LINDBERG GEOLOGIC CONSULTING
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April 4, 2023

Project No: 0352.01

Mr. Scott Roberts
2160 Panorama Drive
Arcata, California 95521

Subject: Hydrologic Isolation of Well WCR2017-002398, Surface Waters
1051 Heidi Lane, Honeydew, CA APN: 107-054-014 - APPS 11653

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-002398 might affect nearby surface waters. The nearest surface waters in the vicinity of this well are perennial tributaries of the Upper North Fork Mattole River. One unnamed perennial tributary, and one unnamed ephemeral tributary of the Mattole River also have their source areas within one mile of the subject well (Figure 1).

A California-Certified Engineering Geologist visited this site on February 14, 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 107-054-014 encompasses approximately 64 acres. Our GPS located the subject well at latitude 40.25969° north, and longitude 124.10515° west (±9'). This well is in Section 31, T2S, R1E, and is 175 feet deep. The wellhead is at an elevation of approximately 2,220 feet (Figure 1) and the elevation of the bottom of the well is therefore 2,045 feet.

The Humboldt County WebGIS and the USGS Bull Creek Quadrangle show no surface waters, springs, or wetlands within 1,000 feet of the subject well. Mapping shows six perennial and ephemeral watercourses within one mile of the well site. More than 2,100 feet to the northeast are two perennial tributaries of the Upper North Fork Mattole River. To the southeast and the south, more than 3,000 feet are one ephemeral tributary and one perennial tributary to the Mattole River. To the west-southwest approximately 3,100 feet, there is a spring-fed perennial tributary of the Upper North Fork Mattole River. Approximately 4,700 feet northwest of the subject well is another perennial tributary of the Upper North Fork Mattole River. As stated, based on interpolation from quadrangle topographic maps: "Bull Creek, Calif." (1969), (Figure 1), and the Humboldt County

WebGIS, the well site elevation is 2,220 feet. The elevation of the nearest watercourse, a perennial tributary of the Upper North Fork Mattole River, is approximately 1,950 feet. The bottom elevation of well WCR2017-002398 is 2,045 feet, making the nearest perennial tributary of the Upper North Fork Mattole River 95 feet lower than the total depth of the well.

The well location is shown approximately on the attached figures, and was drilled by Watson Well Drilling, of Eureka, California, in January 2017, under Humboldt County well permit #16/17-0252. Watson Well Drilling is a licensed well-drilling contractor (C-57 #1014048). Watson Well Drilling submitted their attached well completion report (DWR 188) on July 17, 2017. The driller estimated a yield of 10 gpm on January 13, 2017, based on a 4-hour air lift pump test. Drawdown during the pump test, if any, was not reported.

Again, total drilled depth of this well is 175 feet. The borehole diameter from grade to 20 feet was 12-inches. From 20 feet to 70 feet, the borehole diameter was 7.5 inches, and from 70 feet to 175 feet, the borehole diameter was 7.44-inches. From the ground surface to 20 feet, an 8-inch diameter, blank low carbon steel, casing was installed. From the ground surface to 40 feet a 6.625-inch blank low carbon steel casing was installed. From 40 feet to 140-feet a 6.625-inch knife cut, 0.25-inch slot size, low carbon steel well screen was installed. From 140 feet to 160 feet, 6.625-inch, blank low carbon steel, was installed. In the final 15 feet, from 160 feet to 175 feet, knife cut, 0.25-inch slot, low carbon steel well screen was installed.

Per County requirements, a bentonite surface sanitary seal was installed from surface to 20 feet. From 20 feet to 175 feet the driller reported "no annular fill". This well is cased and sealed through any potential shallow subsurface aquifers in the uppermost 20 feet as required by regulation. Depth to first water was reported at 50 feet, and depth to static water in the completed developed well was reported at 6 feet when the driller conducted the pump test on January 13, 2017.

There are no springs mapped within 1,000 feet of this well on the Bull Creek California, USGS topographic quadrangle map (Figure 1). The nearest mapped spring is approximately 1,760 feet to the northwest, at an elevation of approximately 1,960 feet. The next closest spring is more than 3,100 feet to the west-southwest, at an elevation of approximately 1,280 feet. There are no other springs mapped within 3,200 feet of the subject well on the Bull Creek quadrangle map.

This well is located within California's Coast Range Geomorphic Province, in the Coastal Belt of the Franciscan Complex (McLaughlin et at., 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 McLaughlin shows that the site is underlain by argillite mélange (col) of the Coastal Belt of the Franciscan Complex, as shown in Figure 4.

According to the NRCS Web Soil Survey this is not prime farmland. The near-surface soil consists of loam to 21 inches, gravelly loam to a depth of 46 inches, very gravelly fine sandy loam to 79

inches. Soils are interpreted to be uniformly distributed across that portion of the subject parcel underlain by the Coastal Belt mélange with slopes of 5 to 30 percent.

Materials reported on the geologic log of the driller's report of well completion (attached) include (from grade) 45 feet of "Brown Clay With Gravel". Below 45 feet, to 175-feet, the driller logged "Dark Blue Mudstone with Siltstone Lenses". First water was reported at 50-feet in early January 2017. At the location of the subject well, the elevation of the first water-bearing aquifer unit is thus at an elevation of approximately 2,170 feet, based on the information in the driller's report.

Below the surface, the earth materials encountered in the boring are likely argillite mélange of the Coastal Belt Franciscan Complex, as mapped by McLaughlin et al., (2000). 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 of "Dark Blue Mudstone with Siltstone Lenses" as described by the driller, to be within the coastal belt mélange (co1) of the Franciscan Complex. The siltstone lenses of the profile apparently have favorable hydraulic conductivity, making them, in our interpretation, the primary water bearing unit(s) in this well.

A geologic cross section of the area after McLaughlin et al., (2000) shows the structural and stratigraphic relationships between the regional geologic units (Figure 5). The coastal belt mélange is shown dipping east and bounded by strike-slip and 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 units of the Coastal Belt Franciscan from each other hydrologically and limiting groundwater flow between the fault-bound units.

