



TO: Davie Cowan
Kimley-Horn and Associates, Inc.

FROM: Kear Groundwater
P.O. Box 2601
Santa Barbara, CA 93120-2601

DATE: April 28, 2023

SUBJECT: *New Well Preliminary Report and Design Evaluation, Lone Oak - Rancho Project
Cucamonga Valley Water District, San Bernardino County, California*

Dear Mr. Cowan,

This memorandum provides a summary of Kear Groundwater's (KG) hydrogeologic evaluation and preliminary design evaluation of the planned new water supply well for the "Lone Oak - Rancho Project" in the Chino Basin, Rancho Cucamonga, southwestern San Bernardino County, California. The proposed Project well will be tied into the Cucamonga Valley Water District (CVWD) system. Separately, Dudek (2023) prepared the Project's Water Supply Assessment as per the California Environmental Quality Act (CEQA). Figure 1 presents the aerial location map.

~~KG understands that the maximum total Project water demand after completion of all phases is 1044 acre feet per year (AFY),~~ and that the desired new well location is within the southeastern corner of Assessor Parcel Number (APN) 209-411-34, located about 900 feet south of CVWD No. 46 that is the closest of the nine currently existing District wells in the Chino Basin. The well must be located at least 50 horizontal ft removed from the nearest storm sewer line as part of minimum setback standards. The pilot borehole will penetrate entirely through the unconsolidated deposits that fill the Chino Basin to the total exploration depth of around 1200 feet below ground surface (bgs). Multiple zone isolation tests, constructed from the bottom-up in the pilot bore, will evaluate the vertical stratification of groundwater quality to maximize the final pumped blend quality. When equipped with a 24-inch-diameter steel casing (high-strength low-alloy [HSLA]-over-stainless), a pump, and power, a new well at this location and to this depth appears capable of producing on the order of thousands of gallons per minute (gpm).

A summary of our efforts, findings, conclusions, and more detailed recommendations follows.



Cucamonga Valley Water District – Chino Basin Rights

CVWD operates Public Water System No. CA3610018 as an ‘Urban Water Supplier’ under State Water Resources Control Board, Division of Drinking Water (SWRCB-DDW) regulations. The District provides potable water, recycled water, and sewer services to the City of Rancho Cucamonga, portions of the Cities of Upland, Ontario and Fontana, and some unincorporated areas of San Bernardino County across a service area of 46 square miles. Total water demand (potable and recycled) over 2010 to 2020 averaged 48,276 AFY (Stetson, 2021). CVWD water supplies include: (1) groundwater pumped from both the Chino Basin and Cucamonga Basin, and (2) untreated, imported surface water from the Metropolitan Water District (MWD) of Southern California purchased through the Inland Empire Utilities Agency (IEUA) before treatment by CVWD, (3) local surface water from Cucamonga Canyon, Day/East Etiwanda Canyon, and Deer Canyon, and (4) recycled water purchased from the IEUA. Purchased raw imported water accounts for about 25% to 65% of the District’s total use in a given year.

The Chino Basin was adjudicated in 1978 by the Superior Court for San Bernardino County (“Chino Basin Judgment”). Pursuant to the Judgment, a nine-member board serves as the Chino Basin Watermaster, consisting of: three members appointed by Appropriative Pool parties (cities, districts, utilities), one member by the Non-Agricultural/industrial Pool, two members by the Overlying Agricultural Pool, and three members by the Municipal Water Districts. As such, the Chino Basin is ranked as a “Very Low” priority under the Sustainable Groundwater Management Act (SGMA) of 2014. CVWD maintains appropriative rights that equate to 18.3% of total Chino Basin safe yield, or about 7500 AFY recently, including its 6.6% right and an acquired 11.7% right by the majority interest of Fontana Union Water Company (FUWC). CVWD also acquired the Chino Basin rights of the Etiwanda Water Company. The Chino Basin Judgment set the initial Safe Yield for the Chino Basin at 140,000 AFY but is recalculated every 10 years, including to 131,000 AFY through 2030. The Safe Yield is the “long-term average annual quantity of groundwater (excluding replenishment of stored water but including return flow to the Basin from use of replenishment or stored water) which can be produced from the Chino Basin under conditions of a particular year without causing an undesirable result.”

