DRAFT
PRELIMINARY ENGINEERING DESIGN REPORT

El Camino Well

Prepared for:
Reyes Holdings, LLC
Cucamonga Valley Water District

Prepared by:
Kimley-Horn and Associates, Inc.
401 B Street, Suite 600
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December 2023

Kimley»Horn

TABLE OF CONTENTS

A. INTRODUCTION 3
B. PRELIMINARY ENGINEERING DESIGN (PDR) REPORT OBJECTIVES 5
C. REVIEW OF WELL SIGHTING STUDY AND WATER SUPPLY ASSESSMENT 5
Water Supply Assessment Review 5
Well Sighting Study Report Review 6
Review of Well Site 7
D. FIELD RECONNAISSANCE 7
E. HYDRAULIC ANALYSIS 8
F. PUMP SELECTION ANALYSIS 10
G. ELECTRICAL PRELIMINARY BASIS OF DESIGN 12
Scope 12
Codes and Criteria 12
New Power and Control Design 13
Standards of Design 13
H. REQUIRED PERMITS AND REGULATORY AGENCIES 14
I. ESTIMATED COST 15
J. BASIS OF DESIGN 16

LIST OF APPENDICES

Appendix A	Water Supply Assessment
Appendix B	Well Sighting Study
Appendix C	Hydraulic Calculations
Appendix D	Preliminary Well Pump Data Sheets

PRELIMINARY ENGINEERING DESIGN REPORT

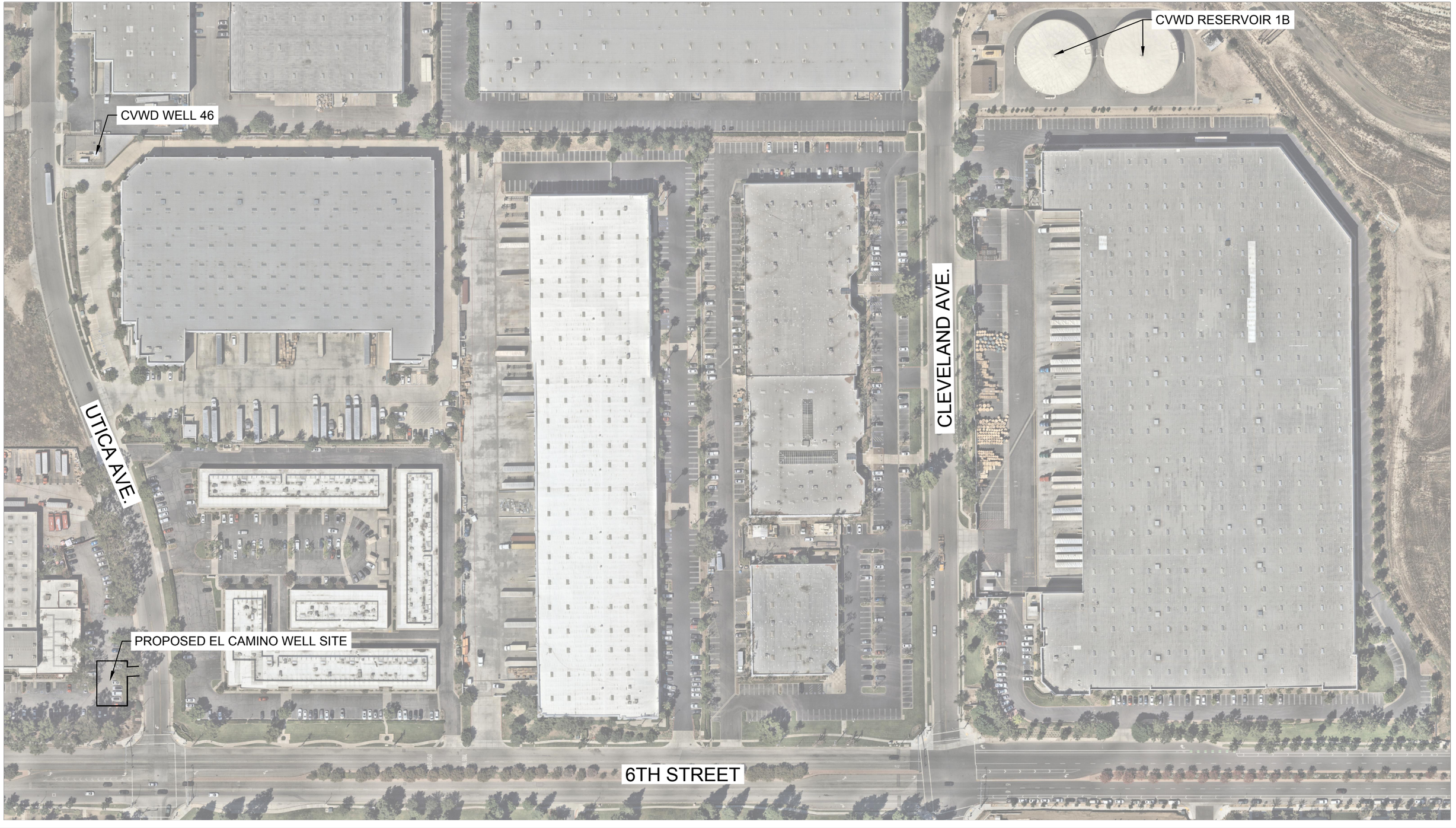
To:	Alberto Landa Senior Project Manager Reyes Holdings, LLC Amanda Coker, P.E. Cucamonga Valley Water District
From:	Davie Cowan, P.E. Maddie Priest, P.E. Sarp Sekeroglu, P.E. Kimley-Horn and Associates, Inc.
Date:	December 18, 2023
Subject:	El Camino – Well Site

A. INTRODUCTION

The El Camino Project is located at 10670 6th Street, Rancho Cucamonga, California and involves the construction and operation of an automated storage and retrieval warehouse, distribution center, production facility, existing building, existing two-story office building, well house and on-site parking, with a total building floor area of 32,890 square feet. In addition to this, the El Camino Project will include approximately 206,250 square feet of landscaping.

The El Camino Well Project is located in the southeast corner of the El Camino Project development and will be approximately 75 feet by 55 feet encompassing a total square footage of 4,125.

The El Camino Well Project is required to supplement the Cucamonga Valley Water District (CVWD) system with additional water supply due to the proposed El Camino Project site water demands as estimated in the Water Supply Assessment (Dudek, 2023). The proposed El Camino Well will tie into the CVWD water system through a new water main to CVWD's Reservoir 1B. The water main from the boundary of the well site to the proposed connection point at the CVWD Reservoir will be designed by CVWD. The El Camino Well Vicinity Map is shown in Figure 1.



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LONE OAK - RANCHO

FIGURE 1:

EL CAMINO WELL VICINITY MAP

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NORTH

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DATE:	12/18/2023

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GRAPHIC SCALE AS SHOWN

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B. PRELIMINARY ENGINEERING DESIGN (PDR) REPORT OBJECTIVES

The objectives of this Preliminary Engineering Design Report (PDR) are as follows:

- Review and summarize technical background information developed during the preliminary design phase.
- Summarize the findings the Well Sighting Study (Kear Groundwater, 2023) and the Water Supply Assessment (Dudek, 2023).
- Summarize field reconnaissance of the proposed well site, surrounding areas and proximal well site.
- Perform hydraulic modelling to verify optimum pipeline and pump size based on the expected well operating points.
- Evaluate different well pumps and for the proposed well.
- Summarize the design components required for the Project to facilitate successful design development.

C. REVIEW OF WELL SIGHTING STUDY AND WATER SUPPLY ASSESSMENT

Water Supply Assessment Review

A Water Supply Assessment was prepared by Dudek and finalized in August of 2023. This assessment was prepared to satisfy the requirements of CWC Section 10910(d) and analyze the effects the El Camino Project water demand makes on the water supply. CVWD is the sole source of water for the Project, therefore their system supply was analyzed in the Assessment. The following water demands were estimated in the Dudek assessment:

Table 1 Project Water Demand

Project Phase	Acre-Feet per Year
Phase 1A	610
Phase 1B	774
Phase 2	863

According to the Assessment, and these calculations, the El Camino Project's peak water demand is estimated to be 1,789 gpm for a duration of 1-hour by year 7 of the project, after the completion of Phase 2.

In addition to analyzing the project demand, the Water Supply Assessment reviewed the groundwater wells in the proximity of the El Camino Well Project. The Assessment reviewed the El Camino Project's demand and estimated that the El Camino Well would need to be pumped

at a rate of approximately 2,253 gpm for 8 hours per day, 5 days per week to meet the El Camino Project's maximum water demand.

Based on the information obtained from the Water Supply Assessment, the flowrate of 2,253 gpm was used as the basis of design for the hydraulic calculations and pump selection. The conclusion of the Water Supply Assessment was that CVWD's total projected water supplies available during normal, single-dry and multiple-dry water year scenarios during a 20-year projection will meet the projected water demand associated with the proposed Project (Dudek, 2023).

The Water Supply Assessment can be found in **Appendix A.**

Well Sighting Study Report Review

A Well Sighting Study was prepared by Kear Groundwater and finalized in August of 2023. The Report is titled "New Well Overview Report & Design Evaluation, Loan Oak – El Camino Project". This Report analyzed the proposed El Camino Well. The Report analyzed the proposed well with a 24-inch diameter steel casing and determined that it would be capable of producing the required flowrate. The Study reviewed CVWD's Chino Basin Rights and the proposed well's effects on the existing surrounding CVWD wells (Kear Groundwater, 2023).

The Study stated that the most adjacent wells will experience an interference of 21.47 ft with the El Camino Well operating at the expected 2,253 gpm for 8 hours per day, 5 days per week. The Study analyzes the water quality in the Chino Basin and CVWD's existing well system. The Study discussed the water quality data from the existing CVWD Chino Basin well network and concluded that the local TDS concentrations tend to be low, between 200 and 300 mg/L, Nitrate (as N), is elevated in the western wells, but below 3 mg/L in the eastern wells, Perchlorate has standards exceedances, but is non-detect in the eastern wells, Arsenic is below detection levels in the eastern wells and only occasionally detected in the western wells, and Hexavalent Chromium is detected at very low concentrations, but higher in the western wells than the eastern wells (Kear Groundwater, 2023).

The preliminary design recommendations are presented in the Study and can be summarized as follows. The first step of the Project will include initiating permit acquisition. Expected permits can be found in Section G of this report. Prior to construction, the location of existing utilities on the proposed site shall be confirmed. Following permit acquisition, a drilling rig would mobilize to the site. Noise attenuation parameters shall be implemented by the contractor and coordinated with the City of Rancho Cucamonga prior to construction. An exploration borehole should be advanced by flooded, reverse-circulation rotary drilling methods. Final well completion and design should be coordinated with a geologist's review of the drilling data, geologic information, downhole geophysical surveys and zone tests completed in the pilot borehole. Following approval of viable conditions for well completion, the pilot borehole would

be reamed to a 36-inch upper borehole diameter that reduces to a 32-inch lower borehole diameter, in order to accommodate the 24-inch diameter well casing and required tubing. After the casing is installed, gravel pack will be emplaced in the annular space. Cement or bentonite seals will be emplaced on top of the gravel pack. Next, the mechanical development, test pumping, collection and analysis of well water quality samples, and equipping the well with appropriate equipment shall be completed. When testing is completed, permanent pump, power and infrastructure are to be installed. A variable frequency drive is recommended so flows can vary and be adjusted to respond to changing water levels over time. (Kear Groundwater, 2023).

The preliminary well design can be found in the Well Sighting Study's Figure 3. The Well Sighting Study can be found in **Appendix B.**

Review of Well Site

As discussed in the well sighting study, the well must be located at least 50 horizontal feet from the nearest storm sewer line as part of minimum setback standards (Kear Groundwater, 2023). Our team has confirmed this separation between storm sewer lines and have additionally confirmed the required distance from sanitary sewer lines and laterals. Additional considerations taken for the well site include appropriate space for operations. As the site will not be developed during drilling operations, it is expected that there will be ample space for drilling. Well drilling operations are known to require approximately 10,000 square feet for the drilling rig and associated equipment. The team has confirmed that there are no known existing utilities that will be affected by the proposed well. An existing fire hydrant is located at the corner of Utica Ave and 6th St., where fresh water can be accessed for drilling operations, appropriate approval from the regulating agency would be required prior to water access. There are also two storm drain inlets on either side of Utica Ave. at the intersection of Utica Ave. and 6th St. that could be viable for water discharge during drilling operations, provided that all NPDES permit requirements are met. The proposed well site appears to comply with separation distance requirements as set forth in the California Department of Water Resources Water Well Standards, as previously discussed.

D. FIELD RECONNAISSANCE

A site visit was performed to observe CVWD Well 46; discuss design preferences, hydraulic information, electrical needs, and constraints; and inspect the proposed well site. Kimley-Horn staff were met by CVWD staff on November 16th, 2023, at the Well 46 site. CVWD expressed preference in Eaton and US Motors manufactures for various equipment. CVWD's electrical technician requested additional space in the switchboard box for setting up equipment and recommended consulting their existing electrician for site specific advice. After examining the Well 46 site, both teams traveled to the proposed well site. The proposed well site is currently a parking lot which is planned to be demolished before well construction.

E. HYDRAULIC ANALYSIS

A hydraulic analysis was required to determine the appropriate pipe size for the well header piping and operating parameters for the proposed well pump. This analysis was performed using Flowmaster and Excel. The parameters required for accurate pump selection include the design flowrate and the total dynamic head. Ductile iron was selected for the pipe material of the well header.

The design flowrate was obtained from the estimated El Camino Project's demand. As previously discussed, the El Camino Well would need to be pumped at a rate of approximately 2,253 gpm for 8 hours per day, 5 days per week to meet the El Camino Project's maximum water demand (Dudek, 2023). The well static water level, well pumping level and well steel casing size were obtained from the Well Sighting Study (Kear Groundwater, 2023). The reservoir high water elevation was obtained from CVWD.

The following design parameters were used as the basis of the El Camino Well Pump Design:

Table 2 El Camino Well System Design Parameters

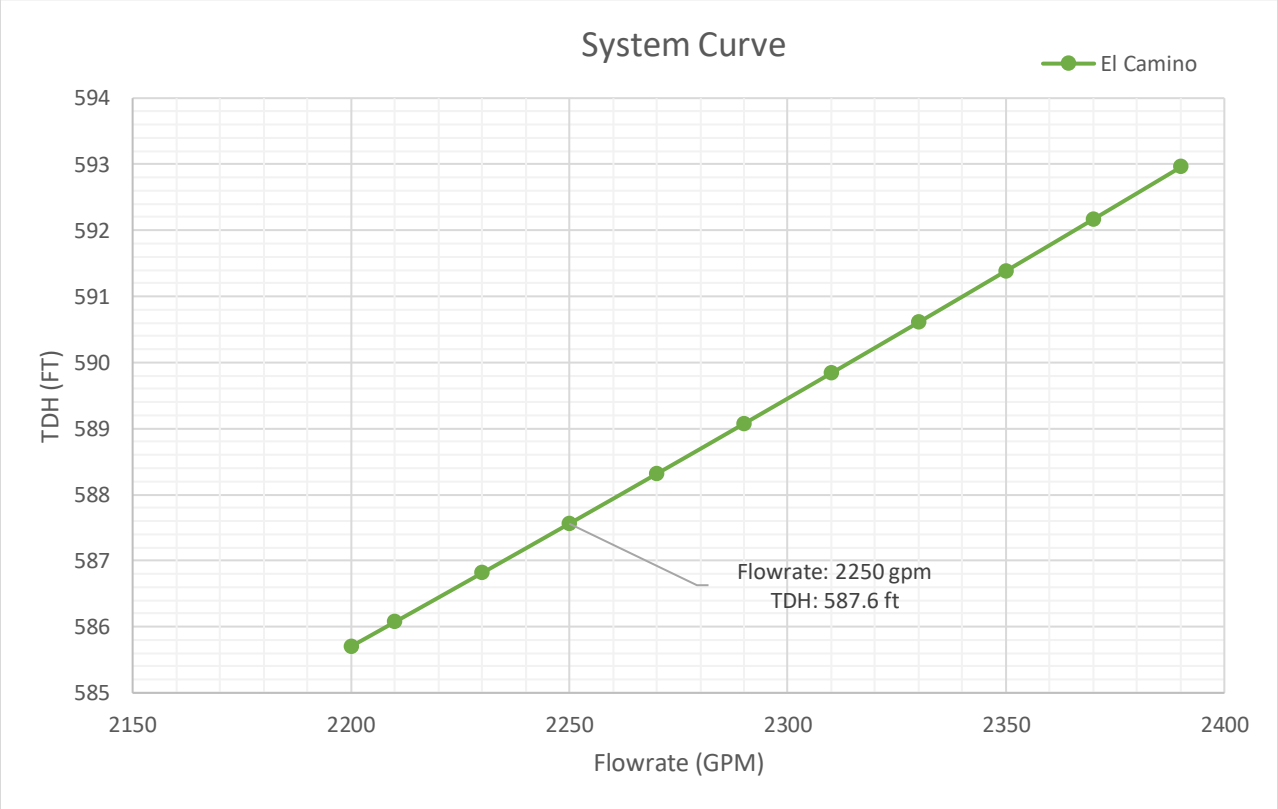
Design Parameter	Value
Flowrate	2,253 gpm
Well Static Water Level (Elevation)	618'
Well Pumping Water Level (Elevation)	577'
Well Steel Casing Size	24 inches
Well Header Pipe Material	Ductile Iron
Water Main Pipe Size	12 inches
Water Main Pipe Material	PVC
Water Main Estimated Length	3,130 ft
Reservoir Existing Grade (Elevation)	1,097'
Reservoir High Water (Elevation)	1,120'

A system curve was calculated by determining the friction losses in the proposed water main at different flowrates. The Hazen-Williams equation was used to determine the friction losses in creating this system curve.

$$h_L = \frac{4.72LQ^{1.85}}{C^{1.85}D^{4.87}} \quad (1)$$

Where *L* is the length of pipe in feet, *Q* is the flow rate in ft^3/sec, *C* is the Hazen-Williams Coefficient (unitless), *D* is the diameter of the pipe in ft, and h_L is the head loss in feet. The Hazen-Williams Coefficient used was 120. Figure 2 depicts the system curve with the design parameters outlined in Table 2.

Figure 2 El Camino Well System Curve



As shown in Figure 2, at the design flowrate of 2,253 gpm, there is an approximate total dynamic head of 587.6 ft. Full calculations can be found in **Appendix C**.

In addition to the system curve created for pump selection analysis, the velocity was analyzed in the selected water pipe size. At the design flowrate of 2,253 gpm, the 12-inch water main is estimated to have a velocity of approximately 6.4 ft/s. The water main is a transmission main for well water to CVWD Reservoir 1B and is not expected to have any service connections on it. This velocity will need to be reviewed and approved by CVWD prior to finalization of pipe sizing.

F. PUMP SELECTION ANALYSIS

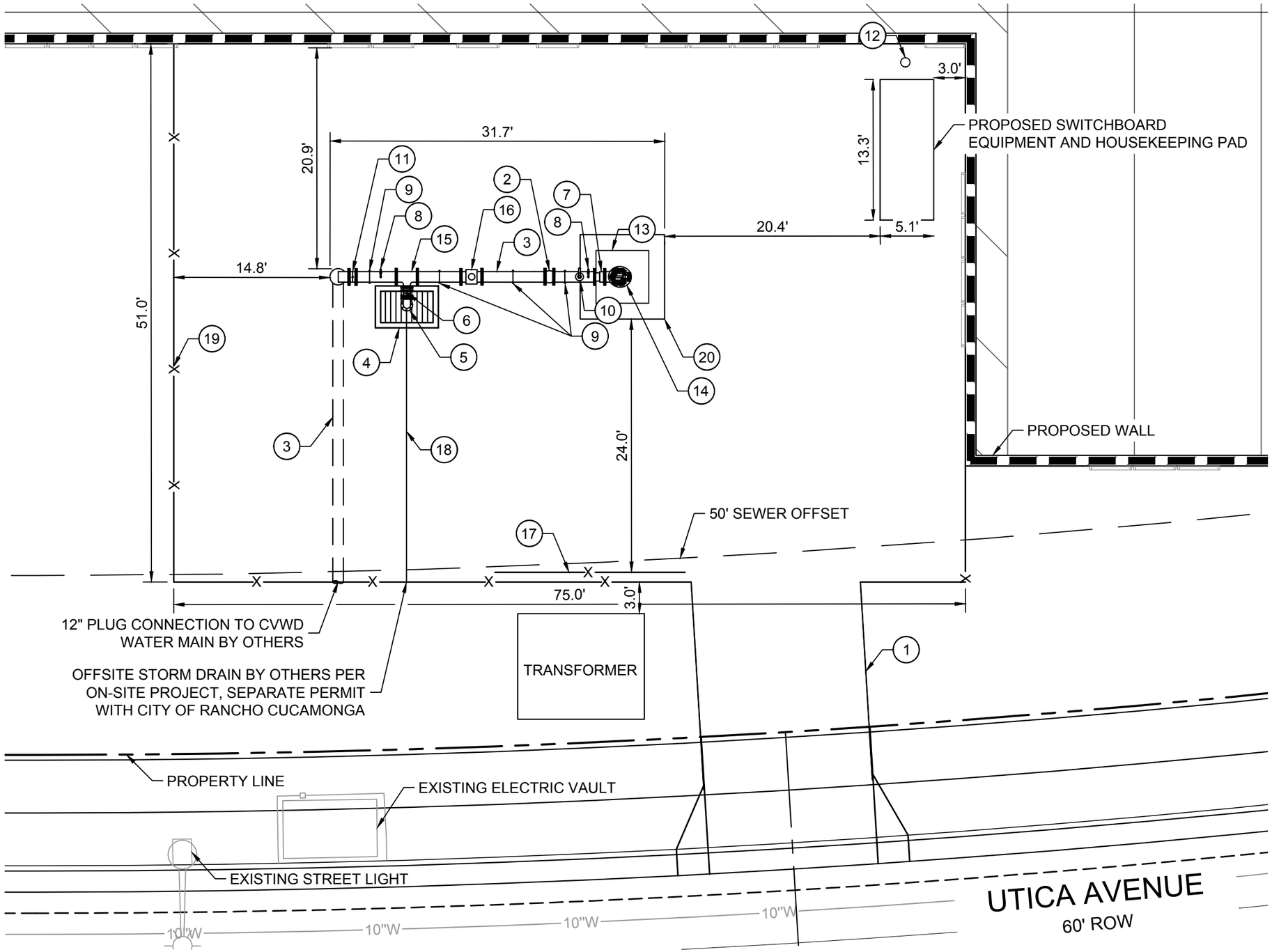
Three pump manufacturers' pump selections were analyzed for selection of the well pump. These manufacturers include Goulds, Peerless and SIMFLO. Suppliers were contacted to obtain the pump selections with the previously stated design criteria. The well pump shall include a VFD motor controller to accommodate fluctuating demands over seasons and project phases. A breakdown of the pump selections can be found in Table 3.

Table 3 Pump Selection Analysis

	Goulds	Peerless	SIMFLO
Flow (gpm)	2,253	2,253	2,251
Total Dynamic Head (ft)	580	619	585
Efficiency (%)	84	83	84
Max Power (hp)	450	451	447
NPSHr (ft)	33	28	19
Speed (rpm)	1,770	1,785	1,770

Each pump was analyzed at the design point flowrate and total dynamic head. The pump with the most expected horsepower (at maximum), is Peerless with a value of 451 hp. The SIMFLO and Goulds pumps both have an efficiency of 84%, while the Peerless pump has an efficiency of 83%.

Pump operations will need to be coordinated with CVWD and integrated into their SCADA system. A preliminary layout of the well site and piping plan can be found in Figure 3. The preliminary pump selection data sheets can be found in **Appendix D**.



CONSTRUCTION NOTES

1. PROPOSED DRIVEWAY
2. FURNISH AND INSTALL 12" SPLIT-DOOR CHECK VALVE
3. 12" DIP
4. FURNISH AND CONSTRUCT 4' X 6' DRAIN BOX W/STL. GRATE (H20) RATED CAST INPLACE PER GREEN BOOK STD.
5. FURNISH AND INSTALL 8" DI CML & BARE P.E. X P.E. 90° ELL WITH MESH SCREEN. WALL THICKNESS 0.25"
6. FURNISH AND INSTALL 8" FLG'D BUTTERFLY VALVE W/ INDICATOR
7. FURNISH AND INSTALL 12" DISMANTLING JOINT (RESTRAINED PIPE AWWA M-11)
8. FURNISH AND INSTALL 1" SAMPLE TAP
9. FURNISH AND INSTALL PIPE SUPPORT
10. FURNISH AND INSTALL 2" AIR RELEASE VALVE
11. FURNISH AND INSTALL 12" FLG'D BUTTERFLY VALVE W/ INDICATOR
12. 30' YAGI SCADA ANTENNA
13. SHADE STRUCTURE
14. PUMP AND PEDESTAL
15. 12" X 12" X 8" DI TEE
16. FURNISH AND INSTALL 12" BI-DIRECTIONAL MAGMETER
17. FURNISH AND CONSTRUCT 18' WROUGHT IRON ROLLING GATE WITH SHEPARDS HOOK.
18. PROPOSED STROM DRAIN LATERAL
19. FURNISH AND CONSTRUCT WROUGHT IRON FENCE WITH SHEPARDS HOOK (H=8') (11 GA.)
20. CONCRETE PAD

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FIGURE 3:

PRELIMINARY WELL SITE AND PIPING PLAN

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G. ELECTRICAL PRELIMINARY BASIS OF DESIGN

Scope

The scope includes the construction of an on-grade well, supporting instrumentation and controls, exterior pole mounted lights, convenience GFCI receptacles for maintenance use, flow metering pressure sensing devices, related equipment, and accessories.

Codes and Criteria

Applicable codes utilized in this design include the following:

CEC	California Electrical Code
NFPA 70E	Standard for Electrical Safety in the Workplace
ANS/IEEE C2	National Electric Safety Code
NETA ATS	Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems
NEMA 250	Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA FU 1	Low Voltage Cartridge Fuses
NEMA ICS 1	Standard for Industrial Control and Systems: General Requirements
NEMA ICS 2	Industrial Control and Systems Controllers, Contactors, and Overload Relays Rated 600 V
NEMA MG 1	Motors and Generators
NEMA TC 2	Standard for Electrical Polyvinyl Chloride (PVC) Conduit
NEMA TC 3	Polyvinyl Chloride (PVC) Fittings for Use With Rigid PVC Conduit and Tubing
TIA-569	Telecommunications Pathways and Spaces
UL 1	UL Standard for Safety Flexible Metal Conduit
UL 6	UL Standard for Safety Electrical Rigid Metal Conduit-Steel
UL 83	UL Standard for Safety Thermoplastic-Insulated Wires and Cables
UL 360	UL Standard for Safety Liquid-Tight Flexible Metal Conduit
UL 489	UL Standard for Safety Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures
UL 508	UL Standard for Safety Industrial Control Equipment
UL 1561	Dry-Type General Purpose and Power Transformers

New Power and Control Design

Providing power to the El Camino Well includes providing conduit, and wiring for a 480V, three phase, three wire system to the new well from the local electrical service provider, Rancho Cucamonga Municipal Utility (RCMU). The Project to provide supporting facilities for the utility based on the service provider's design prepared specifically for this project.

The service switchboard will be complete with utility service entrance underground pull section, metering section, main circuit breaker, customer generator circuit breaker interlocked with main, reduced voltage solid state soft starter Eaton S811 series for pump, full height SCADA section complete with backplane for customer use. There will be integral single phase 120/240V step down transformer and panelboard to power auxiliary loads (lighting, convenience outlets, control, and instrumentation devices). The switchboard construction will be of single assembly, full depth, front and rear aligned, tentatively rated at 1200A, 480V, and fully rated bussing at 65kAIC. A Shark 250 Advanced Power and Energy Meter will be provided with Cyber Security with appropriately rated current transformer on the customer side of main circuit breaker.

For SCADA signaling and communication, the Contractor should provide a 30' pole for mounting of antenna and raceway from switchboard SCADA section to pole. The SCADA system design, hardware/wiring/antenna installation, system integration, and startup will be provided by the District.

A portable generator cam lock connection in a NEMA 3R enclosure separate from the switchboard should be provided along with conduit, wire and ground from generator circuit breaker in switchboard to cam lock connection enclosure.

Standards of Design

Grounding: All conduits will be provided with separate green copper ground sized according to Article 250 of CEC.

Wiring Systems for Power: Conductors for use on low-voltage (600 volts, or less) electrical circuits will be single-conductor copper THWN insulated rated for 600 volts. Use manufacturer supplied assembled cables as necessary for select instrumentation.

Raceways: PVC coated rigid galvanized steel for exposed conduits; liquid tight flexible metal conduit for connection to equipment subject to movement or vibration. PVC Sch 40 for direct buried in select native soil.

Enclosures for electrical equipment located outdoors, NEMA Type 3R galvanized steel.

Service entrance transient voltage suppression device for protection of electronics.

Site Lighting: pole mounted LED fixture with photocell control.

Voltage Drop

1. Limit voltage drop per CEC, as follows:
    a. Feeder Circuits, no greater than 2%.
    b. Branch circuits, no greater than 3% to the furthest outlet.
    c. No greater than 5% overall.

H. REQUIRED PERMITS AND REGULATORY AGENCIES

The expected permits and associated regulatory agencies are shown below in Table 4.

Table 4 Permit Requirements

Name of Permit/Report	Regulatory Agency
Drinking Water Source Assessment and Protection	State Board's Division of Drinking Water
Application for Well Permit	San Bernardino County Environmental Health Services
NPDES Permit	Lahonton Regional Water Quality Control Board
Notification	City of Rancho Cucamonga

I. ESTIMATED COST

An estimated cost for the drilling, construction, and development of the El Camino Well is shown in Table 5. The costs shown are based on bids for similar project recently completed and preliminary estimates from well drilling contractors and pump manufacturers.

*Table 5 Preliminary Estimated Cost**

No.	Item	Quantity	Unit	Unit Price	Cost
1	Mobilization	1	LS	$179,160.00	$179,160
2	Equipment – Vertical Turbine Water Pump, Guiderails, Base Bend and Hardware	1	EA	$630,000.00	$630,000
3	Pump Installation and Testing	1	LS	$70,000.00	$70,000
4	12-Inch Split Door Swing Check Valve	1	EA	$6,000.00	$6,000
5	4'x6' Drain Box	1	EA	$3,250.00	$3,250
6	Concrete Equipment Foundations	1	LS	$20,000.00	$20,000
7	12-Inch DI Piping	53	LF	$415.00	$21,995
8	24-Inch Concrete Storm Drain Lateral	26	LF	$230.00	$5,980
9	8-Inch Butterfly Valve	1	EA	$5,500.00	$5,500
11	2" Air Release Valve	1	EA	$3,000.00	$3,000
12	Electrical Switchboard	1	LS	$60,000.00	$60,000
13	Generator Connection Camlocks and NEMA 3R Enclosure	1	LS	$7,500.00	$7,500
14	Electrical Conduit and Wire	1	LS	$22,500.00	$22,500
15	SCADA	1	LS	$1,500.00	$1,500
16	Electrical Testing and Startup	1	LS	$15,000.00	$15,000
17	Utility Provider Facilities Installed by Owner	1	LS	$17,500.00	$17,500
18	Misc. Piping, Spools, and Fittings	1	LS	$40,000.00	$40,000
19	12-Inch Butterfly Valve	1	EA	$7,500.00	$7,500
20	Shade Structure	1	EA	$10,000.00	$10,000
21	12-Inch Bi-Directional Magmeter	1	EA	$12,000.00	$12,000
22	Wrought Iron Fence	240	LF	$120.00	$28,800
23	Wrought Iron Rolling Gate	1	EA	$5,000.00	$5,000
24	Well Drilling Completion and Components	1	LS	$2,500,000.00	$2,500,000
25	Excavation and Backfill	1	LS	$25,000.00	$25,000
26	Erosion and Sedimentation Control	1	LS	$15,000.00	$15,000
27	Asphalt Pavement	200	TON	$250.00	$50,000

- [x] Conceptual Design
- [ ] Preliminary Design
- [ ] Final Design

Subtotal:		$3,583,025
Contingency (%,+/-)	20	$716,605

Total	**$4,300,000**

** Disclaimer: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.*

J. BASIS OF DESIGN

In summary, this basis of the design report presents preliminary design criteria of the El Camino Well for the following components:

- Construction and permitting of the well site in accordance with all applicable State, County and City regulations
- Installation of the 2,253 gpm well pump with a total dynamic head of 585 feet following recommendations as outlined in the Water Supply Assessment and Well Sighting Study
- 12” Well Header Piping

PRELIMINARY
FOR REVIEW ONLY
Prepared for Concept Plan submittal
Not for construction purposes or permits.
Kimley»Horn
Engineer SARP SEKEROGLU
P.E. No. C71474 Date 12/18/2023

REFERENCES

[1] San Bernardino County Department of Environmental Health Services, "Application for Well Permit and Procedures under Executive Order N-3-23," October 2023. [Online]. Available: https://www.sbcounty.gov/uploads/dph/EHS/Programs/WaterAndWaste/well-permit-application.pdf. [Accessed December 2023].

[2] California Department of Water Resources, "Well Standards," [Online]. Available: https://water.ca.gov/Programs/Groundwater-Management/Wells/Well-Standards.

[3] T. Harter, "Water Well Design and Construction," *Farm Water Quality Planning,* vol. 8086, 2003.

[4] Kear Groundwater, "New Well Overview Report & Design Evaluation," Santa Barbara, 2023.

[5] Dudek, "Water Supply Assessment," Encinitas, 2023.

[6] State Water Resources Control Board, "Drinking Water Source Assessment and Protection Program," [Online]. Available: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/DWSAP.html. [Accessed December 2023].

[7] State of California, "California Electrical Code," National Fire Protection Association, 19 October 2022. [Online]. Available: https://up.codes/viewer/california/ca-electric-code-2022/chapter/2/wiring-and-protection#250.