Based on our observations, our review of pertinent and available information, and our experience, 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 50-feet. This well is sealed with bentonite 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 (50 to 140, and from 160 to 175 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 is sufficient to preclude the potential for hydraulic connectivity with surface waters, of which there are none closer than the spring mapped 1,760 feet to the northwest at an elevation of 1,960 feet. Thus, the water source from which this well draws appears to be a confined subsurface aquifer not demonstrably connected to any proximal surface waters or unconfined, near-surface aquifer(s).

This well appears, in our professional opinion, likely to be significantly hydraulically isolated from nearby wells, surface waters, springs or wetlands.

According to the driller, the estimated yield of this well was 50 gallons per minute (gpm) on January 13, 2017. The drawdown (if any) was not reported after Watson Well Drilling's four-hour air-lift pump test. At 50 gpm, this well would potentially produce 72,000 gallons per day. As noted in the well 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 the site well.

This subject well does not appear to be hydrologically connected to, or capable of influencing surface water flows in the ephemeral or perennial tributaries of the Upper North Fork Mattole River, or the tributary streams of the Mattole River. Nor does this well appear likely to be hydrologically connected to any local springs or ephemeral wetlands (of which we found none). Given the horizontal distances involved, and the elevation differences between the subject well, and the surface waters of the nearest watercourses, and springs, the potential for significant hydrologic connectivity between surface water and groundwater in the Franciscan aquifer(s) appears unlikely.

As mentioned, on the Bull Creek USGS topographic quadrangle map there are springs mapped in Section 31. The closest is 1,760 feet northwest of well WCR2017-002398, at elevation 1,960 feet. The next closest spring is greater than 3,100 feet west-southwest of well WCR2017-002398 in Section 31, at an elevation of approximately 1,280 feet. There are no other significant (mapped) springs mapped within 3,000 feet of this subject well.

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 may be one well which might meet this criterion. However, because the well location is based on the centroid of Section 31, the level of accuracy of this well's location is less than ideal. This apparently closest well (WCR2017-000250) is on parcel 107-054-030, whose centroid is approximately 1,500 feet southwest of the subject well. The subject well is more than 450 feet from the nearest property corner on parcel 170-054-030. Well WCR2017-000250 is a 15 gpm well in Section 31, drilled to a depth of 250 feet; first water was encountered at 90 feet. The next closest well is more than 1,115 feet from the subject well (distance derived from address). The well number is WCR2017-000727, it was drilled on APN 107-054-005, to a depth of 220-feet. Well WCR2017-000727 is a 45 gpm well in which first water was encountered 50 feet below the surface. Parcels 107-054-030 and 107-054-005 are highlighted in blue in Figure 2.

As groundwater mimics topography and responds to the force of gravity, in general any water in a near surface unconfined aquifer will flow down slope in a direction subparallel to topography. The ground surface slopes primarily to the north-northeast; thus, the near surface unconfined aquifer likely flows toward the Upper North Fork Mattole River. A pump is installed in the subject well.

In our professional opinion, it appears that the aquifer tapped by the subject well is recharged by water infiltrating through the soil and mélange bedrock from upslope source areas proximal to the well site. Ephemeral channels 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 Wirefence-Windynip-Devilshole complex, on slopes of 5 to 30 percent, (#646, 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 60 to100 inches per year. Capacity of the most limiting soil layer to transmit water (Ksat) is described as moderately high to high (0.60 to 2.00 in/hr) with a depth to the water table of greater than 80 inches.

If during the wet season, only ten percent of the "low end" precipitation estimation of 60 inches is absorbed by the soils/bedrock and does not flow across the ground surface and into local watercourses (or be lost to evapotranspiration), then approximately 32 acre-feet, or more than 10.4 million gallons of water per year (MGPY), may be expected to recharge the local aquifers below this 64-acre subject property. Given the same amount of precipitation (60") 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 36 acre-feet, or more than 11.7 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 February 13, 2023, Governor Newsom signed Executive Order N-3-23 which, in part, extended a previous executive order (N-7-22) relating to the ongoing drought in California which the Governor had issued on March 28, 2022. 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*". This ridgetop well at 1051 Heidi Lane, Honeydew, 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 experience, it is our professional opinion that the well WCR2017-002398, located at 1051 Heidi Lane, Honeydew, on APN 107-054-014, has a low likelihood of being hydrologically connected to nearby surface waters or neighboring wells in a manner that might significantly have a negative impact or effect on wells or surface waters.

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

Sincerely,

David N. Lindberg

David N. Lindberg, CEG
Lindberg Geologic Consulting

DNL:sll

Attachments:

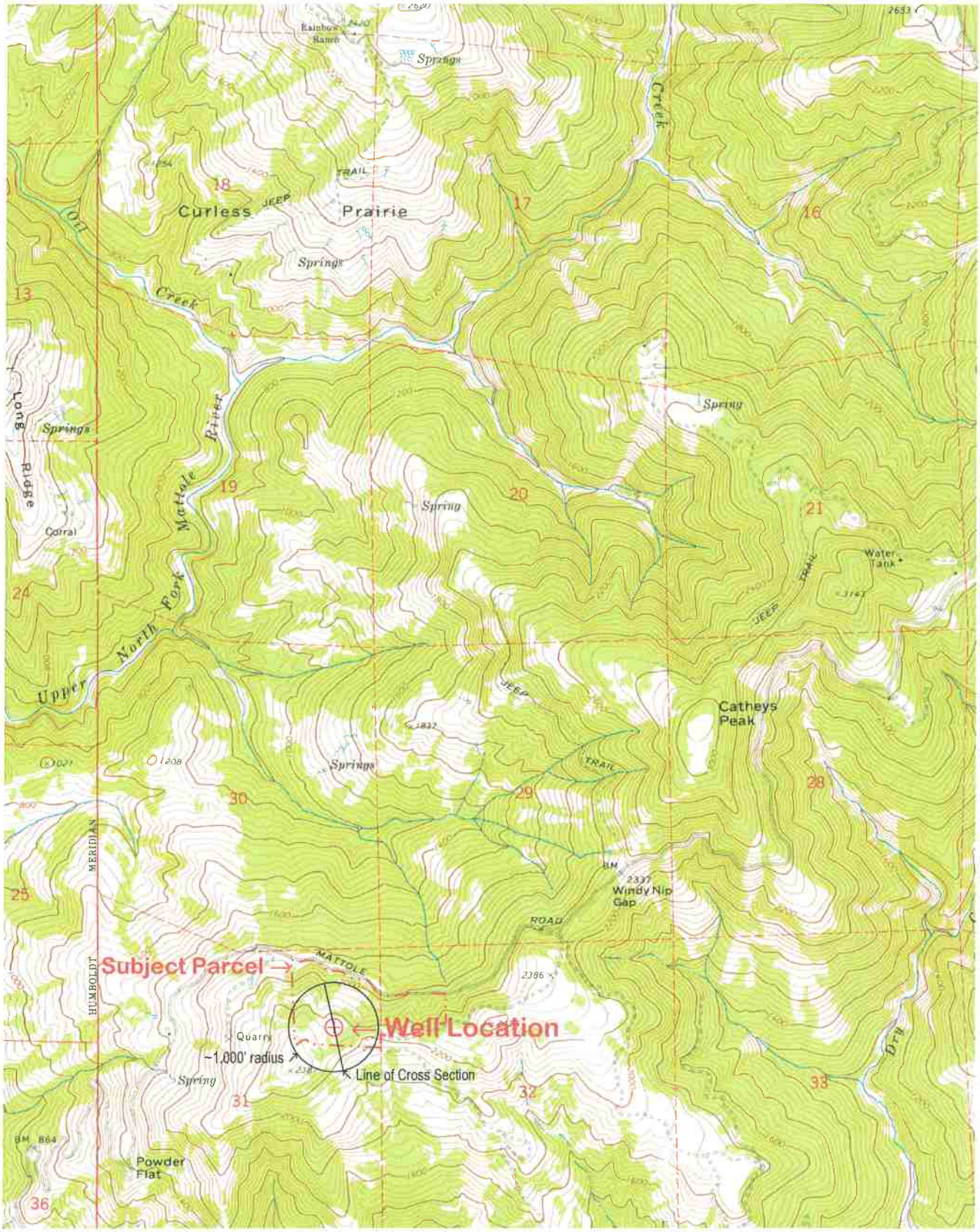
Figure 1:	Topographic Well Location Map
Figure 2:	Humboldt County Assessor's Parcel Map
Figure 3:	Satellite Image of Well location
Figure 4:	Geologic Map of Project Region
Figure 4a:	Geologic Map Explanation
Figure 5:	Generalized Geologic Cross Section
Figure 6:	Hydrogeologic Cross Section Sketch
Figure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

State of California Well Completion Report:
WCR2017-002398, APN: 107-054-014 (Subject Well)
WCR2017-000250, APN: 107-054-030, well approximately 1,000 feet to the southwest
WCR2017-000727, APN: 107-054-005, approximately 1,115 to the southeast

Web Soil Survey, NRCS Map Unit Description:
Wirefence-Windynip-Devilshole complex, #646, 5 to 30 percent slopes.

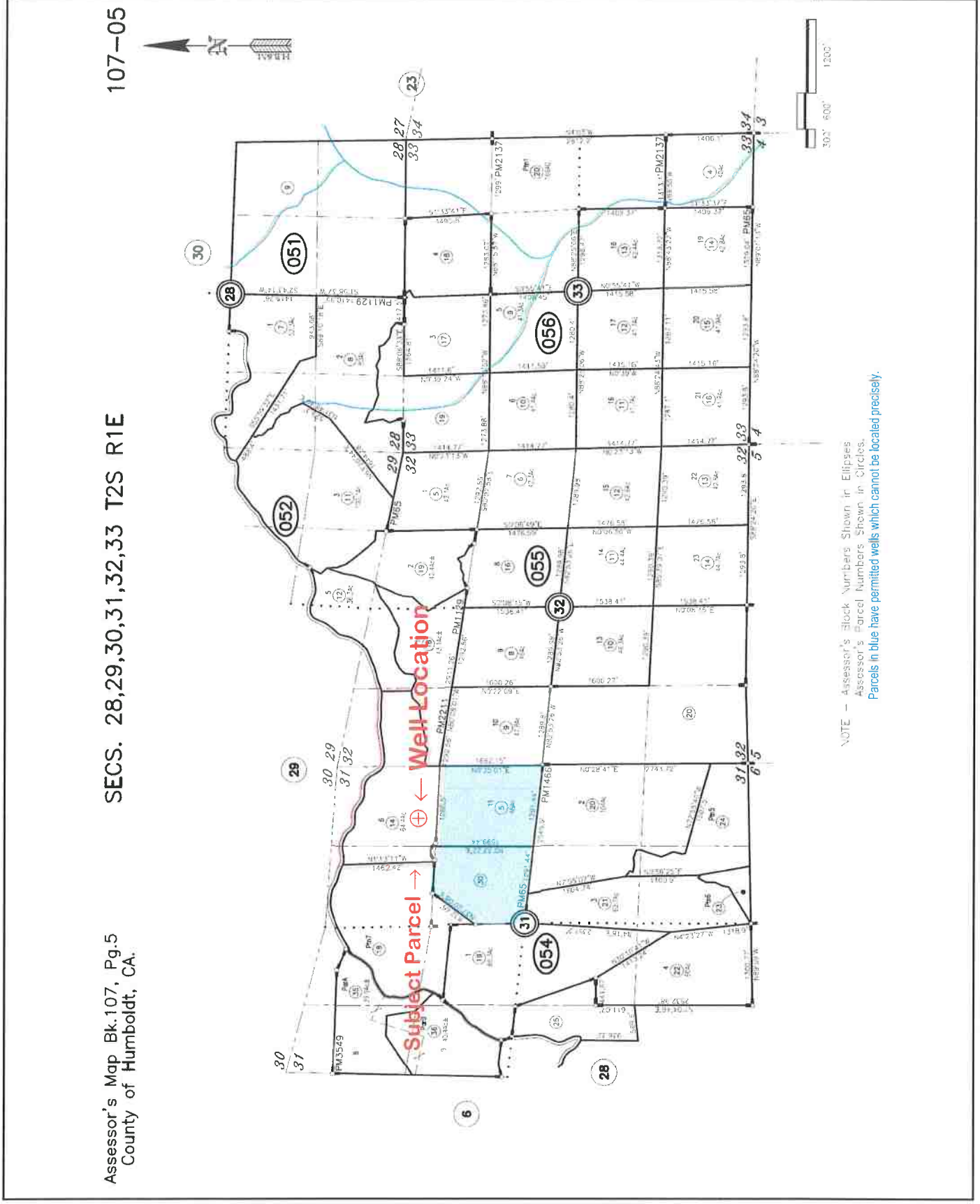
Reference:
Flint et al.: Fine-scale hydrologic modeling for regional landscape applications: the California Basin Characterization Model development and performance. Ecological Process, 2013, 2:25. (doi:10.1186/2192-1709-2-25)