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Existing CVWD Chino Basin Groundwater Wells

There are nine currently existing CVWD groundwater wells, eight of which appear to be currently active, in the Chino Basin (Nos. 1, 4, 5, 30, 38, 41, 42, 46, and the inactive No. 3). Department of Water Resources (DWR) Well Completion Reports (WCRs) are publicly available for Well Nos. 38, 41, 42, and 46.

Layne Christensen Company (Layne) constructed CVWD No. 38 (*State Well Number [SWN] 01S/07W-14D011S*) in 2000, constructing the well with 20-inch-diameter copper-bearing steel to 1200 ft. The casing includes 0.094-inch-aperture Ful-Flo louvered perforations from 610 to 1180 ft. The cement sanitary seal extends from ground surface to 550 ft bgs. The well reportedly produced 2000 gpm over 100 hours in September 2000, during which the water table was drawn down from a static level of 448 ft to a pumping level of 523 ft bgs (75 ft drawdown, or a specific capacity of 26.7 gpm per ft ddn).

South West Pump & Drilling, Inc. (South West) constructed CVWD No. 41 (*SWN 01S/07W-13B001S*) in 2004, with 20-inch-diameter stainless steel to 1010 ft. The casing includes 0.085-inch-aperture Ful-Flo louvered perforations from 650 to 860 ft and 890 to 990 ft. The cement sanitary seal extends from ground surface to 50 ft bgs. The well reportedly produced 3500 gpm over 24 hours in December 2004, during which the water table was pumped down from a static level of 430.75 ft to a pumping level of 552.25 ft bgs (121.5 ft drawdown, or a specific capacity of 28.8 gpm per ft ddn).

South West constructed CVWD No. 42 (*SWN 01S/07W-13G001S*) also in 2004, furnishing the well with 20-inch-diameter stainless steel to 1010 ft. The pilot bore extended to 1210 ft bgs. The casing includes 0.085-inch-aperture Ful-Flo louvered perforations from 650 to 780 ft, 800 to 840 ft, 900 to 940 ft, and 950 to 990 ft. The cement sanitary seal extends from ground surface to 50 ft bgs. The well reportedly produced 4000 gpm over 21 days in November 2004, during which the water table fell from a static level of 431 ft to a pumping level of 576 ft bgs (145 ft drawdown, or a specific capacity of 27.6 gpm per ft ddn).

South West drilled CVWD No. 46 (*SWN 01S/07W-13E002S*) in 2008, equipping the well

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with 24-inch-diameter HSLA-over-stainless steel to 1000 ft. The pilot bore extended to 1200 ft bgs. The casing includes 0.085-inch-aperture Ful-Flo louvered perforations from 650 to 800 ft and 840 to 990 ft. The cement sanitary seal extends from ground surface to 540 ft bgs. The well reportedly produced 3000 gpm over 24 hours in July 2008, during which the water table drew down from a static level of 454.25 ft to a pumping level of 507.25 ft bgs (53 ft drawdown, or a specific capacity of 56.6 gpm per ft ddn).

Per the United States Geological Survey (USGS) National Water Information System (NWIS) Mapper, CVWD No. 1 corresponds to *SWN 01S/07W-14E001S*, CVWD No. 3 corresponds to *SWN 01S/07W-14L001S*, and CVWD No. 5 corresponds to *SWN 01S/07W-14G001S*.

DWR's Water Data Library lists the top of perforations at 341 ft and a well depth of 835 ft bgs for CVWD No. 3.

Per the SWRCB Groundwater Ambient Monitoring and Assessment (GAMA) Program's Groundwater Information System, CVWD No. 1 has perforations between 432 and 774 ft bgs, CVWD No. 4 has perforations between 494 and 835 ft bgs, CVWD No. 5 has perforations between 538 and 966 ft bgs, and CVWD No. 30 has perforations between 470 and 1050 ft bgs.