APPENDICES

APPENDIX A – WATER SUPPLY ASSESSMENT

Water Supply Assessment

El Camino Project

AUGUST 2023

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Table of Contents

SECTION **PAGE NO.**

Acronyms and Abbreviations iii

1 Introduction 1
- 1.1 Purpose of Document 1
- 1.2 Project Location and Description 1
- 1.3 Water Supply Assessment Applicability 2
  - 1.3.1 Identification of a Public Water System 3
  - 1.3.2 Urban Water Management Plan Coverage 3
  - 1.3.3 Groundwater as a Component of Project Water Supply 4
  - 1.3.4 Sufficiency of Supplies Over the Next 20 Years 4

2 Project Water Demand 6

3 Water Supply Assessment 8
- 3.1 Water Resources 8
  - 3.1.1 Groundwater 8
  - 3.1.2 Surface Water 11
  - 3.1.3 Imported Water 12
  - 3.1.4 Recycled Water 12
- 3.2 Water Resources Plans and Programs 12
  - 3.2.1 Cucamonga Valley Water District 2020 Urban Water Management Plan 12
  - 3.2.2 The Metropolitan Water District of Southern California 2020 Urban Water Management Plan 13
  - 3.2.3 The Metropolitan Water District of Southern California 2015 Integrated Water Resources Plan 13
  - 3.2.4 Peace Agreements 13
  - 3.2.5 Optimum Basin Management Program 14
  - 3.2.6 Chino Basin Watermaster 2018 Recharge Master Plan 14
  - 3.2.7 Chino Basin Watermaster Annual Report 14
- 3.3 Water Supply Availability 14
  - 3.3.1 Chino Basin Assessment 15
  - 3.3.2 CVWD Assessment 15
  - 3.3.3 Water Supply and Demand Comparison 17

4 Conclusions 21

5 References 23

TABLES

1 Project Water Demand....6
2 Chino Basin Groundwater Production....10
3 Well Completion Information for Nearby Wells....11
4 Cucamonga Valley Water District Water Supplies....16
5 Normal Year Supply and Demand Comparison....17
6 Single Dry Year Supply and Demand Comparison....17
7 Multiple Dry Year Supply and Demand Comparison....18

FIGURES

1 Project Location....25
2 Site Plan....27
3 Hydrologic Areas, Groundwater Basins, and Water Districts....29
4 Regional Geologic Map....31
5 Groundwater Contamination Plumes and Recharge Basins....33
6 Groundwater Well Locations....35
7 Well 03 Hydrograph....37

APPENDIX

A Water Demand
B Well Logs

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AF	acre-feet
AFY	acre-feet per year
amsl	above mean sea level
APN	Assessor's Parcel Number
CDA	Chino Desalter Authority
CEQA	California Environmental Quality Act
CBWM	Chino Basin Watermaster
CVWD	Cucamonga Valley Water District
CWC	California Water Code
DWR	California Department of Water Resources
FY	fiscal year
gpm	gallons per minute
IEUA	Inland Empire Utilities Agency
IWRP	Integrated Water Resources Plan
MCL	maximum contaminant level
MWD	Metropolitan Water District of Southern California
OBMP	Optimum Basin Management Program
Project	El Camino Project
SB	Senate Bill
SF	Square feet
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment

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1 Introduction

1.1 Purpose of Document

Senate Bill (SB) 610 was passed on January 1, 2002, amending the California Water Code (CWC) to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies, and to ensure that land-use decisions for certain large development projects are fully informed as to whether a sufficient water supply is available to meet project demands. SB 610 requires preparation of a Water Supply Assessment (WSA) for a project that is subject to the California Environmental Quality Act (CEQA) and meets certain requirements. SB 610 is codified in CWC Division 6, Part 2.10 (Sections 10910–10915).

The El Camino Project (Project) has been determined to be subject to CEQA, with the City of Rancho Cucamonga acting as lead agency. The Project satisfies the statutory definition of a "project" for the purpose of determining SB 610 applicability because it is considered an industrial facility in excess of 650,000 square feet of floor area, per CWC Section 10912(a)(5). The lead agency will make an independent determination as to whether there is adequate water supply for the proposed Project, having considered the entire administrative record. In compliance with SB 610, this WSA examines the availability of the identified water supply under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection, accounting for the projected water demand of the Project plus other existing and planned future uses of the identified water supply.

1.2 Project Location and Description

The Project site is on 1,358,636 square feet (SF), or 31.19 acres, of vacant and developed land in the City of Rancho Cucamonga, an incorporated city within San Bernardino County, California (Figure 1, Project Location). The Project site is at 10670 6th Street, Rancho Cucamonga, California, and is bound on the south by 6th Street, on the east by Utica Avenue, on the west by Haven Avenue, and on the north by 7th Street. Access to the Project site is provided via Utica Avenue, 6th Street, and 7th Street. The Project site consists of Assessor's Parcel Numbers (APNs) 209-411-02, 209-411-03, 209-411-04, 209-411-23, 209-411-24, 209-411-32, 209-411-34, and 209-411-35. The Project site lies within the U.S. Geological Survey Guasti, California 7.5-minute topographic quadrangle and San Bernardino Meridian Township 1 South, Range 7 West, Section 13 of the Public Land Survey System (Figure 1).

The Project would involve construction and operation of an automated storage and retrieval warehouse (52,470 SF), distribution center (188,284 SF), production facility (351,601 SF), existing building (62,210 SF), existing two-story office building (32,890 SF), well house, and on-site parking (both surface and multi-level structure). The total building floor area is 600,001 SF (Figure 2, Site Plan). The Project will also include 206,250 SF of landscaped area which will require drip irrigation. The Project is expected to be built out in three phases over the course of 7 years. Phase 1A would be completed after Year 1 of operation, Phase 1B would be completed after Year 4 of operation, and Phase 2 would be completed after Year 7 of operation (Section 2).

The Project would allow for the manufacturing, bottling, and distribution of beverage products from the warehouse facility. The facility will continue to provide deliveries to stores and restaurants through truck deliveries within a specified radius from the facility. The facility will continue to receive inbound trucks that bring in products to the facility for sorting and re-distributing. The facility would operate similar to the existing operations with a total of 474

employees and visitors at the maximum peak operational capacity, that operate through 3 shifts in a 24 hour per day, 6 days per week operation.

1.3 Water Supply Assessment Applicability

SB 610 amended CWC Sections 10910 and 10912 to create a direct relationship between water supply and land use. SB 610 establishes the legal framework for assessing the sufficiency of water supply for new development that qualifies as a "project." Per CWC Section 10912(a), a "project" means any of the following:

- Proposed residential development of more than 500 dwelling units
- Proposed shopping center or business establishment employing more than 1,000 persons, or having more than 500,000 SF of floor space
- Proposed commercial office building employing more than 1,000 persons or having more than 250,000 SF of floor space
- Proposed hotel or motel or both having more than 500 rooms
- Proposed industrial, manufacturing, or processing plant or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 SF of floor area
- Proposed mixed-use project that includes one or more of the above components
- Proposed project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project

The Project qualifies as a "project" per CWC Section 10912(a) because it is a proposed industrial, manufacturing, or processing plant or industrial park that has more than 650,000 SF of floor space. The Project would also demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project.

The CWC, as amended by SB 610, requires that a WSA address the following questions:

- Is there a public water system that will service the project?
- Is there a current Urban Water Management Plan (UWMP) that accounts for the project demand?
- Is groundwater a component of the supplies for the project?
- Are there sufficient supplies to serve the project over the next 20 years?

The primary question to be answered in a WSA per the requirements of SB 610 is "Will the total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?"

The response to this question also informs and assists the lead agency in responding to the CEQA Guidelines Utilities and Service Systems question: "Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?"

1.3.1 Identification of a Public Water System

Section 10912 of the CWC defines a "public water system" as a system that has 3,000 or more service connections and provides piped water to the public for human consumption. Under SB 610, WSA reports must be prepared and furnished to local governments by the water utility serving that community for inclusion in any environmental documentation for projects meeting the specified requirements under Section 10912(a) of the CWC and subject to CEQA. According to CWC Section 10910(g)(1), "the governing body of each public water system, or the city or county if either is required to comply with this act … shall approve the assessment prepared pursuant to this section at a regular or special meeting." According to SB 610, the public water system serving the Project site is required to prepare the WSA report.

The Project is within the service area of the Metropolitan Water District of Southern California (MWD) and the Cucamonga Valley Water District (CVWD), which is a member agency of Inland Empire Utilities Agency (IEUA). IEUA, as a wholesale water agency, provides the CVWD's imported water supply from the MWD. The MWD is a public agency whose service area covers the Southern California coastal plain. It extends approximately 200 miles along the Pacific Ocean from the City of Oxnard on the north to the international boundary with Mexico on the south, and it reaches as far as 70 miles inland from the coast (Figure 1). The total area served is 5,200 square miles and it includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties (MWD 2021a).

The CVWD serves a 46-square-mile area and 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. The CVWD service area is bounded by the City of Fontana to the east, the cities of Upland and Ontario to the west, the City of Ontario to the south, and the San Gabriel Mountains to the north. The CVWD serves a population of 198,979 people, which includes approximately 48,000 water connections and 37,000 sewer connections with an average daily demand of approximately 47 million gallons per day (CVWD 2021).

1.3.2 Urban Water Management Plan Coverage

Urban Water Management Plans (UWMPs) are prepared by California's urban water suppliers to support long-term resource planning and ensure adequate water supplies. UWMPs must be updated and submitted to the California Department of Water Resources (DWR) every 5 years for review and approval. DWR has identified the UWMP as a foundational document in the preparation of a WSA, noting that a thorough UWMP can provide the required information to fulfill the standards set forth by SB 610. Every urban water supplier that either delivers more than 3,000 acre-feet per year (AFY) of water annually or serves more than 3,000 connections is required to assess the reliability of its water sources over a 20-year period under normal-year, dry-year, and multiple dry-year scenarios; these are the same requirements of a WSA as specified by SB 610. A WSA may also rely on additional water supply data beyond the information in the UWMP.

The Project site is within the area covered by MWD's and CVWD's 2020 UWMPs, as well as the MWD Integrated Water Resources Plan (IWRP) 2015 Update (MWD 2016). Descriptions of these plans, as well as other applicable water resources plans, are provided in Chapter 3, Water Supply Assessment, of this WSA. This WSA uses data provided in the aforementioned plans, where applicable, to assess water supply availability.

1.3.3 Groundwater as a Component of Project Water Supply

The primary source of proposed Project water supply is groundwater from the Upper Santa Ana Valley Basin – Chino Subbasin (Chino Basin, DWR Basin No. 8-002.01; Figure 3, Hydrologic Areas, Groundwater Basins, and Water Districts), which has been an adjudicated basin with an order to be managed by a Watermaster since 1978. The Chino Basin was reportedly adjudicated to mitigate declining water levels that were observed as early as the 1930s (SWRCB 2016).

The 1978 Judgement established the following for the Chino Basin (SWRCB 2016):

- Set the initial safe yield of the basin to 140,000 AFY with a stipulation that the safe yield is recalculated every 10 years, and is defined as the long-term average annual quantity of groundwater (excluding replenishment of stored water but including return flow to the Chino Basin from use of replenishment or stored water) which can be produced from the Chino Basin under conditions of a particular yield without causing an undesirable result
- Allocated water rights for three pools of groundwater users: (1) the "overlying agricultural pool," (2) the "overlying non-agricultural pool," and (3) the "appropriative pool"
- Allowed for water transfers
- Created a replenishment fee (pumping tax) program
- Instituted a Watermaster

The Chino Basin Watermaster's (CBWM) function is to administer and enforce provisions of the 1978 *Chino Basin Municipal Water District v. City of Chino* (Judgement, Case Number 164327) and subsequent orders of the Court, and to develop and implement an Optimum Basin Management Program (OBMP) for the Upper Santa Ana Valley Basin – Chino Subbasin. The intent of the OBMP is to enhance basin water supplies, protect water quality, and improve basin management (SWRCB 2016).

In 2012, a restated judgement incorporated all amendments since 1978 and the Peace Agreements of 2000 and 2007 that addressed transfers, subsidence, funding for groundwater exchange, basin de-salters, basin replenishment, and recharge programs. It also allowed an additional 400,000 acre-feet (AF) to be pumped as controlled overdraft for the de-salters (SWRCB 2016). Groundwater is described in more detail in Section 3.1, Water Resources, and water supply availability is discussed in Section 3.3, Water Supply Availability.

The Project would source groundwater from a new on-site well that would be developed in a manner that is suitable to be tied into the Chino Basin. This new source is described in Section 3.3.

1.3.4 Sufficiency of Supplies Over the Next 20 Years

As described in Chapter 2, Project Water Demand, and Chapter 3, Water Supply Assessment, there is adequate water available to supply the proposed Project. Although the future business that is conducted in the warehouses would increase water demand, water supply should be sufficient even at maximum Project demand according to other existing and planned future uses under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection.

2 Project Water Demand

The existing water demand at the Project site based on water usage bills for all parcels except APN 209-411-34 was estimated to be 10 AFY in fiscal year (FY) 2021/2022. The existing parcels are all designated "D 21st Century Employment District", which comprises a mix of businesses and professional offices with supporting services, retail, and multifamily residential (City of Rancho Cucamonga 2021) and are all zoned as "ME2 Mixed Employment 2 Zone" (City of Rancho Cucamonga 2023). All existing project parcels with the exception of APN 209-411-34 contain parking lots, commercial businesses, restaurants, office buildings, vacant land, and possibly manufacturing (Google Earth 2023). It is assumed that water for these parcels is used for potable use and irrigation. APN 209-411-34 is labeled as an existing 144,000 square foot bottling plant (Google Earth 2023); no water usage bills were available for this parcel. However, water usage was estimated for this facility using usage numbers from other industrial businesses. Because this existing facility is reportedly a distribution center it was estimated to have a similar usage of a Walmart distribution center, which has been documented to use 0.031 AF per 1,000 SF (G. Miles, personal communication, June 20, 2022). This equates to 4.5 AFY for APN 209-411-34. Added to the rest of the existing parcels, the existing water demand for the Project site is 14.5 AFY.

The Project water demand includes bottling uses, building uses, and irrigation uses. The bottling use demand ramps up during each Project phase, while the building use and irrigation use demands remain constant. The irrigation use demands were calculated using DWR's Model Water Efficient Landscape Ordinance worksheet and assumed that the entire 206,250 square foot landscape area will be low water use plantings requiring drip irrigation. The irrigation calculations, along with the bottling use demands and building use demands are included as Appendix A and are summarized in Table 1.

Table 1. Project Water Demand

Project Phase	Bottling Use[a] (gpy)	Building Use (gpy)	Irrigation Use (gpy)	Acre-Feet per Year
Phase 1A	193,915,467	2,280,303	2,585,917	610
Phase 1B	247,222,841	2,280,303	2,585,917	774
Phase 2	276,282,860	2,280,303	2,585,917	863

Note: gpy = gallons per year
Source: [a]PET Terra Systems 2023.

The Project water demand is estimated to be approximately 610 AFY in the first year of operation after completion of Phase 1A, ramping up to 774 AFY by Year 4 of operation after completion of Phase 1B, and then 863 AFY by Year 7 of operation after completion of Phase 2 (Table 1). This WSA assumes that Phase 1A will begin January 1, 2026. The Project peak water demand is estimated to be approximately 1,789 GPM for a duration of 1-hour by year 7 of operation after completion of Phase 2 (Table 1).

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3 Water Supply Assessment

A WSA is required to identify and describe the water supply source(s) that would serve a proposed project. CWC Section 10910(d) requires a WSA to include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for a proposed project, and a description of the quantities of water received in prior years if the source is a public water supplier.

3.1 Water Resources

3.1.1 Groundwater

3.1.1.1 Upper Santa Ana Valley Basin – Chino Subbasin

The Project site overlies the adjudicated Upper Santa Ana Valley Basin – Chino Subbasin, which covers an area of 240 square miles. DWR has designated the Chino Basin as very low priority with regard to enacting the Sustainable Groundwater Management Act. The Chino Basin was adjudicated in 1978 and is not subject to the requirements of the Sustainable Groundwater Management Act, but instead is subject to groundwater pumping allocations under the court adjudication set up to meet water users' water supply and quality needs and to safeguard the environment (CBWM 2021a).

Hydrogeologic Setting

The Chino Basin is bounded on the east by the Rialto–Colton Fault, on the southeast by the contact with impermeable rocks forming the Jurupa Mountains and low divides connecting the exposures, on the south with impermeable rocks and by the Chino Fault, on the northwest by the San Jose Fault, and on the north by impermeable rocks of the San Gabriel Mountains and by the Cucamonga Fault (DWR 2004) (Figure 4, Regional Geologic Map).

The two primary water-bearing units of the Chino Basin are Holocene[1] and Pleistocene[2] alluvium (Figure 4). Holocene alluvium consists mainly of alluvial-fan deposits, with a maximum thickness of 150 feet that is coarsest in and near the mouths of the canyons and are finer away from canyon mouths in the southern part of the Chino Basin. The Pleistocene alluvium unit is exposed mainly in the northern part of the Chino Basin and supplies most of the water to wells in the Chino Basin. This alluvium is approximately 600 to 700 feet thick throughout most of the Chino Basin and contains interfingering fine, alluvial-fan deposits and coarser, fluvial deposits. Most of the wells producing water from the eastern half of the Chino Basin draw from the coarse portion of the Pleistocene alluvium. The Pleistocene alluvium in the central part of the Chino Basin has the lowest clay content and the highest well yields, with 500 to 1,000 gallons per minute (gpm). In the southern part of the area, where the sediments tend to contain more clay, wells generally yield between 100 and 500 gpm (DWR 2004). The total groundwater storage capacity of the Chino Basin is estimated to be 18,300,000 AF, and the current amount of groundwater in managed storage is 700,000 AF (CBWM 2021a; DWR 2004).

1 The Holocene Epoch began approximately 12,000 years ago and continues to present day.
2 The Pleistocene Epoch began approximately 2.6 million years ago and lasted until approximately 12,000 years ago.

Groundwater Levels

The Chino Basin receives recharge by direct infiltration of precipitation on the Chino Basin floor, by infiltration of surface flow, and by underflow of groundwater from adjacent basins. As of 2006, the five recharge channels/facilities in the Chino Basin were Deer Creek, Day Creek, East Etiwanda, San Sevaine, and Victoria (DWR 2006). A Recharge Master Plan was completed in 2001 and flood retention facilities, which are also recharge basins, were constructed from 2004 to 2014 (CBWM 2018) (Figure 5, Groundwater Contamination Plumes and Recharge Basins). Before the adjudication, the Chino Basin experienced declining groundwater levels, but levels increased over time. Groundwater levels in 1980 were 80 feet lower than highs from the 1920s, but water levels increased by 20 feet in 2000 (DWR 2004; SWRCB 2016). The MWD found water levels in the Chino Basin were stable in 2007 (MWD 2016).

Groundwater levels vary throughout the Chino Basin. According to a groundwater elevation contour map for spring 2020, groundwater levels ranged from approximately 500 feet above mean sea level (amsl) in the southern part of the Chino Basin to 850 feet amsl in the eastern part of the Chino Basin. The contours from spring 2020 are generally consistent with the contours from spring 2018, indicating regional groundwater flow in a south-southwest direction from the primary areas of recharge in the northern parts of the Chino Basin toward the Prado Basin in the south (CBWM 2021b). From spring 2000 to spring 2020, groundwater levels increased in the western portion of the Chino Basin and decreased in the central and eastern portions of the Chino Basin and around the eastern portion of the Chino Desalter well field in the south (CBWM 2021b).

Existing wells near the Project site are shown in Figure 6, Groundwater Well Locations. Water levels for CVWD Well 03 (State Well Number 01S07W14L001S), which is approximately 0.5 miles west of the Project site, are available from 1979 to 2020 (Figure 6). The hydrograph for Well 03 shows water levels increasing from 1979 to 1990 to a high of approximately 690 feet amsl, declining from 1990 to 2010 to a low of approximately 610 feet amsl, slightly increasing from 2010 to 2015 to approximately 650 feet amsl, and then slightly decreasing to approximately 630 feet amsl in 2022 (SWRCB 2023) (Figure 6).

Groundwater Quality

Groundwater quality in areas of the Chino Basin has been impacted by contamination (CVWD 2021). The most serious problems pertaining to water quality are high concentrations of total dissolved solids and nitrate-nitrogen from agricultural land use. The CVWD 2020 UWMP reports that nitrates and total dissolved solids concentrations in areas of the Chino Basin exceed drinking water quality standards. It also states that the Chino Basin is contaminated with Perchlorate and volatile organic compounds (CVWD 2021). According to the 44th Annual Watermaster report, there are five volatile organic compound contamination plumes within the Chino Basin, based on concentrations measured at wells from July 2015 to June 2020 (CBWM 2021a). The Project site does not fall within the spatial extents of any of the contamination plumes (Figure 5).

The 2020 State of the Basin shows all the contaminants that exceeded a California maximum contaminant level (MCL) and the number of wells with exceedances. Contaminants where a primary MCL was exceeded in 50 or more wells from July 2015 to June 2020 and are not associated with a single point-source contamination plume include 1,2,3-Trichloropropane, 1,2-dichloroethane, arsenic, benzene, total chromium, hexavelant chromium, perchlorate, perchloroethylene, and trichloroethylene. Contaminants that the California Department of Drinking Water considers a candidate for the development of an MCL or is in the process of developing an MCL include perfluorooctanoic acid, perfluorooctanesulfonic acid, and 1,4-dioxane (CBWM 2021b).

Groundwater Production

Total annual groundwater production from the Chino Basin has ranged from a maximum of 188,828 AFY during FY 2008/2009 to a minimum of approximately 122,863 AF during FY 1982/1983. A majority of production is currently pumped for municipal and agricultural purposes, and the remaining production is pumped by non-agricultural parties (CVWD 2021). During FY 2019/2020, 376 production wells were active in the Chino Basin. A breakdown of production per pool can be found in Table 2.

Table 2. Chino Basin Groundwater Production

Pool	Fiscal Year 1982/1983 Production		Fiscal Year 2008/2009 Production		Fiscal Year 2020/2021 Production	
	Acre-Feet	Percentage	Acre-Feet	Percentage	Acre-Feet	Percentage
Agricultural	56,858	46	23,277	12	14,945	9
Overlying Non-Agricultural	2,448	2	2,420	1	2,795	2
Appropriative	63,557	52	134,119	71	105,040	64
Chino Basin Desalter Authority	N/A	N/A	29,012	15	40,156	25

Source: CBWM 2021a.
N/A = not available.

3.1.1.2 Upper Santa Ana Valley Basin – Cucamonga Subbasin

Northwest of the Project site and adjacent to the Chino Basin is the adjudicated Upper Santa Ana Valley Basin – Cucamonga Subbasin (Cucamonga Basin), which covers an area of 15 square miles. The total groundwater storage capacity of the Cucamonga Basin is estimated to be 53,600 AF (DWR 2004).

DWR has designated the Cucamonga Basin as very low priority with regard to the Sustainable Groundwater Management Act. The Cucamonga Basin was adjudicated in 1958 and is not subject to the requirements of the Sustainable Groundwater Management Act, but instead is subject to groundwater pumping allocations under the court adjudication. Today, the adjudicated water rights in the Cucamonga Basin are allocated to three producers: West End Consolidated Water Company, San Antonio Water Company, and CVWD. The 1958 Decree did not designate a Watermaster, and annual reports were not required. The Cucamonga Basin is jointly managed by the CVWD, San Antonio Water Company, and West End Consolidated Water Company, and the CBWM provides reporting for the Cucamonga Basin (SWRCB 2016).

3.1.1.3 Groundwater Well Inventory Proximal to Project Site

Because an on-site well is proposed as the source of water for the Project, available information about the groundwater conditions and users within the radius of influence of the proposed well was reviewed. Based on available information, 21 production wells occur within a 2-mile radius of the Project site: nine CVWD wells, 11 Ontario Municipal Utilities Company wells, and one Fuji Natural Food well (Figure 6). The closest well to the Project site is CVWD Well 46 – Coca Cola Well[3], located near the northeast corner of the Project site and approximately 900 feet due north of the proposed on-site well (Figure 6). Well logs are available for four of the wells: CVWD Wells

[3] Well 46 – Coca Cola Well name per Groundwater Ambient Monitoring Assessment Program database

41, 42, and 46, and Ontario Municipal Utilities Company Well 41. Well completion information, including total depth, screened interval, and estimated yield, are provided in Table 3, and well logs are included in Appendix B.

Table 3. Well Completion Information for Nearby Wells

Well ID	Well Owner	Log No.	Diameter (inches)	Total Depth (feet bgs)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Estimated Yield (gpm)
Well 41	CVWD	e019362	20	1,010	650	990	3,500
Well 42	CVWD	e019365	20	1,010	650	990	4,000
Well 46	CVWD	e077980	24	1,000	650	990	3,000
Well 41	OMUC	793000	20	1,040	600	1,020	3,000

Source: DWR 2023.
CVWD = Cucamonga Valley Water district; OMUC = Ontario Municipal Utilities Company; bgs = below ground surface; gpm = gallons per minute.

Based on the 2020 State of the Basin Report, the three wells closest to the Project site, Well 46 (Coca Cola Well), Well 41, and Well 42, produced 2,500 to 5,000 AF for FY 2019/2020. No contaminants were detected at levels that exceeded the MCLs in these three wells from June 2015 to June 2020 (CBWM 2021b).

Assuming a Phase 2 Project water demand of 863 AFY and the well pumping 24 hours per day 7 days per week, the Project supply well would need to be pumped at a rate of approximately 535 gpm to meet Project maximum demand. Assuming a Phase 2 Project water demand of 863 AFY and a standard 8 hours per day 5 days a week work schedule, the Project supply well would need to be pumped at a rate of approximately 2,253 gpm to meet Project maximum demand. Based on information contained in the well logs, well yields in the vicinity of the Project are more than adequate to satisfy the water requirements of the proposed Project in both scenarios. An estimate of groundwater level drawdown at various distances from the proposed Project supply well induced by Project pumping is provided in Section 3.3.3, Groundwater Supply Sustainability Analyses.

3.1.2 Surface Water

The Santa Ana River is the primary natural surface water feature in the vicinity of the Project site (Figure 3). The Santa Ana River is largely classified as an intermittent stream and only contains flowing water during certain times of the year (USGS 2023).

The CVWD has several tunnel water sources that originate in the canyons of the San Gabriel Mountains. These tunnel water sources, which are influenced by the magnitude of precipitation, consist of streams, springs, and tunnels in the Cucamonga Canyon, Deer Canyon, and Day/East Etiwanda Canyon of the San Gabriel Mountains (Figure 3). Water from these tunnel sources is treated before distribution to customers.

The CVWD acquired the Ioamosa Water Company in the 1970s, along with the Ioamosa Tunnel. CVWD's Cucamonga Canyon facilities are in an unincorporated area of western San Bernardino County, north of the City of Rancho Cucamonga, and consist of two diversion ponds and a 24-inch-diameter transmission pipeline that conveys surface water from the Cucamonga Canyon to the Arthur H. Bridge Water Treatment Plant (CVWD 2021).

The CVWD acquired the Etiwanda Water Company in 1979, along with the surface water rights to the Day Canyon and East Canyon. CVWD's facilities include the Day Basin, East Basin, Smith Tunnel, "Bee" Tunnel, and transmission

pipelines that convey surface water from the Day/East Etiwanda Canyons to either the Royer-Nesbit Water Treatment Plant or the Lloyd Michael Water Treatment Plant (CVWD 2021).

The CVWD acquired the Hermosa Water Company in 1970, along with the water rights to Deer Canyon. When the CVWD acquired the Hermosa Water Company, its major assets were the tunnels in Deer Canyon (Hermosa Tunnel, Thayer Tunnel, and "A" Tunnel) and the transmission mains connecting these various sources to a small reservoir on the south side of Lemon Avenue. The CVWD currently captures flows from only the Hermosa Tunnel in Deer Canyon, which funnels water into a 6-inch-diameter transmission pipeline that conveys surface water to a reservoir for distribution (CVWD 2021).

3.1.3 Imported Water

The CVWD purchases untreated imported water from the MWD through IEUA, which is treated at a water treatment plant. The largest component of CVWD's water supply typically comes from imported water and ranges from approximately 25% to 65% of CVWD's water. The CVWD has two connections to untreated State Water Project water: an 18-inch connection and a 60-inch connection. The CVWD also has one 24-inch connection to untreated Colorado River Aqueduct water, but this connection has been disconnected due to the lack of treatment capabilities. CVWD's projected purchases of untreated imported water over the next 25 years assumes that the CVWD will use all of its maximum MWD Tier I allocation, which is 28,369 AF (CVWD 2021).

3.1.4 Recycled Water

CVWD's recycled water supplies are produced by IEUA, which has five regional wastewater treatment plants that can produce tertiary-treated, Title 22-quality, recycled water. The CVWD has rights to the recycled water produced from the estimated 14,000 AF of sewage that is treated annually by IEUA. The CVWD has 135 recycled water customers and recycled water accounts, for 2% to 3% of CVWD's overall supply (CVWD 2021).

3.2 Water Resources Plans and Programs

3.2.1 Cucamonga Valley Water District 2020 Urban Water Management Plan

The 2020 UWMP provides the CVWD with a planning document for long-term resource planning to ensure adequate water supplies are available to meet existing and future water supply needs. In addition, the 2020 UWMP incorporates water supply reliability determinations resulting from potential prolonged drought, regulatory revisions, and/or changing climatic conditions (CVWD 2021). The 2020 UWMP contains detailed information on CVWD's current and projected water use and supply reliability. CVWD's water supply sources consist of groundwater pumped from the Chino Basin and Cucamonga Basin; untreated, imported surface water from the MWD purchased through IEUA and treated at CVWD's treatment plant; local surface water from Cucamonga Canyon, Day/East Etiwanda Canyon, and Deer Canyon; and recycled water purchased from IEUA. CVWD's main sources of water supply are from groundwater pumped from the Chino Basin and imported surface water (CVWD 2021). The CVWD is a member of the Appropriative Pool of the Chino Basin Judgement. The CBWM can reallocate the unused portion of the Chino Basin safe yield from the Overlying Agricultural Pool to the Appropriative Pool members as a supplement to the Appropriative Pool share of Operating Safe Yield rights in any year (CVWD 2021).

The CVWD relies on imported water as part of its supply, which is ultimately provided by the MWD. The MWD has prepared its own UWMP, which includes a discussion of its water supplies and the impact of climate change (MWD 2021a). MWD's 2020 UWMP is described in Section 3.2.2.

3.2.2 The Metropolitan Water District of Southern California 2020 Urban Water Management Plan

The 2020 UWMP provides an assessment of MWD's water service reliability and describes and evaluates sources of water supply, efficient uses of water, demand management measures, implementation strategy and schedule, and other relevant information and programs. The information included in the 2020 UWMP represents the most current and available planning projections of supply capability and demand forecasts developed through a collaborative process with the member agencies (MWD 2021a). The MWD completed a water service reliability assessment and determined that it has supply capabilities sufficient to meet expected demands from 2025 through 2045 under a normal year, a single dry-year, and a period of drought lasting 5 consecutive water years.

3.2.3 The Metropolitan Water District of Southern California 2015 Integrated Water Resources Plan

As stated in the IWRP (MWD 2016):

> The fundamental goal of the IWRP is for Southern California to have as reliable a water system for tomorrow as the region has enjoyed for decades, regardless of challenges that emerge along the way. MWD plans to meet this goal through an adaptive management strategy that is the cornerstone of the 2015 IWRP Update. The 2015 IWRP Update represents a further step in the iterative planning process of a "living" strategic plan that evolves and adapts as needed to address the needs of the next generation.

3.2.4 Peace Agreements

The Chino Basin Watermaster was established in 1978 under a Judgement entered in the Superior Court of the State of California for the County of San Bernardino. In July 2000, parties to the Judgment entered into the Peace Agreement. The Peace Agreement outlined the parties' intent to implement the OBMP and other related responsibilities for the CBWM and the parties. In 2007, Peace II Agreement was entered into by the parties to the Peace Agreement to maximize the beneficial use of the groundwater and the Chino Basin to further benefit the Chino Basin and the parties to the Judgment (CBWM 2007).

As part of these Agreements, the Chino Basin Storage Management Plan was developed, which includes three types of storage agreements that result in five types of storage accounts. These include unproduced rights in the Safe Yield and Chino Basin water purchased or transferred from other parties. Parties can store water that is in excess of their demands and may recover that water in the future as the need arises. The CBWM maintains records of the replenishment, production, losses, and end-of-year storage totals for all storage accounts and provides that information on an annual basis (CVWD 2021).

The Chino Desalter Authority (CDA) has constructed two desalters and several wells in the southern part of the Chino Basin and can produce approximately 40,000 AFY from the Chino Basin for the purpose of groundwater cleanup and control of contaminant migration. The CDA is not party to the Judgement and has no water rights in

the Chino Basin. All CDA production of groundwater is replenished by members of the Appropriative and overlying non-agricultural Pools, in accordance with the 2007 Peace II Agreement. Collectively, the overlying non-agricultural parties have a relatively small replenishment obligation for the CDA. The members of the Appropriative Pool will contribute a total of 10,000 AFY toward Desalter replenishment as follows (CVWD 2021):

1) 85% of the total will be allocated according to the Operating Safe Yield percentage of each Appropriative Pool member; and

2) 15% of the total will be allocated according to each land use conversion agency's percentage of the total land use conversion claims, based on the actual land use conversion allocations of the year.

3.2.5 Optimum Basin Management Program

The OBMP was developed pursuant to the Judgement and a ruling by the court on February 19, 1998. The OBMP maps a strategy that provides for the enhanced yield of the Chino Basin, and seeks to provide reliable, high-quality water supplies for the development that is expected to occur within the Chino Basin. The OBMP Implementation Plan is the court-approved governing document for achieving the goals defined in the OBMP (CBWM 2021b). The 2020 State of the Basin Report is the most recent State of the Basin Report (CBWM 2021b), and the *OBMP Staff Status Report 2022-2: July to December 2022* is the most recent semi-annual status report (CBWM 2022).

3.2.6 Chino Basin Watermaster 2018 Recharge Master Plan

The 2018 Recharge Master Plan for the CBWM documents the investigation conducted by the IEUA and the CBWM pursuant to the Court's direction to update the 2013 Amendment to the 2010 Recharge Master Plan Update (CBWM 2018). The Recharge Master Plan contains technical documentation demonstrating that the CBWM has sufficient recharge capacity to meet expected future replenishment obligations through 2050 (CBWM 2018).

3.2.7 Chino Basin Watermaster Annual Report

An Annual Report is prepared by the CBWM. These reports encompass the activities that occurred during the fiscal year and includes the Assessment Package and Audited Financial Report that were produced during the year of the report. The report provides updates on the OBMP, the Recharge Master Plan, community and engagement programs, and groundwater monitoring programs. The latest report as of the writing of this WSA is the 44th Annual Report of the Chino Basin Area Watermaster (CBWM 2021a), which provides an update on groundwater conditions in the Chino Basin for water year 2020/2021.

3.3 Water Supply Availability

Water demands throughout the Chino Basin are supplied by a variety of water purveyors, including municipal utilities, water districts, water companies, and private groundwater wells. Water supply for the City of Rancho Cucamonga (Project location) is from the CVWD, whose service area also includes portions of the cities of Fontana, Ontario, and Upland, and some unincorporated areas of San Bernadino County.

