

# Groundwater Investigation Report Cottonwood Sand Mine Jamacha, California

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Submitted to

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## Certification

This Technical Report was prepared in accordance with generally accepted professional hydrogeologic principles and practices. This Technical Report makes no other warranties, either expressed or implied as to the professional advice or data included in it. It has not been prepared for use by parties or projects other than those named or described herein. It may not contain sufficient information for other parties or purposes.

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## GLOSSARY OF TERMS AND ACRONYMS

af/AF	acre feet
afy/AFY	acre-feet per year
APN	Assessor's Parcel Number
bgs	below ground surface
CEQA	California Environmental Quality Act
CIMIS	California Irrigation Management Information System
County	County of San Diego
CRZFSM	Committee on Riparian Zone Functioning and Strategies for Management
CWA	County Water Authority
DEH	Department of Environmental Health
DWR	Department of Water Resources
ET	evapotranspiration
ETo	reference evapotranspiration
ft	feet
gpd	gallons per day
gpd/ft	gallons per day per foot
gpm	gallons per minute
HLGL	historical low groundwater level
K	hydraulic conductivity
msl	mean sea level
MUP	Major Use Permit
NEPA	National Environmental Protection Act
NRCS	Natural Resources Conservation Service
OWD	Otay Water District
PDS	Planning and Development Services
Project	Proposed Cottonwood Sand Mine Project
S	storage
SDNWR	San Diego Natural Wildlife Refuge
SSURGO	Soil Survey Geographic Database
T	transmissivity
t/t'	time since pumping started divided by time since pumping stopped
TOC	top of casing
USGS	U.S. Geological Survey

## Executive Summary

This report describes the groundwater investigation performed for the Cottonwood Sand Mine Project (the Project) as part of obtaining a Major Use Permit (MUP) for extraction of aggregate. The Project is to be located on the current Cottonwood Golf Club property (replacing the golf course) in Jamacha Valley at 3121 Willow Glen Drive, near the communities of Rancho San Diego and Jamacha, in eastern San Diego County, California. The site is situated within the Sweetwater River drainage, downstream of the Loveland Reservoir, and upstream of the Sweetwater Reservoir (Figure 1). The Project proposes to mine areas of the golf course over a period of 10 years, reclaiming the excavated areas with native plant species to create open space at the conclusion of its operations. As with the current golf course operations, the Project proposes to use on-site groundwater from up to eight existing groundwater supply wells as a source of supply to meet the operational and landscape irrigation requirement of the Project. No new groundwater wells will be constructed and no borings will be converted to groundwater monitoring wells. The Project proposes to use an estimated average of 139.9 acre-feet per year (afy) of groundwater, peaking at 146.9 afy during irrigation of the largest reclamation area, as compared with the historically estimated approximately 804 afy of groundwater used by the golf course. At the conclusion of the Project, two years following completion of mining operations, when the plant community is established within the reclaimed area, no groundwater will be used on the Project site, with the exception of groundwater lost due to evapotranspiration (ET) by the native groundwater dependent plant community, and the property will be designated open space with limited land for possible development along Willow Glen Drive. An estimated 337 afy of groundwater ET loss has been calculated associated with the on-site plant community at the conclusion of the project.

Although there are no available groundwater investigation reports or well tests on the existing property, Earth Tech performed a hydrogeologic investigation for the Steele Canyon Golf Course and Steele Canyon Home Owners Association (Earth Tech, 2004) to the southeast of the Cottonwood Golf Course. This study included several long-term aquifer tests, including one immediately southeast of the Cottonwood Golf Course, providing additional aquifer characteristics that were applied in this groundwater evaluation.

This report addresses project specific requirements as described in the County of San Diego Planning and Development Services (PDS) Groundwater Review and Scoping memorandum dated February 4, 2020.

The results of the groundwater investigation are summarized below and are based on the analyses performed for the Project.

- During its operations, the Project will use less than 20 percent of the groundwater used by the Cottonwood Golf Course, and less than 42 percent from ET loss by the groundwater dependent plant community following site reclamation. As a result, the availability of groundwater will be increased and the groundwater conditions within the groundwater basin will be improved. There will be sufficient long-term availability of groundwater within the basin.
- Comparison of the watershed area, in which the Project site is located, with the County General Plan indicates that the area surrounding the site is fully supported by water supply from the Otay Water District, or adjacent County Water Authority water districts. At full build-out under the General Plan there would be no areas that would be solely groundwater dependent for potable water supply.
- Potential long-term drawdown was calculated for Project pumping, modeled assuming two years of maximum pumping for the mining operations (84.3 afy) and irrigation of the largest reclamation area (62.5 afy), 146.9 afy, with no precipitation, return flow or other recharge, and pumping only from the Lakes #11 and Ivanhoe #8 wells, though additional wells would likely be used. Results of the model indicate a maximum drawdown of less than four feet at the nearest off-site well, 1,375 feet from the Ivanhoe #8 well after five years of pumping. This would be considered a less than significant impact based on the County of San Diego well interference threshold of five feet for offsite wells.
- The nearest potentially groundwater dependent habitat is an area of riparian forest along the southwest property boundary. This vegetation is generally supported by a combination of surface water flow during the winter months, and groundwater during drier summer months. It is believed that with the apparent seasonal fluctuations in groundwater of up to 20 feet, this riparian habitat is rooted into the underlying groundwater and capable of obtaining groundwater throughout the year.
- The County of San Diego has established a groundwater drawdown threshold of three feet below the historical low groundwater level (HLGL) for groundwater dependent habitat. Although there is limited data on which to establish a HLGL, the low water level measured in 2013 of 306.4 feet above mean sea level (about 23 feet below ground surface) may be a reasonable surrogate HLGL. It should be noted that with the significantly lower pumping rates associated with the Project, this HLGL may not be reached.