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Hydrogeologic Overview

CVWD is situated in the northern Upper Santa Ana Valley and overlies two of its delineated groundwater sub-basins, the Chino Subbasin (“Chino Basin,” No. 8-2.01) and the Cucamonga Sub-Basin (“Cucamonga Basin,” No. 8-2.02) as defined by the DWR Bulletin 118. The Chino Basin is bounded the Cucamonga Basin and the San Gabriel Mountains to the north, the Rialto-Colton Subbasin (No. 8-2.04) to the northeast, the consolidated rocks of the Jurupa and related hills to the southeast, the Chino and Puente Hills to the southwest, and finally the Spadra Basin, San Jose Hills and the Six Basins to the northwest. The basin covers about 230 square miles largely within San Bernardino County and contains several million acre-feet of groundwater. Cucamonga Creek, including its tributary Deer Creek, drains the Chino Basin southward before joining the Santa Ana River.

Principal aquifers of the Chino Basin are contained with the unconsolidated alluvial deposits that fill the valley, including the active Holocene-aged alluvial fan deposits and (most significantly) the older Pleistocene-aged alluvial fan and fluvial deposits. The Pleistocene alluvium consists of the thickest sequences of coarser-grained material and yields the highest water to wells (thousands of gpm). The unconsolidated basin deposits reach over 1200 ft thick in the vicinity of the CVWD existing wells, as shown on WEI (2003) geologic cross sections.

The total storage capacity of the basin is 18,300,000 AF (DWR, 1971), with about one-third that volume typically filled (DWR, 2006). Annual groundwater production from the basin (including for the appropriative pool, the agricultural pool, and the non-agricultural/industry pool of users per the Judgment) has ranged between about 140,000 and 169,000 AFY over the last ten years (CBWM, 2023).

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Hydrostratigraphy

The broad, fault-bounded Upper Santa Ana Valley is located near the junction between the east-west-trending Transverse Ranges geomorphic province (including the San Gabriel and San Bernardino mountains) and the northwest-trending Peninsular Ranges.

Figure 2 presents the geologic map of the Chino Basin.

Quaternary-aged alluvium fills the low-lying Chino Basin, with sediment derived from the weathering and erosion of the surrounding mountains. The deposits are comprised of unconsolidated mixtures of gravels, sands, silts, and clays of various thicknesses. Groundwater is stored in coarser-grained aquifers separated by finer-grained aquitards. Alluvium is generally separated into recent, active (Holocene-aged, Qa) deposits and older (Pleistocene-aged, Qoa) deposits. The Holocene alluvium reaches a maximum thickness of around 150 ft and is typically coarser grained in and near the canyons and finer away in the distal southern basin (DWR, 2006). The Pleistocene alluvium is thicker and contains interfingering finer, alluvial-fan deposits and coarser, fluvial deposits that form the principal freshwater-bearing units of the basin. The older alluvium is generally between about 600 to 700 ft thick in the Chino Basin; however, WEI (2003) interprets the 1200-ft-deep CVWD Well No. 38 to be constructed entirely within alluvium (in Cross-Section H-H', Figure 2-13; includes resistivity curve trace), representing one of the deeper basin portions. The nearby CVWD Well No. 30, also presented as an approximately 1200-ft-deep pilot bore (in Cross-Section F-F', Figure 2-12), is interpreted to countersink into the underlying sedimentary bedrock near the bore bottom.

WEI (2003) subdivides the Chino Basin into a shallow aquifer system with un-/semi-confined groundwater conditions (generally unsaturated in the northern basin) and a deep confined aquifer system. The deep aquifer tends to have lower permeability but better quality. The distinction between the systems is most pronounced in the west-southwest basin portion, with more clay and silt aquitard layers. The CVWD Chino Basin wells straddle the line of shallow aquifer saturation as defined in the Fall of 2000 (included with Figure 2), suggesting the wells dominantly produce groundwater from the deep aquifer.

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The alluvial basin deposits are unconformably underlain by consolidated bedrock that contains comparatively little groundwater. In the northern and eastern basin, the aquifer material is largely underlain by the Cretaceous-aged crystalline basement complex (principally granite, gneiss, and schist) of the San Gabriel Mountains; in the west-southwestern basin, the alluvium is underlain by the Plio-Miocene-aged sedimentary Puente Formation units that outcrop in the Chino and Puente Hills.