3.3.1 Chino Basin Assessment

The Judgement established a safe yield of 140,000 AFY for the Chino Basin, which has since been lowered by the CBWM, reflecting the effects of continued development, conservation, and long-term drought (CVWD 2021). Pursuant to the most recent safe yield reset, effective July 2020, the safe yield in the Chino Basin is determined to be 131,000 AFY for the period of 2021 through 2030 (CVWD 2021). As a result of this reset, the Appropriative Pool operating safe yield is 40,834 AFY. The safe yield is recalculated every 10 years and is defined by the Judgement as the long-term average annual quantity of groundwater (excluding replenishment of stored water but including return flow to the Chino Basin from use of replenishment or stored water) that can be produced from the Chino Basin under conditions of a particular yield without causing an undesirable result.

The CBWM can reallocate the unused portion of the Chino Basin Safe Yield from the Overlying Agricultural Pool to the Appropriative Pool members in any year if agricultural pool extractions are less than their share or if agricultural land has been converted to non-agricultural use. From 2000 to 2020, the annual quantity of the Agricultural Pool averaged 50,457 AFY (CVWD 2021). In FY 2020/2021, the total water rights available for reallocation due to agricultural pool underproduction of safe yield was 61,315 AF, and rights available for reallocation less claimed rights was 9,000 AF (CBWM 2021a). Appropriators that are parties to the Judgement are authorized to produce groundwater in excess of their rights as long as they pay assessments to the CBWM. The assessments are used to purchase water from MWD to replenish the Chino Basin (CVWD 2021).

The total agricultural pool production in FY 2020/2021 was 21,484.8 AF, and the safe yield was 82,800 AF. Of the 61,315.2 AF available for reallocation, the CVWD received 2,552.2 AF of that. The CVWD produced 26,225.7 AF as part of its Appropriative pool production (CBWM 2021a).

3.3.2 CVWD Assessment

The primary water sources for the CVWD are groundwater pumped from the Chino Basin and imported surface water. On average, from FY 2011 to 2020, 47% of water supplied to CVWD customers was from pumped groundwater (34% from the Chino Basin and 13% from the Cucamonga Basin), 45% was from imported surface water, 6% was from local surface water, and 2% was from recycled water (CVWD 2021). The CVWD will construct new groundwater wells in the Chino Basin by 2025 as part of future water projects, estimated to provide 7,500 AFY (CVWD 2021).

The CVWD has determined that a Chino Basin production well could serve the Project, and the well would be located in the southeastern corner of APN 209-411-34. It is anticipated that the well will have a high production rate, and it could be used for overall supply in the water infrastructure network. The estimated production rate of the well is approximately 1,200 gpm (CVWD 2022).

The CVWD has an appropriative right of 5,199 AFY as of 2021 (CBWM 2021a). The CVWD has acquired the appropriative rights of two other appropriators, the Etiwanda Water Company and a majority interest of the Fontana Union Water Company. Through these acquisitions, the CVWD acquired rights in the Chino Basin to 768 AFY from Etiwanda Water Company and 9,188 AFY from the Fontana Union Water Company. Under the Judgement, the annual pumping rights of Appropriative parties are not administered according to their specific rights. Instead, their specific rights are used to determine what percentage of the “Operating Safe Yield” each Appropriative Party can

produce without paying a replenishment obligation. CVWD's total rights equate to 18.3% of total Chino Basin rights, which equates to 7,455.47 AFY (CVWD 2021).

CVWD's reliable quantities of projected water supply sources over the next 25 years is provided in Table 4.

Table 4. Cucamonga Valley Water District Water Supplies

Water Supply	Additional Detail on Water Supply	Actual Volume (acre-feet)	Projected Water Supply (acre-feet)				
		2020	2025	2030	2035	2040	2045
Groundwater	Chino Basin	23,315	10,250	14,773	16,331	17,630	17,630
Groundwater	Cucamonga Basin	3,618	10,000	10,000	10,000	10,000	10,000
Surface Water	Cucamonga Canyon Tunnel Water	931	800	800	800	800	800
Surface Water	Deer Canyon	0	50	50	50	50	50
Surface Water	Day/East Etiwanda Canyon Tunnel Water	3,813	2,100	2,100	2,100	2,100	2,100
Purchased or Imported Water	Inland Empire Utilities Agency	14,343	28,369	28,369	28,369	28,369	28,369
Recycled Water	Inland Empire Utilities Agency (Direct Use)	1,038	1,800	2,000	2,000	2,000	2,000
Recycled Water	Inland Empire Utilities Agency (Groundwater Recharge)	4,458	4,000	4,000	4,000	4,000	4,000
	Total	**51,516**	**57,369**	**62,092**	**63,650**	**64,949**	**64,949**

Source: CVWD 2021.

CVWD's projected quantities of imported water supplies and surface water supplies are based on historical long-term averages and available supplies during previous dry year conditions. CVWD's projected quantities of recycled water supplies to meet non-potable demands are based on historical long-term averages. The CVWD will purchase additional imported water supplies and produce additional groundwater from the Chino Basin to meet its total water demands. In the event that local surface water and/or imported water is limited, the CVWD has the flexibility to increase groundwater production from the Chino Basin (CVWD 2021).

CVWD's imported water supplies from the MWD, through the IEUA, may be impacted during a multi-year drought or other conditions that limit the MWD from delivering sufficient water supplies to all its member agencies, and consequently to the CVWD. In anticipation of such a reduction in supplies, the MWD developed a Water Supply Allocation Plan that provides a means of equitably providing reduced water supplies to each of MWD's member agencies (MWD 2021b).

3.3.3 Water Supply and Demand Comparison

CVWD's projected normal water year demands were based on CVWD's 2020 Water Use Target of 232 gallons per-capita per-day for potable water demands. The ratio of total water supplies available to the CVWD during a historical normal year and during a historical single dry year was used to estimate the CVWD's projected water demands during single dry years. The ratio of total water supplies available to the CVWD during a historical normal year and a historical 5-year drought was used to estimate the CVWD's projected water demands during a 5 consecutive-year drought period. CVWD's projected dry-year water supplies over the next 25 years were based on the minimum supplies needed by the CVWD to meet projected single-dry-year demands. CVWD water demands over the past 10 years has ranged from 40,166 AFY to 55,726 AFY, with an average of 48,276 AFY (CVWD 2021).

FY 2010/2011 represents an "average" or "normal" water year for CVWD, in which the total amount of rainfall was similar to the historical average rainfall of 10.7 inches (CVWD 2021). CVWD's projected water supplies available during normal years in 5-year increments over the next 25 years are provided in Table 5.

Table 5. Normal Year Supply and Demand Comparison

	Projected Water Supply and Demand (acre-feet)				
	2025	2030	2035	2040	2045
CVWD Supply Totals	57,369	62,092	63,650	64,949	64,949
CVWD Demand Totals	53,369	58,092	59,650	60,949	60,949
Project Water Demand[1]	N/A	774	863	863	863
Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
Difference[2]	**4,000**	**3,240.5**	**3,151.5**	**3,151.5**	**3,151.5**

Source: CVWD 2021.
CVWD = Cucamonga Valley Water District; N/A = not applicable.
1 Project Water Demand and Existing Water Usage are discussed in Chapter 2.
2 Difference = CVWD Supply Totals – CVWD Demand Total – Project Water Demand + Existing Water Usage

A single dry year for the CVWD was represented in FY 2017/2018, in which the total amount of rainfall was below the historical average rainfall. CVWD's projected water supplies available during single dry years in 5-year increments over the next 25 years are provided in Table 6.

Table 6. Single Dry Year Supply and Demand Comparison

	Projected Water Supply and Demand (acre-feet)				
	2025	2030	2035	2040	2045
CVWD Supply Totals	55,999	60,610	62,131	63,399	63,399
CVWD Demand Totals	52,099	56,710	58,231	59,499	59,499
Project Water Demand[1]	N/A	774	863	863	863
Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
Difference[2]	**3,900**	**3,140.5**	**3,051.5**	**3,051.5**	**3,051.5**

Source: CVWD 2021.
CVWD = Cucamonga Valley Water District; N/A = not applicable
1 Project Water Demand and Existing Water Usage are discussed in Chapter 2.
2 Difference = CVWD Supply Totals – CVWD Demand Total – Project Water Demand + Existing Water Usage

CVWD's projected water supplies available during 5 consecutive dry years in 5-year increments over the next 25 years are provided in Table 7. Upon adoption of a water supply shortage stage, water reduction demands will be effective immediately (CVWD 2021).

Table 7. Multiple Dry Year Supply and Demand Comparison

		Projected Water Supply and Demand (acre-feet)				
		2025	2030	2035	2040	2045
First Year	CVWD Supply Totals	60,708	65,708	67,358	68,733	68,733
	CVWD Demand Totals	56,508	61,508	63,158	64,533	64,533
	Project Water Demand[1]	N/A	774	863	863	863
	Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
	Difference[2]	**4,200**	**3,440.5**	**3,351.5**	**3,351.5**	**3,351.5**
Second Year	CVWD Supply Totals	63,297	68,509	70,229	71,662	71,662
	CVWD Demand Totals	58,897	64,109	65,829	67,262	67,262
	Project Water Demand[1]	N/A	774	863	863	863
	Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
	Difference[2]	**4,400**	**3,640.5**	**3,551.5**	**3,551.5**	**3,551.5**
Third Year	Supply Totals	64,924	70,271	72,035	73,506	73,506
	Demand Totals	60,424	65,771	67,535	69,006	69,006
	Project Water Demand[1]	N/A	774	863	863	863
	Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
	Difference[2]	**4,500**	**3,740.5**	**3,651.5**	**3,651.5**	**3,651.5**
Fourth Year	Supply Totals	57,077	61,774	63,323	64,615	64,615
	Demand Totals	53,077	57,774	59,323	60,615	60,615
	Project Water Demand[1]	N/A	774	863	863	863
	Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
	Difference[2]	**4,000**	**3,240.5**	**3,151.5**	**3,151.5**	**3,151.5**
Fifth Year	Supply Totals	46,852	50,707	51,978	53,038	53,038
	Demand Totals	43,552	47,407	48,678	49,738	49,738
	Project Water Demand[1]	N/A	774	863	863	863
	Existing Water Usage[1]	N/A	14.5	14.5	14.5	14.5
	Difference[2]	**3,300**	**2,540.5**	**2,451.5**	**2,451.5**	**2,451.5**

Source: CVWD 2021.
CVWD = Cucamonga Valley Water District; N/A = not applicable

[1] Project Water Demand and Existing Water Usage are discussed in Chapter 2.
[2] Difference = CVWD Supply Totals – CVWD Demand Total – Project Water Demand + Existing Water Usage

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4 Conclusions

A WSA is required to identify and describe the water supply source(s) that will serve a proposed Project. CWC Section 10910(d) requires a WSA to include an identification of any existing water supply entitlements, water rights, and water service contracts relevant to the identified water supply for a proposed project, and a description of the quantities of water received in prior years if the source is a public water supplier.

The CVWD would be the sole source of water for the Project, and its primary sources are groundwater pumped from the Chino Basin and Cucamonga Basin, and imported surface water. The CVWD has the ability to purchase additional imported water supplies and produce groundwater from the Chino Basin to meet its total water demands. In the event local surface water and/or imported water is limited, the CVWD has the flexibility to increase groundwater production from the Chino Basin (CVWD 2021). CVWD may increase groundwater production from the Chino Basin in excess of water rights as long as overproduction is taken from the CVWD storage account or by purchasing replenishment water. CVWD currently has about 65,000 AF stored in the Chino Basin.

Based on the information, analysis, and findings documented in this WSA, and depending on coordination with the Basin Watermaster, CVWD's total projected water supplies available during normal, single-dry, and multiple-dry water year scenarios during a 20-year projection will meet the projected water demand associated with the proposed Project, accounting for the projected water demand of the Project plus other existing and planned future uses of the identified water supply.

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5 References

CBWM (Chino Basin Watermaster). 2007. *2007 CBWM Groundwater Model Documentation and Evaluation of the Peace II Project Description*. November 2007.

CBWM. 2018. *2018 Recharge Master Plan.* Prepared by Wildermuth Environmental Inc. September 2018.

CBWM. 2021a. *44th Annual Report of the Chino Basin Area Watermaster. Fiscal Year 2020–21*. 2021.

CBWM. 2021b. *Chino Basin Optimum Basin Management Program. 2020 State of the Basin Report*. Prepared by West Yost. June 2021. http://www.cbwm.org/docs/engdocs/State_of_the_Basin_Reports/SOB%202020/2020%20State%20of%20the%20Basin%20Report.pdf.

CBWM. 2022. *Optimum Basin Management Program Staff Status Report 2021-2: July to December 2021*.

City of Rancho Cucamonga. 2021. *Plan RC: City of Rancho Cucamonga General Plan*. Adopted December 2021. https://www.cityofrc.us/planrc.

City of Rancho Cucamonga. 2023. *Zoning Plan Interactive Viewer*. Accessed March 2023. https://www.cityofrc.us/everything-we-do/zoning-map

CVWD (Cucamonga Valley Water District). 2021. *Cucamonga Valley Water District 2020 Urban Water Management Plan*. Prepared by Stetson Engineers Inc. June 2021. https://www.cvwdwater.com/DocumentCenter/View/4741/Final-Cucamonga-Valley-Water-District-2020-UWMP.

CVWD. 2022. "CVWD/Reyes – Water and Sewer Demands/Discharges." Meeting minutes from a conference call on October 24, 2022.

Driscoll, F.G. 1986. *Groundwater and Wells*, 2nd ed. Johnson Filtration Systems Inc., St. Paul, Minnesota.

DWR (Department of Water Resources). 2004. *California's Groundwater Bulletin 118 Upper Santa Ana Valley Groundwater Basin, Cucamonga Subbasin*. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/8_002_02_CucamongaSubbasin.pdf.

DWR. 2006. *California's Groundwater Bulletin 118 Upper Santa Ana Valley Groundwater Basin, Chino Subbasin*. Updated January 20, 2006. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Bulletin-118/Files/2003-Basin-Descriptions/8_002_01_ChinoSubbasin.pdf.

DWR. 2023. SGMA Data Viewer, Well Completion Reports. Accessed February 11, 2023. https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels.

Google Earth. 2023. View of Project Site. Accessed February 2023. https://earth.google.com/web/.

MWD (The Metropolitan Water District of Southern California). 2016. *Integrated Water Resources Plan 2015 Update*. January 2016. https://www.mwdh2o.com/how-we-plan/integrated-resource-plan/.

MWD. 2021a. *2020 Urban Water Management Plan*. https://www.mwdh2o.com/media/21641/2020-urban-water-management-plan-june-2021.pdf.

MWD. 2021b. *Water Shortage Contingency Plan*. June 2021. https://www.mwdh2o.com/media/21648/water-shortage-contingency-plan-june-2021.pdf.

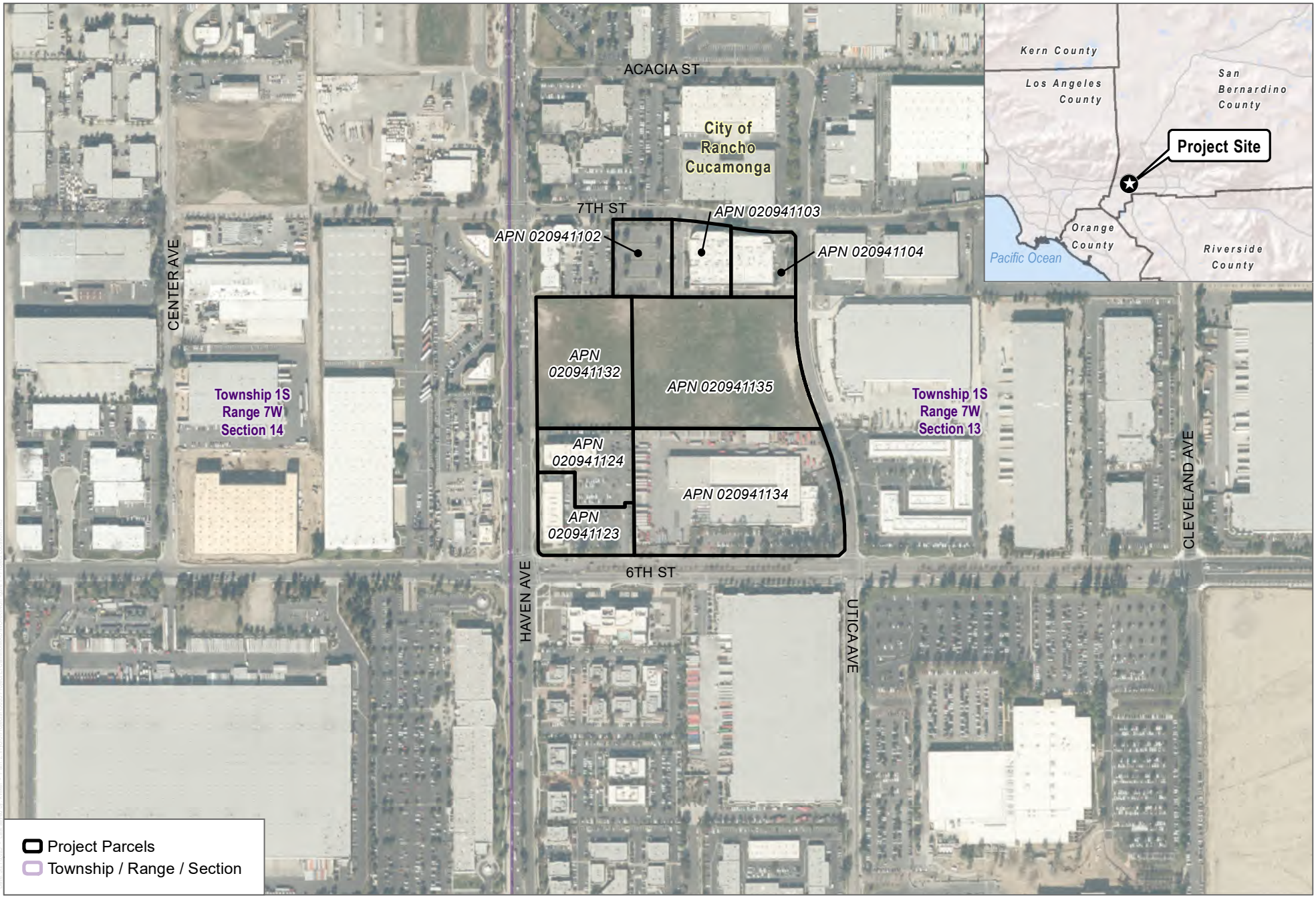
PET Terra Systems. 2023. *Project El Camino – Water Balance*. Revised April 11, 2023.

SWRCB (State Water Resources Control Board). 2016. *An Evaluation of California's Adjudicated Groundwater Basins*. January 2016. https://www.waterboards.ca.gov/water_issues/programs/gmp/docs/resources/swrcb_012816.pdf.

SWRCB. 2023. *Groundwater Information System*. 2023. https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/.

USGS (U.S. Geological Survey). 1962. *Theory of Aquifer Tests, Groundwater Hydraulics. Geological Survey Water-Supply Paper No. 1536-E*. Prepared by J.G. Ferris, D.B. Knowles, R.H. Brown, and R.W. Stallman. Denver, Colorado: USGS.

USGS. 2023. The National Map Viewer. Accessed January 2023. https://apps.nationalmap.gov/viewer/.



SOURCE: ESRI; USGS; County of San Bernardino

DUDEK

0 500 1,000 Feet

FIGURE 1

Project Location

El Camino Water Supply Assessment

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2 VICINITY MAP
SCALE: 1" = 80'-0"
NORTH

PROJECT DATA:

APN:
209-411-34, 209-411-32, 209-411-35

SITE AREA:

GROSS:		1,110,345 SF (25.49 AC)
R.O.W. DEDICATION:		3,614 SF (0.08 AC)
NET:		25.43 AC 1,107,731 SF

BUILDING AREA:

EXISTING 2-STORY OFFICE FOOTPRINT:	16,390 SF
EXISTING 2-STORY OFFICE 2ND LEVEL:	16,500 SF
EXISTING 2-STORY OFFICE TOTAL:	32,890 SF
DC FOOTPRINT:	186,452 SF
DC MEZZANINE:	1,832 SF
DC TOTAL:	188,284 SF
ASRS FOOTPRINT:	52,470 SF
PC FOOTPRINT:	298,248 SF
PC MEZZANINE:	7,675 SF
PC 2ND LEVEL:	135,678 SF
PC TOTAL:	351,601 SF
PC/DC ADMIN FOOTPRINT:	19,223 SF
PC/DC ADMIN 2ND LEVEL:	12,388 SF
PC/DC ADMIN TOTAL:	31,611 SF
TRUCK DECK FOOTPRINT:	65,107 SF
TRUCK DECK 2ND LEVEL:	61,924 SF
TRUCK DECK TOTAL:	127,031 SF
PARKING GARAGE FOOTPRINT:	52,111 SF
PARKING GARAGE TOTAL (4 LEVELS):	208,444 SF
TOTAL SITE BUILDING FOOTPRINT AREA:	**600,001 SF**
TOTAL SITE BUILDING AREA:	**992,331 SF**

BUILDING USE:

NEW BUILDINGS:	
WAREHOUSE (INCL 2ND LEVEL PC):	322,130 SF
INDUSTRIAL/MANUF (1ST LEVEL PC):	208,248 SF
OFFICE:	34,112 SF
EXISTING BUILDINGS:	
OFFICE:	32,890 SF

FLOOR AREA RATIO/FAR:
GROSS: (GROSS BUILDING AREA / NET SITE AREA) 0.89 / 1

LOT COVERAGE:
GROSS: (BUILDING FOOTPRINT AREA / NET SITE AREA) 54%

PARKING SUMMARY:
PARKING REQUIRED(ZONING CODE):
WAREHOUSE:

1ST 20,000 SF	2/1,000 SF	40 STALLS
20,000 SF - 40,000 SF	1/2,000 SF	10 STALLS
40,000 SF +	1/4,000 SF	71 STALLS
INDUSTRIAL/MANUF.	2/1,000 SF	417 STALLS
OFFICE:	4/1,000 SF	268 STALLS
TOTAL REQUIRED:		806 STALLS

PARKING PROVIDED:

AUTO:		490 STALLS
REG. ACCESSIBLE	2% OF TOTAL	9 STALLS
REG. EV CHARGING	10% OF TOTAL	25 STALLS
TRAILER:		87 STALLS
TRUCK DOCKS:		57 STALLS
DOCK-HIGH DOORS		57 DOORS
GRADE-LEVEL DOORS		4 DOORS

REQUIRED BICYCLE PARKING:

SHORT TERM:	5% OF TOTAL	25 STALLS
LONG TERM:	5% OF TOTAL	25 STALLS

DEVELOPMENT STANDARDS:

ZONING:
ME2 - MIXED EMPLOYMENT 2 ZONE

SITE COVERAGE:

MAX COVERAGE ALLOWED PER ZONING:	0.4 - 1.0 FAR
MAX STORIES:	4 STORIES

SETBACKS:

SURFACE PARKING, FRONT:	40 FT
SURFACE PARKING, SIDE STREET:	10 FT

PARKING:
ALL PARKING STALLS SHALL BE PERMANENTLY MAINTAINED WITH DOUBLE LINES, WITH TWO LINES LOCATED AN EQUAL NINE INCHES ON EITHER SIDE OF THE STALL SIDELINES.

OUTDOOR:	9' x 17' MIN. + 1' OVERHANG
INDOOR - ADJACENT TO WALL/COLUMN:	10' x 20'
INDOOR:	9' x 17' MIN.
GARAGE PARKING:	10' x 20' CLEAR
LOADING BERTH - INDOOR/OUTDOOR:	12' x 30'
FIRE LANE:	26' WIDE
DRIVE AISLE PER TABLE 17.64.040-1:	25' (1) ROW + 2-WAY AISLE 63' (2) ROWS +2-WAY AISLE

FORM BASED CODE DEVIATIONS:
MASTER PLAN TO ADDRESS THE FOLLOWING DEVIATIONS FROM THE FORM-BASED CODE:

- 17.138.020 E 2: 3 BUILDING TYPES ARE REQUIRED
- TABLE 17.138.030-1: MAX BLOCK LENGTH IF 500'
- 17.138.030 H 2: FRONTAGE ROAD IS REQUIRED
- TABLE 17.130.050-1:
  1. FAR IS 0.41, WE ARE PROPOSING A FAR OF 0.89:1
  2. SETBACK REQUIREMENTS
- TABLE 17.130.050-1: ALLOWED BUILDINGS TYPES ARE "MAIN STREET", "ROWHOUSE", "COURTYARD BUILDING", "MULTIPLEX", OR "MID-RISE".
- TABLE 17.132.030-1: ALLOWED FACADE TYPES ARE "SHOPFRONT" OR "FORECOURT".
- 17.134.030: AS THE PROJECT IS OVER 3 ACRES, (2) QTY. OPEN SPACES ARE REQUIRED.
- CONDITIONAL USE PERMIT
  1. TABLE 17.136.020-1: PROJECT TO BE CONSIDERED "MANUFACTURING, LIGHT - LARGE"

SHEET INDEX - ENTITLEMENT PACKAGE

SHEET NO.	DRAWINGS NAME
00 ENTITLEMENT - GENERAL	
G0.00	TITLE SHEET
G0.01	GENERAL INFORMATION & VICINITY MAP
G0.02	OVERALL SITE PLAN
G0.03	MATERIAL BOARD
G0.04	OVERALL CAMPUS EXTERIOR ELEVATIONS
G0.05	PARTIAL EXTERIOR ELEVATIONS - SCREEN WALL
G0.06	PARTIAL EXTERIOR ELEVATIONS - SCREEN WALL
10 ENTITLEMENT	
A1.00	OVERALL RENDERED EXTERIOR ELEVATIONS
A1.01	OVERALL EXTERIOR ELEVATION
A1.02	PARTIAL EXTERIOR ELEVATIONS - DISTRIBUTION AND PRODUCTION CENTER
A1.10	OVERALL FLOOR PLAN - LOWER LEVEL ADMIN
A1.11	OVERALL FLOOR PLAN - LOWER LEVEL PRODUCTION
A1.12	OVERALL FLOOR PLAN - LOWER LEVEL DISTRIBUTION
A1.13	OVERALL FLOOR PLAN - MEZZANINE LEVEL PRODUCTION
A1.14	OVERALL FLOOR PLAN - UPPER LEVEL PRODUCTION
A1.15	OVERALL ROOF PLAN
A1.20	OVERALL SIGHTLINE SECTIONS
A1.21	OVERALL SIGHTLINE SECTIONS
A1.30	WALL SECTIONS
A2.00	RENDERED EXTERIOR ELEVATIONS - 3-STORY OFFICE
A2.02	EXTERIOR ELEVATIONS - 3-STORY OFFICE
A2.10	OVERALL FLOOR PLANS - 3-STORY OFFICE
A2.11	OVERALL ROOF PLAN - 3-STORY OFFICE
A2.20	SIGHTLINE SECTIONS - 3-STORY OFFICE
A3.00	RENDERED EXTERIOR ELEVATIONS - PARKING GARAGE
A3.01	RENDERED EXTERIOR ELEVATIONS - PARKING GARAGE
A3.02	EXTERIOR ELEVATIONS - PARKING GARAGE
A3.03	EXTERIOR ELEVATIONS - PARKING GARAGE
A3.10	OVERALL FLOOR PLANS - PARKING GARAGE
A3.11	OVERALL FLOOR PLANS - PARKING GARAGE
A3.20	SIGHTLINE SECTION - PARKING GARAGE
A4.00	EXTERIOR 3D RENDERINGS
A4.01	EXTERIOR 3D RENDERINGS
A4.02	EXTERIOR 3D RENDERINGS
A4.03	EXTERIOR 3D RENDERINGS
15 CIVIL	
C001	CIVIL COVER SHEET
C002	CONCEPTUAL MASTER PLAN
C003	PHASING PLAN
C004	SITE UTILIZATION MAP
C005	FIRE DEPARTMENT ACCESS PLAN
C006	CONCEPT GRADING PLAN - PHASE 1
C007	CONCEPT GRADING SECTIONS - 1
C008	CONCEPT GRADING SECTIONS - 2
C009	CONCEPT GRADING CUT & FILL MAP
C010	CONCEPT UTILITY PLANS - PHASE 1
C011	CONCEPT EXISTING DMA MAP - PHASE 1
C012	CONCEPT PROPOSED DMA MAP - PHASE 1
C013	PRELIMINARY WQMP SITE - PHASE 1
C014	CONCEPT GRADING PLAN - PHASE 2
C015	CONCEPT GRADING CUT & FILL MAP - PHASE 2A
C016	CONCEPT EXISTING DMA MAP - PHASE 2A
C017	CONCEPT PROPOSED DMA MAP - PHASE 2A
C018	PRELIMINARY WQMP SITE - PHASE 2A
C019	CONCEPT GRADING PLAN - PHASE 2B
18 LANDSCAPE	
L001	PHASE 1 - CONCEPTUAL LANDSCAPE PLAN
L002	CONCEPTUAL LANDSCAPE ENLARGEMENTS
L003	PHASE 2A - CONCEPTUAL LANDSCAPE PLAN
L004	PHASE 2B - CONCEPTUAL LANDSCAPE PLAN
15 PARKING GARAGE CONCEPT	
TR1.00	PARKING GARAGE CONCEPT - GROUND LEVEL
TR2.00	PARKING GARAGE CONCEPT - UPPER LEVELS
15 PHOTOMETRICS	
E0.01	ELECTRICAL SITE LIGHTING PLAN - PHASE 1
E0.03	ELECTRICAL SITE LIGHTING PLAN - PHASE 2B
E1.20A	ELECTRICAL SITE LIGHTING PLAN - AREA A
E1.20B	ELECTRICAL SITE LIGHTING PLAN - AREA B
E1.20C	ELECTRICAL SITE LIGHTING PLAN - AREA C
E1.20D	ELECTRICAL SITE LIGHTING PLAN - AREA D
E1.20E	ELECTRICAL SITE LIGHTING PLAN - AREA E
E3.20A	ELECTRICAL SITE LIGHTING PLAN - AREA A
E3.20B	ELECTRICAL SITE LIGHTING PLAN - AREA B
E3.21A	ELECTRICAL SITE LIGHTING PLAN - AREA A
E3.21B	ELECTRICAL SITE LIGHTING PLAN - AREA B

RYAN

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600 West 9th Street
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Fort Worth, TX 76102
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612.677.7499 fax

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9/29/2023 11:08:34 PM

LONE OAK - EL CAMINO

10670 6TH STREET
RANCHO CUCAMONGA, CA 91730

DESIGN REVIEW
DRC2023 -00067

SUBMITTAL:

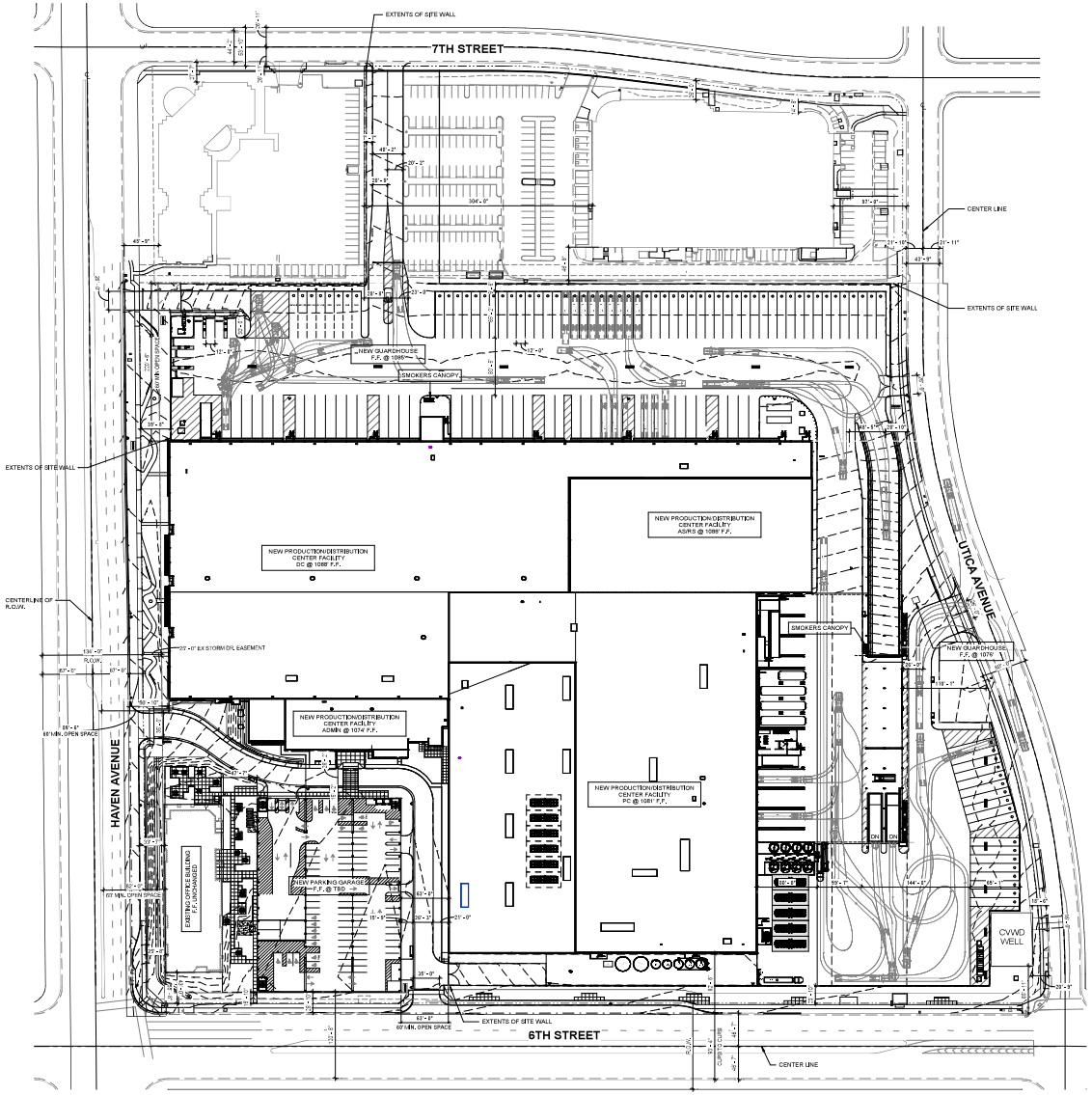
1ST SUBMITTAL	DATE: 02.15.2023
2ND SUBMITTAL	DATE: 05.31.2023

G0.01
GENERAL INFORMATION & VICINITY MAP

Path: Z:\Projects\102120\MAP\DOCS\DOCUMENTS\as-all Builder\Rush\Memo

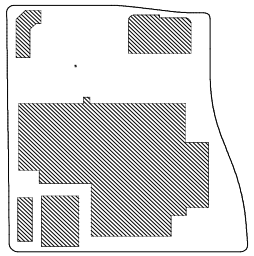
FIGURE 2a
Site Plan
El Camino - WSA

DUDEK



GENERAL NOTES: SITE PLAN

A. SITE PLAN PROVIDED FOR REFERENCE ONLY. REFER TO CIVIL PLANS FOR PAVING, PARKING, EASEMENTS, UTILITIES, SIGNAGE AND DIMENSION CONTROLS.