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 1
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Topographic Well Location Map (locations approximate)	1" ≈ 2,500'



Modified from: USGS "Bull Creek, Calif." 7.5' Quadrangle Map, 1969. N ≡

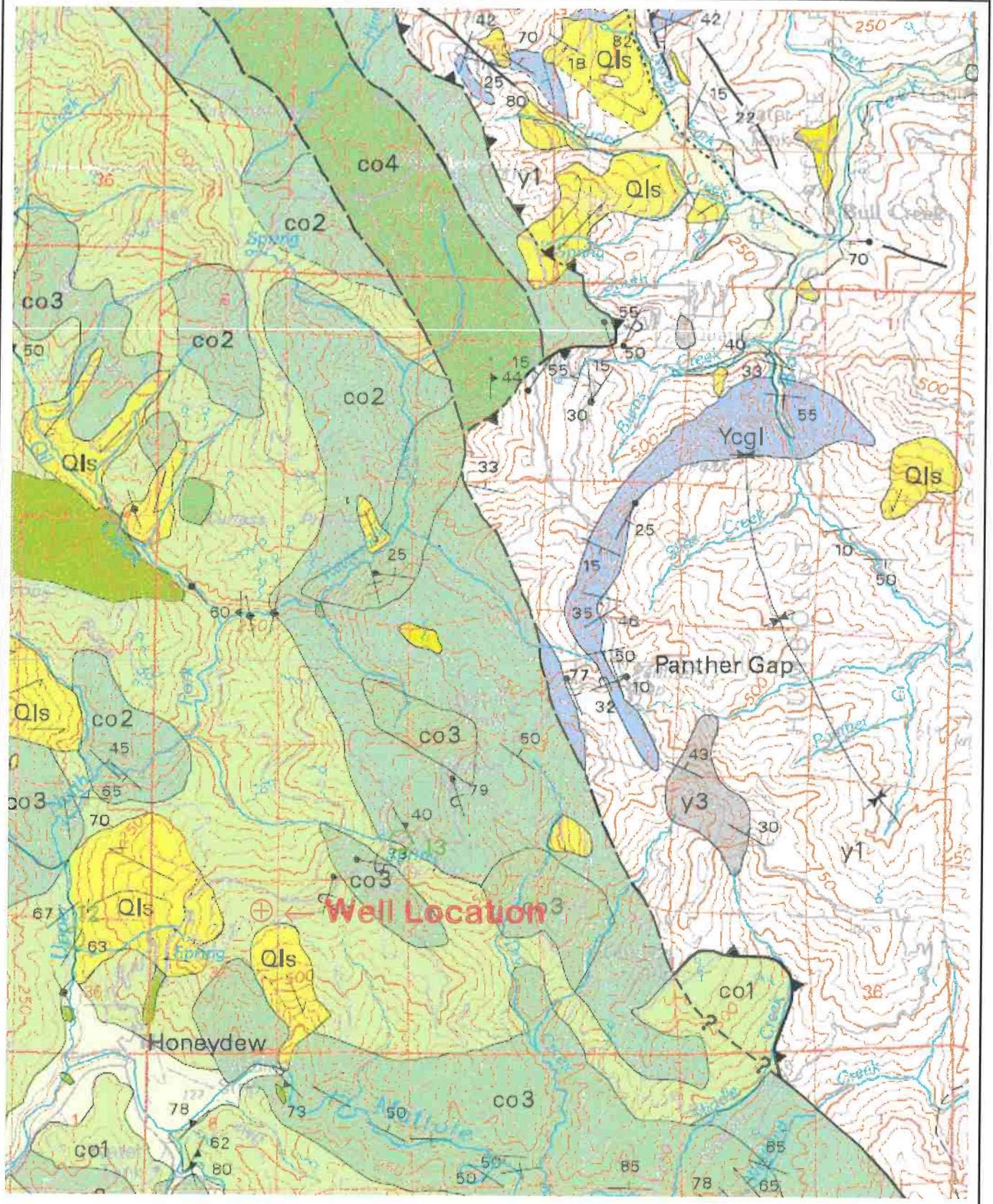
Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 2
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Humboldt County Assessor's Parcel Map (locations approximate)	Scale as Shown



Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 3
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Satellite Image of Well Location (locations approximate)	1" ≈ 450'

Modified from: Google Earth Imagery of April 21, 2019. N ≡

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 4
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Geologic Map of Project Region	1" ≅ 4,500'



Modified from: McLaughlin, et al., (2000) N ≅

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 4a
P. O. Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Geologic Map Explanation	No Scale

DESCRIPTION OF MAP UNITS

QUATERNARY AND TERTIARY OVERLAP DEPOSITS

- Qal — Alluvial deposits (Holocene and late Pleistocene?)
- Qm — Undeformed marine shoreline and aolian 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)
- cols — Limestone (Late Cretaceous)
- cu — 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 — Tafiaferro 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:

- dpms — Mudstone (Late Jurassic)

Coast Range ophiolite (Middle and Late Jurassic):

- dpt — Tuffaceous chert (Late Jurassic)
- dpb — Basaltic flows and keratophyric 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 (Chanchelulla Peak of Wright and Fahan, 1988) pluton (Middle Jurassic)
- whwp — Clinopyroxenite
- whji — Diorite and gabbro plutons (Middle? Jurassic)

Rattlesnake Creek terrane

- rcm — Melange (Jurassic and older)
- rcls — Limestone
- rcc — Radiolarian chert
- rcls — 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:

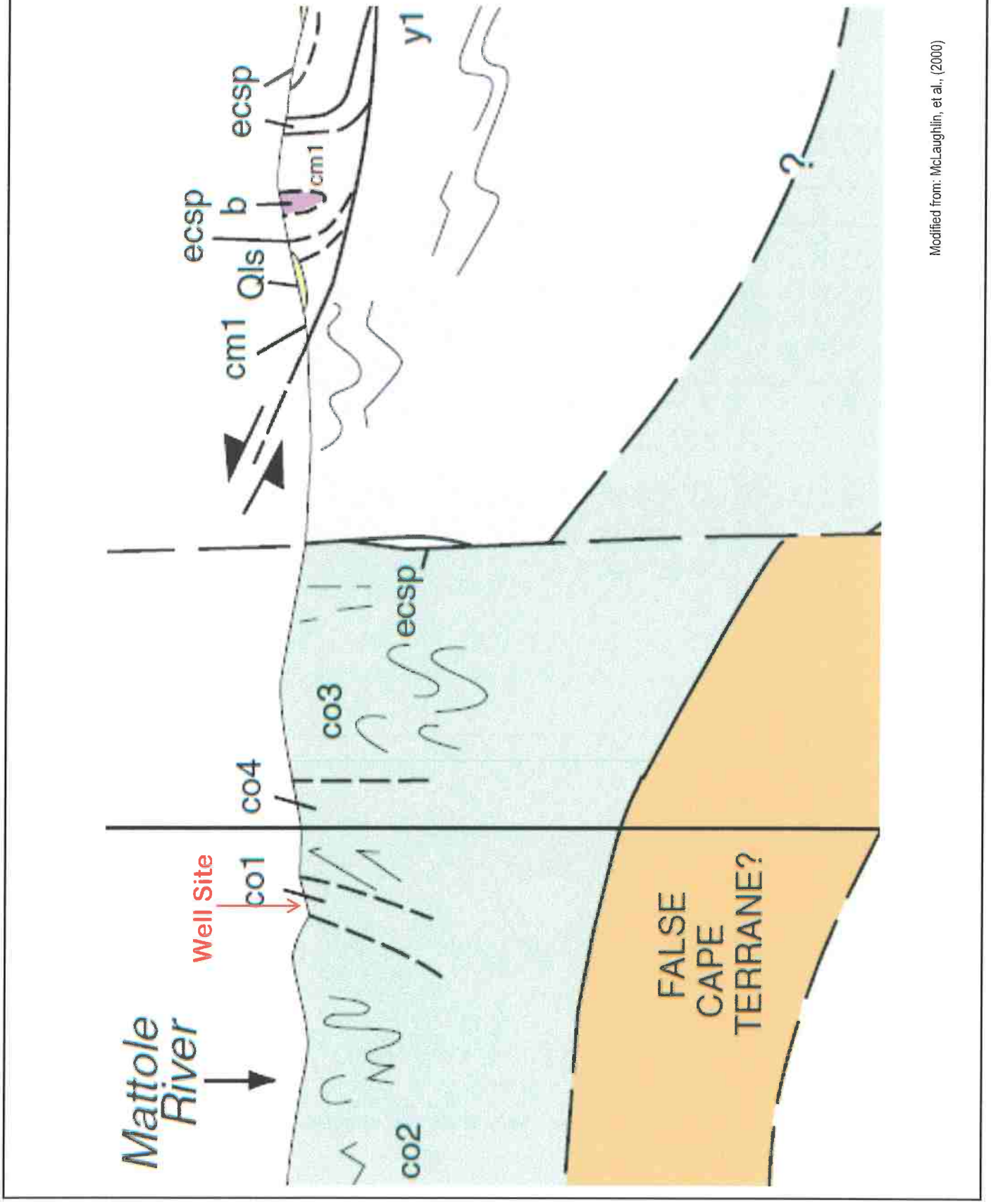
- Inclined
- Vertical

Folds:

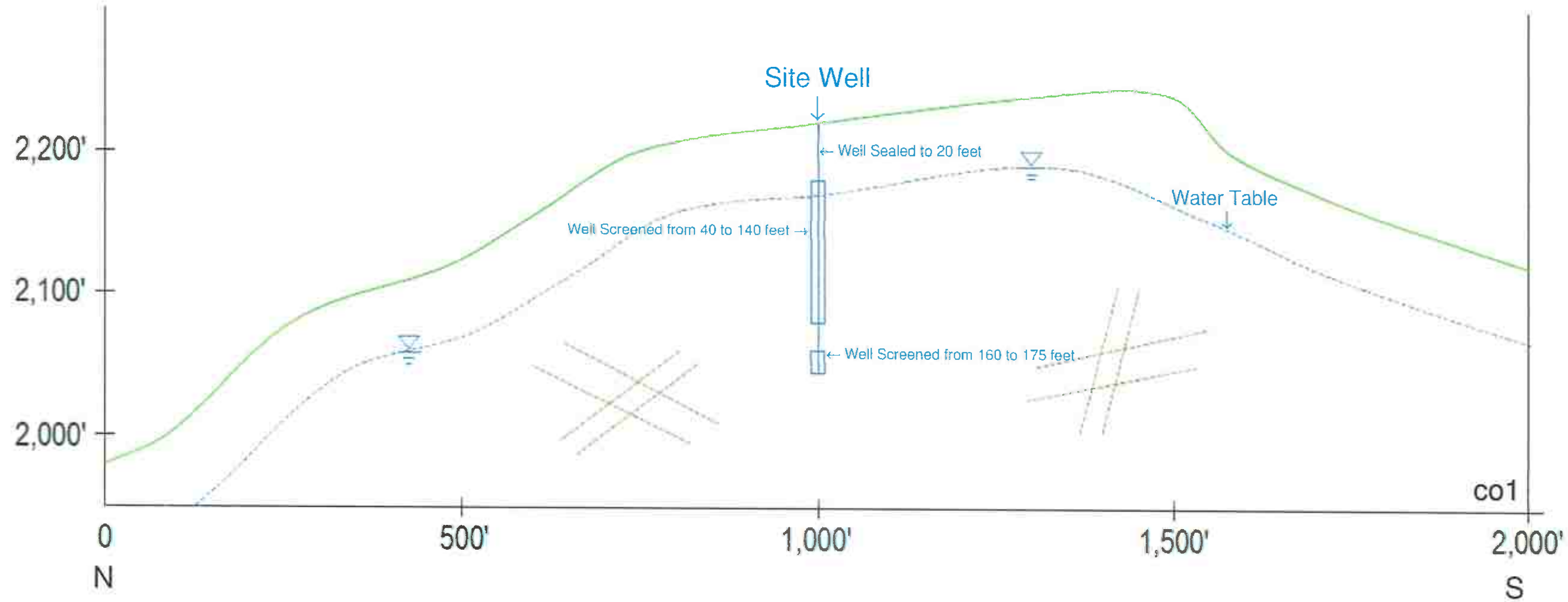
- Synclinal or synformal axis
- Anticlinal or antiformal axis
- Overturned syncline
- Landslide
- Melange Blocks:
- Serpentinite
- Chert
- Blueschist
- Greenstone
- Fossil locality and number