- Well interference modeling was performed to evaluate drawdown for the potentially groundwater dependent habitat. The model indicates that pumping at the maximum volume during mining operations and irrigation of the largest reclamation area over a period of two years will result in a drawdown of less than 2.4 feet at the nearest potentially groundwater dependent habitat after the two-year period. The County of San Diego has established a groundwater drawdown threshold of three feet below the historical low groundwater level (HLGL) for groundwater dependent habitat. Based on the well interference analysis, the impact from pumping is less than three feet and therefore is less than significant.
- Groundwater has not been proposed as a source of potable water for the Project. As a result, water quality is not a factor for this Project. The Proponent will obtain a will serve letter from the Otay Water District to obtain potable water for limited mine staff use.

## 1. Introduction

### 1.1 Purpose of the Report

This report has been prepared by Geo-Logic Associates to satisfy the groundwater resource requirements identified by the County of San Diego (County) Department of Planning and Development Services (PDS) for the proposed Cottonwood Sand Mine Project (Project). The purpose of this report is to document the existing groundwater resources of the site, and to evaluate potential impacts to groundwater resources as a result of the sand mining operations. Additionally, this report presents recommended measures to avoid, minimize, and/or mitigate significant impacts consistent with federal, state, and local rules and regulations including California Environmental Quality Act (CEQA), and San Diego County Groundwater Ordinance, as applicable.

This report has been prepared in general accordance with Guidelines for Determining Significance and Report Format and Content Requirements – Groundwater Resources (County of San Diego, 2007), and addresses comments received from the County of San Diego in memorandum dated February 4, 2020, and in various conversations and communications with County staff; comment letters submitted by the Sweetwater Authority (SWA) dated December 13, 2018, and November 21, 2019; comments on the Project Work Plan (GLA, 2020) from the County and SWA; as well as comments from the Valle De Oro Community Planning Group dated November 22, 2019. The County comments are provided in Appendix A. Additionally, this report addresses comments provided by the County on the November 2020 report in redline/strikeout format.

### 1.2 Project Location and Description

The Project is to be located on the current Cottonwood Golf Club property (replacing the two 18-hole golf courses [Lakes and Ivanhoe]) in Jamacha Valley at 3121 Willow Glen Drive within the Valle de Oro Community Plan area and adjacent to the community of Rancho San Diego in southwestern San Diego County, California. (Figure 1) The approximately 280-acre site is situated within the Sweetwater River valley and in the floodplain of the Sweetwater River, which flows in a northeast-to-southwest direction through the site from the Loveland Reservoir, toward the Sweetwater Reservoir. The Project location occupies portions of Sections 9, 10, and 16, Township 15 South, Range 1 East of the El Cajon Mountain, California, U.S. Geological Survey (USGS) 7.5-minute quadrangle, San Bernardino Base and Meridian, County of San Diego, California at approximately 32°52' 38.53" N latitude -116° 52' 50.00 W longitude. There are 22

separate Assessors Parcels (APNs) associated with the project site as presented on Figure 2. All APNs are classified as “open space - recreation” land use per the San Diego County General Plan (County, 2011). Portions of the property will not be mined although those areas may be disturbed as part of the reclamation effort for the property.

The project’s mining operations would extract, process, and transport sand using conventional earth moving and processing equipment. Approximately 4.3 million cy (CY; 6.40 million tons) of material are proposed to be extracted. Mining and extraction activities are expected to produce approximately 3.8 million cy (5.7 million tons) of sand and gravel for market use, with a 10 percent waste factor from the total amount extracted that includes wash fines and materials undesirable for processing. Material extracted and processed at the site would be suitable for construction uses and would be available to customers in San Diego County. Approximately 214 acres of the approximately 280-acre Project site are proposed for extractive use under a phased extraction program. Surface areas not disturbed by mining would be subject to removal of invasive species in the river channel on the southwest portion of the site or be left in their current condition. The existing Sweetwater River channel and the majority of native habitat that currently exists on the site would be retained.

Working from southwest to northeast, the project would be developed in three continuous mining phases, with sub-phases in each major phase. In addition, a fourth phase of reclamation would follow the mining phases. Areas disturbed by resource extraction would be progressively reclaimed as mine operations within a given sub-phase area are completed. Reclamation would include establishment of all final slopes and topographic features, incorporation of accumulated wash fines and topsoil (as applicable), installation of irrigation lines, revegetation of the channel and slopes using appropriate native species, establishment and seeding with an erosion control mix of pads suitable for future development, weed control, and monitoring. Reclamation would be an ongoing process that immediately commences where mining operations have ceased within a given sub-phase area and continues until all mining-related disturbance is reclaimed and all equipment involved in these operations has been removed. Upon completion of the extraction activities, the entire site would be reclaimed in accordance with the mining and reclamation plan. The Project will be fully completed with plants established in 12 years. There will be no human intervention; including, irrigation, fertilization, or weeding after project completion.