SITE KEYPLAN
NOT TO SCALE

RYAN
Ryan Companies US, Inc.
533 South Third Street, Suite 100
Minneapolis, MN 55415
612-492-4000 tel
612-492-3000 fax
WWW.RYANCOMPANIES.COM

RSP
RSP Architects
600 West 6th Street Suite 100
Fort Worth, TX 76102
682.200.0340
612.677.7499 fax
www.rsparch.com

Consultants

Certification

THESE DRAWINGS ARE FOR REVIEW ONLY. THEY ARE NOT INTENDED FOR BIDDING, PERMITTING, OR CONSTRUCTION PURPOSES.

Project For

REYES Coca-Cola BOTTLING

RCCB

LONE OAK - EL CAMINO

10870 6TH STREET
RANCHO CUCAMONGA, CA 91730

Project No.	3513.001.00
Drawn By	AS
Checked By	SF
Date	08/18/2023

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Sheet Issues / Revisions

No.	Date	Description
1	08/18/2023	DD/EXPRESS SET

ARCHITECTURAL SITE PLAN

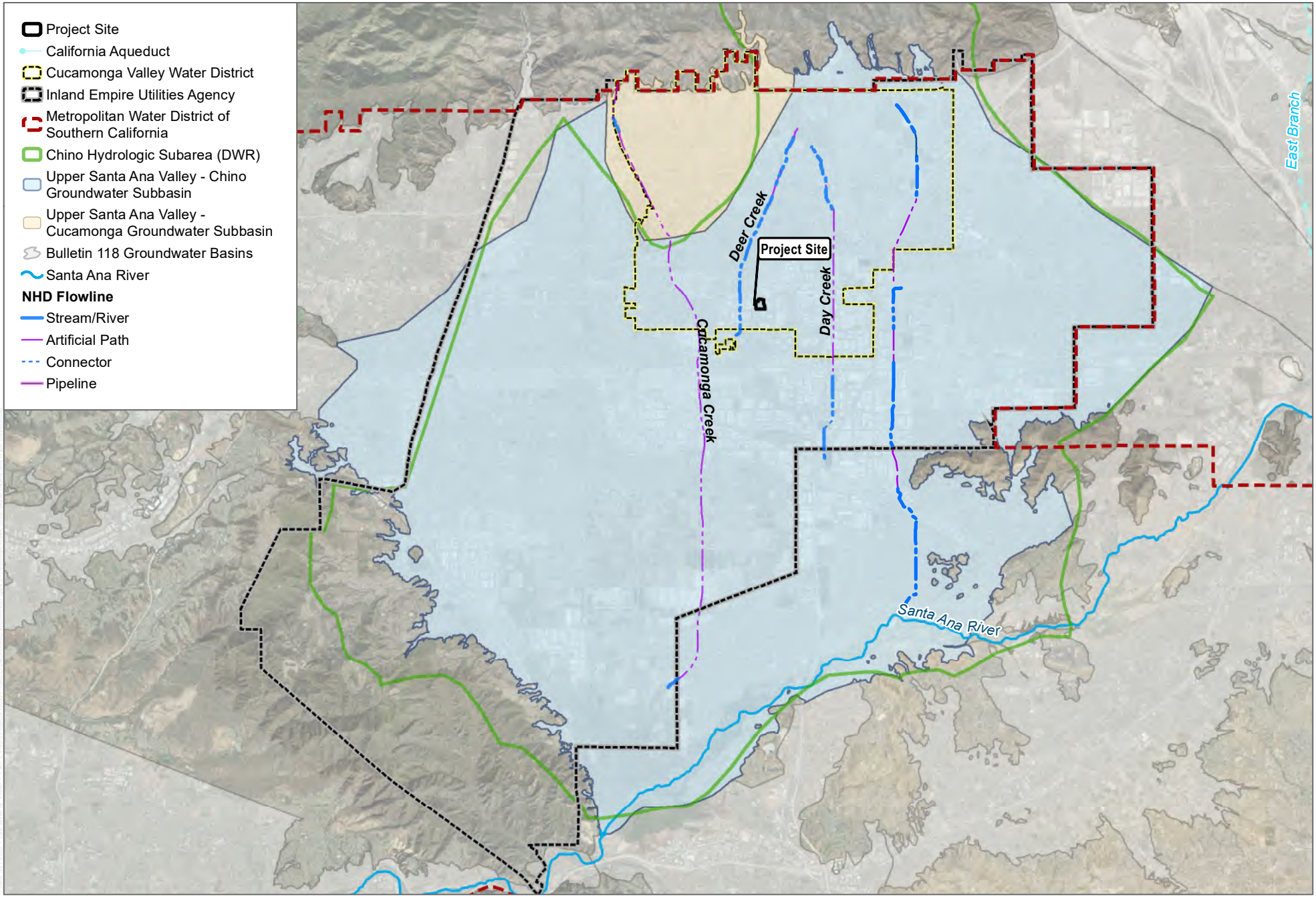
A001

Path: Z:\Projects\102120\MAP\DOCS\DOCUMENTS\Vault\Boulder\Boise\Memo

DUDEK

FIGURE 2b
Site Plan
El Camino - WSA

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SOURCE: ESRI; DWR; NHD

DUDEK

0 1.5 3 Miles

FIGURE 3

Hydrologic Areas, Groundwater Basins, and Water Districts

El Camino Water Supply Assessment

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Project Site

Upper Santa Ana Valley-Chino Groundwater Subbasin

Structural Features

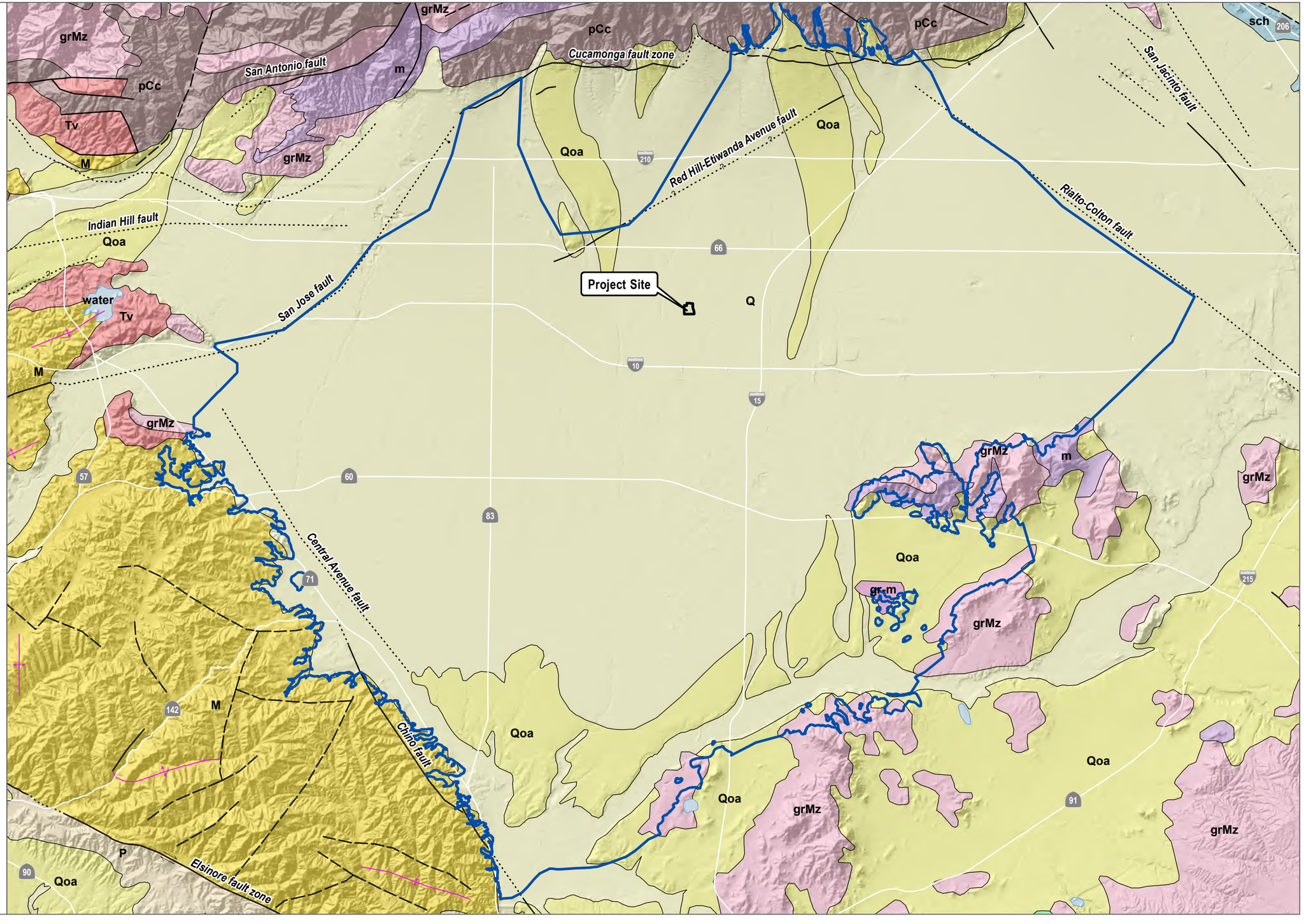
- anticline, certain
- syncline, certain

Contacts and Faults

- contact, certain
- fault, approx. located
- fault, certain
- fault, concealed
- fault, concealed, queried
- water boundary
- dextral fault, certain
- normal fault, certain
- normal fault, concealed
- normal fault, concealed, queried

Geologic Units

- Q - Alluvium, lake, playa, and terrace deposits
- Qoa - Older alluvium, lake, playa, and terrace deposits
- P - Pliocene marine sandstone, siltstone, shale, and conglomerate
- M - Miocene marine sandstone, shale, siltstone, conglomerate, and breccia
- Tv - Tertiary volcanic flow rocks
- J - Jurassic shale and sandstone; minor conglomerate, chert, slate, limestone, and pyroclastic rocks
- sch - Schists of various types; mostly Paleozoic or Mesozoic age; some Precambrian
- gr-m - Mesozoic to Precambrian granitic and metamorphic rocks; mostly gneiss and other metamorphic rocks injected by granitic rocks
- grMz - Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite
- m - Undivided pre-Cenozoic metasedimentary and metavolcanic rocks of great variety
- pCc - Complex of Precambrian igneous and metamorphic rocks
- Water



SOURCE: California Department of Conservation

DUDEK

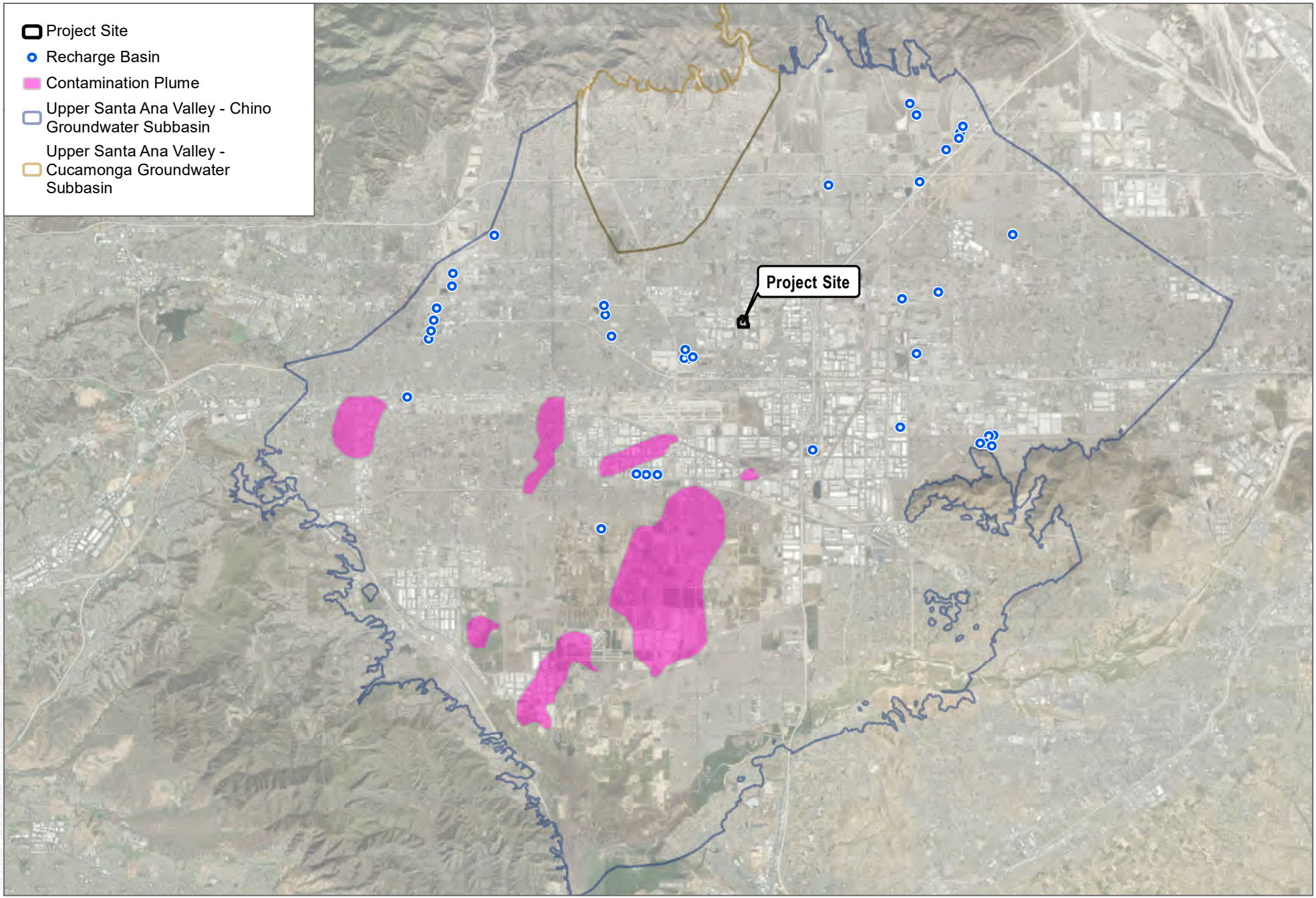
0 1.5 3 Miles

FIGURE 4

Regional Geologic Map

El Camino Water Supply Assessment

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SOURCE: ESRI; DWR; CBWM 2018; CBWM 2021b

DUDEK

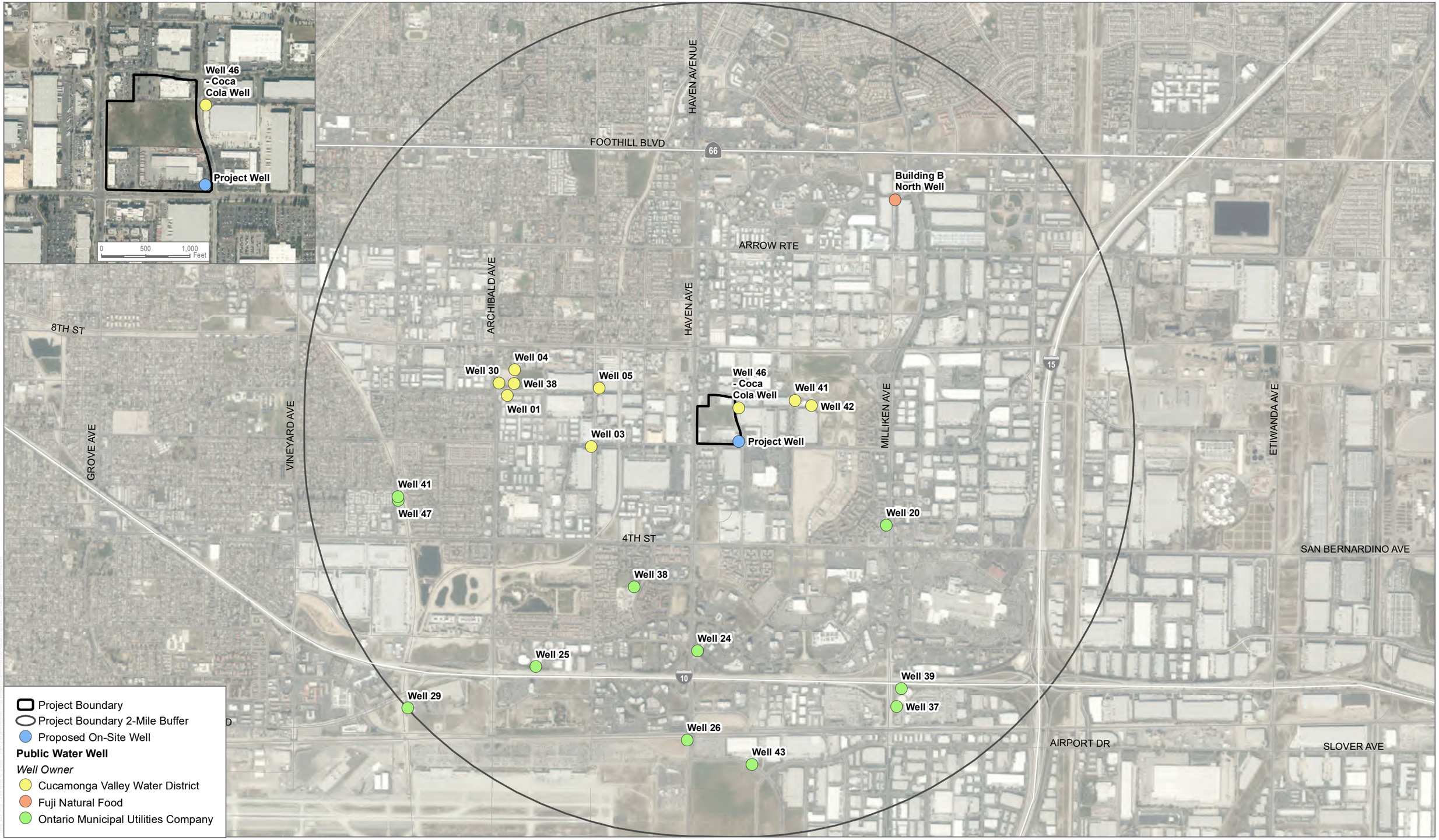
0 1.5 3 Miles

FIGURE 5

Groundwater Contamination Plumes and Recharge Basins

El Camino Water Supply Assessment

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SOURCE: SWRCB; DWR; USGS

DUDEK

FIGURE 6

Groundwater Well Locations

El Camino Water Supply Assessment

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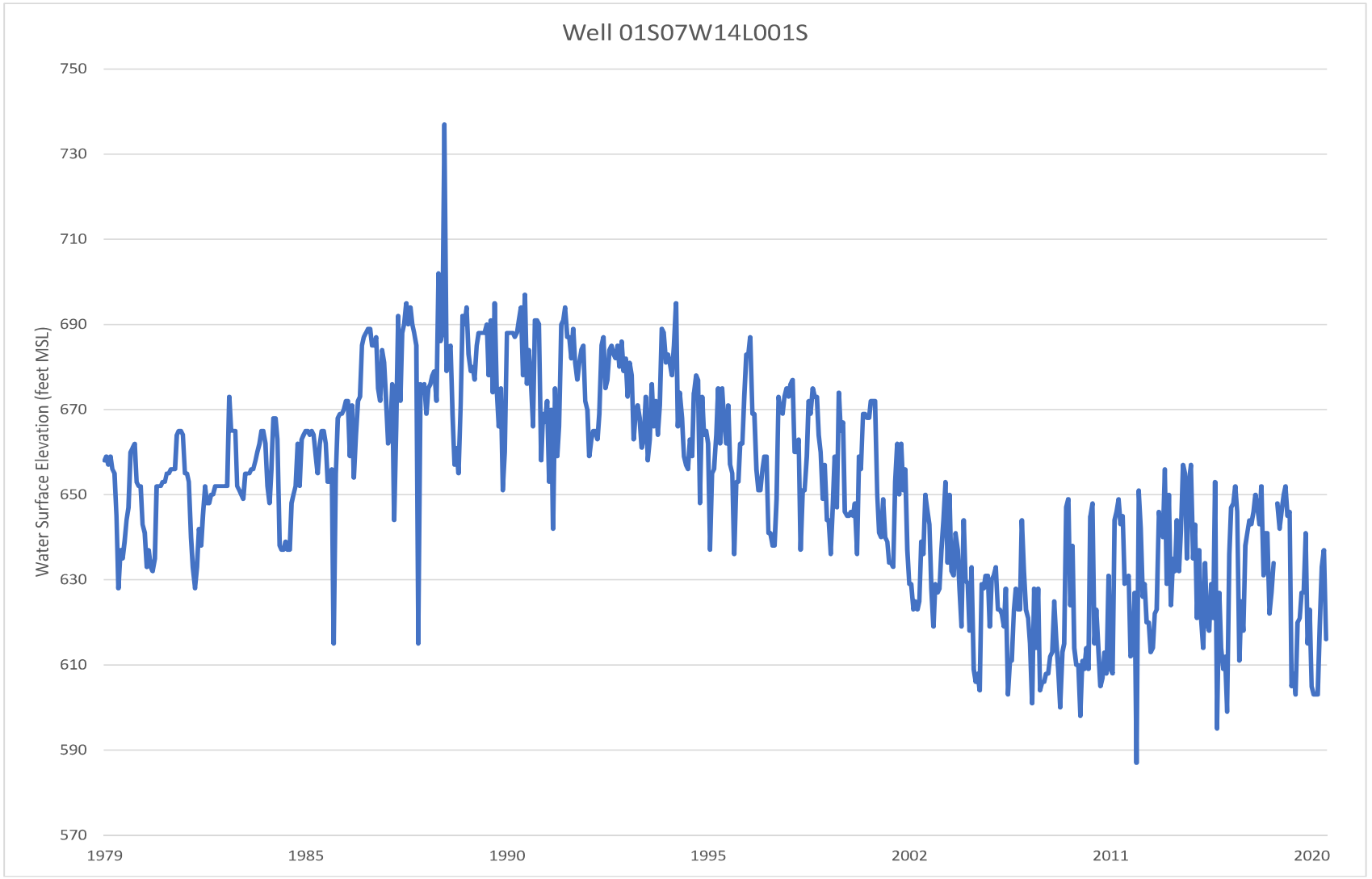


FIGURE 7

Well 01S07W14L001S Hydrograph

El Camino - WSA

DUDEK

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Appendix A
Water Demand

Project El Camino - Water Balance

Revision - April 11, 2023

Phase 1A = 3000 cpm Can Line, 1500 cpm Can Line, Small PET Line, Large PET Line
Phase 1B = Aseptic Small PET Line
Phase 2 = 1500 cpm Can Line

WATER BALANCE SHEET

Assumed Line Utilization	60%
Assumed RO Recovery	80%
VSEP Overall Recovery	98%
CIP Reuse Percent	60%

	VSEP OF RO CONCENTRATE						
	Peak Day City Water Demand (gpm)	Average Day City Water Usage (gpd)	Average Month Water Usage @ 5 days/wk (gal/mo)	Average Year Water Usage @ 5 days/wk (gal/yr)	Average Day Flow to City Sewer (gpd)	Average Day VSEP Brine Generation RO (gpd)	Estimated WUR
Phase 1A	1,082	830,473	16,159,622	193,915,467	145,810	13,748	1.24
Phase 1B	1,520	1,058,770	20,601,903	247,222,841	299,224	18,349	1.32
Phase 2	1,707	1,183,224	23,023,572	276,282,860	299,368	20,835	1.28

	VSEP OF RO CONCENTRATE AND CIP WATER						
	Average Day City Water Usage (gpd)	Average Month Water Usage @ 5 days/wk (gal/mo)	Average Year Water Usage @ 5 days/wk (gal/yr)	Average Day Flow to City Sewer (gpd)	Average Day VSEP Brine Generation CIP (gpd)	Average Day VSEP Brine Generation TOTAL (gpd)	Estimated WUR
Phase 1A	767,158	14,927,625	179,131,505	71,810	11,123	24,871	1.15
Phase 1B	983,277	19,132,938	229,595,254	140,229	23,823	42,172	1.23
Phase 2	1,107,658	21,553,178	258,638,132	140,286	23,836	44,671	1.20

PROJECT EL CAMINO - WATER USAGE ESTIMATE

DISTRIBUTION CENTER

SHIFT	NUMBER OF EMPLOYEES PER SHIFT	GPD PER EMPLOYEE	GALLONS USED
1ST SHIFT	25	9.49	237.3
2ND SHIFT	0	9.49	0.0
3RD SHIFT	61	9.49	578.9
DRIVERS	75	2.98	223.7
ADMIN	17	9.49	161.3
WASHDOWN FOR MISC. CLEANUP	# OF WASHDOWNS PER DAY	GPD	GALLONS USED
	3	20	60
		SUBTOTAL (GPD)	**1262**

PRODUCTION CENTER

SHIFT	NUMBER OF EMPLOYEES PER SHIFT	GPD PER EMPLOYEE	GALLONS USED
1ST SHIFT	161	9.49	1527.9
2ND SHIFT	130	9.49	1233.7
3RD SHIFT	125	9.49	1186.3
		SUBTOTAL (GPD)	**3948**

VISITORS

SHIFT	NUMBER OF EMPLOYEES PER SHIFT	GPD PER EMPLOYEE	GALLONS USED
10 PER HR, 12 HR PER DAY	120	0.90	108.0
		SUBTOTAL (GPD)	**108**

2 STORY OFFICE BUILDING

SHIFT	NUMBER OF EMPLOYEES PER SHIFT	GPD PER EMPLOYEE	GALLONS USED
EXECUTIVE / HR	30	9.49	284.7
SALES / MERCH	8	9.49	75.9
		SUBTOTAL (GPD)	**361.0**

TOTAL BUILDING LOAD (GPD)	**5,679**

SAFETY FACTOR	10%	**6,247**

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.

Reference Evapotranspiration (ETo) 54.6

Hydrozone # /Planting Description[a]	Plant Factor (PF)	Irrigation Method[b]	Irrigation Efficiency (IE)[c]	ETAF (PF/IE)	Landscape Area (sq, ft,)	ETAF x Area	Estimated Total Water Use (ETWU)[e]
Regular Landscape Areas							
2) Low water use plantings	0.3	Drip	0.81	0.37037	206,250	76,389	**2,585,917**
				Totals	(A)	(B)	
Special Landscape Areas							
				1			
				1			
				1			
				Totals	(C)	(D)	
						ETWU Total	**2,585,917**
						Maximum Allowed Water Allowance (MAWA)[e]	3,141,889

[a] ***Hydrozone #/Planting Description***
E.g
1.) front lawn
2.) low water use plantings
3.) medium water use planting

[b] ***Irrigation Method***
overhead spray
or drip

[c] ***Irrigation Efficiency***
0.75 for spray head
0.81 for drip

[d] ***ETWU*** **(Annual Gallons Required) =**
Eto x 0.62 x ETAF x Area
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year.

[e] ***MAWA (Annual Gallons Allowed)*** *= (Eto) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]*
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, SLA is the total special landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations

Regular Landscape Areas

Total ETAF x Area	(B)
Total Area	(A)
Average ETAF	**B ÷ A**

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

All Landscape Areas

Total ETAF x Area	(B+D)
Total Area	(A+C)
Sitewide ETAF	**(B+D) ÷ (A+C)**

Appendix B
Well Logs

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No.e019362

ORIGINAL
File with DWR
Page 1 of 1
Owner's Well No. #41

Date Work Began 3/9/2004 Ended 12/1/2004
Local Permit Agency San Bernardino County Dept. of Public Health
Permit No. 2004-01-0043 Permit Date 1/9/2004

DWR USE ONLY --- DO NOT FILL IN
01S 07W 13B0015
STATE WELL NO. / STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION: XX VERTICAL ___ HORIZONTAL ___ ANGLE
DRILLING METHOD reverse rotary FLUID water

DEPTH FROM SURFACE		DESCRIPTION
	50	Conductor Casin
50	90	Sand - Gravel and Rock
90	110	Sand - Gravel and Clay
110	140	Silty Sand and Clay
140	160	Coarse Sand and Gravel
160	200	Fine Sand and Clay
200	230	Coarse Sand and Gravel
230	270	Clay and Some Gravel
220	310	Coarse Sand and Clay
310	340	Coarse Sand
340	400	Fine Sand and Clay
400	460	Trace Clay and Sand
460	510	Coarse Sand and Clay
510	580	Clay and Medium Sand
580	650	Clay and Sand
650	700	Coarse Sand and Small Gravel
700	750	Small Gravel
750	810	Coarse Sand and Smal Gravel
810	860	Small Gravel
860	890	Clay and Sand
890	940	Coarse Sand and Small Gravel
940	990	Small Gravel and Sand
990	1010	Clay and Sand

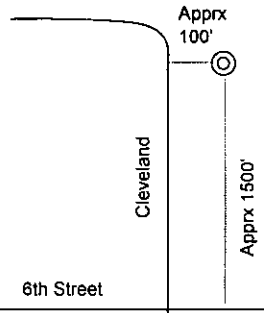
TOTAL DEPTH OF BORING: 1010 (Feet)
TOTAL DEPTH OF COMPLETED WELL 1010 (Feet)

WELL OWNER

WELL LOCATION

Address 9111 Cleveland Avenue
City Rancho Cucamunga
County San Bernadino County
APN Book 0209-272-26 Page ___ Parcel ___
Township 1S Range 7W Section 13
Latitude ___ Longitude ___

LOCATION SKETCH



Illustrate or Describe Distance of Well From Roads, Buildings, Fences, Rivers, etc. and attach a map
Use additional paper of necessary.
PLEASE BE ACCURATE & COMPLETE

ACTIVITY

XX NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other
___ Destroy

PLANNED USES

WATER SUPPLY
Dom. ___
Public XX
Irrig. ___
Indust. ___
Monitor ___
Test ___
Cath. ___
Heat ___
Drct Psh ___
Inject ___
Vapor ___
Sparg ___
Other ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF FIRST WATER 430.75 (Ft.) BELOW SURFACE
STATIC WATER LEVEL 430.75 (Ft.) & DATE 12/1/2004
ESTIMATED YIELD 3,500 (GPM) & TEST TYPE Constant
TEST LENGTH 24 (Hrs.) TOTAL DRAWDOWN (Ft.) 121.5

DEPTH FROM SURFACE Ft.	to Ft.	BORE HOLE DIA. Inch.	CASING (S) TYPE BL-ANK	SCR-EEN	CON DUCT	FILL PIPE	MATERIAL/ GRADE	ID. Inch	GAUGE/ WALL	SLOT SIZE inch.	DEPTH FROM SURFACE Ft.	to Ft.	ANNULAR MATERIAL TYPE CEMENT	BEN-TONITE	FILL	FILTER PACK
0	50	46			XX		Mild Steel	36	5/16		0	50	XX			10 3 Sack
50	650	30	XX				304 Stainless Steel	20	5/16							
650	860	30		XX			Ful Flo	20	5/16	0.085						
860	890	30	XX				304 Stainless Steel	20	5/16							
890	990	30		XX			Ful Flo	20	5/16	0.085						
990	1010	30	XX				304 Stainless Steel	20	5/16							

ATTACHMENTS

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analysis
XX Other
ATTACH ADDITIONAL INFORMATION.

CERTIFICATION STATEMENT

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

NAME SOUTH WEST PUMP & DRILLING, INC.
ADDRESS 53-381 HWY 111, COACHELLA, CA 92236

Signed ___ 723919
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE 8-24-05 C-57 LICENSE NUMBER

01S 07W 13G 001S

STATE OF CALIFORNIA

ORIGINAL
File with DWR
Page 1 **of** 2
Owner's Well No. #42

WELL COMPLETION REPORT

Refer to Instruction Pamphlet
No.e019365

DWR USE ONLY — DO NOT FILL IN
01S 07W 13G 001S
STATE WELL NO. / STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

Date Work Began 1/26/2004 Ended 6/2/2004
Local Permit Agency San Bernardino County Dept. of Public Health
Permit No. 2004-01-0044 Permit Date 1/9/2004

GEOLOGIC LOG

ORIENTATION: XX VERTICAL ___ HORIZONTAL ___ ANGLE
DRILLING METHOD reverse rotary FLUID water

DEPTH FROM SURFACE		DESCRIPTION
0	50	Conductor casing
50	80	sand gravel and rock
80	100	sand gravel and rock traces of clay
100	130	fine silty sand and small amount of gravel
130	140	coarse sand
140	150	coarse sand and some gravel
150	170	fine silty sand and some clay
170	190	coarse sand and some gravel
190	200	coarse sand and some silt
200	210	clay and some sand
210	220	Coarse sand and clay
220	310	coarse sand and small gravel
310	340	coarse sand some gravel traces of clay
340	380	coarse sand and some gravel
380	390	coarse sand gravel
390	400	coarse sand gravel clay
400	420	coarse sand and clay
420	430	clay and some coarse sand
430	470	clay and medium sand
470	480	clay and coarse sand
480	550	coarse sand small gravel and clay
550	650	coarse sand and gravel
650	690	coarse sand and small gravel
690	710	small gravel
710	820	coarse sand and small gravel
820	830	gravel and little coarse sand
830	840	coarse sand little clay small gravel
840	850	clay and coarse sand
850	880	little coarse sand mostly clay
880	890	little coarse sand small gravel and mostly clay

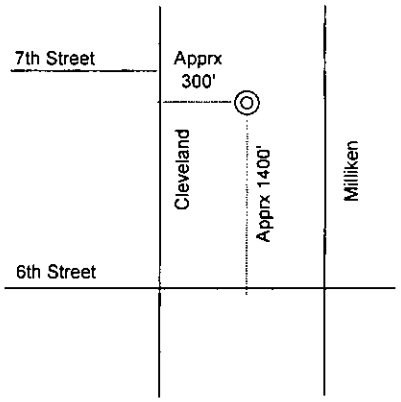
TOTAL DEPTH OF BORING: ___ (Feet)
TOTAL DEPTH OF COMPLETED WELL (Feet)

WELL OWNER

WELL LOCATION

Address 9111 Clevelend Avenue
City Rancho Cucamunga
County San Bernadino County
APN Book 209-272-2 Page ___ Parcel ___
Township 1S Range 7W Section 13
Latitude 34.0877198 Longitude 117.565391

LOCATION SKETCH



Illustrate or Describe Distance of Well From Roads, Buildings, Fences, Rivers, etc. and attach a map
Use additional paper of necessary.
PLEASE BE ACCURATE & COMPLETE

ACTIVITY

XX NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other
___ Destroy

PLANNED USES

WATER SUPPLY
Dom. ___
Public XX
Irrig. ___
Indust. ___
Monitor ___
Test ___
Cath. ___
Heat ___
Drct Psh ___
Inject ___
Vapor ___
Sparg ___
Other ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF FIRST WATER ___ (Ft.) BELOW SURFACE
STATIC WATER LEVEL 431 (Ft.) & DATE 11/24/2004
ESTIMATED YIELD 4,000 (GPM) & TEST TYPE turbine pump
TEST LENGTH 21 days (Hrs.) TOTAL DRAWDOWN (Ft.) 145

DEPTH FROM SURFACE Ft.	to Ft.	BORE HOLE DIA. Inch.	CASING (S) TYPE BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL/ GRADE	ID. Inch	GAUGE/ WALL	SLOT SIZE Inch.	DEPTH FROM SURFACE Ft.	to Ft.	ANNULAR MATERIAL TYPE CEMENT	BENTONITE	FILL	FILTER PACK
0	50	46			XX		Mild Steel	5-Feb	5/16		0	50	XX			10.3 sack
10	650	30	XX				304 stainless steel	20	5/16							
650	780	30		XX			moss ful-flo	20	5/16	0.085						
780	800	30	XX				304 stainless steel	20	5/16							
800	840	30		XX			moss ful-flo	20	5/16	0.085						
840	900	30	XX				304 stainless steel	20	5/16							
900	940	30		XX			moss ful-flo	20	5/16	0.085						

ATTACHMENTS

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analysis
___ Other
ATTACH ADDITIONAL INFORMATION.