A historic oil exploration bore from 1928, Italian Vineyard Co. Well No. 1 located by the modern day Ontario Airport south of the Lone Oak parcels, ceased drilling operations at 1320 ft upon encountering granite. Slightly more southerly, at Argyle Campbell & Co. Well No. 1 in 1954, blue shale was first encountered around 1284 ft prior to granite at 1436 ft. The well was reportedly converted to a water well by the landowner.

Groundwater Recharge and Levels

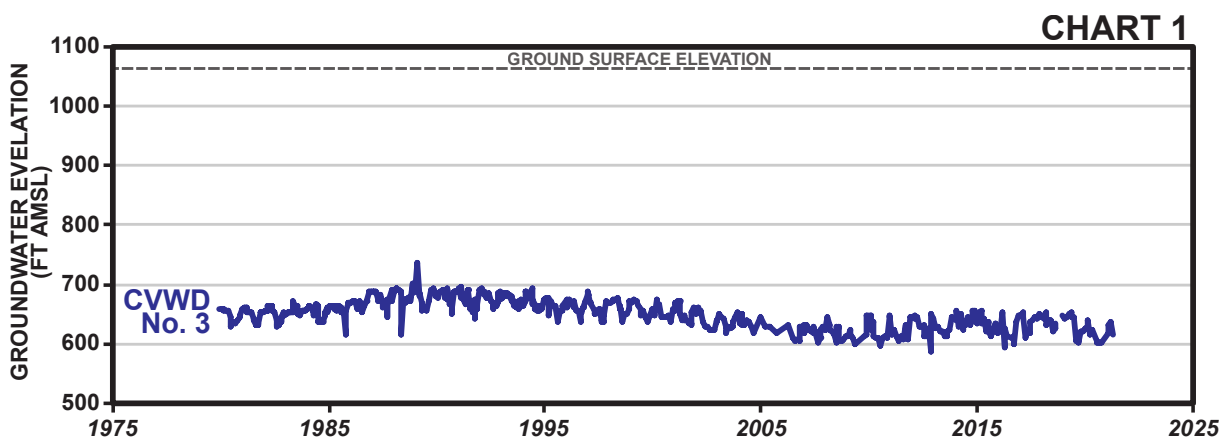
Recharge to the Chino Basin alluvial aquifers is naturally derived from the infiltration of rainfall and percolation of resultant surface flows along unlined drainage channels, in addition to underflow from upgradient contiguous groundwater basins. The upgradient Cucamonga Basin receives much of the San Gabriel Mountains runoff, whereas faults that cut the basin alluvium restrict groundwater inflow into the Chino Basin (e.g., Thiros [USGS], 2010). In northern forebay of the Chino Basin, recharge is augmented across a large network of flood control/multipurpose and conservation basins; multipurpose basins are operated primarily for flood peak discharge attenuation and secondarily for the recharge of storm and supplemental water, whereas conservation basins are operated to recharge storm and supplemental water. IEUA recharges recycled water in Chino Basin recharge facilities for the benefit of its member agencies.

Groundwater flows in a similar direction as surface drainage patterns, generally from the high-elevation recharge forebays in the north and toward the Santa Ana River with the Prado Dam Flood Control Basin to the south-southwest. DWR's Water Data Library includes the long-term water level hydrograph from 1979 through 2021 in CVWD No. 3, presented as Chart 1. The

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hydrograph demonstrates the overall stability of the Chino Basin water levels since its adjudication in 1978, including through drought periods. The historical and on-going management practices have created a stable and reliable supply (e.g., Stetson, 2021). Prior to the adjudication, water levels in the Chino Basin declined by about 80 ft from the historical highs of the 1920s to 1980 (DWR, 2006). Water levels then increased by about 40 ft through the early 1990s prior to declining again by about 80 ft by 2010. Water levels recovered by as much as 50 ft by 2014, remained stable through 2020 before declining slightly. Thus, while periods of rising or falling conditions typically persist (generally related to groundwater pumpage and imported water recharge), the long-term trend is stable with total fluctuations of less than about 100 ft over the period of record.