GEOLOGY OF THE CAPE MENDOCINO, EUREKA, GARBERVILLE, AND SOUTHWESTERN PART OF THE HAYFORK 30 X 60 MINUTE QUADRANGLES AND ADJACENT OFFSHORE AREA, NORTHERN CALIFORNIA (McLaughlin et al., 2000)

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 5
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Generalized Geologic Cross Section (locations approximate)	Not to Scale

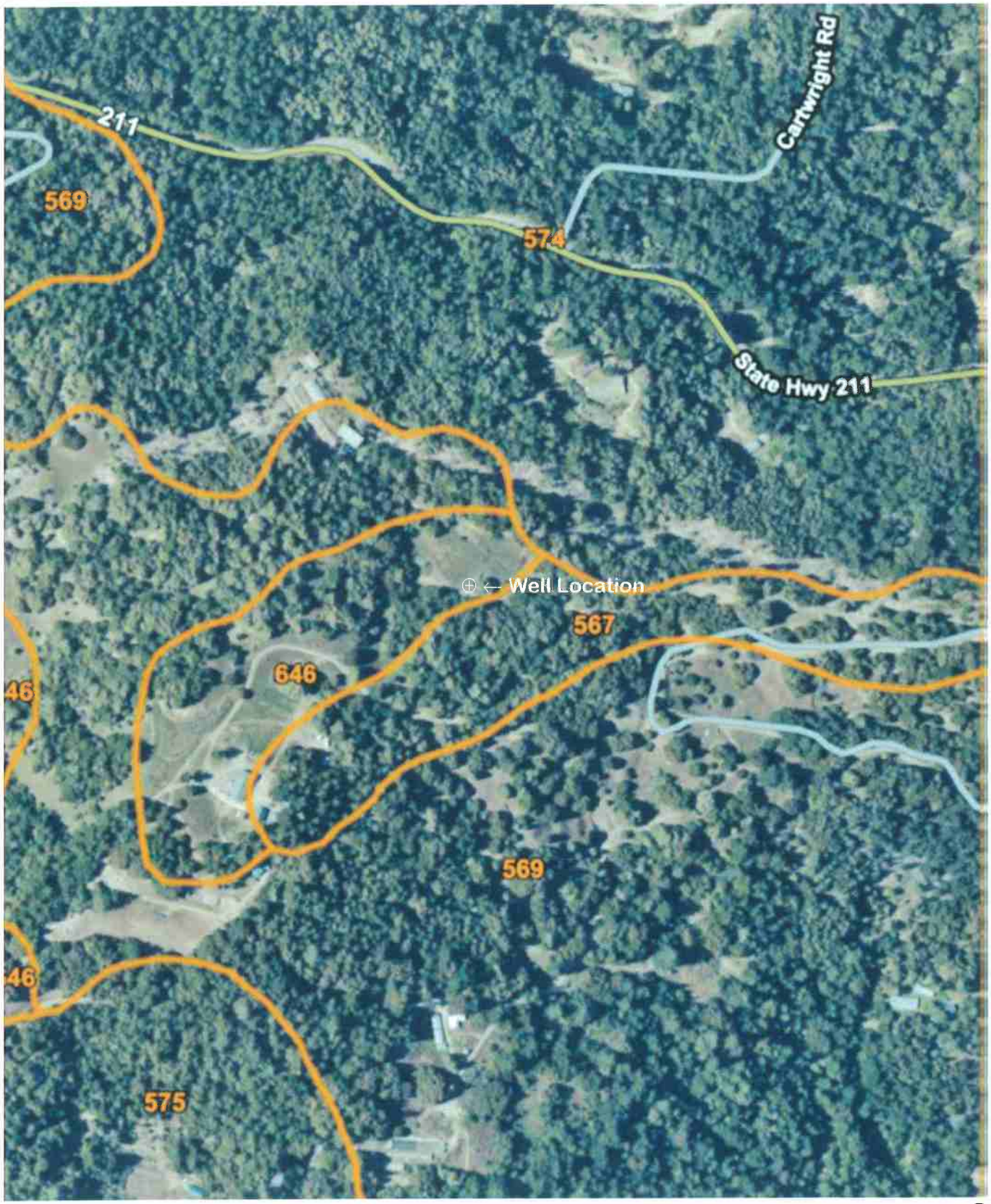


Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 6
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	Hydrogeologic Cross Section Sketch (locations approximate)	2 x VE



In this vertically exaggerated (~2x) cross section, the view is looking to the east-northeast toward Windy Nip Gap. Groundwater flow in this cross section is west-southwest, or toward the viewer, out of the page. Groundwater is presumed to flow from recharge areas in the higher ground to the east-northeast. This well is sited high above the Mattole valley. Subgrade is composed of argillite mélange of the Coastal Belt of the Franciscan Complex (co1). Groundwater is envisioned to flow through bedrock fractures. Fractures are interpreted to be the primary permeability, providing preferential flow paths for the local groundwater. The driller noted that first water encountered at 50 feet. Static water level was reported to be 6 feet below the surface. A bentonite seal was installed from grade to the 22-foot depth. This well is cased to 40 feet below the ground surface and screened from 40 feet to 140 feet. The deepest 15 feet (160' to 175') are also screened. This well thus draws groundwater from an 100-foot portion of the profile from 40 to 140 feet, and a 15 foot interval from 160 to 175 feet, below the surface. Bedrock mapping (Figure 4) is from McLaughlin et al., (2000).

