75 percent

Surface area covered with cobbles, stones or boulders: 1.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to high (0.60 to 2.00 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 7.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Ecological site: F004BJ102CA - Dry, steep mountain slopes

Hydric soil rating: No

Description of Sproulsh, Warm

Setting

Landform: Mountain slopes

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Colluvium derived from mudstone and/or colluvium derived from sandstone and/or residuum weathered from mudstone and/or residuum weathered from sandstone

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material

A - 2 to 8 inches: gravelly loam

Bt1 - 8 to 16 inches: loam

Bt2 - 16 to 35 inches: loam

Bt3 - 35 to 55 inches: loam

Bt4 - 55 to 79 inches: gravelly loam

Properties and qualities

Slope: 50 to 75 percent

Surface area covered with cobbles, stones or boulders: 0.0 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high to high (0.20 to 2.00 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: High (about 10.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: B

Ecological site: F004BJ102CA - Dry, steep mountain slopes

Hydric soil rating: No

Description of Redwohly, Warm

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and/or
residuum weathered from mudstone

Typical profile

A - 0 to 8 inches: gravelly loam
Bt - 8 to 30 inches: very paragravelly loam
C - 30 to 79 inches: paragravel

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 20 to 39 inches to strongly contrasting
textural stratification
Drainage class: Well drained
Capacity of the most limiting layer to transmit water
(Ksat): Moderately low to moderately high (0.14 to 1.42 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 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F004BJ102CA - Dry, steep mountain slopes
Hydric soil rating: No

Minor Components

Crazycoyote

Percent of map unit: 7 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave, convex, linear
Across-slope shape: Linear
Hydric soil rating: No

Caperidge, warm

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Mountaintop

Down-slope shape: Convex, linear
Across-slope shape: Linear, convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Center third of
mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Humboldt County, South Part, California

Survey Area Data: Version 10, Sep 6, 2021