CERTIFICATION STATEMENT

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

NAME SOUTH WEST PUMP & DRILLING, INC.
ADDRESS 53-381 HWY 111, COACHELLA, CA 92236

Signed ___ 723919
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE 8-24-05 C-57 LICENSE NUMBER

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No.e019365

ORIGINAL
File with DWR
Page 2 **of** 2

Owner's Well No. #42

Date Work Began 1/26/2004 Ended 6/2/2004

Local Permit Agency San Bernardino County Dept. of Public Health

Permit No. 2004-01-0044 Permit Date 1/9/2004

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO. / STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION: ____ VERTICAL ____ HORIZONTAL ____ ANGLE

DRILLING METHOD ____ FLUID ____

DEPTH FROM SURFACE		DESCRIPTION
890	950	coarse sand and small gravel
950	970	coarse sand and gravel
970	990	coarse sand small gravel and traces of clay
990	1000	coarse sand traces of clay
1000	1010	sand and clay
1010	1020	coarse sand and small clay
1020	1040	coarse sand and clay and small gravel
1040	1050	coarse sand and gravel
1050	1060	coarse sand
1060	1080	coarse sand and gravel
1080	1110	coarse sand and clay
1110	1130	coarse sand gravel and clay
1130	1160	coarse sand and clay
1160	1210	coarse sand small gravel and clay

TOTAL DEPTH OF BORING: 1210 (Feet)

TOTAL DEPTH OF COMPLETED WELL 1010 (Feet)

WELL OWNER

WELL LOCATION

Address 9111 Cleveland Avenue

City Rancho Cucamunga

County San Bernadino County

APN Book 209-272-2 Page ____ Parcel ____

Township 1S Range 7W Section 13

Latitude ____ Longitude ____

LOCATION SKETCH

Illustrate or Describe Distance of Well From Roads, Buildings, Fences, Rivers, etc. and attach a map

Use additional paper of necessary.

PLEASE BE ACCURATE & COMPLETE

ACTIVITY

XX NEW WELL

MODIFICATION/REPAIR

____ Deepen

Other

____ Destroy

PLANNED USES

WATER SUPPLY

Dom. ____

Public XX

Irrig. ____

Indust. ____

Monitor ____

Test ____

Cath. ____

Heat ____

Drct Psh ____

Inject ____

Vapor ____

Sparg ____

Other ____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF FIRST WATER ____ (Ft.) BELOW SURFACE

STATIC WATER LEVEL ____ (Ft.) & DATE ____

ESTIMATED YIELD ____ (GPM) & TEST TYPE ____

TEST LENGTH ____ (Hrs.) TOTAL DRAWDOWN (Ft.)

DEPTH FROM SURFACE Ft. to Ft.		BORE HOLE DIA. Inch.	CASING (S) TYPE BL-ANK	SCR-EEN	CON DUCT	FILL PIPE	MATERIAL/ GRADE	ID. Inch	GAUGE/ WALL	SLOT SIZE Inch.	DEPTH FROM SURFACE Ft. to Ft.		ANNULAR MATERIAL TYPE CEMENT	BEN-TONITE	FILL	FILTER PACK
940	960	30	XX				304 stainless steel	20	5/16							
960	990	30		XX			moss ful-flo	20	5/16	0.085						
990	1010	30	XX				304 stainless steel	20	5/16							

ATTACHMENTS

____ Geologic Log

____ Well Construction Diagram

____ Geophysical Log(s)

____ Soil/Water Chemical Analysis

____ Other

ATTACH ADDITIONAL INFORMATION.

CERTIFICATION STATEMENT

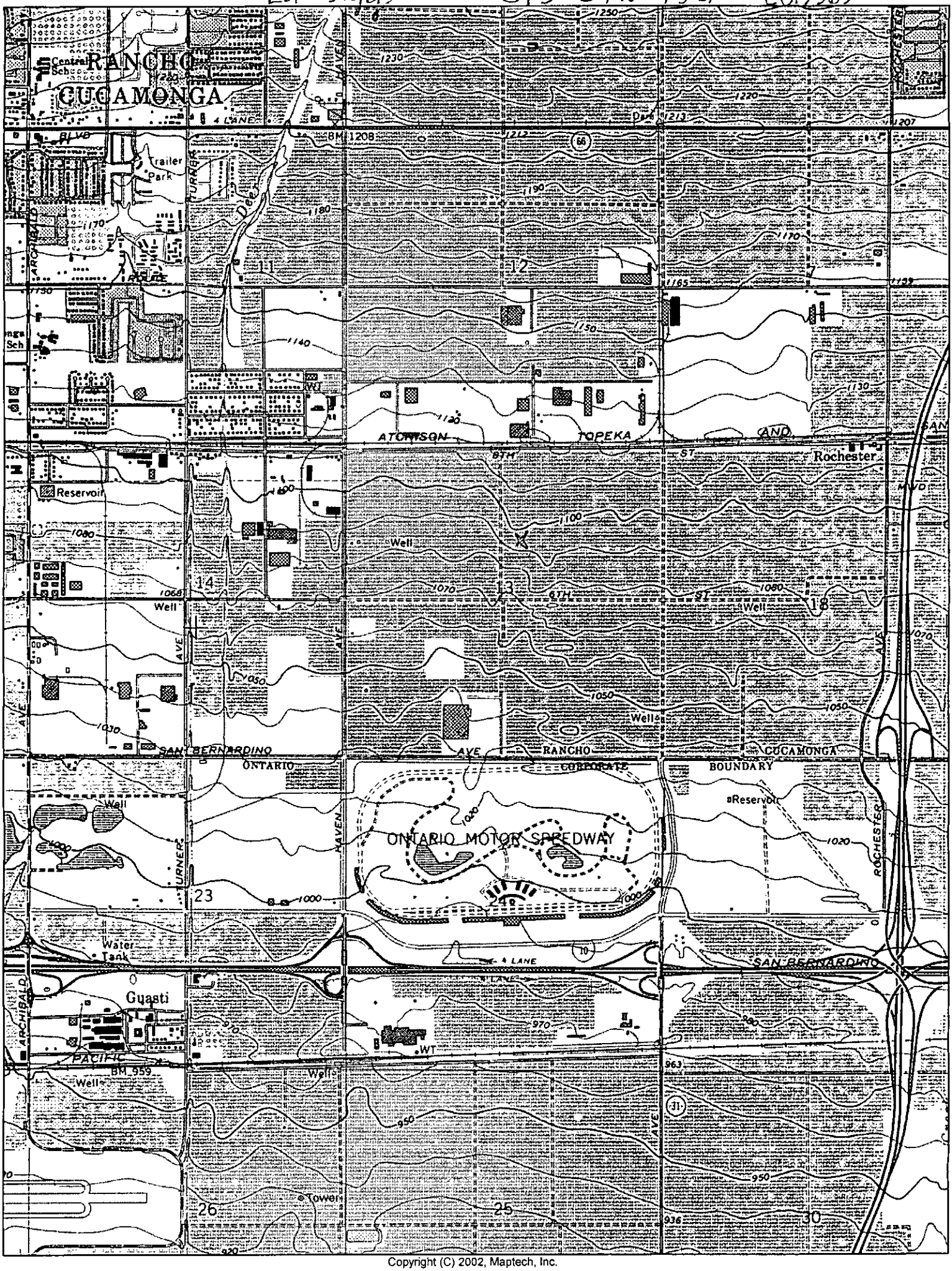
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME SOUTH WEST PUMP & DRILLING, INC.

ADDRESS 53-381 HWY 111, COACHELLA, CA 92236

Signed ____ 723919

WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE C-57 LICENSE NUMBER



Copyright (C) 2002, Maptech, Inc.

mvr 10/16/08

STATE OF CALIFORNIA

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. e077980

ORIGINAL
File with DWR
Page 1 **of** 1
Owner's Well No. 46

Date Work Began 4/14/2008 Ended 7/30/2008
Local Permit Agency County of San Bernardino Environmental Health Services
Permit No. 2008040185 Permit Date 4/14/2008

DWR USE ONLY — DO NOT FILL IN
01S07W13E002S
STATE WELL NO. / STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION: ___ VERTICAL X HORIZONTAL ___ ANGLE
DRILLING METHOD Reverse Rotary FLUID Water

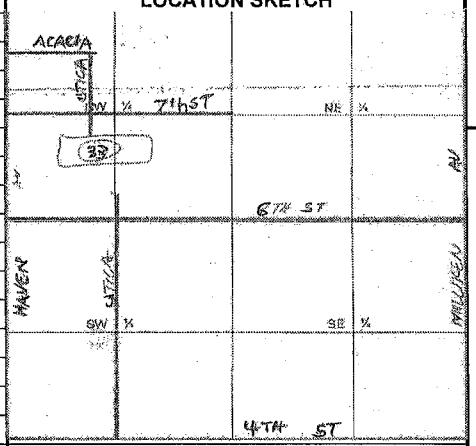
DEPTH FROM SURFACE		DESCRIPTION
0	70	Sand
70	150	Sand, Gravel
150	640	Sand, Gravel, Clay
640	660	Sand, Gravel, Rock
660	730	Sand, Gravel, Clay
730	800	Sand, Gravel
800	820	Sand, Gravel, Clay
820	860	Sand, Clay
860	910	Sand, Clay, Gravel
910	960	Sand, Gravel
960	1000	Sand, Gravel, Clay
1000	1040	Sand, Clay
1040	1100	Gravel, Sand, Clay
1100	1120	Sand, Clay
1120	1140	Sand, Gravel, Clay
1140	1160	Sand, Clay
1160	1200	Sand, Gravel, Clay

TOTAL DEPTH OF BORING: 1200 (Feet)
TOTAL DEPTH OF COMPLETED WELL 1000 (Feet)

WELL OWNER

Address Utica Avenue & 7th Street
City Rancho Cucamonga, CA 91736
County San Bernardino
APN Book 020-941-133 Page ___ Parcel ___
Township 1S Range 7W Section 13 E
Latitude ___ Longitude ___

LOCATION SKETCH



Illustrate or Describe Distance of Well From Roads, Buildings, Fences, Rivers, etc. and attach a map
Use additional paper of necessary.
PLEASE BE ACCURATE & COMPLETE

ACTIVITY

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other
___ Destroy

PLANNED USES

WATER SUPPLY
Dom. ___
Public X
Irrig. ___
Indust. ___
Monitor ___
Test ___
Cath. ___
Heat ___
Drct Psh ___
Inject ___
Vapor ___
Sparg ___
Other ___

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF FIRST WATER 459 (Ft.) BELOW SURFACE
STATIC WATER LEVEL 454.25 (Ft.) & DATE 7/30/2008
ESTIMATED YIELD 3,000 (GPM) & TEST TYPE Constant Rate
TEST LENGTH 24 (Hrs.) TOTAL DRAWDOWN (Ft.) 53

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE HOLE DIA. Inch.	TYPE BL-ANK	SCR-EEN	CON DUCT	FILL PIPE	MATERIAL/ GRADE	ID. Inch	GAUGE/ WALL	SLOT SIZE Inch.
0	50	48			X		Mild Steel Conductor	44	3/8	
0	650	38	X				HSLA Steel Blank	24	3/8	
650	800	36		X			304 SS Ful-Flo Louver	24	5/16	0.085
800	840	36	X				304 SS Blank	24	5/16	
840	990	36		X			304 SS Ful-Flo Louver	24	5/16	0.085
990	1000	36	X				304 SS Sump with Shoe	24	5/16	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT	BEN-TONITE	FILL	FILTER PACK
0	540	10.3 Sack			
540	550		X		
550	1010				6 x 12

ATTACHMENTS

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
X Soil/Water Chemical Analysis
___ Other
ATTACH ADDITIONAL INFORMATION.

CERTIFICATION STATEMENT

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

NAME SOUTH WEST PUMP & DRILLING, INC.
ADDRESS 53-381 HWY 111, COACHELLA, CA 92236

Signed _____ 8/13/2008 723919
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE C-57 LICENSE NUMBER

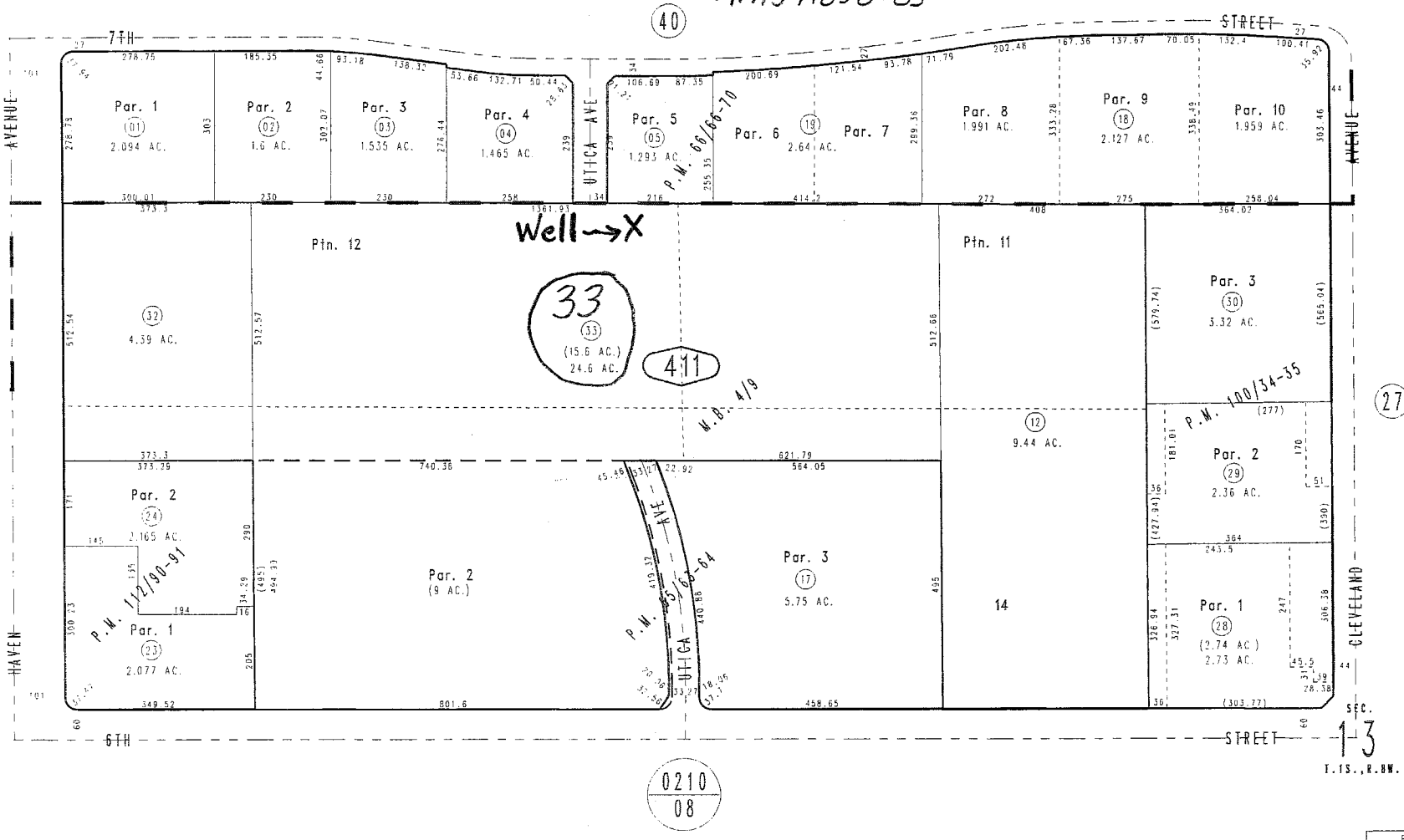
THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

Ptn. Cucamonga Fruit Lands
M.B. 4/9

City of Rancho Cucamonga
Tax Rate Area
15015

0209 - 41

D.D. 34,087507632
-117,571838783



SEC. 13
T.1S.,R.8W.

0210
08

Parcel Map No. 10223, P.M. 112/90-91
Parcel Map No. 9204, P.M. 100/34-35
Ptn. Parcel Map No. 6544, P.M. 65/63-64
Ptn. Parcel Map No. 6194, P.M. 62/62-66, Amended P.M. 66/66-70

Ptn. N.W.1/4, Sec.13
T.1S.,R.7W.

Assessor's Map
Book 0209 Page 41
San Bernardino County

REVISED
04/25/07 GL

September 2004

0077980

DUPLICATE
Driller's Copy

Job #: 2404

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Page 1 of ____

015/07W-15L001S No. 793000

Owner's Well No. 41

Date Work Began 01/2003, Ended 02/2003

Local Permit Agency San Bernardino County

Permit No. 200209752 Permit Date 09/2002

DWR USE ONLY — DO NOT FILL IN
01S07W29A002S
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DRILLING METHOD Reverse FLUID Water

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
-0-	120	Sand and Gravel
120	130	Clay and Gravel
130	140	Clay
140	200	Sand and Gravel
200	210	Sand, Gravel and some Clay
210	240	Sand and Gravel
240	260	Sand, Gravel and some Clay
260	300	Sand and Clay
300	320	Sand and Gravel
320	400	Gravel and Rocky
400	440	Gravel and Clay
440	470	Gravel and Rocky
470	520	Gravel, Sand and Clay
520	570	Sand and Gravel
570	660	Gravel, Sand and Clay
660	670	Clay
670	690	Clay and Sand
690	700	Sand and Gravel
700	820	Clay and Gravel
[illegible]0	890	Sand, Gravel & Clay
[illegible]20	900	Clay and Sand
900	910	Clay, Sand and Gravel
910	920	Clay Sand
920	1210	Clay, Sand and Gravel
1210	1280	Gravel and Clay
1280	1300	Sand, Gravel and Clay
1300	1320	Sand and Gravel
1320	1360	Sand, Gravel and some Clay
1360	1370	Clay
1370	1400	Grey and Brown Clay, Gravel

TOTAL DEPTH OF BORING 1400 (Feet)

TOTAL DEPTH OF COMPLETED WELL 1040 (Feet)

WELL OWNER

WELL LOCATION

Address S/E Corner of Hellman & 5th St.

City Ontario

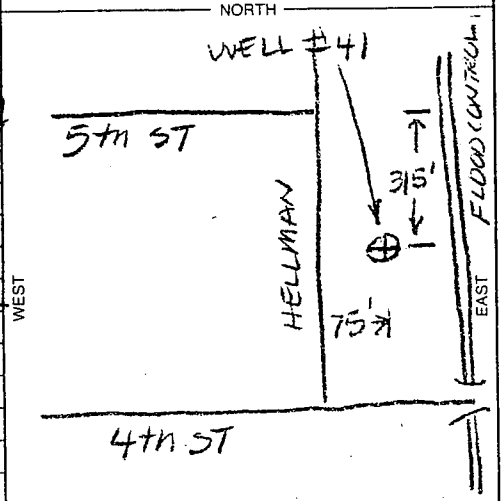
County San Bernardino

APN Book ____ Page ____ Parcel 0210-062-36

Township 1S Range 7W Section 21

Latitude ~~34 3 33.03~~ NORTH DEG. MIN. SEC. Longitude ~~117 37 40.65~~ WEST DEG. MIN. SEC.

LOCATION SKETCH



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.***

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)

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

PLANNED USES (✓)

WATER SUPPLY
___ Domestic X Public
___ Irrigation ___ Industrial

___ MONITORING
___ TEST WELL
___ CATHODIC PROTECTION
___ HEAT EXCHANGE
___ DIRECT PUSH
___ INJECTION
___ VAPOR EXTRACTION
___ SPARGING
___ REMEDIATION
___ OTHER (SPECIFY)

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER 402 (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL 402 (Ft.) & DATE MEASURED 2/17/03

ESTIMATED YIELD * 3000 (GPM) & TEST TYPE Pump

TEST LENGTH 24 (Hrs.) TOTAL DRAWDOWN 63 (Ft.)

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

CASING (S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
-0-	50	48			X		139-B	35¼	.375	
+2	600	30	X				139-B	20	.375	
600	1020	30		X			139-B	20	.312	3/32
1020	1040	30	X				139-B	20	.312	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
-0-	50	X			
-0-	450	X			
450	1060				3/8" x 16
1060	1080		X		

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 Ted Caldwell for Beylik Drilling, Inc.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

555 S. Harbor Blvd. La Habra, CA 90631-6124
ADDRESS CITY STATE ZIP

Signed T. Caldwell
WELL DRILLER/AUTHORIZED REPRESENTATIVE

3/7/03
DATE SIGNED

306291
C-57 LICENSE NUMBER

DWR 188 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

City of Ontario - Well 41

793000

Complete as much information as possible. Leave blank if information is not available, use N.A. if not applicable.

** Indicates items required for Source Water Assessment*

*** Indicates additional items required for assessments and Ground Water Rule*

	(separate multiple entries in field with semi-colon)	Actual, Estimated or Default?
DATA SHEET GENERAL INFORMATION		
System Name	City of Ontario	
System Number	3610034	
Source of Information *(well log, DHS/County files, system, etc)*	GEOSCIENCE Support Services, Inc.	
Organization Collecting Information *(DHS, County, System, other)*	GEOSCIENCE Support Services, Inc.	
Date Information Collected/Updated	4/11/03	
WELL IDENTIFICATION		
* Well Number or Name	Well 41	
* DHS Source Identification Number (**FRDS ID No.**)	NA	
DWR Well Log on File? (yes or no)	NA	
State Well Number (from DWR)	NA	
Well Status (Active, Standby, Inactive)	Unequipped as of Apr-03	
WELL LOCATION		
Latitude	34.07962° North	Estimate
Longitude	117.60211° West	Estimate
Ground Surface Elevation (ft above MSL)	1,035	Estimate
Street Address	~~Hellman Avenue~~	1252 N. Hellman
Nearest Cross Street	5th Avenue	
City	Ontario	
County	San Bernardino	
Neighborhood/Surrounding Area *(see Note 1)*	Re, Co	
Site plan on file? (yes or no)	No	
DWR Ground Water Basin	Upper Santa Ana	
DWR Ground Water Sub-basin	Chino	
SANITARY CONDITIONS		
** Distance to closest Sewer Line, Sewage Disposal, Septic Tank (ft)	100	Estimate
Distance to Active Wells (ft)	6,720	Actual
Distance to Abandoned Wells (ft)	8,060	Actual
Distance to Surface Water (ft)	30	Estimate
** Size of controlled area around well (square feet)	11,000	Estimate
* Type of access control to well site *(fencing, building, etc)*	Fencing & Building	Estimate
* Surface Seal? (Concrete slab)(yes or no)	Yes, Concrete Slab	Yes
* Dimensions of concrete slab: Length(ft)/ Width(ft)/ Thick(in)	54' x 40' x 6''	Estimate
* Within 100 year flood plain? (yes or no)	Yes, FEMA Map	Actual
* Drainage away from well? (yes or no)	Yes	Estimate
ENCLOSURE/HOUSING		
Enclosure Type *(building, vault, none, etc.)*	Block Building	Estimate
Floor material	Concrete	Estimate
Located in Pit? (yes or no)	No	Actual
Pit depth (feet) (if applicable)	-	-

City of Ontario - Well 41

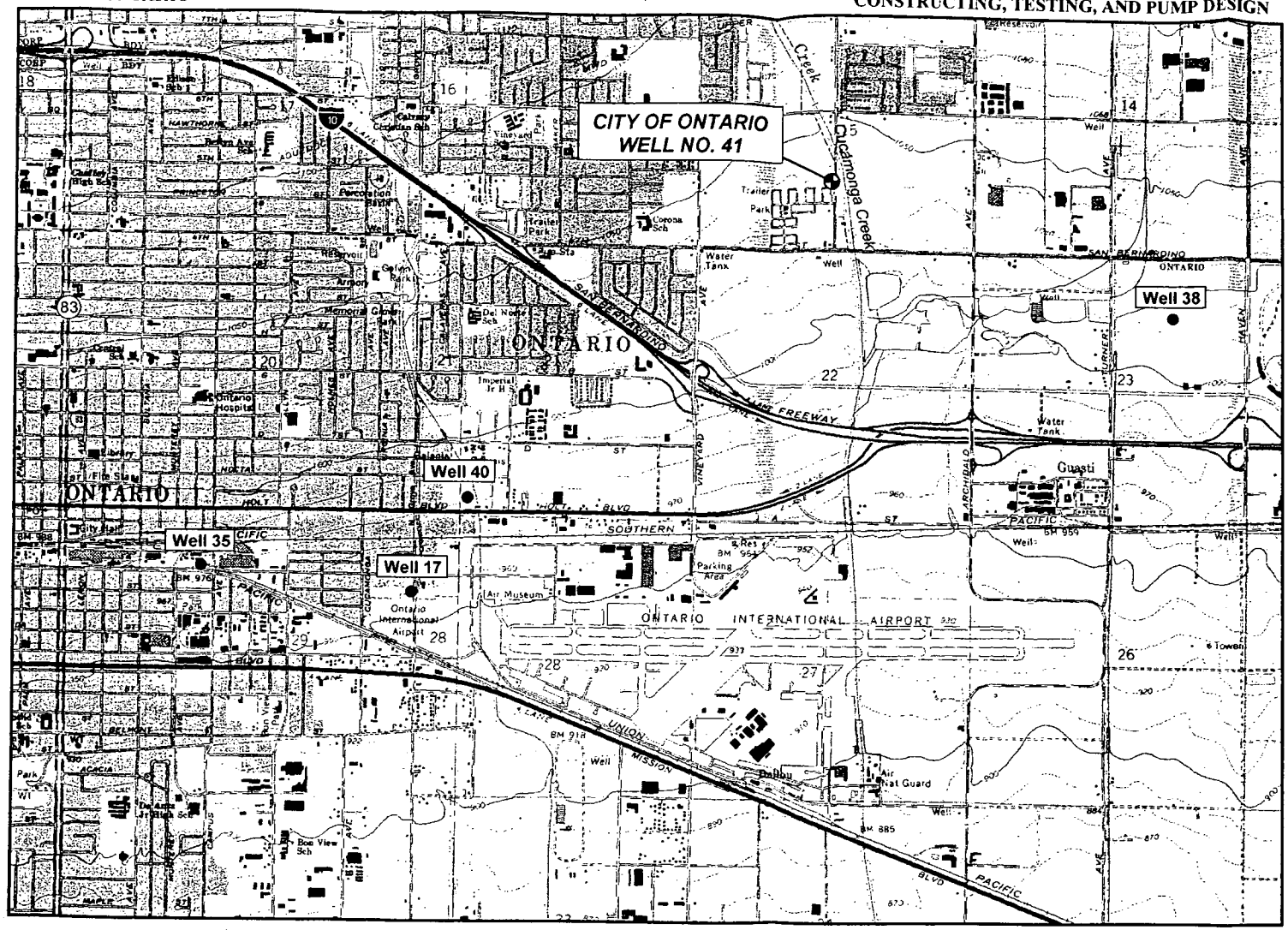
793000

WELL CONSTRUCTION		
Date drilled	Dec-03	Actual
Drilling Method	Reverse	
Depth of Bore Hole (feet below ground surface)	1,080	Actual
Casing Beginning Depth/Ending Depth(ft below surface); 2nd Casing Beginning Depth/Ending Depth; 3rd Casing, etc.	0-1,040	Actual
Casing Diameter (inches); 2nd Casing Diameter; 3rd Casing, etc.	20	Actual
Casing Material; 2nd Casing Material; 3rd Casing, etc.	copper-bearing steel	Actual
Conductor casing used? (yes, no or not sure) *(See Note 2)*	Yes	Actual
Conductor casing removed? (yes, no or not sure)	No	
* Depth to highest perforations/screens(ft below surface)	600	Actual
Screened Interval Beginning Depth/Ending Depth (ft below surface); 2nd Screened Interval Beg. Depth/Ending Depth; 3rd Screened Interval, etc.	600-1,020	Actual
* Total length of screened interval (ft) *(default = 10% pump capacity in gpm)*	420	Actual
* Annular Seal?(yes, no, or not sure) *(See Note 3)*	Yes	Actual
* Depth of Annular Seal (ft)	450	Actual
Material of Annular Seal *(cement grout, bentonite, etc.)*	10.5 sack cement	Actual
Gravel pack, Depth to top (ft below ground surface)	450-1,080	Actual
Total length of gravel pack (ft)	630	Actual
AQUIFER		
* Aquifer Materials *(list all that apply: sand, silt, clay, gravel, rock, fractured rock)*	Gravel; Sand; Silt; Clay	Actual
* Effective porosity (decimal percent) *(default = 0.2)*	0.25	Default
* Confining layer (Impervious Strata) above aquifer? (yes, no or not sure)	Yes	Actual
Thickness of confining layer, if known (ft)	10	Actual
Depth to confining layer, if known (ft below ground)	130	Actual
* Static water level (ft below ground surface)	403	Actual
Static water level measurement: Date/Method	24-Feb-03 / Sounder	Actual
Pumping water level (ft below ground surface)	462	Actual
Pumping water level measurement: Date/Method	25-Feb-03 / Sounder	Actual
WELL PRODUCTION		
Well Yield (gpm)	2,500	Actual
Well Yield Based On (i.e., pump test, etc.)	Pump Test	
Date measured	24-Feb-03	
Is the well metered? (yes or no)	N/A	
Production (gallons per year)	N/A	
Frequency of Use (hours/year)	N/A	
Typical pumping duration (hours/day)	N/A	
PUMP		
Make	Perless Pump	Estimate
Type	Vertical Turbine	Estimate
Size (hp)	600	Estimate
* Capacity (gpm)	2,500	Estimate
Depth to suction intake (ft below ground surface)	580	Estimate
Lubrication Type	Oil	Estimate
Type of Power: *(i.e., electric, diesel, etc.)*	Electric	Estimate
Auxiliary power available?(yes or no)	Yes	Estimate
Operation controlled by: *(i.e., level in tank, pressure, etc.)*	Level in Tank	Actual
Pump to Waste capability? (yes or no)	Yes	Estimate
Discharges to: *(i.e., distribution system, storage, etc.)*	Distribution Sytem	Estimate

REMARKS AND DEFECTS (use additional sheets as necessary)

ALBERT A. WEBB ASSOCIATES /
CITY OF ONTARIO

CITY OF ONTARIO WELL 41: RESULTS OF DRILLING, CONSTRUCTING, TESTING, AND PUMP DESIGN



GENERAL LOCATION MAP
CITY OF ONTARIO
WELL 41

EXPLANATION

- City of Ontario Well 41
- Other City of Ontario Wells

Map Projection:
UTM 1927 (Zone 11)
Central Meridian: -117 degrees

Base Maps from:
U.S.G.S Topographic Maps Ontario (1981) and Guasti (1981).
Scale: 24,000.