Lindberg Geologic Consulting	Engineering-Geologic Well Connectivity Assessment Report	Figure 7
Post Office Box 306	1051 Heidi Lane, Honeydew, California, APN: 107-054-014	April 4, 2023
Cutten, CA 95534	Well WCR2017-002398, Mr. Scott Roberts, Client	Project 0352.01
(707) 442-6000	USDA-NRCS Soils Map (locations approximate)	Scale not Determined



Modified from: USGS-NRCS Web Soil Survey, April 3, 2023. N ≈

State of California

Well Completion Report

WCR Form - DWR 188 Complete 08/23/2017

WCR2017-002398

Owner's Well Number 2 | Date Work Began 01/06/2017 | Date Work Ended 01/13/2017

Local Permit Agency Humboldt County Department of Health & Human Services - Land Use Program

Secondary Permit Agency | Permit Number 16/17-0252 | Permit Date 09/22/2016

Well Owner (must remain confidential pursuant to Water Code 13752)

Name XXXXXXXXXXXXXXXXXXX

Mailing Address XXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXX

City XXXXXXXXXXXXXXXXXXX State XX Zip XXXXX

Planned Use and Activity

Activity New Well

Planned Use Water Supply Domestic

Well Location

Address 1051 Heidi LN

City Honeydew Zip 95545 County Humboldt

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

Dec. Lat. Dec. Long.

Vertical Datum Horizontal Datum WGS84

Location Accuracy Location Determination Method

APN 107-054-014

Township 02 S

Range 01 E

Section 31

Baseline Meridian Humboldt

Ground Surface Elevation

Elevation Accuracy

Elevation Determination Method

Borehole Information

Orientation Vertical Specify

Drilling Method Other - Casing Advance Drilling Fluid Air

Total Depth of Boring 175 Feet

Total Depth of Completed Well 175 Feet

Water Level and Yield of Completed Wall

Depth to first water 50 (Feet below surface)

Depth to Static Water Level 6 (Feet) Date Measured 01/13/2017

Estimated Yield* 50 (GPM) Test Type Air Lift

Test Length 4 (Hours) Total Drawdown (Feet)

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

Geologic Log - Free Form

Depth from Surface Feet to	Feet	Description
0	45	Brown Clay With Gravel
45	175	Dark Blue Mudstone with Siltstone Lenses

Casings

Casing #	Depth from Surface Feet to	Feet	Casing Type	Material	Casings Specifications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	Low Carbon Steel	N/A	0.188	8			
2	0	40	Blank	Low Carbon Steel	N/A	0.188	6.625			
2	40	140	Other: Knife Cut/ Star Perforator	Low Carbon Steel	N/A	0.188	6.625		0.25	
2	140	160	Blank	Low Carbon Steel	N/A	0.188	6.625			
2	160	175	Other: Knife Cut/ Star Perforator	Low Carbon Steel	N/A	0.25	6.625		0.25	

Annular Material

Depth from Surface Feet to	Feet	Fill	Fill Type Details	Filter Pack Size	Description
0	20	Bentonite	Non Hydrated Bentonite		3/8 Hole Plug
20	175	Other Fill	See description.		No Annular Fill

Other Observations:

Borehole Specifications

Depth from Surface Feet to	Feet	Borehole Diameter (inches)
0	20	12
20	70	7.5
70	175	7.44

Certification Statement

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

Name: WATSON WELL DRILLING, INC.
Person, Firm or Corporation

500 Summer Street | Eureka | CA | 95501
Address | City | State | Zip

Signed: *electronic signature received* | 07/17/2017 | 1014048
C-57 Licensed Water Well Contractor | Date Signed | C-57 License Number

Attachments

WellReport_05222017_1_20170823_151217.pdf - WCR Final

DWR Use Only

Site Number / State Well Number

Latitude Deg/Min/Sec | Longitude Deg/Min/Sec

TRS:

APN:

State of California

Well Completion Report

Form DWR 188 Complete 1/27/2017

WCR2017-000250

Owner's Well Number: 1 | Date Work Began: 01/13/2017 | Date Work Ended: 01/17/2017

Local Permit Agency: Humboldt County Department of Health & Human Services - Land Use Program

Secondary Permit Agency: | Permit Number: 16/17-0266 | Permit Date: 09/22/2016

Well Owner (must remain confidential pursuant to Water Code 13752)

Name: XXXXXXXXXXXXXXXXXXX

Mailing Address: XXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXX

City: XXXXXXXXXXXXXXXXXXX | State: XX | Zip: XXXXX

Planned Use and Activity

Activity: New Well

Planned Use: Water Supply Domestic

Well Location

Address: 1300 Heidi LN

City: Honeydew | Zip: 95545 | County: Humboldt

Latitude: Deg. Min. Sec. N | Longitude: Deg. Min. Sec. W

Dec. Lat.: 40.25446 | Dec. Long.: -124.11133

Vertical Datum: | Horizontal Datum: WGS84

Location Accuracy: Centroid of | Location Determination Method: Derived from TRS

APN: 107-054-030

Township: 02 S

Range: 01 E

Section: 31

Baseline Meridian: Humboldt

Ground Surface Elevation:

Elevation Accuracy:

Elevation Determination Method:

Borehole Information

Orientation: Vertical | Specify:

Drilling Method: Direct Rotary | Drilling Fluid: Air

Total Depth of Boring: 250 Feet

Total Depth of Completed Well: 245 Feet

Water Level and Yield of Completed Well

Depth to first water: 90 (Feet below surface)

Depth to Static Water Level: (Feet) | Date Measured: 01/17/2017

Estimated Yield*: 15 (GPM) | Test Type: Air Lift

Test Length: (Hours) | Total Drawdown: (feet)

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

Geologic Log - Free Form

Depth from Surface Feet to Feet		Description
0	28	Brown Clay
28	250	Blank Shale w/Blue Sandtone Lenses

Casings

Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	Low Carbon Steel	Grade: ASTM A53	0.188	8			
2	5	245	Other: Knife Cut	Low Carbon Steel	Grade: ASTM A53	0.188	6		0.25	Perf 80'-100' 120'-140' 160'-180' 200'-220' 240'-245'

Annular Material

Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	20	Bentonite	Other Bentonite	0.375	Hole Plug
20	250	Other Fill	See description.		No Annular Fill