Specifically, the CVWD Chino Basin wells are within the north-central portion of CBWM’s “Management Zone 2,” where water levels declined by as much as 130 ft between 1930 and 1977 during periods of overdraft prior to adjudication (WEI, 2003). A lag time can occur in water level responses to climatic trends (dry, typical, wet) due to the thick vadose/unsaturated zone and the lateral distance between the forebay/recharge areas in the north.

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Groundwater Quality

Groundwater in areas of the Chino Basin is currently contaminated with perchlorate and volatile organic compounds (VOCs, primarily trichloroethylene [TCE], per[tetra]chloroethylene [PCE], and 1,2,3-Trichloropropane [1,2,3-TCP]), chiefly associated with historic agricultural and industrial practices of the area, and often does not meet the SWRCB potable water criteria. In addition, nitrates and total dissolved solids (TDS) concentrations can exceed drinking water standards. Hexavalent chromium could become an issue depending on the future drinking water standards. Arsenic also can be elevated at depth particularly near the City of Chino Hills.

Thus, many producers in the area require additional wellhead treatment facilities prior to potable use. Previously, producers abandoned contaminated wells in favor of imported water. As imported water costs increase and its availability becomes less dependable, the reliability and control over local groundwater has become a more attractive alternative despite these added treatment costs. Common treatment strategies include air stripping, granular activated carbon (GAC) adsorption, reverse osmosis (RO)/nanofiltration, or (an)ion exchange resins. The Chino Basin Desalter Authority removes salts from brackish groundwater extracted from the lower Chino Basin through the Chino I and II Desalter facilities. The treatment processes include reverse osmosis, ion exchange for removal of nitrates and TDS, and air stripping for the removal of VOCs, with capacity to treat 40,000 AFY from the Chino Basin for the purpose of groundwater cleanup and control of contaminant migration. TDS concentrations are generally lower/fresher in the northern basin (north of the 60 Freeway) and higher/poorer in the southern basin (e.g., WEI, 2003).

“Contaminants of emerging concern” (CECs) represent a wide range of chemical compounds, industrial pollutants, and human by-products that are present in the environment and bioaccumulate up the food web. CECs are generally associated with various anthropogenic sources, such as municipal wastewater treatment plants, agricultural and urban runoff, septic systems, and industrial sites. Contaminant plumes are typically tracked from known point-source releases. The majority of these delineated plumes occur south/hydraulically-downgradient of the CVWD Chino Basin wellfield. For example, the Stringfellow Superfund Site involved disposal

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pits in Pyrite Canyon, north of Highway 60 in Jurupa Valley, which received 35 million gallons of liquid hazardous waste (including heavy metals, pesticides, solvents and perchlorate from rocket testing and possible fireworks and blasting sources) between 1956 to 1972. The United State Environmental Protection Agency (EPA) and California Department of Toxic Substances Control (DTSC) have installed hundreds of groundwater monitoring wells, extraction wells, and several treatment plants to contain and clean up contaminated groundwater since 1986.

Perchlorate is commonly used as an oxidizer in solid propellants, munitions, fireworks, airbag initiators for vehicles, matches and signal flares. The highly soluble chemical is found in groundwater aquifers near military, industrial, and legacy agricultural sources (Izbicki et al., 2014). The downward migration of fluid in the basin may distribute contaminant plumes from shallow into deeper groundwater aquifers, with some degree of microbial degradation during transport. Lower detection limits revealed widespread perchlorate contamination in groundwater due to fertilizers used for citrus orchards derived from specific nitrate deposits in Chile. Nitrate contamination is typically associated with these historic citrus operations in the northern Chino Basin, as opposed to the historic dairy operations in the southern basin. PCE and TCE are industrial solvents, with PCE commonly used in the dry-cleaning industry and TCE historically used for metal degreasing and as a food extractant. 1,2,3,-TCP is used primarily as a solvent, extractive agent, paint and varnish remover, cleaning and degreasing agent.

The groundwater contaminant plumes of Chino Basin (delineated by the CBWM) are shown in Figure 2, all of which are south/down-gradient of the CVWD Chino Basin wellfield.