The Project proposes to use on-site groundwater from up to eight existing groundwater supply wells to meet the operational and landscape irrigation requirement of the Project. No new groundwater wells will be constructed and no borings will be converted to groundwater

monitoring wells. Based on the information contained in the project description Project components that will require water include dust suppression, aggregate processing/surface watering of outgoing loads, and native plant irrigation. At the process rate of 570,000 TPY an estimated 84.3 acre-feet of water would be used per year (afy), including evaporative loss. Landscape irrigation is estimated to require an average of 55.6 afy, resulting in an average total groundwater demand of 139.9 afy over the Project duration (during mining). During peak irrigation of the largest area to be reclaimed, the maximum groundwater demand would be 146.9 afy. This is a significant reduction from the currently estimated 804 afy used by the golf course (i.e., this Project is planned to use about 82 percent less groundwater, annually, than existing conditions). At the conclusion of the project, when the plant community is established within the reclaimed area (two years after mining operations are complete), no groundwater will be used on the Project site, though it is recognized that there will be some groundwater removed through evapotranspiration (ET) by the groundwater dependent habitat.

### 1.3 Applicable Groundwater Regulations

Groundwater use for projects within the County of San Diego must address the requirements in the County of San Diego Groundwater Ordinance No. 10249, Section 67.722.B, which requires preparation of a Groundwater Investigation and stipulates that an application shall not be approved unless the approving authority finds, based upon the groundwater investigation or other available information either: (1) for a water intensive use (a project proposing to use more than 20,000 gallons per day or more than 20 afy), that groundwater resources are adequate to meet the groundwater demands both of the project and the groundwater basin if the basin were developed to the maximum density and intensity permitted by the General Plan; or (2) for all other projects, that groundwater resources are adequate to meet the groundwater demands of the project (County of San Diego, 2013).

Since the Project is proposing to use more than 20,000 gallons per day, it is considered a “water intensive project” according to the Groundwater Ordinance, and thus requires an evaluation of the cumulative groundwater impacts associated with the Project and within the groundwater basin. The California Environmental Quality Act (CEQA) also requires the County to assess groundwater impacts. The Ordinance and County Guidelines for Determining Significance – Groundwater Resources provide methods of analysis to assess potential impacts to the groundwater resource. This groundwater investigation was performed in conformance with the County’s Guidelines for Determining Significance and Report Format and Content Requirements – Groundwater Resources (Guidelines) (County, 2007), with specific additional Project specific

modifications to the guidelines from the County Department of Planning and Development Services (PDS, February 4, 2020).

This Project does not include lands under Federal jurisdiction, and therefore, the regulations contained within National Environmental Protection Act (NEPA) do not apply.

CEQA includes two questions that would be applicable to the Project when evaluating groundwater:

1. Would the project "violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?"
2. Would the project "substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?"

(State CEQA Guidelines, Appendix G, Section X, subd. (a).)

The County *Guidelines for Determining Significance – Groundwater Resources* (County of San Diego, 2007) presented below were used to evaluate the significance of long-term use of groundwater resources by the Project at maximum density and intensity permitted by the County General Plan. The Guidelines consider a project to have a significant impact to the local groundwater resource if the following conditions are met:

"For proposed projects in fractured rock or sedimentary rock basins, groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction."

To evaluate off-site well interference as a result of this project, the following guideline for determining significance is typically used:

"As an initial screening tool, offsite well interference will be considered a significant impact if after a five-year projection of drawdown, the results indicate a decrease in water level of 5 feet or more in the offsite wells. If site-specific data indicates alluvium or sedimentary rocks exist which substantiate a saturated thickness greater than 100 feet in

offsite wells, a decrease in saturated thickness of 5% or more in the offsite wells would be considered a significant impact”

Because the proposed Project will result in a substantial reduction in groundwater use as compared to the current permitted groundwater use for a 36-hole golf course (139.9 afy compared with 804 afy), there will be an improvement in the groundwater conditions and the amount of groundwater in storage. Additionally, the project site and vicinity are within the San Diego County Water Authority (CWA) and therefore has access to imported water supplies from CWA member water agencies. Therefore, rather than perform a water balance analysis, PDS requested to document the changes in groundwater demand in the report to demonstrate improved groundwater conditions as a result of the project. The County asked for a figure to show the Otay Water District (OWD) coverage area and any areas that are outside of coverage (i.e., the Project watershed) and would therefore be groundwater dependent. PDS further requested to include evaluation on whether the project would impact the basin’s ability for land that is entirely groundwater dependent to be developed to the maximum density and intensity permitted by the General Plan.

The mining operations will result in groundwater extraction causing drawdown that may temporarily affect local groundwater resources. As a result, the County and CEQA require an evaluation of environmental impacts associated with groundwater extraction, as well as other components of the project.

Groundwater resource guidelines intersect biological resource guidelines where vegetation either uses or relies on groundwater. According to the County’s Biological Resources significance determination guideline Section 4.2.C, a significant impact may occur if “The project would draw down the groundwater table to the detriment of groundwater-dependent habitat, typically a drop of 3 feet or more from historical low groundwater levels.” Therefore, this biological resources regulation is also indirectly a groundwater regulation.

## 2. Existing Conditions

### 2.1 Topographic Setting

The site is located along the Sweetwater River within the Sweetwater Watershed, which is part of the San Diego Hydrologic Region (Figure 1). Based on guidance from the County, a sub-watershed is delineated on Figure 3, (referred to as the “Project sub-watershed” in this report) to

represent local watershed conditions extending from the western extent of the Sycuan Reservation to the western Project boundary. In the Project vicinity, the Sweetwater River channel slopes gently from approximately 400 feet above mean sea level (msl) to 300 feet amsl. Land to the north and east slopes steeply to over 700 feet amsl. The area to the south consists of rugged terrain rising quickly to elevations over 800 feet amsl, and continuing to rise to San Miguel Mountain, at over 2,500 feet amsl, approximately three miles to the south.