Other Observations:

Borehole Specifications

Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	20	12
20	250	7.5

Certification Statement

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

Name: WATSON WELL DRILLING
Person, Firm or Corporation

500 Summer Street | Eureka | CA | 95501
Address | City | State | Zip

Signed: *electronic signature received* | 01/20/2017 | 1014048
C-57 Licensed Water Well Contractor | Date Signed | C-57 License Number

DWR Use Only

CSG #	State Well Number	Site Code	Local Well Number

					N

Latitude Deg/Min/Sec

					W

Longitude Deg/Min/Sec

TRS:

APN:

State of California

Well Completion Report

WCR Form - DWR 188 Complete 06/23/2017

WCR2017-000727

Owner's Well Number: 2
Date Work Began: 01/18/2017
Date Work Ended: 01/24/2017
Local Permit Agency: Humboldt County Department of Health & Human Services - Land Use Program
Secondary Permit Agency:
Permit Number: 16/17-0453
Permit Date: 11/02/2016

Well Owner (must remain confidential pursuant to Water Code 13752)

Name: XXXXXXXXXXXXXXXXXXX
Mailing Address: XXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXX
City: XXXXXXXXXXXXXXXXXXX State: XX Zip: XXXXX

Planned Use and Activity

Activity: New Well
Planned Use: Water Supply Domestic

Well Location

Address: 360 Hilde LN
City: Honeydew Zip: 95545 County: Humboldt
Latitude: Deg. Min. Sec. N Longitude: Deg. Min. Sec. W
Dec. Lat. Dec. Long.
Vertical Datum Horizontal Datum: WGS84
Location Accuracy Location Determination Method
APN: 107-054-005
Township: 02 S
Range: 01 E
Section: 31
Baseline Meridian: Humboldt
Ground Surface Elevation
Elevation Accuracy
Elevation Determination Method

Borehole Information

Orientation: Vertical Specify:
Drilling Method: Other - Casing Advance Drilling Fluid: Air
Total Depth of Boring: 220 Feet
Total Depth of Completed Well: 220 Feet

Water Level and Yield of Completed Wall

Depth to first water: 50 (Feet below surface)
Depth to Static Water Level: 32 (Feet) Date Measured: 01/25/2017
Estimated Yield*: 45 (GPM) Test Type: Air Lift
Test Length: (Hours) Total Drawdown: (Feet)
*May not be representative of a well's long term yield.

Geologic Log - Free Form

Depth from Surface Feet to	Feet to	Description
0	2	Top Soil
2	50	Brown Clay w/Gravel
50	195	Fractured Blue Sandstone
195	220	Black Shale

Casings

Casing #	Depth from Surface Feet to	Feet to	Casing Type	Material	Casings Specifications	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	20	Blank	Low Carbon Steel	N/A	0.188	8			
2	0	40	Blank	Low Carbon Steel	N/A	0.188	6			
2	40	80	Other: Knife Cut Screen	Other	N/A	0.188	6		0.25	
2	80	100	Blank	Low Carbon Steel	N/A	0.188	6			
2	100	140	Other: Knife Cut Screen	Low Carbon Steel	N/A	0.188	6		0.25	
2	140	160	Blank	Low Carbon Steel	N/A	0.188	6			
2	160	180	Other: Knife Cut Screen	Low Carbon Steel	N/A	0.188	6		0.25	
2	180	200	Blank	Low Carbon Steel	N/A	0.188	6			
2	200	220	Other: Knife Cut Screen	Low Carbon Steel	N/A	0.188	6		0.25	

Annular Material

Depth from Surface Feet to	Feet	Fill	Fill Type Details	Filter Pack Size	Description
0	20	Bentonite	Non Hydrated Bentonite	0.375	Non-Hydrated
20	220	Other Fill	See description.		No Annular Fill

Other Observations:

Borehole Specifications

Depth from Surface Feet to	Feet	Borehole Diameter (inches)
0	20	12
20	150	7.5
150	220	7.44

Certification Statement

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

Name: WATSON WELL DRILLING (Person, Firm or Corporation)

500 Summer Street (Address) | Eureka (City) | CA (State) | 95501 (Zip)

Signed: *electronic signature received* (C-57 Licensed Water Well Contractor) | 03/07/2017 (Date Signed) | 1014048 (C-57 License Number)

Attachments

WellReport_05222017_1_20170623_145830.pdf - WCR Final

DWR Use Only

Site Number / State Well Number

Latitude Deg/Min/Sec: N

Longitude Deg/Min/Sec: W

TRS:

APN:

Humboldt County, South Part, California

646—Wirefence-Windynip-Devilshole complex, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1lpq7
Elevation: 200 to 3,280 feet
Mean annual precipitation: 60 to 100 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 240 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Wirefence and similar soils: 35 percent
Windynip and similar soils: 30 percent
Devilshole and similar soils: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wirefence

Setting

Landform: Ridges
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium and residuum derived from sandstone

Typical profile

A1 - 0 to 11 inches: loam
A2 - 11 to 21 inches: loam
A3 - 21 to 33 inches: gravelly loam
AB - 33 to 46 inches: gravelly loam
Bw - 46 to 63 inches: very gravelly fine sandy loam
C - 63 to 79 inches: very gravelly fine sandy loam

Properties and qualities

Slope: 5 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 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: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F004BI106CA - High precipitation mountain slopes
Hydric soil rating: No

Description of Windynip

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium and residuum derived from sandstone and mudstone

Typical profile

A1 - 0 to 5 inches: loam
A2 - 5 to 12 inches: clay loam
A3 - 12 to 20 inches: clay loam
AB - 20 to 33 inches: clay loam
Bt1 - 33 to 59 inches: gravelly clay loam
Bt2 - 59 to 79 inches: very gravelly clay loam

Properties and qualities

Slope: 5 to 30 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 low to moderately high (0.06 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: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R004BI202CA - Loamy Uplands
Hydric soil rating: No

Description of Devilshole

Setting

Landform: Ridges
Landform position (two-dimensional): Shoulder, summit

Hydric soil rating: No

Rainbear

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

Data Source Information

Soil Survey Area: Humboldt County, South Part, California
Survey Area Data: Version 12, Sep 2, 2022