Groundwater quality data from the existing CVWD Chino Basin well network are available via the SWRCB GAMA Program's Groundwater Information System. Local TDS concentrations tend to be low, typically between 200 to 300 mg/L. VOCs (TCE, PCE, and 1,2,3-TCP) are generally below detectable concentrations in all CVWD Chino Basin wells. Nitrate (as N) can be elevated in the western wells (Nos. 1, 3, 4, 5, 30, and 38), including exceeding its MCL of 10 mg/L at CVWD No. 1 and No. 30, but is below 3 mg/L in the eastern well cluster (Nos. 41, 42, and 46). Perchlorate has a similar trend, with drinking standard exceedances at No. 1 and No. 30 but non-detectable concentrations in the eastern wells. Arsenic is also below detection limits in

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the eastern wells and is only occasionally at measurable concentrations in the western wells. Hexavalent chromium is detected at very low concentrations in all CVWD Chino Basin wells, but also tends to be higher in the western wells than in the eastern wells. The highest measured concentration was 6.7 µg/L at CVWD No. 1 as compared to 3 µg/L at CVWD No. 46; hexavalent chromium is currently regulated under the Total Chromium state MCL of 50 µg/L but SWRCB has proposed a drinking water MCL of 10 µg/L.

Overall water quality degrades during drought conditions, when there is a reduction in the amount of high-quality stormwater recharge, limited or no imported water for recharge (and poorer quality of the imported water), and an associated rise of TDS concentrations in recycled water (source water quality of municipal water supplies is higher in TDS due to poorer quality imported water and indoor water conservation practices) (WEI, 2020).

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PRELIMINARY DESIGN RECOMMENDATIONS FOR NEW CHINO BASIN WELL

Our recommended approach for the new Project well includes permitting through San Bernardino County, ~~the Chino Basin Watermaster~~, and any other applicable agency. Permissibility of new well construction to the total recommended depth should be ensured prior to action. Subsurface utilities should be adequately located as part of a standard utility clearance operations. Following permit retention and site preparation, a drilling rig and equipment would be mobilized to the site. Temporary noise attenuation barriers and ground vibration monitoring, as well as a neighborhood notification process, may be useful to minimize potential disturbances to neighboring properties or residents and quantify the potential nuisances.

DWR mandates a minimum horizontal setback of 50 ft from water wells and any sewer line (including sanitary, industrial, or storm; main or lateral). The nearby south-draining sewer line in Utica Avenue appears to generally follow the street centerline. In closer proximity is the storm drainage line (include its inlet receptor) that begins under the western sidewalk near the intersection with 6th Street, as shown in the San Bernardino County Stormwater Facility Mapping Tool. The new well location must be at least 50 ft from the northwestern corner of this drain (see aerial inset in Figure 1). As long as this condition is met, the new well can be drilled wherever most logistically desirable or feasible within the proposed CVWD easement area.

Figure 3 presents the preliminary design schematic for the new Project well. The figure includes the short-normal resistivity curve traces and lithologic interpretations of CVWD No. 30 and No. 38 (located about 1.25 miles west-northwest of the proposed new well) as presented on WEI (2003) cross sections, in comparison with short- and long-normal resistivity curves from the geophysical log of CVWD No. 46 (located about 900 ft effectively due north of the proposed new well). The exploratory borehole will be advanced entirely through the basin alluvium before countersinking into the underlying bedrock for a total exploration depth of around 1200 ft bgs.

The exploration borehole should be advanced via flooded reverse-circulation rotary drilling methods to allow for collection of drill cuttings, to maintain borehole stability, and to provide a fluid to facilitate geophysical logging, including electric logging, deviation, and sonic/variable

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density logging. The geophysical logs would inform well design, intending to prevent casing or screening the well in poor quality zones. AZITs would quantify water quality in target zones, including for CECs such as nitrate, VOCs, and perchlorate. The final well completion should be designed, if advisable, after geologist's review of the drilling data, geologic information, down-hole geophysical surveys and any zone tests completed in the pilot borehole.

Should the exploratory bore and AZIT quality results indicate viable conditions for well completion and a design agreed upon, the same drilling rig would then ream the pilot borehole out to a larger diameter, as needed, in order to accommodate the well casing and permanent annular materials. The pilot borehole would be reamed out to a 36-inch (minimum) upper borehole diameter that reduces to 32-inch lower borehole diameter, which will accommodate the 24-inch-diameter HSLA-over-stainless steel well casing and ancillary tubings.