## 2.2 Climate

Generally, the climate can be characterized as having warm summers and cool winters. For this groundwater study, the climate factors of most concern include precipitation and evapotranspiration. Data provided in this section come from the County of San Diego Groundwater Limitations Map, the California Irrigation Management System (CIMIS) Reference Evapotranspiration (ETo) Map, and available precipitation records in the general vicinity of the Project site.

The San Diego County Groundwater Limitations Map (Figure 4) places the Project site within the range of 12 to 15 inches of precipitation annually (Figure 4; SANDAG, 2004). Review of rain gauge data for El Cajon (<https://www.usclimatedata.com/climate/el-cajon/california/united-states/usca0331> about five miles northwest of the site) records an average of 12.3 inches of rainfall per year in the area, though the amount of precipitation received at the Project site varies considerably from year to year. Approximately 70 percent of annual precipitation falls between December and March. Pan evaporation data from the SWA Loveland and Sweetwater reservoirs nearby indicate an ET of 48.6 inches per year (EnviroMine, 2020). However, with guidance from the County, an ETo of 49.7 inches associated with CIMIS ETo Map Zone 6 has been applied to the Project site.

## 2.3 Land Use

The proposed Project is situated within Jamacha Valley in the County's Valle de Oro Community Planning area. Rancho San Diego is located about 0.5 miles to the west of the Project site. The Valle de Oro Community Plan characterizes the area as a balance of urban, semi-rural agricultural, and open space land uses, with the Rancho San Diego area developed with large-scale, well-planned residential and commercial developments interspersed with large areas of green-belt and biological open space for wildlife preservation.

Surrounding area land uses include residences, parks, and commercial areas of the Rancho San Diego community to the north and west; undeveloped land and extractive operations to the

northeast; rural residential development, a residential treatment facility, and the Steele Canyon Golf Club (including a 27-hole golf course and associated residences) adjacent to the Project site on the south and southeast; and the San Diego Natural Wildlife Refuge (SDNWR) to the southwest, along the Sweetwater River. Jamacha Elementary School is located approximately one-quarter mile to the south, Steele Canyon High School is approximately one-half mile to the south, Valhalla High School approximately three-quarters of a mile to the northwest, Hillsdale Middle School approximately one-half mile to the west, and Cuyamaca College approximately two-thirds of a mile to the west.

Land use in the vicinity is limited by physical constraints with the presence of the Sweetwater River channel, which passes through the area in a northeast-to-southwest direction, and by steep terrain on the north and south. Runoff from the upper Sweetwater River watershed is captured at Loveland Reservoir, primarily during winter and spring months. Sweetwater Reservoir is a terminal drinking water reservoir located about 3 miles downstream of the Project site. Surface water in the river channel typically is only present during or shortly following precipitation, or during water releases from the Loveland Reservoir by the SWA.

Important biological resources in the vicinity generally include core blocks of coastal sage scrub and chaparral, open space conserved within the SDNWR and the Dictionary Hill open space block, and perennial waters and riparian habitat associated with Sweetwater River corridor and Sweetwater Reservoir.

Areas upstream and downstream along the Sweetwater River are characterized by riparian forest and riparian scrub vegetation. Undeveloped lands to the north, east, and south are primarily vegetated with coastal sage scrub, with smaller areas of grassland.

## **2.4 Water Demand**

The following sections provide a discussion of the existing water users in the vicinity of the Project site, and the proposed water demand for the Project.

### **2.4.1 Existing Water Users**

The Cottonwood Golf Club includes two 18-hole golf courses (Lakes and Ivanhoe) situated along the sides of the Sweetwater River. Permitted in 1962 and opened in 1963, it relies solely on groundwater for irrigation of the courses, landscaping and filling of golf course water hazards. Eight wells have been constructed on the property, including three on the Lakes Course south of the Steele Canyon Road, and five on the Ivanhoe Course north of the road. These wells are not

metered, so estimates have been made to approximate the annual groundwater use. The first estimate was provided by the golf course superintendent based on his experience managing the irrigation system and work on the site, and who estimated that 840 afy of groundwater was applied. Using an alternate actual evapotranspiration (ET) method that considers groundwater loss from evaporation from the soil and plant transpiration, water use is estimated at 803.6 afy (EnviroMine, Groundwater Use Analysis, October 27, 2020).

A request for information regarding groundwater wells that are permitted within one mile of the Project boundaries was submitted to the San Diego County Department of Environmental Health (DEH). DEH identified 114 permitted groundwater wells within approximately one mile of the site (Figure 5). Review of the well location map indicates that most of the wells are in two areas within large-lot, residential parcels on the south side of the Project site. These two areas, Steele Canyon Estates and the properties near Par 4 Drive, began development in the 1980s and continued into the early 2000s. It is believed that the majority of these were constructed at the time to irrigate their large landscaped yards. At a minimum, golf course irrigation commenced 17 years prior to residential development adjacent to the Project site.

The areas where residential wells are concentrated, are in Otay Water District's service area, and essentially all water demand within the Project sub-watershed is served by either of three water districts: Otay Water District, or the Padre Dam Municipal Water District, and Helix Water District, which abut the Otay Water District. Therefore, potable water is provided to the homes by the local water district, and water from the wells is used for landscaping purposes

#### **2.4.2 Proposed Water Demand**

The proposed Project will greatly reduce the quantities of groundwater being used currently to support the Cottonwood golf courses. Annual water use for the proposed mining operation, including initial startup water demand of 20 afy and irrigation to establish a diverse native plant population on site, is estimated to be 139.9 afy; a reduction of more than 80 percent (664 afy) from golf course groundwater use. Groundwater use would be discontinued completely once the plant community had been established, approximately two years following completion of the mining operations.