NORTH

0 2000 4000 Feet

23-APR-03

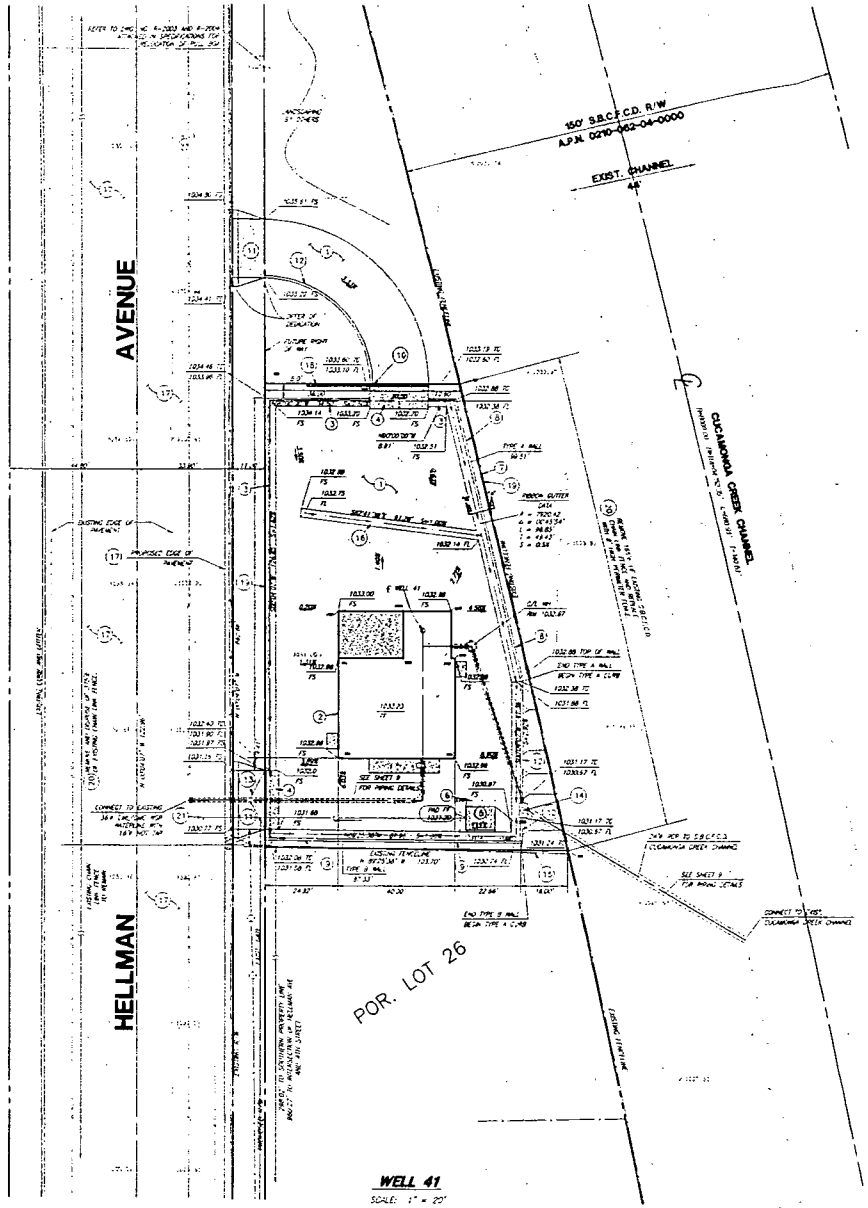
Prepared by: DWB

GEOSCIENCE
GEOSCIENCE Support Services, Inc.
P.O. Box 220, Claremont, CA 91711
Tel: (909) 920-0707 Fax: (909) 920-0403
E-mail: email@geoscience-water.com

Figure 1

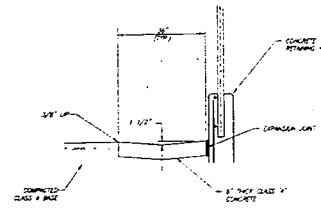
GIS_proj\city_of_ontario_40_41\ontario_well_40_41_figs.apr

793000

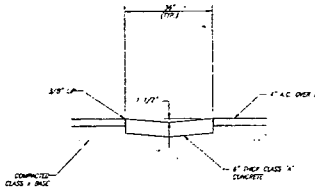


CONSTRUCTION NOTES

1. WELL 41 – CONSTRUCT 4" A.C. OVER 8" MIN. CLASS 2 BASE
2. CONSTRUCT MASONRY BUILDING PER ARCHITECTURAL SHEETS 13 THRU 23
3. CONSTRUCT TYPE B CURB AND GUTTER (18" CF) PER CITY OF ONTARIO STD. DWG. 111
4. CONSTRUCT CONCRETE CROSS-GUTTER PER CITY OF ONTARIO STD. DWG. 120
5. CONSTRUCT 8' X 12' ELECTRICAL TRANSFORMER PAD PER SCE REQUIREMENTS
6. CONSTRUCT REMOVEABLE GUARD POSTS PER DETAIL 4/A7 AND SCE STANDARDS
7. REMOVE PORTION OF EXISTING S.B.C.F.C.D. FENCE AND REPLACE WITH MESH PERIMETER FENCE
8. CONSTRUCT 3'-4" HIGH (TYPE A) 10" THICK CONCRETE WALL PER DETAIL 1/3
9. CONSTRUCT 3'-8" HIGH (TYPE B) 10" THICK CONCRETE WALL PER DETAIL 2/3
10. CONSTRUCT 20' WIDE X 8' HIGH, PVC COATED FABRIC MESH (1" X 1") MOTOR DRIVEN SLIDING GATE PER DETAIL ON SHEET 3. MOTOR SHALL BE MANUFACTURED BY ELITE OR APPROVED EQUAL
11. CONSTRUCT 20' WIDE A.C. DRIVEWAY PER CITY OF ONTARIO STD DWG NO. 117
12. CONSTRUCT TYPE A CURB PER CITY OF ONTARIO STD DWG 114
13. CONSTRUCT 20' WIDE X 8' HIGH, PVC COATED FABRIC MESH (1" X 1") DOUBLE DOOR SWING GATE PER GREENBOOK STD DWG NO. 500-0
14. INSTALL CONCRETE CATCH BASIN PER PROFILE ON SHEET 9
15. REMOVE EXISTING FENCE AND SALVAGE TO PROPERTY OWNER AND REPLACE WITH 8' HIGH PERIMETER FENCE.
16. CONSTRUCT CONCRETE SWALE PER DETAIL 2/3
17. REFER TO DWG. NO. R-2001 AND R-2004 ATTACHED IN SPECIFICATIONS AND BIDDING SHEET FOR PROPOSED STREET IMPROVEMENTS ON HELLMAN AVENUE.
18. CONSTRUCT 12"W X 5" THICK X 42" LONG CONCRETE GATE GUIDE FOUNDATIONS
19. CONSTRUCT 8' HIGH, PVC COATED FABRIC MESH (1" X 1") PERIMETER FENCE PER GREENBOOK STD. DWG. 600-6 AND SPECIFICATIONS. FENCING SUBCONTRACTOR SHALL BE RESPONSIBLE FOR FENCING GATES AND GATE OPERATION TRANSMITTER AND RECEIVER.
20. COORDINATE WITH S.B.C.F.C.D. AND CITY PRIOR TO REMOVAL OF EXIST. FENCE
21. CONTRACTOR SHALL COORDINATE WITH SCE AND CONSTRUCT PRIMARY ELECTRICAL FACILITIES FOR SCE ELECTRICAL SERVICE PLAN AS PART OF THE CONTRACT WORK. REFER TO SPECIFICATIONS.



RIBBON GUTTER DETAIL 1/3



CONCRETE SWALE DETAIL 2/3

SECTION "A"-"A"
BLOCK WALL AND FENCE DETAIL 3/3

GRAPHIC SCALE 1"=20'

WELL 41
SCALE: 1" = 20'

Underground Service Alert
CALL TOLL FREE
1-800
227-2600
TWO WORKING DAYS BEFORE YOU DIG

REVISIONS			
MARK	DATE	BY	APPROVED/RCE No.

DESIGNED BY _____ DATE _____
DRAWN BY _____ DATE _____
CHECKED BY _____ DATE _____

CITY OF ONTARIO

REVIEWED BY _____ UTILITIES PROJECT MANAGER _____ C.E. No. _____ DATE _____
ACCEPTED BY _____ UTILITIES ENGINEERING MANAGER _____ C.E. No. _____ DATE _____

BENCH MARK No. _____ ELEV. _____
LOCATION:
SEE SHEET 2 FOR BENCH MARK LOCATIONS.

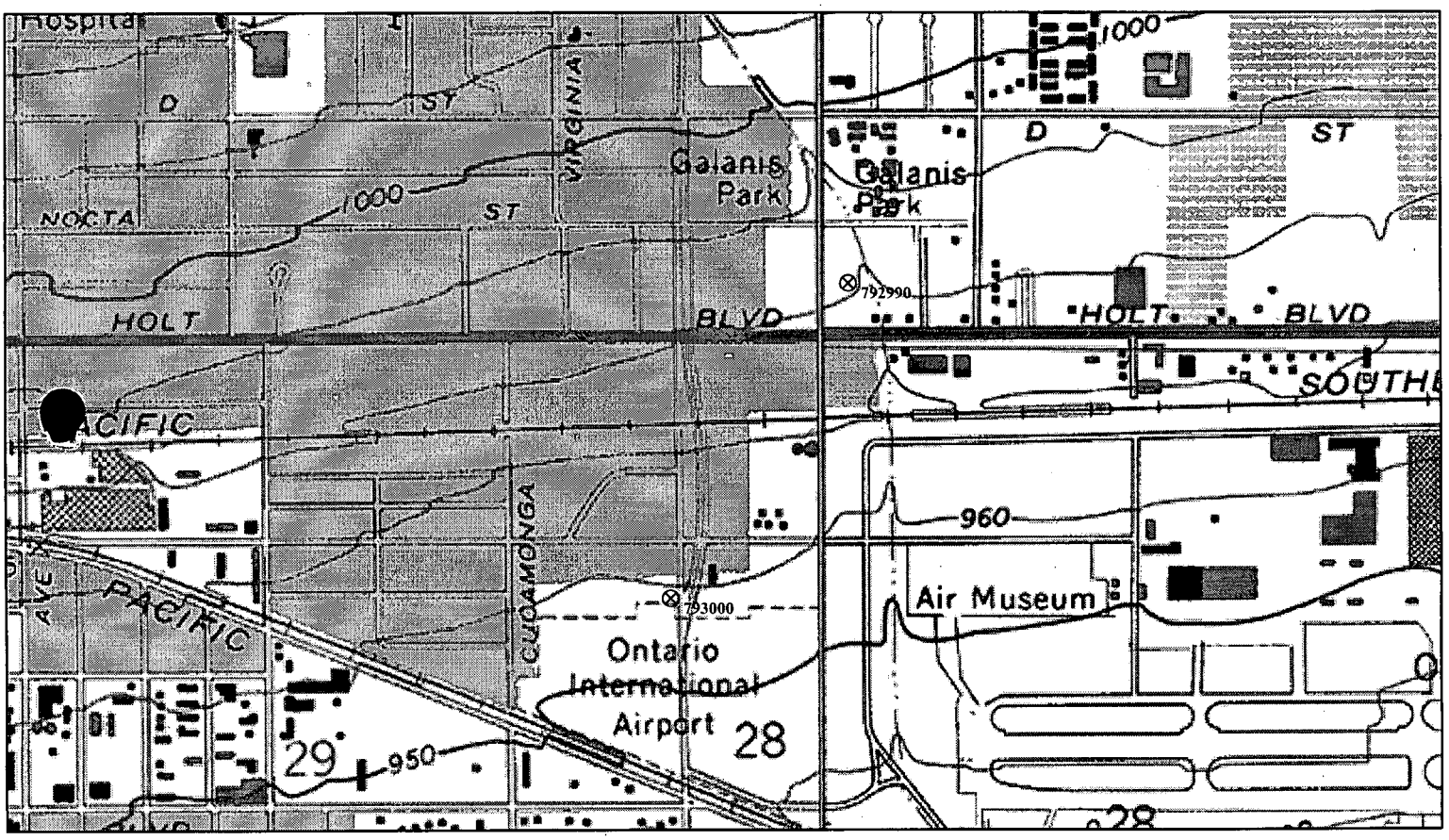
ALBERT A. WEBB ASSOCIATES
CIVIL ENGINEERS
3788 McCRAY ST. RIVERSIDE, CA. 92506
PH. (909) 686-1070
SIGNATURE _____ C26817 R.C.E. No. _____ DATE _____

CITY OF ONTARIO WELL NOS. 40 AND 41
WELL 41 SITE AND GRADING PLAN

SHEET 4 OF 35
CONTRACT 0203-02
ACCOUNT _____
DWG. No. W-2688

793000

793000



15/7W-29A

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APPENDIX B – WELL SIGHTING STUDY

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

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

DATE: August 24, 2023 Update

SUBJECT: *New Well Overview Report & Design Evaluation, Lone Oak – El Camino 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 proposed new water supply well for the "Lone Oak – El Camino 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 total Project water demand after completion of all phases is 863 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, situated about 900 feet south of CVWD No. 46 that is the closest of the 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 new 12-inch-diameter transmission main pipeline will connect the future well to CVWD Reservoir 1B.

P.O. BOX 2601• SANTA BARBARA, CALIFORNIA • 93120 TELEPHONE: (805) 512-1516 JORDAN@KEARGROUNDWATER.COM
CALIFORNIA REGISTERED PROFESSIONAL GEOLOGIST N. 6960 CALIFORNIA CERTIFIED HYDROGEOLOGIST N. 749

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 its 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 Judgment set the initial Safe Yield for the 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."

Existing CVWD Chino Basin Groundwater Wells

There are nine nearby 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. CVWD Well Nos. 39, 40, 43, and the new 48 are elsewhere in the basin.

Layne Christensen Company (Layne) constructed CVWD No. 38 (*State Well Number* [*SWN*] *01S/07W-14D011S*) in 2000, equipping 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 fell 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, equipping the well 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 fell 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, equipping 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 constructed CVWD No. 46 (*SWN 01S/07W-13E002S*) in 2008, equipping the well

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 fell 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.

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 of 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).

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.

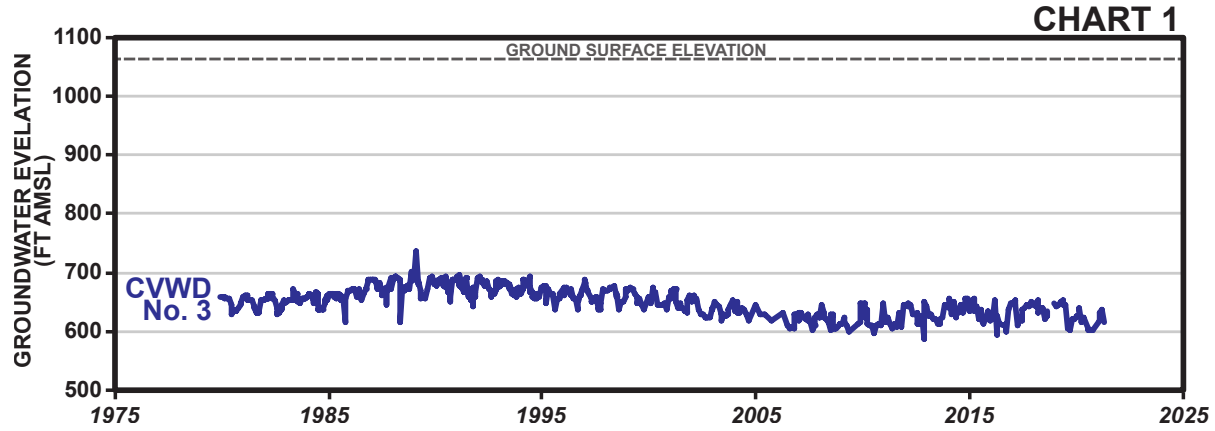
The alluvial basin deposits are unconformably underlain by consolidated bedrock that contains comparatively little groundwater. In the northern and eastern basin, the aquifer material is largely underlain by the Cretaceous-aged crystalline basement complex (principally granite, gneiss, and schist) of 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 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, Levels, and Projected Interference

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 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.

Dudek (2023) estimated interference to nearby wells by pumping the future well via Theis distance-drawdown calculations using aquifer input parameters from WEI (2007), including a hydraulic conductivity value of 22.1 ft/day, saturated aquifer thickness of 300 ft, and storativity of 0.0001. Assuming an average pumping rate of 535 gpm continuously for one year to achieve a total of 863 AFY, Dudek (2023) calculates 13.73 ft of interference to the closest existing CVWD well (No. 46, located about 900 ft to the north); at 2253 gpm for 8 hours per day over 5 days per week to meet the same Project demand, the calculated interference is 57.81 ft [*NOTE: KG calculates just 21.47 ft of interference assuming 2253 gpm for 8 hour intervals*]. Dudek (2023) recommends coordinated pumping between the new well and CVWD No. 46 to minimize potential interference issues.

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-Tricholropropane [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

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 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

the eastern wells and is only occasionally at measurable concentrations in the western wells. Hexavalent chromium is detected at very low concentrations is 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).

PRELIMARY DESIGN RECOMMENDATIONS FOR NEW CHINO WELL

Our recommended approach for the new Project well includes permitting through San Bernardino County 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

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-

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 bid guidelines 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.

The well site plan prepared by Kimley-Horn (2023), is also attached with this document.

Please do not hesitate to contact us with any questions.

Best Regards,





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

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

References

California Department of Water Resources [DWR] (**1971**), Meeting water demands in the Chino-Riverside area: Bulletin 104-3.

Carson, S.E., and Matti, J.C. [USGS] (**1985**), Contour map showing minimum depth to ground water, Upper Santa Ana River Valley, California, 1973-1979: Miscellaneous Field Studies Map MF-1802.

Wildermuth Environmental, Inc. [WEI] (**2003**), Chino Basin Management Program, Chino Basin Dry-Year Yield Program Modeling Report: Prepared for Chino Basin Watermaster.

WEI (**2005**), Chino Basin Optimum Basin Management Program, 2004 State of the Basin Report: Prepared for Chino Basin Watermaster.

Groundwater Recharge Coordinating Committee (**2006**), Chino Basin recharge facilities operation procedures.

Morton, D.M., and F.K. Miller [USGS] (**2006**), Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California: United States Geological Survey, Open-File Report 2006-1217.

DWR (**2006**), Upper Santa Ana Valley Groundwater Basin, Chino Subbasin, South Coast Hydrologic Region: Bulletin 118.

WEI (**2007**), 2007 Groundwater Model Documentation and Evaluation of the Peace II Project Description: Prepared for Chino Basin Watermaster.

WEI (**2009**), Chino Basin Optimum Basin Management Program, 2008 State of the Basin Report: Prepared for Chino Basin Watermaster.

Thiros, S.A. (**2010**), Section 12. Conceptual understanding and groundwater quality of the basin-fill aquifers in the Santa Ana Basin, California: United States Geological Survey National Water-Quality Assessment Program, Professional Paper 1781.

WEI (**2018**), 2018 Recharge Master Plan: Prepared for Chino Basin Watermaster and Inland Empire Utlities Agency.

City of Rancho Cucamonga (**2018**), Local Agency Management Program for Onsite Water Treatment System.

WEI (**2020**), Optimum Basin Management Program Update Report: Prepared for Chino Basin Watermaster.

Stetson Engineers Inc. [Stetson] (**2021**), 2020 Urban Water Management Plan: Prepared for Chino Basin Desalter Authority.

West Yost (**2021**), Chino Basin Optimum Basin Management Program. 2020 State of the Basin Report: Prepared for Chino Basin Watermaster.

Stetson (**2021**), 2020 Urban Water Management Plan: Cucamonga Valley Water District.

Dudek (**2023**), Water Supply Assessment, El Camino Project, August 2023 Draft: Prepared for Kimley-Horn.

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. 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.

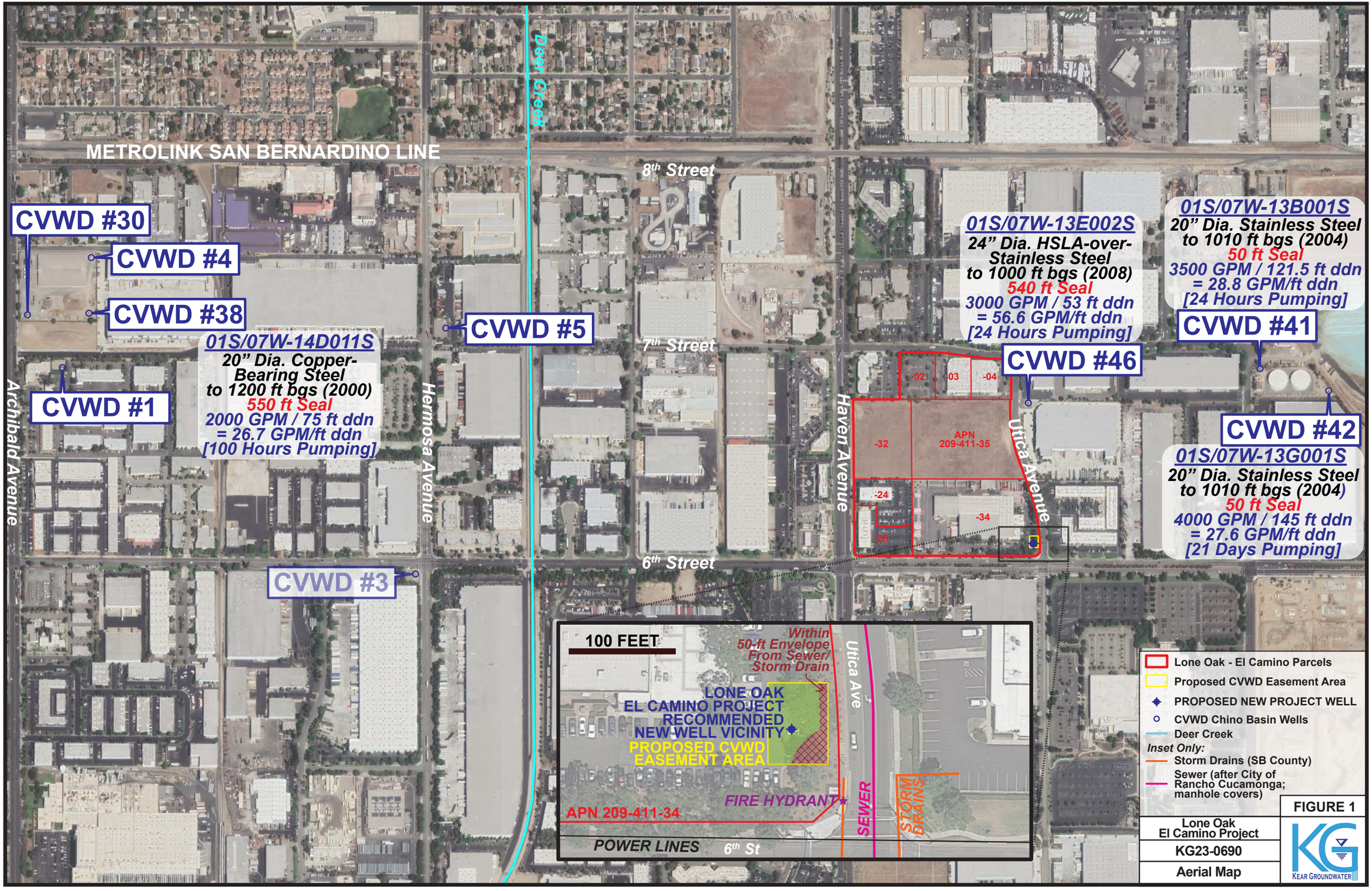


FIGURE 1

Lone Oak
El Camino Project

KG23-0690

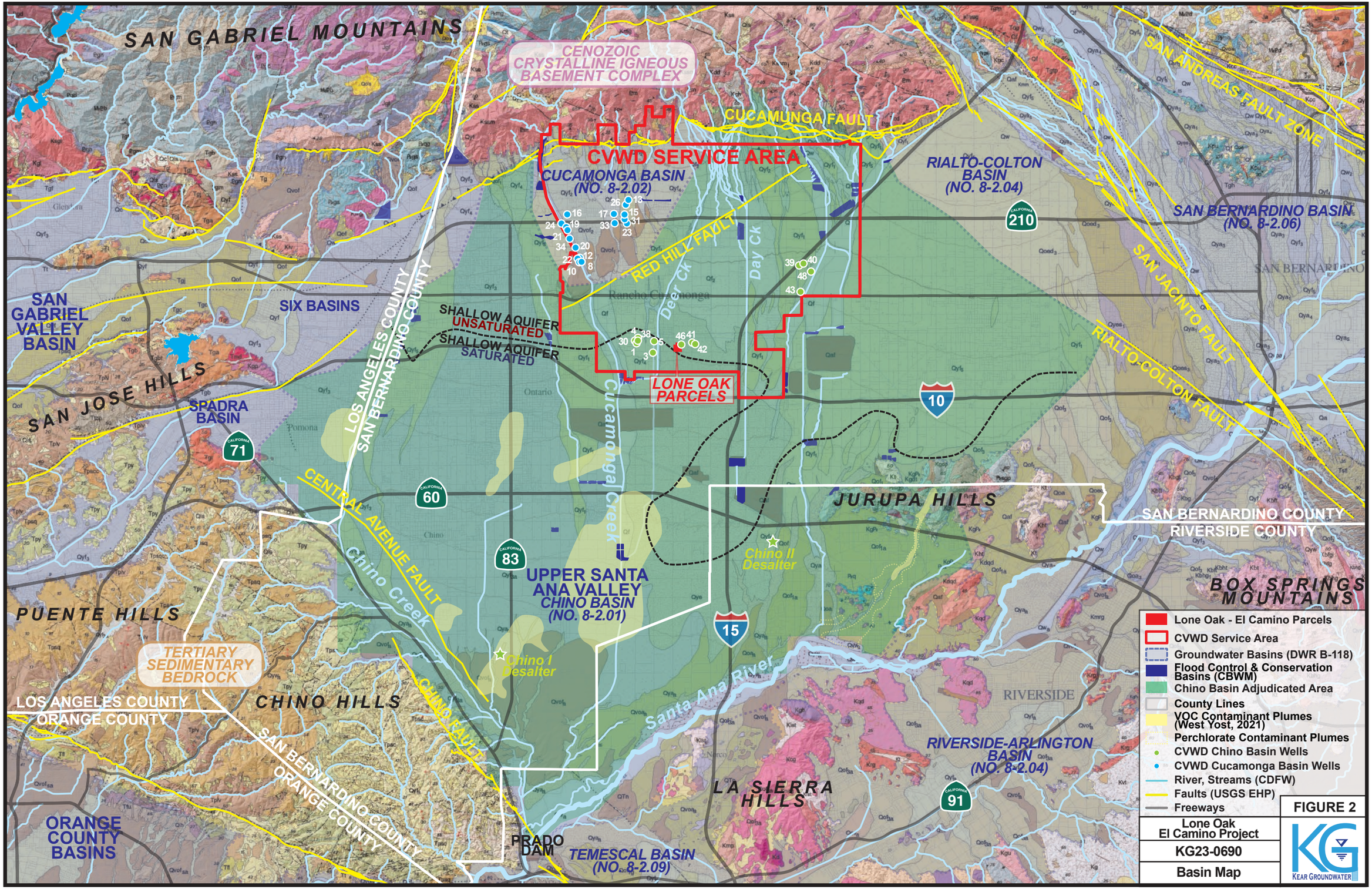
Aerial Map

KEAR GROUNDWATER

CVWD Well Details: DWR WCRs; SWRCB GAMA
Aerial Image: Google Earth (7-Sept-2021)

0 1000 2000 FEET

N


SAN GABRIEL MOUNTAINS
CENOZOIC CRYSTALLINE IGNEOUS BASEMENT COMPLEX
CUCAMUNGA FAULT
CVWD SERVICE AREA
CUCAMONGA BASIN (NO. 8-2.02)
RIALTO-COLTON BASIN (NO. 8-2.04)
SAN ANDREAS FAULT ZONE
SAN BERNARDINO BASIN (NO. 8-2.06)
RED HILL FAULT
Deer Ck
Day Ck
SAN GABRIEL VALLEY BASIN
SIX BASINS
SHALLOW AQUIFER UNSATURATED
SHALLOW AQUIFER SATURATED
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
LONE OAK PARCELS
SAN JACINTO FAULT
RIALTO-COLTON FAULT
SAN JOSE HILLS
SPADRA BASIN
Cucamonga Creek
CENTRAL AVENUE FAULT
Chino Creek
UPPER SANTA ANA VALLEY
CHINO BASIN (NO. 8-2.01)
Chino II Desalter
Chino I Desalter
JURUPA HILLS
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
BOX SPRINGS MOUNTAINS
PUENTE HILLS
TERTIARY SEDIMENTARY BEDROCK
LOS ANGELES COUNTY
ORANGE COUNTY
CHINO HILLS
CHINO FAULT
SAN BERNARDINO COUNTY
ORANGE COUNTY
Santa Ana River
RIVERSIDE-ARLINGTON BASIN (NO. 8-2.04)
LA SIERRA HILLS
ORANGE COUNTY BASINS
PRADO DAM
TEMESCAL BASIN (NO. 8-2.09)
Lone Oak - El Camino Parcels
CVWD Service Area
Groundwater Basins (DWR B-118)
Flood Control & Conservation Basins (CBWM)
Chino Basin Adjudicated Area
County Lines
VOC Contaminant Plumes (West Yost, 2021)
Perchlorate Contaminant Plumes
CVWD Chino Basin Wells
CVWD Cucamonga Basin Wells
River, Streams (CDFW)
Faults (USGS EHP)
Freeways
FIGURE 2
Lone Oak El Camino Project
KG23-0690
Basin Map
KEAR GROUNDWATER
Geologic Basemap: USGS (2006)
Shaded Relief: Modified from USGS NED
0
5
10 MILES
N

CVWD No. 30

CVWD No. 38

Vent Tubes

Concrete Pedestal

Argyle Campbell & Co. Oil Well No. 1

CVWD No. 46

FEET BELOW GROUND SURFACE

0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300

LITHOLOGIC SYMBOLS
(per WEI, 2003)

- High Plasticity Clay
- Low Plasticity Clay
- Silty Sand
- Poorly-graded Sand
- Poorly-graded Gravel

16" Short Normal Geophysical Log (Right Deflection = Better Aquifers)

Modified to reflect record

Well Screen Intervals

50’ — Conductor Borehole; 38” O.D. Conductor Casing (Set in Cement)

36” Min. Dia. Upper Borehole Ream (50 to 640 ft)

Cement Sanitary Seal (0 to 600 ft)

2” Dia. Mild Steel Upper G.F.T. (0 to 620 ft)

3” Dia. Stainless Steel Camera-Entrance Tube (Enters Casing ~632 to 640 ft)

APPROX. STATIC WATER LEVEL

24” Dia. HSLA Blank Well Casing (0 to 578 ft)

600’ — 24” Dia. Dissimilar Metal Dielectric Coupler (578 to 580 ft)

640’ — 24” Dia. Stainless Steel Blank Well Casing

700’ — 32” Min. Dia. Lower Borehole Ream (640 to 1200 ft)

No. 6 x No. 8 Gradation Gravel Pack (600 to 1200 ft)

900’
920’ — 24” Dia. Stainless Steel Perforated Well Casing 0.085” Ful-Flo Louvers

1160’
1180’
1200’ — 24” Dia. Stainless Steel Blank Cellar Casing w/ End Cap

Remnant Backfilled Pilot Bore

Sanitary Seal Depth

Well Screen Intervals

APPROX. BASIN ALLUVIUM BOTTOM

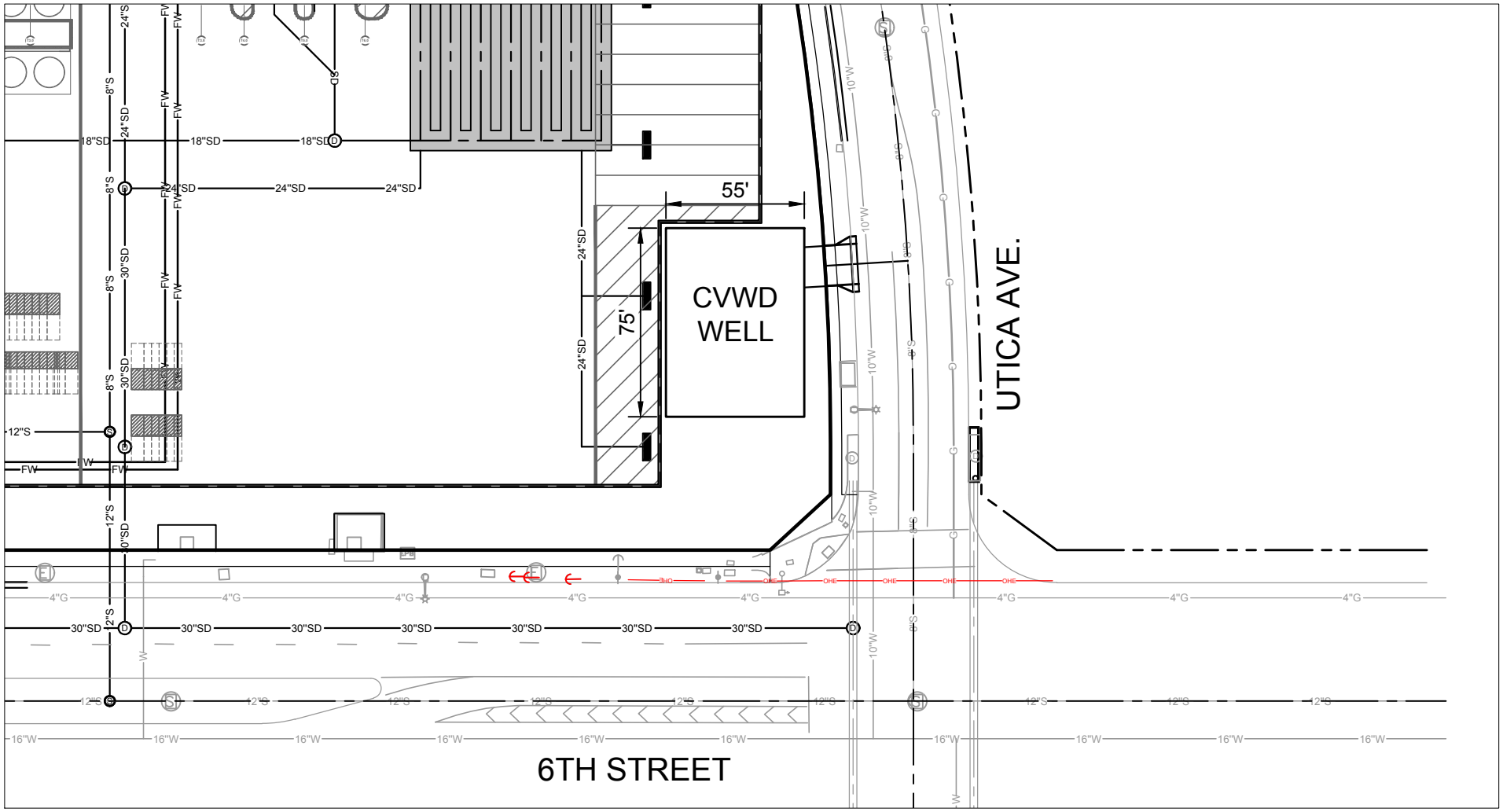
FIGURE 3

Lone Oak El Camino Project

KG23-0690

Preliminary New Well Design Schematic

KEAR GROUNDWATER



EXISTING OVERHEAD POWER LINES —OHE—

EXISTING POWER POLE ⌀

POWER POLE TIE-DOWN/ANCHOR →

Kimley»Horn

401 B STREET, SUITE 600,
SAN DIEGO, CA 92101
PHONE: 619-234-9411
WWW.KIMLEY-HORN.COM

LONE OAK - RANCHO

EXHIBIT:

WELL SITE LAYOUT

NORTH

JOB NO.:	095468009
DATE:	8/2/23

0 30 60

GRAPHIC SCALE AS SHOWN

1 OF 1

K:\RIV_LDEV\095468009 - LONE OAK-RANCHO\CAD\EXHIBITS\CVWD WELL LAYOUT\095468009 - WELL LAYOUT EXHIBIT.DWG

THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC. COPYRIGHT KIMLEY-HORN AND ASSOCIATES, INC., 2023

APPENDIX C – HYDRAULIC CALCULATIONS

By: MP	Date:		12/14/23	Subject: El Camino Well
Checked: TT	Date:		12/14/23	Job No.: 1945406001

Nominal Diameter of Water Main	12.00	IN
Length of Water Main	3,130.00	FT
Nominal Diameter of Well Casing	24.00	IN
Length of Well Casing	571.00	FT
Nominal Diameter of Yard Piping (2)	12.00	IN
Length of Yard Piping (2)	0.00	FT
Suction Side of Pump (Low HGL)	577.81	FT
Suction Side of Pump (High HGL)	617.45	FT
Highest Elevation in System	1,120.00	FT
Hazen Williams C (Water Main)	120.00	Unitless
Hazen Williams C (Yard Piping 1)	120.00	Unitless
Hazen Williams C (Yard Piping 2)	120.00	Unitless
Area of Water Main	0.79	SF
Area of Well Casing	3.14	SF
Area of Yard Piping (2)	0.79	SF