Following casing installation, gravel pack would be emplaced in the annular space and cement/bentonite seal(s) would be emplaced above the gravel pack and/or adjacent to poor quality zones. Gravel feed tubes are advisable to aid in development of each gravel pack zone. A camera-entrance tube typically enters the well casing immediately above the uppermost set of perforations, and allows for assessment activities including video surveying, flow meter testing, and downhole sampling (and potentially rehabilitation) access without removing the pump.

Mechanical development and test pumping, collection and analyses of water quality samples, and equipping the well with appropriate infrastructure should follow. Qualified hydrogeologic personnel should be present during all key periods of drilling, construction, development, and testing to assist in the decision processes toward well completion. After testing, a permanent pump, power, and infrastructure (including for treatment) can be designed and installed at the well. Recordation of the well and extractions via the Watermaster and complying with their ordinances and allocations will remain key in well production operations.

KG recommends establishing regular schedule of operation and maintenance procedures, including collection of water quality samples and measurement of static/pumping water levels and flow rates. It is recommended that the wells not be produced on a continuous, 24-hour-per-

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day basis and that regular servicing be performed, including shutdown periods (at least a few hours of non-pumping) to provide surging action and backwash fine-grained formation materials. If specific capacities decline, or other indicators of imminent well aging problems such as increases in iron, manganese, turbidity, odor or sand production, the well should be considered for rehabilitation, including pump removal, inspection via video surveys to determine any necessary rehabilitation work (such as jetting or chemical treatment). KG also recommends that the well be equipped with a variable frequency drive so that flow rates can be adjusted in response to changing water levels with time. Continued use and monitoring of water levels and production rates is imperative as rates are optimized and adjusted to long-term use, precipitation, and aquifer response patterns.

We look forward to our continued involvement with the Project; our subsequent contracted tasks include preparation of technical specifications for new well construction, permitting assistance, and field support during drilling, construction, development, and testing at the new well, culminating with preparation of a summary of operations report that documents all well construction details.

Please do not hesitate to contact us with any questions.

Best Regards,

A handwritten signature in black ink, appearing to read 'Jordan Kear'.

Jordan Kear
Principal Hydrogeologist
Professional Geologist No. 6960
Certified Hydrogeologist No. 749

A handwritten signature in black ink, appearing to read 'Timothy Becker'.