The following section provides a description of the proposed water demand for the sand mining operations and plant irrigation as provided by EnviroMine (2020). The water demand includes annual operational water of 84.3 afy, and irrigation water applied at a rate of 1.1 af per acre with a one-year overlap (i.e., continued irrigation of the acreage from the previous year is included) to establish the plants. The water demand quantities are summarized in the following table.

**Table 2-1**  
**Mining Project Water Demand**

Year	Phase	Acres	Irrigation (af)*	Operations (af)**	Total (af)
1	1a+Startup	22.1	24.31	84.3+20	128.6
2	1b	26.46	53.42	84.3	137.7
3	1c	30.42	62.57	84.3	146.9
4	2a	15.26	50.25	84.3	134.6
5	2b	19.08	37.77	84.3	122.1
6	2c	13.74	36.10	84.3	120.4
7	3a	29.42	47.48	84.3	131.8
8	3b	16.15	50.13	84.3	134.4
9	3c	14.13	33.31	84.3	117.6
10	3d	18.87	36.30	84.3	120.6
11	4	8.65	30.42	0	30.4

Notes:

\*Assumes an irrigation application rate of 1.1 af per acre. After the first year, a second year of application is assumed (e.g., in year 2, water is applied to Phases 1a [22.1 acres] and Phase 1b [26.46 acres] for a total of 48.56 acres and 53.42 af of irrigation water). A slightly higher application of 1.11 af per acre is used in year 11 to account for water demand on slopes, right of ways and finished grades in the final year.

\*\*An additional 20 af of water is included in the first year of operations for project startup.

Sand quarries use water to move material on-site as a slurry, wash the material for use off-site and water roads. The total amount of water used in the mining and processing is “handled water”. Water that is lost from the site during the mining and processing is “consumed water”. Although the amount of handled water is significant, it is mostly recycled. As a result, using studies of groundwater consumption for similar sand mining operations that account for water loss from retained moisture on aggregate product that is shipped from the site, and evaporation of wash water and water applied for dust suppression, and applying site-specific climatic conditions, the consumption value for the Project process water is estimated to be 64 afy. An additional 20.3 afy is included to account for evaporation from mining pit ponds, and 55.6 afy is added for landscape irrigation as an average value within the reclaimed areas of the site. The estimated water demand for the reclaimed areas varies based on the acreage that is planted during reclamation. EnviroMine estimated that the average water demand is 139.9 afy, peaking at 146.9 afy during irrigation of the largest reclamation area (Phases 1b and 1c). Variations in the average water demand are based on the estimated irrigation requirements required to establish the native plant community.

All of the proposed annual water will be obtained from the eight on-site wells, with the particular wells used dependent on the location of the mining operations. Although, long-term well tests have not been performed on these wells, the wells reportedly yield 250 to 350 gpm (Earth Tech, 2004). When the wells are no longer needed for mining or reclamation, six of the wells will be destroyed under permit by the County DEH. Two wells will be left in place as monitoring wells per the request of the SWA. These wells are located at the northeast property line and southwest property line and are referred to as Lakes #11 and Ivanhoe #11, respectively. It is anticipated that abandonment of wells will occur as the area where a well is located is excavated, e.g., wells Lakes #15A and Lakes #15B located in the Phase 1b area of the site will be the first two wells abandoned.

## 2.5 Geology and Soils

The Project is located within the Peninsular Range Province of California, which comprises granitic rocks of the Cretaceous Southern California Batholith. The Project sub-watershed exists within the USGS preliminary geologic map of the El Cajon 30' X 60' quadrangle, as shown on Figure 6. A portion of the USGS preliminary geologic map of the El Cajon 30' X 60' quadrangle that spans the Project sub-watershed is shown on this figure. The hills and terraces surrounding the Project Site are underlain by granitic rocks of the southern California batholith. The granitic rocks within the Project sub-watershed are predominantly gabbro, monzogranite, tonalite and granitoid rocks that are exposed on the hillslopes. They are most weathered (known as "residuum") near ground surface, and expected to be less weathered with depth. In the floodplain of the Sweetwater River within the Project site, these granitic rocks underly stream-deposited Quaternary alluvium on the order of 60 to 100 feet thick in the Middle Sweetwater River floodplain (NBS Lowry, 1990). The alluvium is predominantly composed of unconsolidated fine- to coarse-grained sand with varying amounts of silt (Geocon, 2017).

Soils within the Project sub-watershed are primarily sandy loams, comprising various types (e.g., Cieneba, Fallbrook, and Visalia) as identified per the SSURGO database maintained by the National Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA). These are mapped on Figure 7.

## 2.6 Hydrogeologic Units

The Project sub-watershed does not belong to a California Department of Water Resources (DWR) Bulletin 118 groundwater basin. The watershed is defined in the San Diego Basin Plan as

falling with the Jamacha Hydrologic Subarea (902.21) of the Middle Sweetwater Hydrologic Area of the Sweetwater Hydrologic Unit.

Three hydrologic units are mapped within the Project area, from shallowest to deepest, and include Recent alluvium overlying both the weathered and unweathered intrusive igneous bedrock. The weathered bedrock is often referred to as decomposed granite or residuum and tends to be more weathered at shallower depths, with less fractures/disaggregation with increasing depth.