SYSTEM CURVE POINTS (Lowest Suction Pressure, Max Elev Head)

FLOW (GPM)	Flow (CFS)	Pressure Pipe Headloss (FT)	Fitting Headloss (FT)	TDH (FT)	Velocity (FT/SEC)	TDH (PSI)
2200	4.902	40.25	3.27	585.7	6.2	253.6
2210	4.924	40.58	3.30	586.1	6.3	253.7
2230	4.969	41.27	3.36	586.8	6.3	254.0
2250	5.013	41.95	3.42	587.6	6.4	254.4
2270	5.058	42.65	3.48	588.3	6.4	254.7
2290	5.102	43.34	3.54	589.1	6.5	255.0
2310	5.147	44.05	3.60	589.8	6.6	255.3
2330	5.192	44.76	3.66	590.6	6.6	255.7
2350	5.236	45.47	3.73	591.4	6.7	256.0
2370	5.281	46.19	3.8	592.2	6.7	256.3
2390	5.325	46.91	3.9	593.0	6.8	256.7

SYSTEM CURVE POINTS (Highest Suction Pressure, Min Elev Head)

FLOW (GPM)	Flow (CFS)	Pressure Pipe Headloss (FT)	Fitting Headloss (FT)	TDH (FT)	Velocity (FT/SEC)	TDH (PSI)
2200	4.902	40.25	0.00	542.8	6.2	235.0
2210	4.924	43.60	0.01	546.2	6.3	236.4
2230	4.969	44.34	0.03	546.9	6.3	236.8
2250	5.013	45.07	0.08	547.7	6.4	237.1
2270	5.058	45.82	0.14	548.5	6.4	237.4
2290	5.102	46.57	0.22	549.3	6.5	237.8
2310	5.147	47.32	0.26	550.1	6.6	238.2
2330	5.192	48.08	0.37	551.0	6.6	238.5
2350	5.236	48.85	0.49	551.9	6.7	238.9
2370	5.281	49.62	0.6	552.8	6.7	239.3
2390	5.325	50.40	0.8	553.7	6.8	239.7

Flow	5.325	CFS
Velocity in Water Main	6.78	FPS
Velocity in Well Casing	1.70	FPS
Velocity in Yard Piping (2)	6.78	FPS

Fittings in Well Header

FITTING	DIAMETER (IN)	NUMBER IN SYS	K	$V^2/2G$ (FT)	$Hf=K*V^2/2G$	HL (FT)
Cast 90-Deg Bend	12	3	0.25	0.71	0.18	0.54
Flow Meter	12	1	0.5	0.71	0.36	0.36
Swing Check Valve	12	1	2	0.71	1.43	1.43
Tee, Line Flow	12	1	0.3	0.71	0.21	0.21
						2.53

Fittings in Water Main

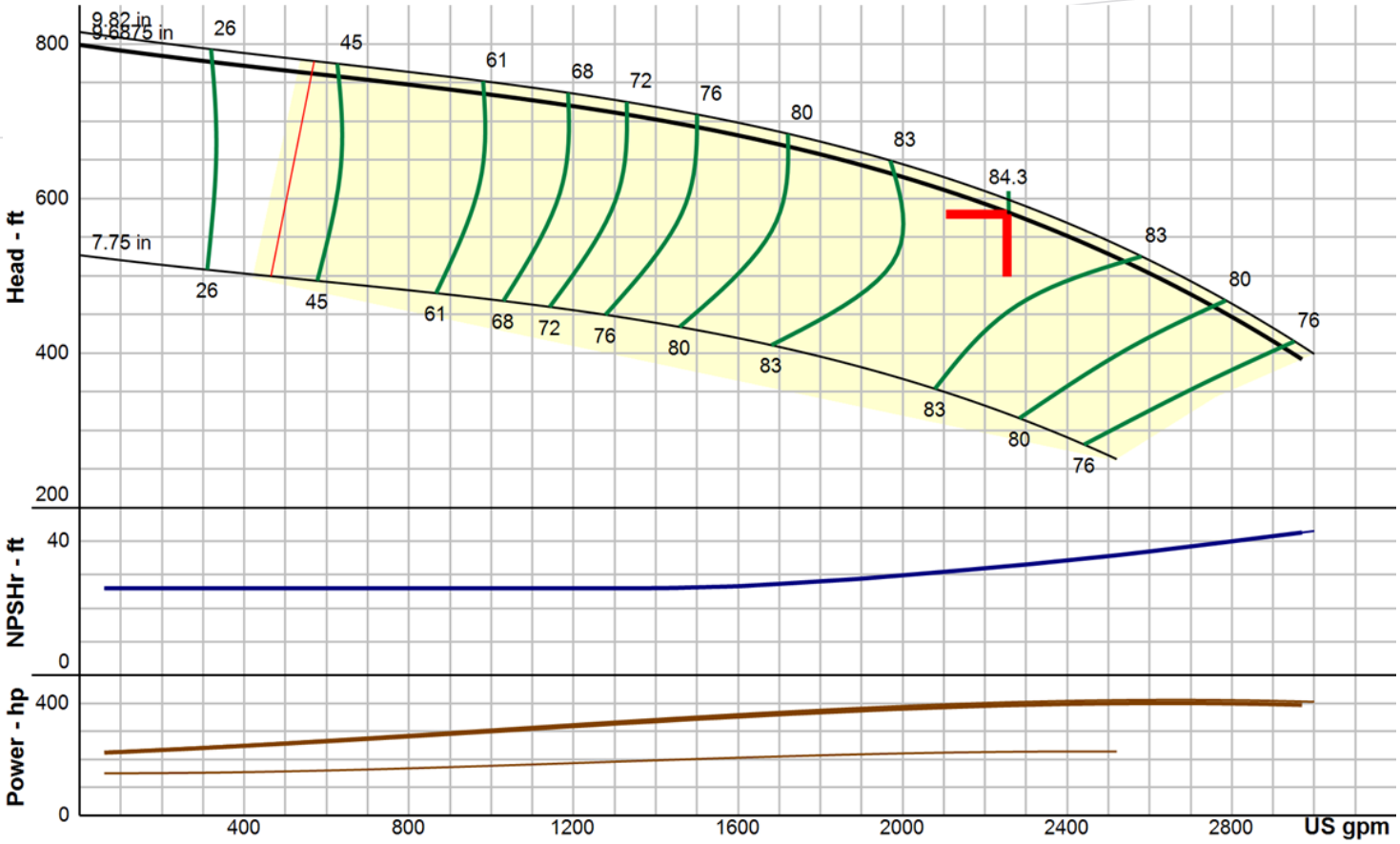
Cast 90-Deg Bend	12	5	0.25	0.71	0.18	0.89
Resiliant Seated Gate Val	12	2	0.3	0.71	0.21	0.43
						1.32

Total Fitting Headloss **3.85**

APPENDIX D – PRELIMINARY WELL PUMP DATA SHEETS

PERFORMANCE CURVE

Quote ID: 9001-231213-003:0:1 QTY: 1
DWT-FFTM 14RJHC, 7 Stages
ENGINEER - TEKDRAULICS San Clemente



Curve & hydraulic data presented is nominal performance based on ANSI/HI 14.6 acceptance grade 1B.
Design values are guaranteed within the following tolerances: Flow ± 5%, Head ± 3%, and optionally either Power + 4% or Efficiency - 3% at manufacturer's discretion.

Specified NPSH available is insufficient for the pump.

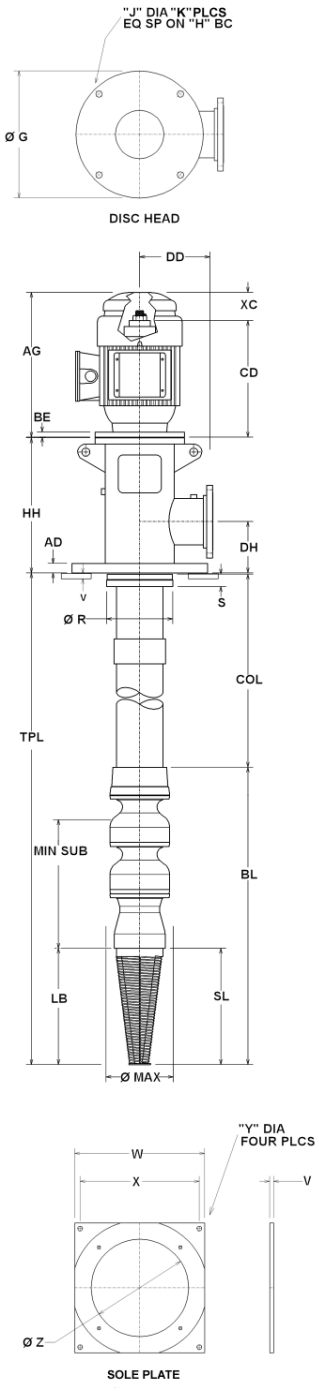
Specified Flow	2253.00 USgpm	**Shut Off Pressure (Bowl)**	345.9 psi	**Driver Size Criteria**	NOL Power Across Design Curve
Specified TDH	580.00 ft	**Shut Off Pressure (Disch Flange)**	133.3 psi	**Allow Service Factor**	No
Rated Speed	1770 RPM	**Run Out Flow**	2970.0 USgpm	**kWh per 1000 gal**	2.37034
Atmospheric Pressure	14.70 psi	**Run Out TDH (Bowl)**	392.0 ft	**NPSHr at Design**	32.6 ft
Pumping Level	490.00 ft	**Run Out TDH (Disch Flange)**	-131.6 ft	**NPSH Margin at Design**	77.2 ft
NPSHa at Grade	34.0 ft	**Run Out Pressure (Bowl)**	169.7 psi	**Min Submergence at Design**	39.32 in
NPSHa at 1st Impeller	109.8 ft	**Run Out Pressure (Disch Flange)**	-57.0 psi	**Actual Submergence**	930.00 in
Fluid	Water	**Bowl Efficiency at Design**	84.30 %	**Thrust K-Factor**	16.2 lbpft
Fluid Temperature	68.0 °F	**Guaranteed Bowl Efficiency**	81.77 %	**Thrust at Design**	15331.4 lb
Specific Gravity	1.0000	**Best Efficiency**	84.30 %	**Thrust at Shut Off**	18831.1 lb
Viscosity	1.0017 cP	**BEP Flow**	2258.0 USgpm	**Thrust at Run Out**	12242.7 lb
Vapor Pressure	0.3393 psi	**Design Flow % BEP**	99.78 %	**Bowl Material**	Cast Iron with Glass Enamel
Density	62 lbs/ft³	**Pump Efficiency**	80.28 %	**Bowl Material Derate Factor**	1.00
Design Flow	2253.0 USgpm	**Motor Efficiency**	96.20 %	**Impeller Material**	316SS
Min Flow (MCSF)	564.0 USgpm	**Overall Efficiency**	77.23 %	**Impeller Matl Derate Factor**	1.00
Design TDH (Bowl)	583.0 ft	**Friction Loss at Design**	10.34 ft	**Total Flow Derate Factor**	1.00
Design TDH (Disch Flange)	72.2 ft	**Power at Design**	393.0 Hp	**Total Head Derate Factor**	1.00
Design Pressure (Bowl)	252.4 psi	**Guaranteed Power**	408.7 Hp	**Total Efficiency Derate Factor**	1.00
Design Pressure (Disch Flange)	31.2 psi	**NOL Power**	401.0 Hp		
Shut Off TDH (Bowl)	799.0 ft	**Max Power (NOL) Flow**	2670.0 USgpm		
Shut Off TDH (Disch Flange)	308.0 ft	**Recommended Power**	450.00 Hp		

DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Certified By		
Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

OUTLINE DRAWING

Quote ID: 9001-231213-003:0:1 QTY: 1
DWT-FFTM 14RJHC, 7 Stages
ENGINEER - TEKDRAULICS San Clemente



DIMENSIONS

Dim G [Mounting Flange Dia]	25.00 in
J [Mounting Flange Hole Dia]	1.25 in
K [Mounting Hole Places]	4
H [Mounting Flange Bolt Circle]	22.75 in
AG [Motor Height]	56.59 in
CD [Motor Coupling Height]	49.81 in
XC [Top Hdshft to top VHS Motor]	6.25 in
BD [Motor Base Dia]	20.00 in
BE [Motor Base Thickness]	2.00 in
Discharge Head Size	12.00 in
BD Head [Discharge Head Base Dia]	20.00 in
HH [Head Height]	34.00 in
AD [Mounting Flange Thickness]	1.75 in
DD [Disch Flange Stickout]	17.50 in
DH [Disch Flange Height]	12.00 in
S [Hanger Flange Stickdown Length]	2.38 in
R [Hanger Flange OD]	14.60 in
COL [Column Length]	6710.12 in
Column Diameter	10.00 in
TPL [Total Pump Length]	6840.00 in
MIN SUB [Minimum Submergence]	39.32 in
LB [Length to Bottom]	30.00 in
MAX [Max Assembly OD]	13.63 in
BL [Bowl Assembly Length]	129.88 in
V [Sub Base Thickness]	1.00 in
W [Sub Base Overall Size]	25.00 in
X [Center Line of Holes]	22.00 in
Y [Mounting Holes Base Plate Dia]	1.00 in
Z [Base Plate Opening or Can ID]	26.00 in
SU [Shaft Stickup]	14.00 in
SUT [Tube Stickup]	6.00 in
SL [Suction Length]	28.87 in
Discharge Flange	12"-150#
Suction Bowl Size	10"

PUMP DATA

Column Diameter	12 in [305 mm]
Lineshaft Diameter	1 15/16 in [49.2 mm]
Specified Flow	2253.00 USgpm
Specified TDH	580.00 ft
Pumping Level	490.00 ft
Motor Manufacturer	US
Driver Type	Vertical Hollow Shaft Motor
Selected Motor Power	450.00 Hp
Motor Speed	1770 RPM
Phase / Frequency	3 PH / 60 Hz
Voltage	460PWS V

WEIGHTS

Total Bowl Weight	1423 lbs
Total Column Weight	38080 lbs
Head Weight	**Refer to Factory**
Motor Weight	2800 lbs
Total Weight	**Refer to Factory**

NOTES	
1	Total Pump Length ± 1.0 inch.
2	Tolerance on all dimensions is .12 or ± .12 inch per 5 ft, whichever is greater.
3	All dimensions shown are in inches unless otherwise specified.
4	Drawing not to scale.
5	½" NPT – Gauge Conn (plugged)
6	Driver may be rotated at 90º intervals about vertical centerline for details refer to driver dimension drawing.
7	Refer to product IOM for impeller setting requirements.
8	This assembly has been designed so that its natural frequency responses avoid the specific operating speeds by an adequate safety margin. The design has assumed the foundation to be rigid.

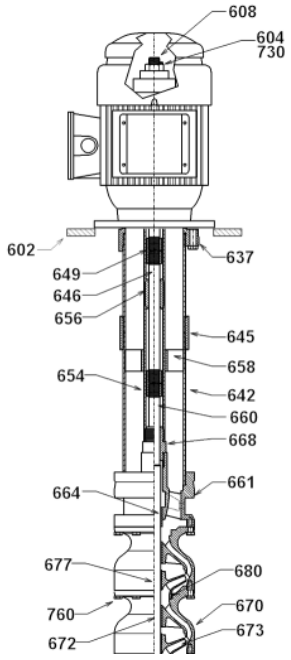
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Certified By		
Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

GOULDS WATER TECHNOLOGY
a xylem brand

CROSS SECTION DRAWING

Quote ID: 9001-231213-003:0:1 QTY: 1
DWT-FFTM 14RJHC, 7 Stages
ENGINEER - TEKDRAULICS San Clemente



BILL OF MATERIALS

ITEM	PART NAME	CODE	MATERIAL	ASTM#
Head Assembly				
608	Headshaft	2227	SST 416	A582 S41600
600	Head - Discharge	9645	Carbon Steel Fab	A53
602	Base - Sub	3201	Carbon Steel GR D	A36M
604	Nut - Adjusting	2242	Carbon Steel 1018	A108
616	Box - Stuffing	1003	Cast Iron CL 30	A48 CLASS 30B
617	Bearing - Seal Housing	1618	Bismuth Bronze	B584 Modified
618	Gland - Split	1203	SST 316	A744M
620	Packing	5026	Graphite Packing	ML402-99
623	Nut - Tension	2242	Carbon Steel 1018	A108
625	Plate - Tension	1003	Cast Iron CL 30	A48 CLASS 30B
637	Flange - Column Hanger	1003	Cast Iron CL 30	A48 CLASS 30B
649	Coupling - Headshaft	2265	SST 416	A582M
730	Key - Motor Gib	2242	Carbon Steel 1018	A108
760	Capscrew - Hex	2229	SST 316	A276
Column Assembly				
642	Pipe - Column	6501	Black Pipe Sch 40	A53
645	Column - Coupling	6501	Black Pipe Sch 40	A53
646	Lineshaft	2227	SST 416	A582 S41600
649	Coupling - Lineshaft	2265	SST 416	A582M
654	Tube - Enclosing	6503	Black Pipe	A53
656	Bearing - Lineshaft	1618	Bismuth Bronze	B584 Modified
658	Retainer - Tube	5121	Rubber EPDM	D3568
Bowl Assembly				
660	Bowlshaft	2227	SST 416	A582 S41600
661	Bowl - Discharge	1003	Cast Iron CL 30	A48 CLASS 30B
664	Bearing - Discharge Bowl	1618	Bismuth Bronze	B584 Modified
668	Bearing - Tube Adapter	1618	Bismuth Bronze	B584 Modified
670	Bowl - Intermediate	6911	Cast Iron CL 30 Enamel	A48
672	Bearing - Intermediate Bowl	1618	Bismuth Bronze	B584 Modified
673	Impeller	1203	SST 316	A744M
677	Taperlock - Impeller	2217	SST 416	A582M
680	Wear Ring - Bowl	1232	SST CA15	A743M
688	Suction	1003	Cast Iron CL 30	A48 CLASS 30B
690	Bearing - Suction	1618	Bismuth Bronze	B584 Modified
692	Sandcollar	1205	SST 304	A744M
698	Strainer	9722	SST 316L Fab	A182M
747	Plug - Pipe	1046	Malleable Iron	A197
760	Capscrew - Hex	2229	SST 316	A276

DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED

Certified By		
Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

GOULDS WATER TECHNOLOGY a xylem brand

SUBMITTAL

Quote ID: 9001-231213-003:0:1 QTY: 1
DWT-FFTM 14RJHC, 7 Stages
ENGINEER - TEKDRAULICS San Clemente

PERFORMANCE ON DESIGN CURVE AT 1770 RPM

	Shut Off	Design [2]	Run Out [5]		
Flow (USGPM)	0.0	2253.0	2970.0	**Best Efficiency**	84.30 % at 2258.0 USgpm
TDH-Bowl (ft)	799.0	583.0	392.0	**Design Flow % BEP**	99.78 %
TDH-Disch Flange (ft)	308.0	72.2	-131.6	**Pump Efficiency**	80.28 %
Bowl Efficiency (%)	-	84.30	74.50	**Overall Efficiency**	77.23 %
Guaranteed Bowl Efficiency (%)	-	81.77	-	**NOL Power**	401.0 Hp at 2670.0 USgpm
Power (Hp)	220.0	393.0	394.0	**Specified NPSH Ratio**	1.1
Guaranteed Power (Hp)	-	408.7	-	**Thrust Load Power Loss**	2.03498 Hp
NPSHr (ft) [1]	-	32.6	42.6	**Total Flow Derate Factor**	1.00
NPSH Margin (ft) [1]	-	77.2	67.2	**Total Head Derate Factor**	1.00
Hydraulic Thrust(lb)	12939.0	9440.0	6352.0	**Total Efficiency Derate Factor**	1.00
Thrust (lb)	18831.1	15331.4	12242.7	**Actual Submergence**	930.00 in
Pressure-Bowl (psi)	345.9	252.4	169.7	**Shaft Friction Power Loss**	10.33 Hp
Pressure-Disch Flange (psi)	133.3	31.2	-57.0	**Min Flow (MCSF)**	564.0 USgpm
Min Submergence (Inch) [3]	-	39.32	47.50	**kWh per 1000 gal**	2.37034
Friction Loss (ft) [4]	-	10.34	17.60	**Impeller Running Clearance**	0.13 in
Lineshaft Elongation (Inch)	1.02071	0.74469	-		
Column Elongation (Inch)	0.27594	0.20134	-		
Lateral (Inch)	0.87477	0.67334	-		

[1] at 1st impeller eye [2] rated values [3] from pump suction inlet [4] from bowl to disch flange [5] per published data

OPERATING CONDITIONS

Specified Flow	2253.00 USgpm
Specified TDH	580.00 ft
Rated Speed	1770 RPM
Atmospheric Pressure	14.70 psi
TPL	570.00 ft
Pumping Level	490.00 ft
Setting Depth	559.18 ft
NPSHa at 1st Impeller	109.8 ft
NPSHa at Grade	34.0 ft
Well Diameter	20 in [508 mm] Casing
Operational Design	Variable Speed

FLUID CHARACTERISTICS

Fluid	Water
Fluid Temperature	68.0 °F
Specific Gravity	1.0000
Viscosity	1.0017 cP
Vapor Pressure	0.3393 psi
Density	62 lbs/ft³

MATERIALS & DIMENSIONS

Bowl Data	
Bowl Material	Cast Iron with Glass Enamel
Impeller Material	316SS
Bowlshaft Material	416SS
Impeller Attachment	Taper Lock
Taperlock Material	416SS
Discharge Bowl Material	Cast Iron
Suction Type	Bowl
Suction Material	Cast Iron
Bowl Bolting Material	316SS
Sand Collar	304SS
Pipe Plug	Iron
Suction Bearing	Bronze
Discharge Bowl Bearing	Bronze
Intermediate Bowl Bearing	Bronze

Bowl Data	
Strainer Type	Cone Strainer
Strainer Material	316LSS
Tube Adapter Bearing Material	Bronze
Impeller Trim	9.69 in
Bowl Pressure Limit	360 psi
Model Max Sphere Size	1.06 in
Available Lateral	1.28 in
Bowl Shaft Diameter	1 15/16 in [49.2 mm]
Impeller Balance	Dynamic Two Plane Balance
Impeller Design	Enclosed
Bowl Wear Ring	416SS
Bowl Shaft Power Limit	579.47 Hp
Bowl Assembly Provided By	Xylem

Bowl Specials

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Certified By		
Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

GOULDS WATER TECHNOLOGY
a xylem brand

SUBMITTAL

Quote ID: 9001-231213-003:0:1 QTY: 1
DWT-FFTM 14RJHC, 7 Stages
ENGINEER - TEKDRAULICS San Clemente

Column Data

Column Type	Threaded
Column Diameter	12 in [305 mm]
Lineshaft Diameter	1 15/16 in [49.2 mm]
Column Pipe Material	Carbon Steel
Lineshaft Material	416SS
Lineshaft Bearing Material	Bronze
Lineshaft Coupling Type	Threaded
Lineshaft Coupling Material	416SS
Column Loss	9.43 ft
Column Velocity	6.99 ft/s
Enclosing Tube Material	Carbon Steel
Enclosing Tube Size	3 in [76.2 mm]
Tube Retainer Material	Rubber
Bearing Retainer Design	Separate

Column Data

Maximum Bearing Spacing	5 ft [1.5 m] Spacing
Max Column Section Length	120 in
Number of Bearings	113
First Lateral Critical Speed	2856 RPM
First Lateral Critical Speed Ratio	1.61
Second Lateral Critical Speed	10449 RPM
Second Lateral Critical Speed Ratio	5.90
Column Wall Thickness	0.38 in
Lubrication Method	(Enclosed LS) Water Flush
Lineshaft Power Limit	574 Hp
Column Assembly Provided By	Xylem

Column Specials

Head Data

Head Type	FF (Fab F)
Discharge Flange Rating	150 #
Disch Flange Pressure Limit	285 psi
Head Design	One Piece Head
Discharge Head Material	Carbon Steel
VFD Compliant Head Design	Included
Headshaft Material	416SS
Headshaft Coupling Type	Threaded
Headshaft Coupling Material	416SS
Headshaft Diameter	1.94 in
Discharge Head Size	12 in [305 mm]
Discharge Head BD	20 in [508 mm]
Sealing Method	Tension Plate

Head Data

Packing Material	Acrylic Yarn and Graphite
Stuffing Box Material	Cast Iron
Tension Plate	Cast Iron
Stuffing Box / Seal Hsg Bolt	316SS
Stuffing Box / Seal Hsg Brg	Bronze
Steel Sub Base	Carbon Steel
Head Loss	0.91 ft
Head Bolting	316SS
Split Gland	316SS
Head Assembly Provided By	Xylem

Head Specials

Motor Data

Driver Type	Vertical Hollow Shaft Motor
Manufacturer	US
HP Rating	450 Hp
Speed [Poles]	1800 rpm [4 pole]
Voltage	460PWS V
Phase / Frequency	3 PH / 60 Hz
Enclosure	WPI
Efficiency / Config	Premium
Motor Efficiency	96.20 %
Motor Frame	449TPH
BD	20.0 in
BX / U	1.94 in

Motor Data

BE	2.00 in
Thrust Level	100% HT
Thrust Capacity	9500 lbs
Inverter Duty	Yes
Steady Bushing	Yes
Coupling	NRR w/ Steady Bushing
Mfg Catalog Number	HO450V2SLH
Motor Part Number	H450S2A1HH-WVRU-000A0C000
Motor Provided By	Xylem
Motor Mounted By	Customer

Motor Specials

Coating Data

Bowl OD	Tnemec 21 (NSF 61), Liquid Epoxy (16 mils)
Head ID	Tnemec 21 (NSF 61), Liquid Epoxy (16 mils)

Coating Data

	Epoxy (16 mils)
Head OD	Tnemec 21 (NSF 61), Liquid Epoxy (16 mils)

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Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

GOULDS WATER TECHNOLOGY a xylem brand

SUBMITTAL

Quote ID: 9001-231213-003:0:1 QTY: 1
DWT-FFTM 14RJHC, 7 Stages
ENGINEER - TEKDRAULICS San Clemente

Testing Data

Accessories

Engineering Services

NSF 61 Certified Construction	Approved

Engineering Services Notes

Miscellaneous Specials

Assembly and Crating

Assembly	Column Loose
Crating	Domestic Skid

Assembly and Crating Notes

In general, pumps are crated and shipped fully assembled* via standard freight methods (LTL/LCL) if overall crated length is 20 ft or less and weight is 2500 lbs or less. Up to 45 ft and 4000 lbs can still be fully assembled but will ship via dedicated freight methods (FTL/FCL/flatbed/air/special). Otherwise, each sub-assembly (bowl, column, and head) is crated separately ("column loose"). *Motors, suction cans, mechanical seals, spare parts, and other special items are crated separately. Coordinate specific expectations with the factory at time of order.

Weight Data

Total Bowl Weight	1423 lbs
Total Column Weight	38080 lbs
Head Weight	**Refer to Factory**

Weight Data

Motor Weight	2800 lbs
Total Weight	**Refer to Factory**

Comments

INFO, WARNING & ERROR MESSAGES

Packing Material	Invalid	Packing Material is only compatible to "Packing" Sealing Method.
	Invalid	is invalid
	Error	Pump design thrust exceeds motor thrust capacity, please select a new motor with higher thrust capacity or contact factory for assistance.

Our offer does not include specific review and incorporation of any Statutory or Regulatory Requirements, and the offer is limited to the requirements of the design specifications. Should any Statutory or Regulatory requirements need to be reviewed and incorporated, then the Customer is responsible to identify those and provide copies for review and revision of our offer.

Our quotation is offered in accordance with our comments and exceptions identified in our proposal and governed by our standard terms and conditions of sale – Xylem Americas. Available here: https://www.xylem.com/en-us/support/xylem-americas-standard-terms-and-conditions/

For units requiring a factory performance test, all performance tests will be conducted per ANSI/HI 14.6 standards unless otherwise noted. As a standard, test results for the primary design point meeting grade 2B tolerances for pumps with a rated shaft power of 134 hp or less and grade 1B for greater than 134 hp will be considered passing. If secondary or tertiary design points are required to be tested, these will be subject to grade 3B tolerances. For testing of more than 3 points, consult the factory. Other acceptance grades are available and must be clearly noted and mutually agreed upon between the Customer and Xylem before release to manufacture.

Holding shipment for testing approval allows 2 weeks of calculated production lead time for the approval process. If shipment approval has not been obtained by 4 weeks after submission of passing test results, Xylem reserves the right to ship product on purchase orders less than or equal to $10,000 USD without explicit approval, or to impose storage fees until shipment approval is granted on purchase orders greater than $10,000 USD. For planned approval processes exceeding 2 weeks, please consider that additional lead time and coordinate expectations with the factory, including storage fees. For faster shipment, select "No" to the hold shipment for testing approval option.

For units not requiring a factory performance test, product performance can be expected to meet 3B tolerances primarily due to the variability of field conditions. Field-measured performance may vary from factory-measured performance or published data as a result of unknown or unpredictable system conditions and measurement variability. If field performance testing is required after installation, factory performance testing before shipment is strongly recommended. Field performance test results do not constitute a warranty claim unless verified by Xylem.

The information provided in this submittal is published data nominally representative of the selected pump model's performance characteristics. If factory performance testing is included, actual as-tested performance curves for each tested

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Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

pump will be provided after testing is complete. Impeller trim diameter is subject to change to meet intended design conditions.

Special requests are subject to further review after receipt of customer purchase order during the factory's order entry and design engineering processes. If NSF 61 certified construction is required, an additional audit will completed. The Xylem team will communicate any discrepancies and possible changes. Xylem certifies that the materials specified with a NSF 61 certified construction are in compliance with NSF/ANSI/CAN 61 Drinking Water System Components - Health Effects. In compliance with NSF, Xylem vertical turbine pumps are assembled in NSF certified facilities in our Vertical Turbine Global Center of Excellence in Lubbock, TX, or our Vertical Column Pump factory in Pewaukee, WI. For more information, see our official listing here: https://info.nsf.org/Certified/PwsComponents/Listings.asp?Company=1D860&Standard=061

Customer is responsible for verifying that the recommendations made and the materials selected are satisfactory for the Customer's intended environment and Customer's use of the selected pump. Customer is responsible for determining the suitability of Xylem recommendations for all operating conditions within Customer's and/or End User's control. Xylem disclaims all warranties, express or implied warranties, including, but not limited to, warranties of merchantability and fitness for a particular purpose, and all express warranties other than the limited express warranty set forth in the attached standard terms and conditions of sale – Xylem Americas attached hereafter.

Xylem does not guarantee any pump intake configuration. The hydraulic and structural adequacies of these structures are the sole responsibility of the Customer or his representatives. Further, Xylem accepts no liability arising out of unsatisfactory pump intake field operating conditions. The Customer or his representatives are referred to the Hydraulic Institute Standards for recommendations on pump intake design. To optimize the hydraulic design of a field pump intake configuration, the Customer should strongly consider performing a detailed scale model pump intake study. However, the adequacies of these recommendations are the sole responsibility of the Customer.

Xylem's standard enamel paint offering is a coating applied at no extra charge and is intended to provide a limited cosmetic improvement over the bare metal product. The coating will not prevent rust, corrosion, or fading. Fading, flaking, chipping, or bleeding rust can be expected within 3 months of exposure to weather or other elements. For applications where visual aesthetics or corrosion resistance is important, please consider one of our protective coating options.