Timothy Becker
Professional Geologist No. 9589
Certified Hydrogeologist No. 1109

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Statement of Limitations

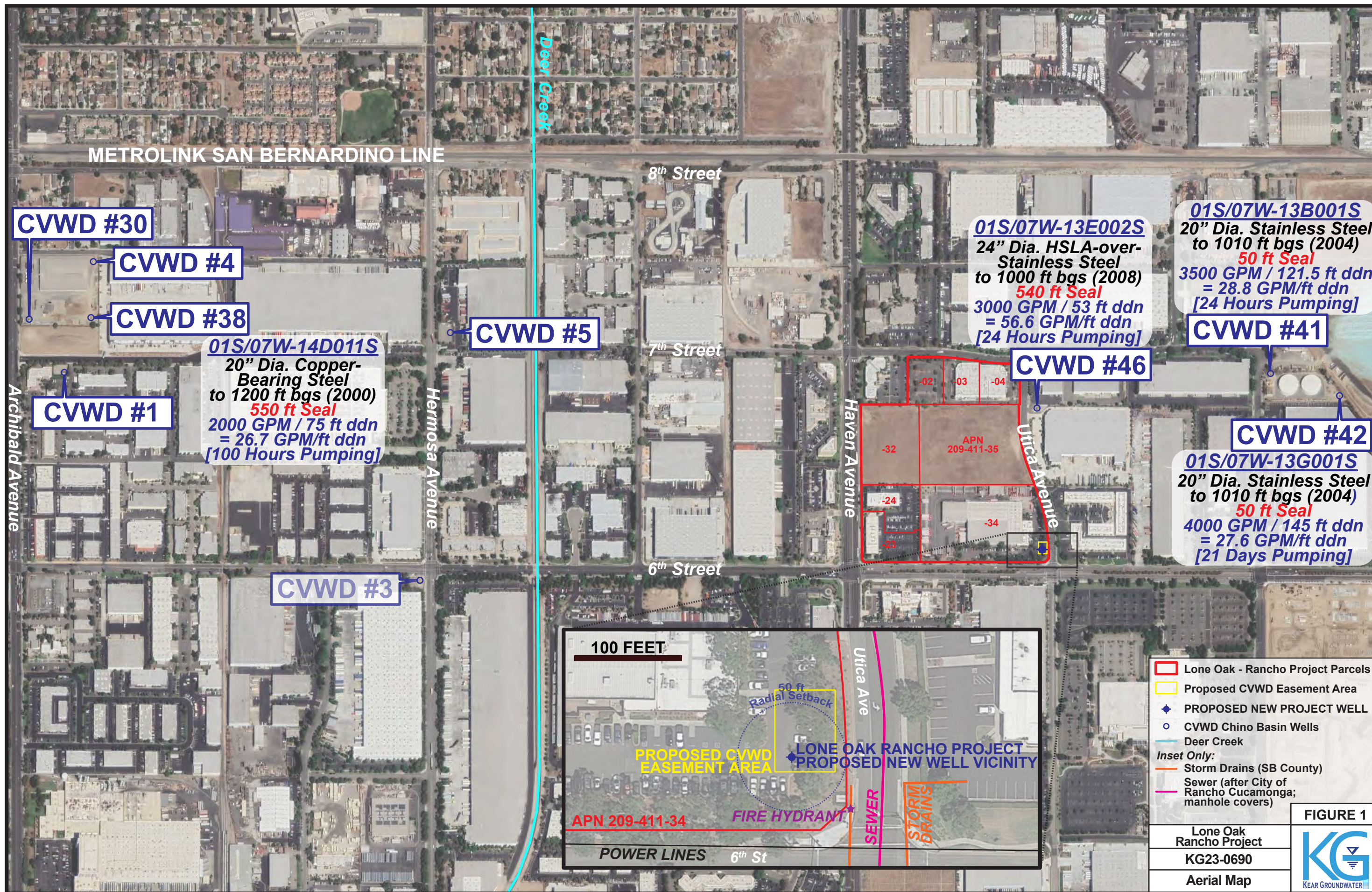
The services described in this report were performed in a manner consistent with our agreement with the client and in accordance with generally accepted professional consulting principles and practices. Opinions and recommendations contained in this report apply to conditions existing at certain locations when services were performed and are intended only for the specific purposes, locations, time frames, and project parameters indicated. We cannot be responsible for the impact of any changes in standards, practices, or regulations after performance of services.

Hydrogeologic analyses for this report relied solely on available background data obtained from the water agencies, San Bernardino County, the Chino Basin Watermaster, the State of California, and/or published geologic reports. No independent subsurface exploration or geophysical surveying was conducted by our firm for this study. No guarantee of water quantity or quality from an attempted well, nor sustained production from an existing well, can be offered. Because the efforts to implement recommendations contained herein rely on the skill of outside contractors, our liability is limited to the dollar value of our professional efforts. Professional hydrogeologic review of pilot hole data is imperative to implementing the recommendations of this report.

Any discussions of fault activity herein are offered as they relate to groundwater resource development only. This report does not substitute a geotechnical analysis to support earthwork or construction. Discussions of water rights presented herein are presented for general information only and are based on our research and experience; such discussions are not to convey legal advice, for which a qualified attorney specializing in water rights should be consulted. Any use of this report by a third party is expressly prohibited without a written, specific authorization from the client. Such authorization will require a signed waiver and release agreement.

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- Lone Oak - Rancho Project Parcels
- Proposed CVWD Easement Area
- ◆ PROPOSED NEW PROJECT WELL
- CVWD Chino Basin Wells
- Deer Creek
- Inset Only:**
- Storm Drains (SB County)
- Sewer (after City of Rancho Cucamonga; manhole covers)

FIGURE 1

Lone Oak
Rancho Project
KG23-0690
Aerial Map