Alluvium. The alluvium occurs within the Sweetwater River valley area and its tributaries, with thickest deposits estimated between 60 and 100 feet in the vicinity of the Project site and pinching out toward the outer margins of the valley. Derived from the surrounding granitic rock, the alluvium generally consists of saturated boulders, gravels, sands, silts and clays. It is considered unconsolidated and permeable, with specific yields (i.e., interconnected or effective porosity) of 10 to 30 percent with production in wells from 50 to 350 gpm. Aquifers within this hydrogeologic unit are considered to be unconfined.

The existing wells are likely completed in this hydrogeologic unit (see Section 2.6). Static water levels measured in the Cottonwood Lakes #11 and Ivanhoe #11 wells exhibit 20-foot, seasonal fluctuations, recharged by infiltration from winter rains, reservoir releases, and irrigation returns.

Residuum. The weathered granitic bedrock or residuum occurs beneath the alluvium where it is present, and at the ground surface outside of the main Sweetwater River drainage. It reportedly extends 15 to 100 feet below the ground surface (Earth Tech, 2004). The residuum represents the primary source of groundwater for production wells in the area, outside of the drainage. Specific yields in the residuum are typically 1 to 10 percent, and wells generally produce at a rate of 20 to 150 gpm.

Aquifer testing conducted at wells screened in the residuum aquifer in the nearby Mexican Canyon and Ivanhoe Canyon Basins to the southeast of the Project site indicate hydraulic conductivities in the range of 1 to 38 ft/day and specific yields in the range of 0.3 to 25 percent (Earth Tech, 2004). No aquifer tests are known to have been conducted at the Project site.

Granitic Bedrock. Production from the crystalline bedrock is fracture controlled. A few wells have been completed in fractured bedrock in the upland areas outside of the alluvial valley, and specific yields in this rock are typically 0.1 percent or less and may only produce at 1 to 10 gpm (Earth Tech, 2004).

## 2.7 Hydrologic Inventory and Groundwater Levels

There are eight water wells on the Project site, which have been used to support irrigation of the golf course. They include three on the Lakes course (Lakes #11, #15a and #15b) and five on the Ivanhoe course (Ivanhoe #1, #8, #11, #15 and #18). However, well logs for these wells have either not been identified, or in the case of Ivanhoe #1 and #8, are not specifically named in the well completion reports. Based on their locations, it is likely that they are constructed primarily within the productive alluvial aquifer. Additionally, since these wells are not metered, production rates for the individual wells are unknown, though it is estimated that in combination, an estimated 804 afy of groundwater is applied to the golf courses.

A request for information regarding groundwater wells that are permitted within one mile of the Project boundaries was submitted to the San Diego County Department of Environmental Health (DEH) for the Project. DEH identified 114 permitted groundwater wells within the reference area and provided a map showing the one-mile area and the approximate location for each well (Figure 5). Unpermitted groundwater wells are not accounted for.

Review of the well location map indicates that most of the wells are in two areas within large-lot, residential parcels on the southern side of the Project site. These two areas, Steele Canyon Estates and the properties near Par 4 Drive, began development in the 1980s and continued into the early 2000s (EnviroMine, 2020). At a minimum, golf course irrigation commenced 17 years prior to residential development adjacent to the Project site. The areas where residential wells are concentrated are in Otay Water District's service area (Figure 5) and since the Otay Water District is responsible for providing potable water to these residences, the wells in these two areas are believed to provide additional landscape irrigation water for these properties.

Under the request, DEH was able to provide seven well logs: two well destruction reports, one well completed to 98 feet bgs on the Steele Canyon Golf Course, two on the Cottonwood Golf property, and two wells (LWELL 6061 and LWELL 7055) identified as being closest to two of the proposed project production wells (Ivanhoe #8 and Lakes #11), respectively. The on-site wells include one unnamed "Premier Golf" well completed on the Cottonwood Golf Course to 85 feet bgs, believed to be Ivanhoe #1 based on provided global position system (GPS) coordinates, and a second Premier Golf well, completed to 80 feet, possibly Ivanhoe #8, based on provided distances on the well completion report. A four-hour airlift well test was performed by the driller, estimating a production rate of 300 gpm for the first of the Cottonwood Golf Course wells, and 100 gpm was estimated for the second golf course well, though no production testing data were reported for the second well. No well test information was provided with the Steele

Canyon (#2) golf course well completion report. However, review of a hydrogeologic investigation performed for the Steele Canyon Golf Course (Earth Tech, 2004) suggests that this well is PW-8. It was tested in 2000, as part of the investigation and yielded an average of 19 gpm. The two off-site wells closest to the Ivanhoe #8 and Lakes #11 wells were both drilled to a depth of 220 feet into granitic bedrock, with production estimated at 15 and 20 gpm, respectively. Well information from the well completion logs are included in Table 2-2 and the well logs are provided in Appendix B.