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Project	Cucamonga Valley WD Well 46	
Tag		
PO Number		
Serial Number		

Pump Performance Datasheet

Customer	:	Quote Number / ID	: 12523 Barrett El Camino Well 550'
Customer ref. / PO	:	Peerless Model	: GL14ME/MC
Tag Number	: 001	Stages	: 7
Service	:	Based on curve number	: GL14MEMC4606334 Rev Oct 2022
Quantity	: 1	Date last saved	: 05 Dec 2023 11:33 PM

Operating Conditions

Flow, rated	: 2,253 USgpm
Differential head / pressure, rated (requested)	: 600.00 ft
Differential head / pressure, rated (actual)	: 619.69 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed, rated	: 1785 rpm
Impeller diameter, rated	: 10.70 / 10.77 in
Impeller diameter, maximum	: 11.03 / 11.87 in
Impeller diameter, minimum	: 9.81 / 9.81 in
Efficiency (bowl / pump)	: 83.22 / 77.93 %
NPSH required / margin required	: 27.5 / 0.0 ft
Ns (imp. eye flow) / Nss (imp. eye flow)	: 2,327 / 7,354 US Units
MCSF	: 790 USgpm
Head, maximum, rated diameter	: 803.77 ft
Head rise to shutoff (bowl / pump)	: 29.93 / 34.31 %
Flow, best eff. point (bowl / pump)	: 1,999 / 1,952 USgpm
Flow ratio, rated / BEP (bowl / pump)	: 112.69 / 115.43 %
Diameter ratio (rated / max)	: 93.71 %
Head ratio (rated dia / max dia)	: 72.51 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Acceptable

Liquid

Liquid type	: Cold Water
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.000 / 1.000 SG
Viscosity, rated	: 1.00 cP
Vapor pressure, rated	: 0.34 psi.a

Material

Material selected	: Material Group, Standard

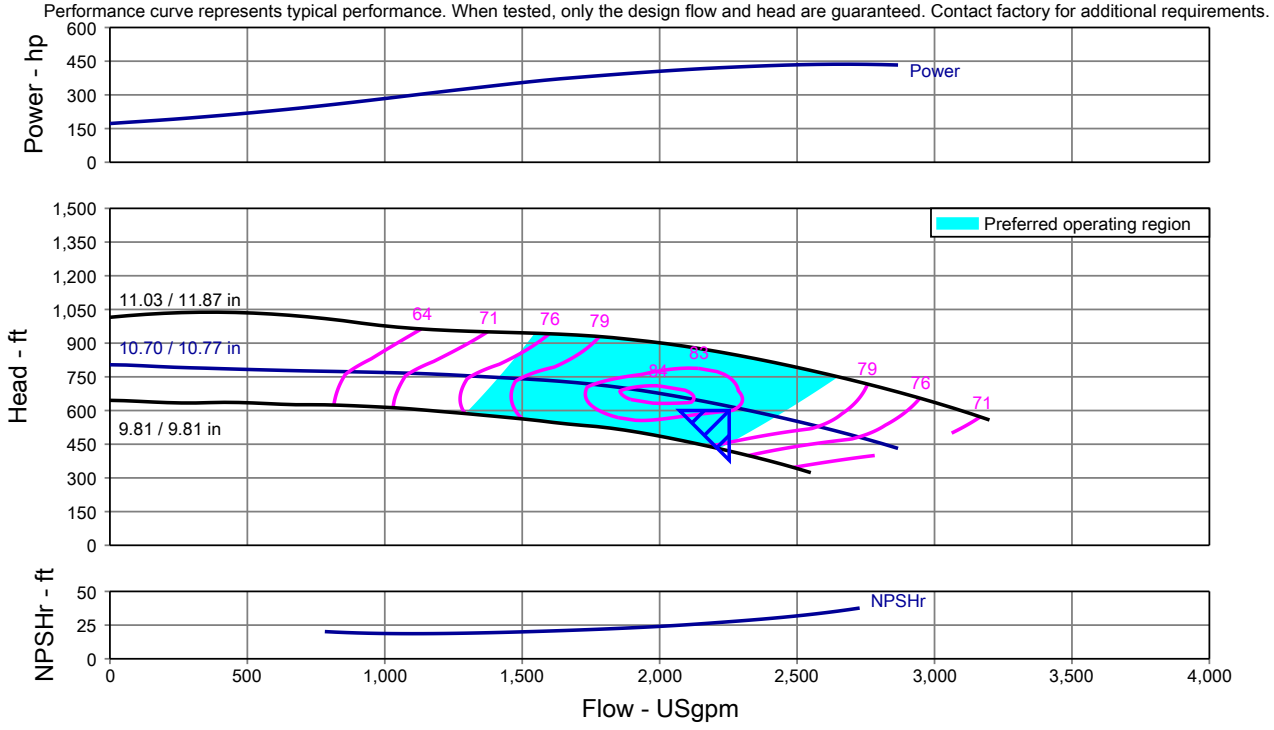
Pressure Data

Maximum working pressure	: See the Additional Data page
Maximum allowable working pressure	: See the Additional Data page
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: See the Additional Data page

Driver & Power Data (@Max density)

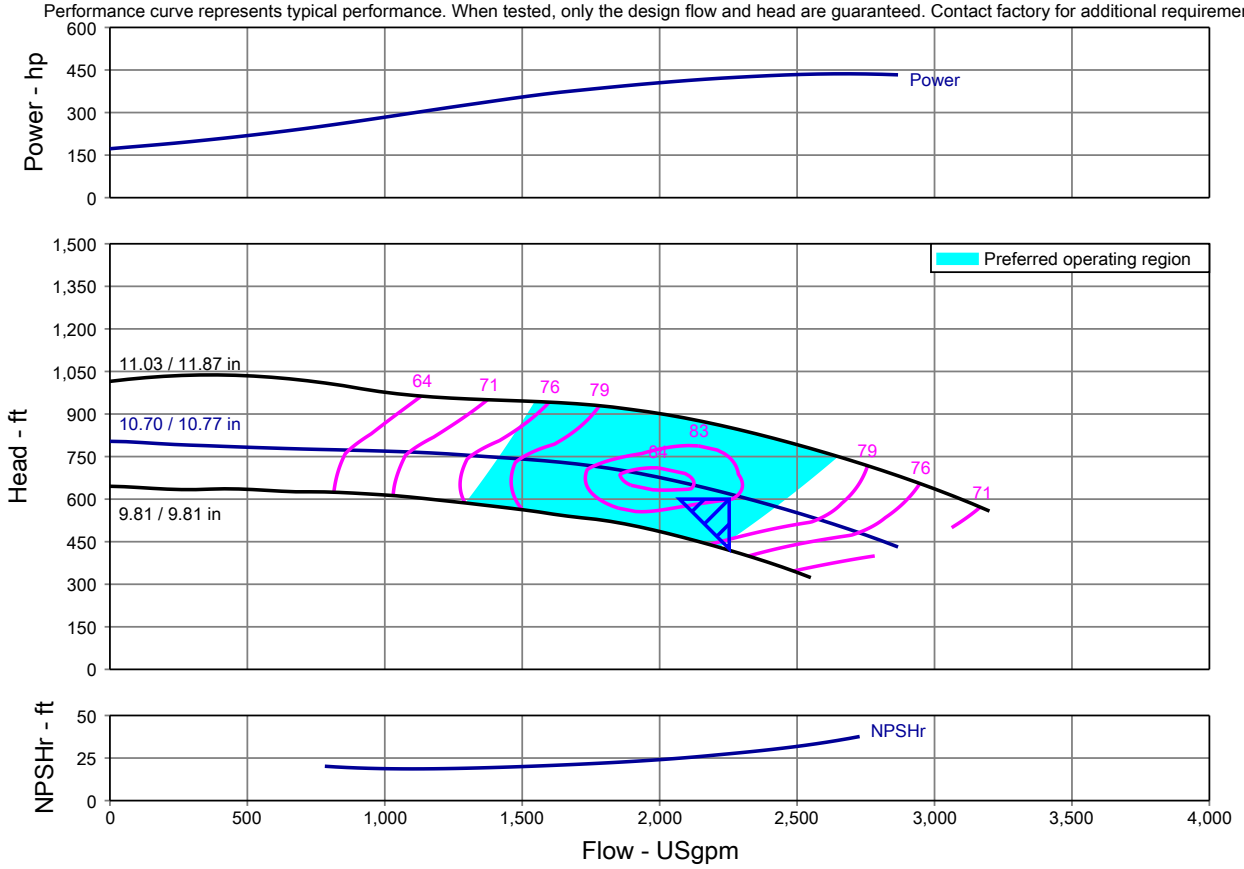
Motor sizing specification	: Max power (non-overloading)
Margin over specification	: 0.00 %
Service factor	: 1.15 (used)
Power, hydraulic	: 351.8 hp
Power (bowl / pump)	: 422.8 / 436.8 hp
Max power (non-overloading)	: 450.6 hp
Nameplate motor rating	: 400.0 hp / 298.3 kW

Bowl performance. Adjusted for construction and viscosity.
The duty point represents the head at the bowl.
Performance based on test acceptance - Hyd Ins 14.6 Unilateral (1U)
Performance curve represents typical performance. When tested, only the design flow and head are guaranteed. Contact factory for additional requirements.



Pump Performance Curve

Bowl performance. Adjusted for construction and viscosity.
The duty point represents the head at the bowl.
Performance based on test acceptance - Hyd Ins 14.6 Unilateral (1U)
Performance curve represents typical performance. When tested, only the design flow and head are guaranteed. Contact factory for additional requirements.



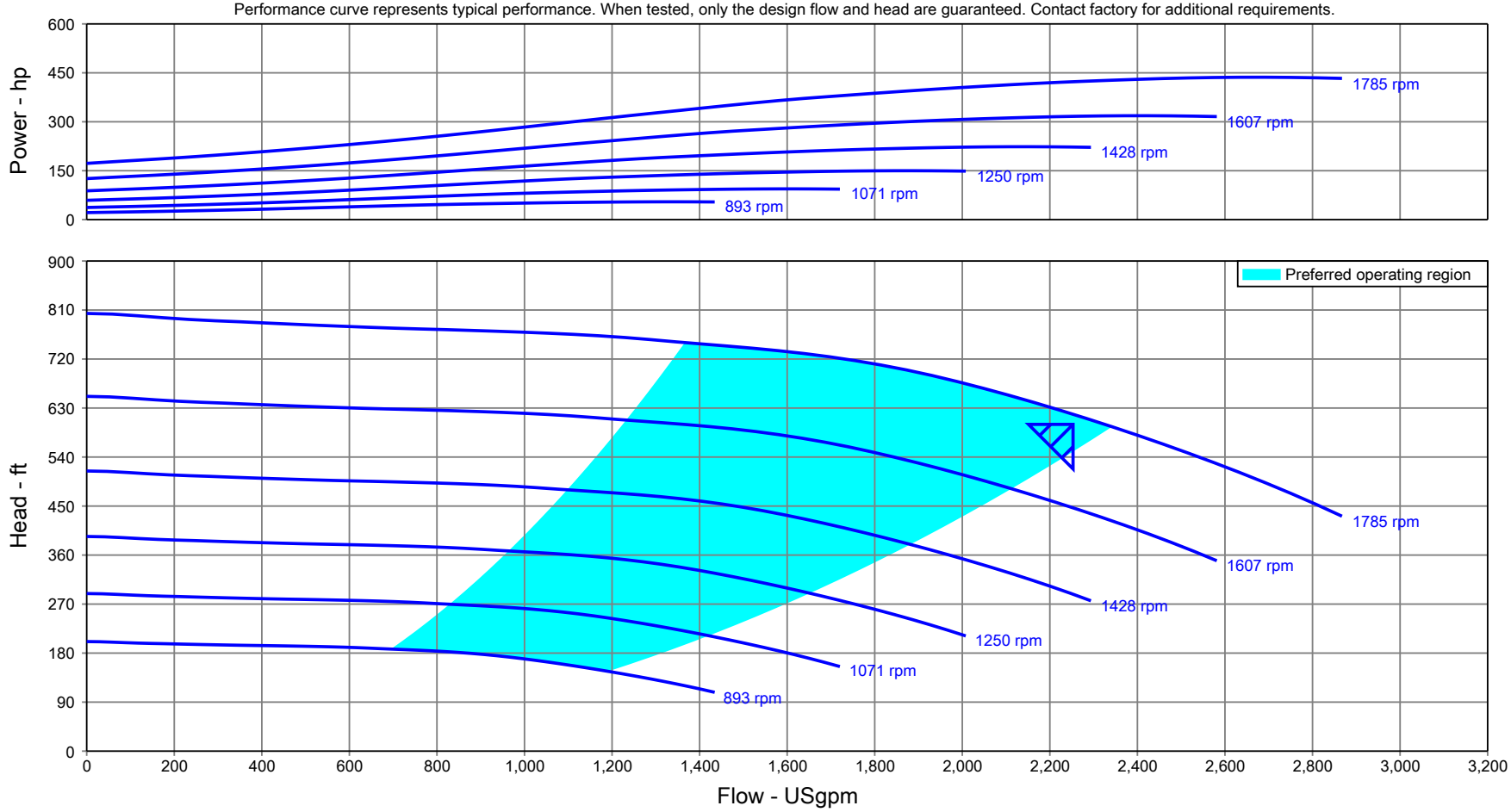
Customer	:
Customer ref. / PO	:
Tag Number	: 001
Service	:
Quantity	: 1
Quote Number / ID	: 12523 Barrett El Camino Well 550'
Date last saved	: 05 Dec 2023 11:33 PM
Flow, rated	: 2,253 USgpm
Differential head / pressure, rated	: 600.00 ft
Fluid density, rated / max	: 1.000 / 1.000 SG

Peerless Model	: GL14ME/MC
Stages	: 7
Speed, rated	: 1785 rpm
Based on curve number	: GL14MEMC4606334 Rev Oct 2022
Efficiency (bowl / pump)	: 83.22 / 77.93 %
Power (bowl / pump)	: 422.8 / 436.8 hp
Max power (non-overloading)	: 450.6 hp
NPSH required	: 27.5 ft
Viscosity	: 1.00 cP
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00

Flow (USgpm)	Head (ft)	Efficiency (%)	Power (hp)	NPSHr (ft)	Thrust, total (lbf)
0	803.75	0.00	172.4	-	13,491
319	789.42	31.76	199.9	-	12,416
637	778.53	53.38	234.6	-	11,502
956	770.48	67.05	277.3	18.9	10,673
1,274	756.64	75.21	323.6	18.9	9,758
1,593	734.23	80.57	366.5	20.6	8,691
1,912	693.27	84.12	397.7	23.1	7,351
2,230	624.28	83.39	421.5	27.2	5,698
2,549	537.65	79.49	435.2	32.9	3,947
2,867	431.38	72.12	433.0	-	2,233

Multi-Speed Performance Curve

Bowl performance. Adjusted for construction and viscosity.
The duty point represents the head at the bowl.
Performance based on test acceptance - Hyd Ins 14.6 Unilateral (1U)
Performance curve represents typical performance. When tested, only the design flow and head are guaranteed. Contact factory for additional requirements.



Project name	: Barrett El Camino Well 550'	Tag Number	: 001	Speed, rated	: 1785 rpm
Commissioned Representative	:	Service	:	Flow, rated	: 2,253 USgpm
		Peerless Model	: GL14ME/MC	Differential head / pressure, rated	: 600.00 ft
Customer	:	Quantity	: 1	Fluid density, rated / max	: 1.000 / 1.000 SG
Customer ref. / PO	:	Quoted By (Sales Office)	: Indianapolis (default)	Viscosity	: 1.00 cP
Quote Number / ID	: 12523 Barrett El Camino Well 550'	Quoted By (Sales Engineer)	: Gary Holt	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Date last saved	: 05 Dec 2023 11:33 PM	Stages	: 7	Based on curve number	: GL14MEMC4606334 Rev Oct 2022

"Construction Datasheet"

Customer	:	Quote Number	: 12523 Barrett El Camino Well 550'
Customer Reference	:	Service	:
Item Number	: 001	Date Last Saved	: 05 Dec 2023 11:33 PM
Pump Size - Stages	: GL14ME/MC - 7	Quantity of Pumps	: 1

Construction

Bowl construction	: Discharge Case
Impeller type	: Static (single plane) Balance
Impeller fastening	: 316 Stainless Steel (lock collets)
Strainer	: Cone
Column construction	: Threaded and Coupled
Column dia (nominal)	: 10.00 in
Column pipe length	: 6,600.00 in
Max column length	: 6,600.00 in
Lineshaft diameter	: 2.19 in
Lineshaft construction	: OLS
Lineshaft lubrication	: Product Lubrication
Discharge	: Above Base (floor)

Materials

Bowl	: Cast iron
Impeller	: 316LSS
Bowl bearing	: Standard (Bronze/Rubber)
Bowl shaft	: 416 Stainless Steel
Bowl wear ring	: None
Impeller wear ring	: None
Strainer	: Galvanized Steel
Column	: Steel
Lineshaft	: 416 SS
Bearing retainer / ELS Tube	: 304SS
Lineshaft bearing	: Standard (Rubber)
Discharge head	: Fabricated Steel
Sole plate	: Steel
Paint	: Class III

Approximate Weights

Complete pump	: 32,616 lb
Driver	: 3,630 lb

Motor Information

Manufacturer	: GE
Vertical shaft type	: VHS
Full load speed	: 1790 rpm
Power	: 450.0 hp
Service Factor	: 1.15
Volts / Phase / Hz	: 460 V / 3 / 60 Hz
Frame size / Base diameter	: 20.00 in
Enclosure	: WP1
Duty Type	: Continuous duty
Inverter Duty Rated	: 0
Efficiency Class, 100%/75%/50%	: Premium, 96.02 % / 96.02 % / 95.70 %
Power factor	: 86.81 / 84.49 / 77.67
Driver amp full load	: 505.00 A
NEMA design	: B
Motor starting	: Full Volt
Insulation	: F
Ambient temperature	: 104.0 deg F
Max altitude	: 3300
Thrust rating	: Standard High Thrust

Additional information

Pit / sump depth	: 6,600 in
Pump length	: 6,752.07 in
Max pump dia below mounting surface	: 14.00 in
Max sphere size	: 1.17 in
Total / best lateral setting	: 1.37 / 0.99
Max suction pressure**	: 0.00 psi.g

Testing

Hydraulic performance test	: Factory Performance Test - Non Witness
Hydrostatic test	: None
Curve approval	: Yes
NPSH test	: None
String test	: None
Test w/ motor	: None

Pump Performance - Additional Data

Project name	: Barrett El Camino Well 550'	Tag Number	: 001
Commissioned Representative	:	Service	:
Customer	:	Model	: GL14ME/MC
Customer ref. / PO	:	Quantity	: 1
Quote Number / ID	: 12523 Barrett El Camino Well 550'	Quoted By (Sales Office)	: Indianapolis (default)
Date last saved	: 05 Dec 2023 11:33 PM	Quoted By (Sales Engineer)	: Gary Holt
Stages	: 7	Speed, rated	: 1785 rpm

Performance Data		Stage, Speed and Solids Limits	
Head, maximum diameter, rated flow	: 853.06 ft	Stages, maximum	: 22
Head, minimum diameter, rated flow	: 419.93 ft	Stages, minimum	: 1
Head, maximum, rated diameter	: 803.77 ft	Pump speed limit, maximum	: 1800 rpm
Efficiency adjustment factor, total	: 0.98	Pump speed limit, minimum	: 1 rpm
Power adjustment, total	: 9.80 hp	Curve speed limit, maximum	: 1800 rpm
Head adjustment factor, total	: 1.00	Curve speed limit, minimum	: 1 rpm
Flow adjustment factor, total	: 1.00	Variable speed limit, maximum	: -
NPSHR adjustment factor, total	: 1.00	Variable speed limit, minimum	: -
NPSH margin dictated by pump supplier	: 0.0 ft	Solids diameter limit	: 1.17 in
NPSH margin dictated by user	: 0.0 ft	**Typical Driver Data**	
NPSH margin used (added to 'required' values)	: 0.0 ft	Driver speed, full load	: 1780 rpm
Mechanical Limits		Driver speed, rated load	: 1778 rpm
Torque, rated power, rated speed	: 24.47 hp/100 rpm	Driver efficiency, 100% load	: N/A
Torque, maximum power, rated speed	: 25.24 hp/100 rpm	Driver efficiency, 75% load	: N/A
Torque, driver power, full load speed	: 22.47 hp/100 rpm	Driver efficiency, 50% load	: N/A
Torque, driver power, rated speed	: 22.41 hp/100 rpm		
Torque, pump shaft limit	: -		
Radial load, worst case	: -		
Radial load limit	: -		
Impeller peripheral speed, rated	: -		
Impeller peripheral speed limit	: -		

Various Performance Data	Flow (USgpm)	Head (ft)	Efficiency (%)	NPSHr (ft)	Power (hp)
Shutoff, rated diameter	0	803.75	-	-	172.4
Shutoff, maximum diameter	0	1,015.09	-	-	287.7
MCSF	790	774.66	60.80	20.1	254.2
Rated flow, minimum diameter	2,253	419.93	77.60	-	307.8
Rated flow, maximum diameter	2,253	853.06	82.31	-	589.5
BEP flow, rated diameter	1,999	676.40	84.28	24.0	405.1
120% rated flow, rated diameter	2,704	489.07	76.48	36.9	436.5
End of curve, rated diameter	2,867	431.38	72.12	42.4	433.0
End of curve, minimum diameter	2,550	323.40	68.39	33.2	304.4
End of curve, maximum diameter	3,200	557.90	69.97	54.5	644.1
Maximum value, rated diameter	-	803.77	84.28	-	450.6
Maximum value, maximum diameter	-	-	82.31	-	644.1

System differential pressure	@ Density, rated	@ Density, max
Differential pressure, rated flow, rated diameter (psi)	267.7	267.7
Differential pressure, shutoff, rated diameter (psi)	347.8	347.8
Differential pressure, shutoff, maximum diameter (psi)	439.3	439.3

Discharge pressure	@ Suction pressure, rated	@ Suction pressure, max	@ Suction pressure, rated	@ Suction pressure, max
Discharge pressure, rated flow, rated diameter (psi.g)	267.7	267.7	267.7	267.7
Discharge pressure, shutoff, rated diameter (psi.g)	347.8	347.8	347.8	347.8
Discharge pressure, shutoff, maximum diameter (psi.g)	439.3	439.3	439.3	439.3

Ratios			
Maximum flow / rated flow, rated diameter	: 127.26 %	Head rated diameter / head minimum diameter, rated flow	: 147.31 %

Pump Performance - Additional Data

Head and Power Losses

Friction loss rate, column	: 3.05 %
Friction loss, column	: 16.76 ft
Friction loss, discharge head	: 2.01 ft
Friction loss, can/barrel	: -
Friction loss, suction bell and strainer	: 0.00 ft
Friction loss, bowl/column adaptor	: 1.40 ft
Friction loss, total	: 20.17 ft
Power loss, lineshaft bearings	: 13.00 hp
Power loss, thrust bearing	: 0.98 hp
Power loss, total	: 13.98 hp

Bowl vs. Pump Performance

Head (bowl / pump)	: 618.59 ft / 597.51 ft
Efficiency (bowl / pump)	: 83.22 % / 77.93 %
Power (bowl / pump)	: 422.8 hp / 436.8 hp
NPSH required at first stage impeller eye	: 27.5 ft

Weights and Down Thrust

Weight, lineshaft	: 0 lb
Weight, bowl assembly rotating element	: 1,759 lb
Thrust factor	: 9.03 lb/ft
Thrust, hydraulic (rated / max)	: 5,574 / 13,491 lbf
Thrust, bowl shaft end (rated / max)	: 0 / 0 lbf
Thrust, shaft step (rated / max)	: -24 / -24 lbf
Thrust, stuffing box sleeve (rated / max)	: 0 / 0 lbf
Thrust, total (rated / max)	: 7,309 / 15,226 lbf
Thrust bearing capacity	: -

* Rated thrust @ rated head, density, and suction pressure where applicable
* Max thrust @ max head, density, and suction pressure where applicable

Pressure Data	Maximum working pressure (psi.g)	Maximum allowable working pressure (psi.g)	Hydrostatic test pressure (psi.g)
Bowl	347.8	420.0	N/A
Column	347.8	-	N/A
Discharge head	347.8	600.0	N/A
Can/Barrel	-	-	-

Torque Limits

Torque, lineshaft limit	: -

Dimensions

Minimum clearance below suction bell lip/case	: 34.94 in
Minimum well diameter	: 15.00 in
Suction nozzle centerline height	: -
Suction to first stage impeller centerline	: 9.03 in
Bowl assembly length, first stage	: 33.13 in
Bowl assembly length, upper stage	: 14.63 in
Bowl assembly length, total	: 121 in
Suction bearing hub length	: 0.00 in
Strainer length	: 31.19 in
Bowl to column adaptor length	: 0.00 in
Discharge head stick-down	: 0.00 in
Submersible motor adaptor length	: -
Submersible motor length	: -
Column length	: 6,600.00 in
Total pump length	: 6,752.07 in
Can / barrel length	: -
Stuffing box sleeve diameter	: 2.19 in
Suction bell diameter	: -
Minimum submergence to prevent vortexing	: 0.00 in
Actual submergence (based on LLL)	: 6,721 in
Discharge head height	: 34.25 in
Discharge nozzle centerline height	: 11.00 in
Min distance discharge nozzle centerline to suction bell	: 0.00
Lineshaft length	: 6,634.25 in
Bowl shaft diameter	: 1.94 in
Bowl diameter, outside	: 14.50 in
Bowl diameter, exit	: 7.59 in
Column diameter, inside	: 10.19 in
Column internal obstruction diameter	: 2.19 in
Can/barrel diameter, inside	: -
Can/barrel obstruction diameter	

NPSH

NPSH at bowl (available / required)	: Ample / 27.5 ft
NPSH at low liquid level (available / required)	: Ample / -
NPSH at suction flange (available / required)	: - / -

Liquid Velocities

Column liquid velocity	: 9.29 ft/s
Discharge head liquid velocity	: 9.29 ft/s
Can liquid velocity	: -
Suction nozzle liquid velocity	: -

Pump Performance - Additional Data

Mixed Stage Performance	Set #1	Set #2	Set #3	Set #4	Alternate First Stage
Model	GL14ME/MC	-	-	-	-
Stages	7	-	-	-	-
Based on curve number	GL14MEMC4606334	-	-	-	-
Impeller diameter, rated	10.73 in	-	-	-	-
Impeller diameter, maximum	11.45 in	-	-	-	-
Impeller diameter, minimum	9.81 in	-	-	-	-

Limitations

Tolerance Type	: Hyd Ins 14.6 Unilateral (1U)	Low liquid level (Measured from bottom of head)	: in
Head measured at	: Bowl	NPSHa measured at	: Low liquid level
Pump type	: Complete Pump	Velocity column	: 10.00 ft/s
Direct connect	: No	Well inside diameter (Enter a value >0 if a diameter check is required)	: in
Length strategy	: Column length	Maximum working pressure strategy	: Maximum head, rated diameter
Length	: 6,600.00 in		

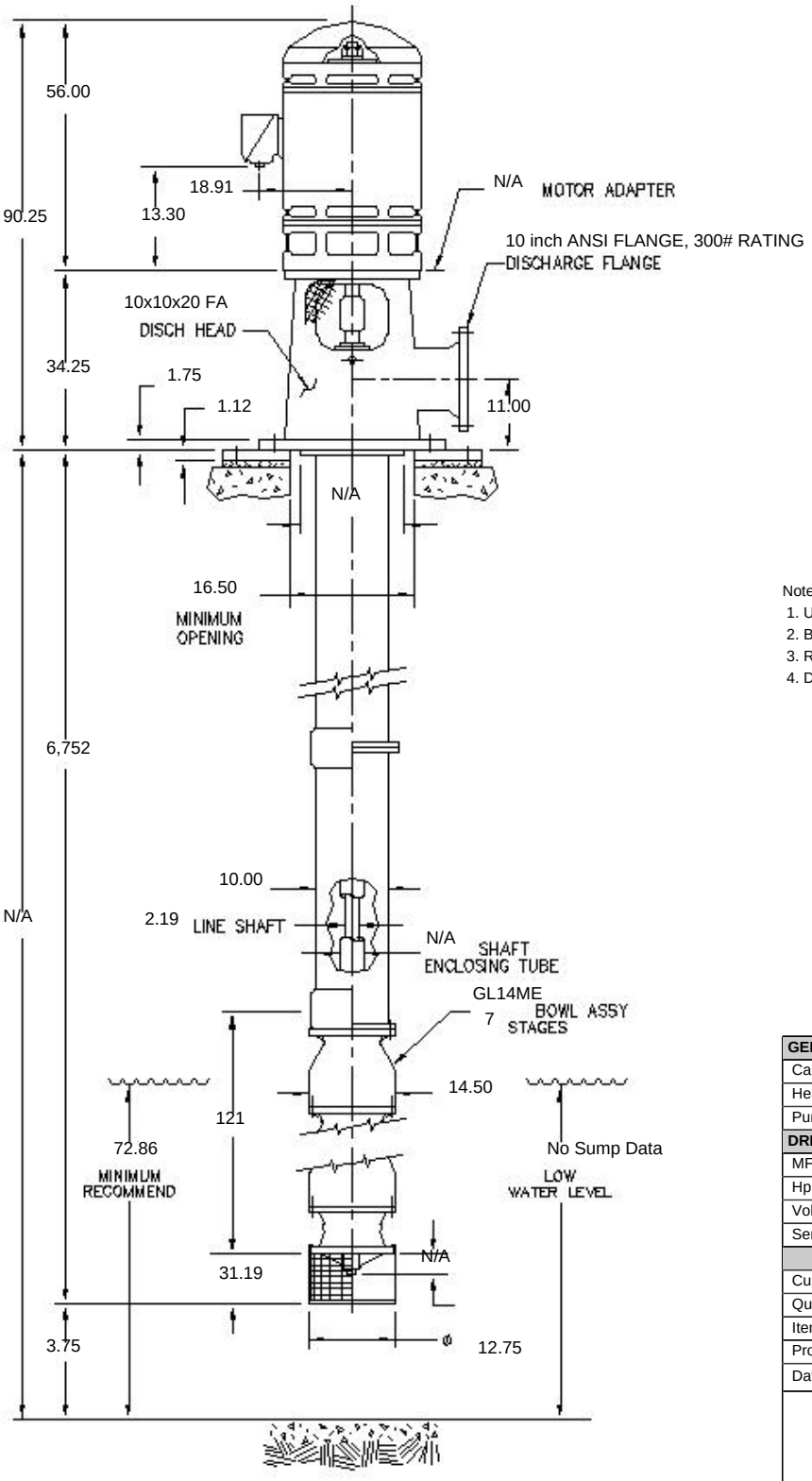
Product Line Options

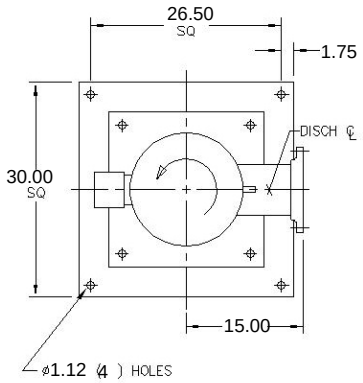
Suction type	: Threaded Case	Drive shaft type	: VHS
Bowl discharge type	: Discharge case	Discharge location	: Above ground
Bowl shaft material	: 416 SS	Discharge head material	: Steel
Bowl shaft diameter	: 1 15/16 inch	Discharge head design	: Type FA
Impeller connection type	: Taper lock	Discharge head size	: 10x10x20
Column diameter	: 10 inch	Sealing type	: Stuffing box
Column construction	: Threaded	Discharge flange rating	: 300lb ANSI flange
Suction accessory	: Cone Strainer	Coupling design	: Threaded coupling
Lineshaft material	: 416 SS	Top shaft material	: 416 SS
Lineshaft diameter	: 2 3/16 inch	Top shaft diameter	: 2 3/16 inch
Lineshaft lubrication	: Open Lineshaft		

Performance Adjustment Options

Impeller polished	: Not polished	Bowl wear ring	: None
Impeller wear ring	: None		

General Arrangement Drawing





Notes

1. Unless otherwise specified, dimensions are in inches
2. Baseplate requires support on all sides.
3. Read instructions before beginning pump assembly or installation.
4. Drawing is preliminary until certified by factory.

APPROXIMATE DRY WEIGHT	
Driver	3,630 lb
Discharge Head	617 lb
Column / Shaft	18,700 lb / 7,975 lb
Bowl Assembly	1,694 lb
Total	32,616 lb

GENERAL DATA			
Capacity	2,253 USgpm	Liquid	Cold Water
Head	600.00 ft	Specific Gravity	1.000 SG
Pump Speed	1785 rpm		
DRIVER DATA			
MFGR	-	Shaft Type	OLS
Hp	450.0 hp	Enclosure / Type	WP1
Volt / Ph / Hz	460 / 3 / 60 Hz	Frame / Model	L449TP
Service Factor	1.15		

Customer Name	
Quote No	2121084
Item No.	001
Project	Barrett El Camino Well 550'
Date	05 Dec 2023 11:29 PM

2121084-001

Pump Data Sheet - SIMFLO

Company: MuniQuip Socal, LLC.
Name: Cucamonga Valley-Water Well 1
Date: 12/12/2023

SIMFLO®

Pump:

Size:	SM14M (stages: 8)	Dimensions:	
Type:	VERTTURBINE	Suction:	10 in
Synch Speed:	1800 rpm	Discharge:	10 in
Dia:	11.26 in	Vertical Turbine:	
Curve:	SM14M.05.O.4646.1022	Eye Area:	48.2 in²
Impeller:	SM14M	Bowl Size:	14 in
Specific Speeds:	Ns: 3057	Max Lateral:	1.25 in
	Nss: 9164	Thrust K Factor:	17 lb/ft

Search Criteria:

Flow:	2250 US gpm	Near Miss:	---
Head:	585 ft	Static Head:	0 ft

Fluid:

Name:	Water		
SG:	1	Vapor Pressure:	0.256 psi a
Density:	62.4 lb/ft³	Atm Pressure:	14.7 psi a
Viscosity:	1.1 cP		
Temperature:	60 °F	Margin Ratio:	1

Pump Limits:

Temperature:	---	Sphere Size:	1.31 in
Wkg Pressure:	869 psi g	Power:	887 hp

Motor:

Standard:	US	Size:	400 hp
Enclosure:	TYPE 1	Speed:	1800 rpm
Frame:	----		
Sizing Criteria:	Max Power on Design Curve		

Pump Selection Warnings:

None

--- Duty Point ---

Flow:	2251 US gpm
Head:	585 ft
Eff:	84%
Power:	394 hp
NPSHr:	19.3 ft
Speed:	1770 rpm

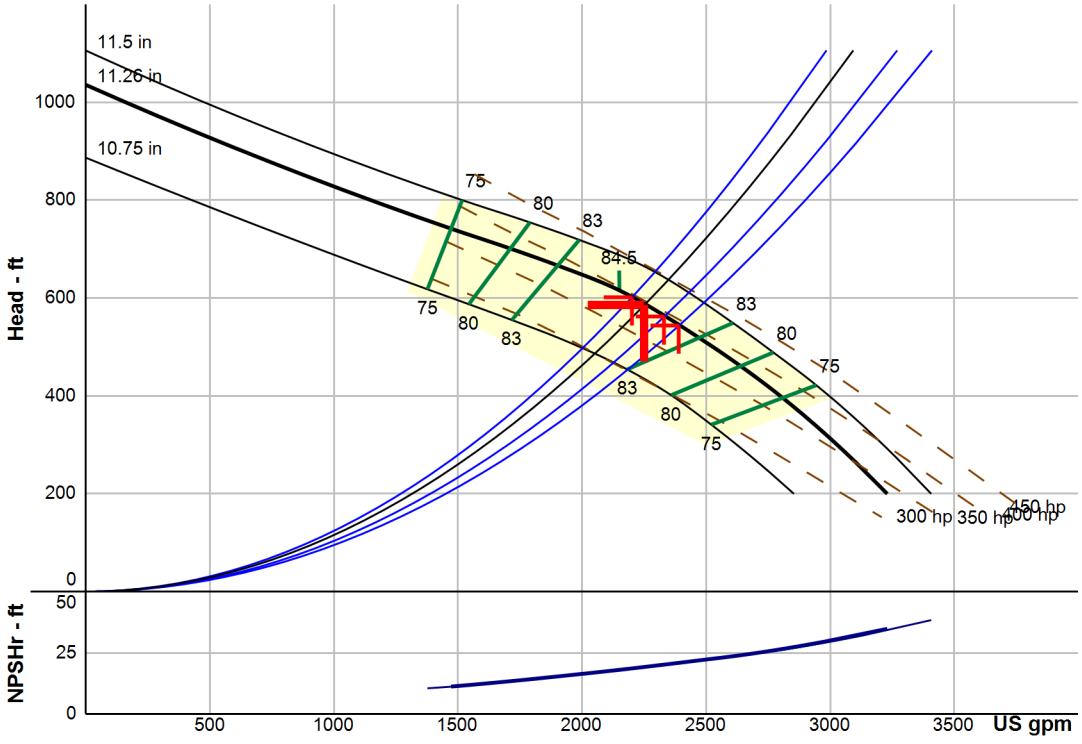
--- Design Curve ---

Shutoff Head:	1036 ft
Shutoff dP:	449 psi
Min Flow:	--- US gpm

BEP: 84.5% @ 2151 US gpm
NOL Power:
396 hp @ 2151 US gpm

--- Max Curve ---

Max Power:
447 hp @ 2255 US gpm



Data reflects nominal performance and may be derated for specified ANSI/HI 14.6 acceptance grade and/or materials of construction. Consult factory. www.simflo.com / pump-flo@simflo.com

Operating Points:

Data Point	Speed	Flow	Head	NPSHr	Efficiency	Power	Min Flow
	rpm	US gpm	ft	ft	%	hp	US gpm
Primary	1770	2251	585	19.3	84	394	---
1	1770	2200	601	18.7	84.3	395	---
2	1770	2330	561	20.2	83.7	393	---
3	1770	2390	543	20.9	83.4	392	---