**Table 2-2**  
**On-Site and Off-Site Well Descriptions**

Well Name	Completion Depth (ft)	Depth to Water (ft; date)	Est. Production Rate (gpm)	Alluvium (ft bgs)	Residuuum (ft bgs)	Fractured Granite (ft bgs)
<b>On-Site Wells</b>						
Premier Golf (Ivanhoe #1)	85	34; 9/28/2003	300	0-65	65-80	NA
Premier Golf (Ivanhoe #8?)	80	70;6/27/2014	100	0-60	60-72	72-80
<b>Off-Site Wells</b>						
Steele Canyon #2 (PW-8)	98	26.3; 6/13/2000	19	0-15	15-73	73-98
LWELL 7055 (1600 ft from Lakes #11)	220	80; 3/26/1984	20	0-4	4-80	80-220
LWELL 6061 (1375 ft from Ivanhoe #8)	220	35; 10/31/1988	15	0-6	6-34	34-220

Available water level data indicate a general groundwater gradient (i.e., flow direction) from northeast to southwest, mimicking topography and surface water flow in the Sweetwater River. Two wells on the golf course property have been monitored by the SWA between January 2007 and February 2019. They include Ivanhoe #11 on the northeast, upgradient end of the site, and Lakes #11 on the southwest downgradient end of the site. From the SWA records, groundwater level time series charts present elevations in feet relative to mean sea level (ft-msl) for these two wells in Figure 9. Based on measured water levels, the average groundwater elevation at upgradient Ivanhoe #11 is about 339 ft-msl, while that at downgradient Lakes #11 is about 315 ft-msl; though, considerable fluctuations in the water levels (on the order of 20 feet) are apparent, some of which are related to seasonal flow in the Sweetwater River (e.g., precipitation and reservoir releases) and some may be related to pumping to irrigate the golf course. Groundwater levels, on average, are deeper below ground surface (bgs) at Ivanhoe #11 (about 26 ft bgs) than down-gradient at Lakes #11 (about 12 ft bgs).

Surface water bodies within the area include the Sweetwater River, which runs through the golf course, and the golf course water hazards, a series of ponds within the course. The Sweetwater River drainage is often dry with flows occurring during heavy rains or when the SWA transfers water from the Loveland Reservoir, upstream of the site, to the Sweetwater Reservoir, downstream of the site. The main tributary to the Sweetwater River is the Mexican Canyon drainage that enters the Sweetwater River on the east side of the site. There are no known springs or other water bodies within the area. The nearest USGS stream gauge to the Project site is located about six miles upstream on the Sweetwater River at station 11016200 (near Dehesa).

## 2.8 Water Quality

The current groundwater wells are not being used as a source of potable water. Additionally, this groundwater used for the mining operations and area reclamation will not be a drinking water source. The County has mapped potential nitrate and radioactive element problem areas within the County and presented them on a map within the Guidelines for Determining Significance – Groundwater Resources. The project site does not fall within either problem area. This conclusion is supported by limited water quality data that has been collected by the SWA at the Ivanhoe #11 and Lakes #11 wells between 1989 and 2017.

A Water Quality Investigation Report was prepared by GLA (2021) for this Project, presenting the results of soil, surface water and groundwater quality data at three locations (top, middle and bottom site locations) across the site. Results of this study indicated that the existing water quality at the Project site generally met water quality objectives (WQOs) and Federal and State Maximum Contaminant Levels (MCLs), with the exception of exceedances of some State secondary MCLs, which relate to aesthetics of the water quality. From the limited water quality data, it can be characterized as generally good.

## 3. Groundwater Quantity Impact Analysis

Water quantity impact analyses were performed in accordance with the County of San Diego Groundwater Ordinance and the County's Guidelines for Determining Significance and Report Format and Content Requirements – Groundwater Resources. In accordance with the County Scoping Letter (2020; Appendix A), the County requested that rather than a water balance analysis, changes in groundwater demand be presented to demonstrate improved groundwater conditions as a result of the project. Data provided herein were obtained from EnviroMine,

describing the anticipated water needs for the project in comparison with the current golf course water requirements. Also, to evaluate the availability of groundwater, the County requested documentation of available public water supply sources for area water users and identification of areas outside of a water district that would be solely groundwater dependent (i.e., outside of a public water supply source).

The analysis also evaluated impacts to off-site well users from extraction of the groundwater from site wells. Well interference analysis is required to assess the potential impacts. However, because there are no available well tests on the project site, aquifer test data from the Steele Canyon Golf Club adjacent to and southeast of the Cottonwood Golf Club were considered suitable for the well interference analysis.

Finally, biologists have mapped an area of riparian forest, potentially groundwater-dependent habitat, in the vicinity of the Project site, and an analysis of impacts to this habitat was considered. Therefore, this section addresses the following three conditions that if met would be considered a significant impact to groundwater resources as they relate to the identified project:

- 50 Percent Reduction of Groundwater in Storage
- Well Interference
- Groundwater-Dependent Habitat

Sections 3.1 and 3.2 discuss each of these conditions and provide the methodologies used to analyze the groundwater conditions and evaluate if there are significant impacts to the groundwater resources, based on State CEQA guidelines as related to water quantity.

### **3.1 50% Reduction of Groundwater in Storage**

Based on guidance from the County, additional information was requested for evaluation of the groundwater in storage in lieu of a quantitative water balance analysis.

#### **3.1.1 Guidelines for Determination of Significance**

For proposed projects in fractured rock and sedimentary basins, the County Guidelines state:

“groundwater impacts will be considered significant if a soil moisture balance, or equivalent analysis, conducted using a minimum of 30 years of precipitation data, including drought periods, concludes that at any time groundwater in storage is reduced to a level of 50% or less as a result of groundwater extraction.”

### 3.1.2 Methodology

To address the 50 percent reduction of groundwater in storage analysis requirement, GLA worked directly with the County to develop an appropriate approach. As presented above, the proposed Project will use less than 20 percent (139.9 afy on average) of the permitted groundwater (804 afy) used to irrigate the Cottonwood golf course. The net reduction in groundwater removed from storage is about 664 afy. Because this is a substantial reduction in groundwater use, it can be demonstrated that there will be a substantial improvement in the amount of groundwater in storage. When the mined area has been fully reclaimed with the planting of native plant species, artificial (surface) irrigation from groundwater will not be required and no additional groundwater extraction will be performed associated with the project. However, because the post-mining conditions will include groundwater-dependent native plants, some groundwater will be lost to the plants by ET. The additional ongoing groundwater loss was calculated for the existing vegetation communities, and those established during reclamation. As presented in Table 3-1, an estimated 336.7 afy is calculated to be lost from ET based on several factors including depth to groundwater, plant species, density, microclimate, and the ETo for the site, provided in collaboration with Helix Environmental Planning biologists with methods employed for a similar local mining project (AECOM, 2018). This post-project groundwater use represents a reduction of about 58 percent from the permitted groundwater used by the Cottonwood golf course.

For this analysis of groundwater in storage, GLA also reviewed maps showing the distribution of the potable water supply provided by County Water Authority (CWA) agencies on the Project site and in the vicinity of the Project. A tributary watershed was delineated to include the Project site and extending within the Sweetwater River watershed up to the Sycuan Indian Reservation to identify the drainage area upgradient of the project, defined herein as the Project sub-area. The purpose of this evaluation was to identify any areas within the watershed, that were outside of a CWA agency service area at full build out under the County General Plan, and thus would be solely reliant on groundwater for water supply. Figure 5 presents the Project sub-area overlain on the water district boundaries.

**Table 3-1**  
**Groundwater Demand for Groundwater Dependent Habitat**

Vegetation Community	Species Factor (K <sub>s</sub> )	Density Factor (K <sub>d</sub> )	Microclimate Factor (K <sub>mc</sub> )	Landscape Coefficient (K <sub>L</sub> ) <sup>1,2</sup>	Reference Evapotranspiration Rate (inches/year) <sup>4</sup>	Estimated Evapotranspiration (inches/year) <sup>5</sup>	Mapped Area (acres)	ET Loss (afy)
Freshwater Marsh (existing - to remain)	0.90	1	1	0.90	49.7	44.73	0.31	1.16
Streambed	0.7	1	1	0.7	49.7	34.79	9.92	28.76
Riparian Scrub	0.7	1	1	0.7	49.7	34.79	85.08	246.66
Riparian Forest	0.4	1	1	0.4	49.7	19.88	15.51	25.69
Riparian Scrub (rehabilitated) <sup>4</sup>	0.4	1	1	0.4	49.7	19.88	6.13	10.16
Southern Willow Scrub (existing - to remain)	0.7	1	1	0.7	49.7	34.79	1.05	3.04
Southern Cottonwood-Willow Riparian Forest (existing - to remain)	0.4	1	1	0.4	49.7	19.88	12.83	21.26
							Total Mapped Area:	336.7
							Total ET Loss:	336.7

Notes: Groundwater demand is based on groundwater depths ranging from 20 to 30 feet using HLGLs from measurements in the Lakes #11 and Ivanhoe #11 wells, respectively.

1. The Landscape Coefficients (K<sub>L</sub>) for the vegetation communities were determined using The Landscape Coefficient Method and Water Use Classification of Landscape Species (WUCOLS) III in A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California (University of California Cooperative Extension, California Department of Water Resources, August 2000).

2. K<sub>s</sub> x K<sub>d</sub> x K<sub>mc</sub> = K<sub>L</sub>. Landscape coefficient values for the project factor in site conditions, groundwater elevations, and post-mining planting palettes, which include riparian species and transitional upland species due to conditions that are drier than typical riverine systems.

3. Landscape Coefficient (K<sub>L</sub>) x Reference Evapotranspiration = Evapotranspiration (inches/year).

4. Reference evapotranspiration (E<sub>to</sub>) from CIMIS (1999).

5. Existing tamarisk scrub, arundo-dominated riparian, disturbed southern willow scrub, and disturbed southern cottonwood-willow riparian forest will be rehabilitated through the treatment and/or removal of invasive and non-native plants and installation of native plantings and seed material.

### 3.1.3 Significance of Impacts Prior to Mitigation

The results of the analyses demonstrate that there will be ample groundwater in storage as a result of the proposed Project, associated with a reduction of at least 664 afy in groundwater demand during the Project's 10-year operational lifespan (6,640 acre-feet in 10 years), with additional reductions when the mining operations are completed and only landscape irrigation is required to establish the native vegetation over a period of one to two more years. Once the vegetation is established, no groundwater extraction will occur, though the groundwater dependent native vegetation has been calculated to draw upon an estimated 337 afy from the

underlying groundwater by ET. The net reduction in groundwater use is calculated to be about 467 afy less than existing use for the golf course at the conclusion of the project, resulting in 58 percent more groundwater left in storage compared with the prior golf course water demand.

Review of the Project sub-area with CWA agency coverage, as shown on Figure 5, the majority of the area is served by the Otay Water District with limited areas being served by the Padre Dam and Helix Water Districts. Therefore, there are no areas within the drainage area that would be reliant solely on groundwater at full build out under the County's General Plan.

### **3.1.4 Mitigation Measures and Design Considerations**

Based on the information obtained on the Project water demand, which is substantially less than the current permitted groundwater use, the current Project will not impact the amount of groundwater in storage, and will in fact, improve the groundwater in storage. Additionally, there are no areas within the Project sub-area that are outside of a CWA service area, and would be reliant on groundwater as the sole source of water. Therefore, no mitigation measures are required.

### **3.1.5 Conclusions**

Under the anticipated Project water demand requirements, and based on the above analysis of groundwater in storage, the proposed Project would have a less than significant impact to groundwater storage, as defined by the County guidelines.

## **3.2 Well Testing**

### **3.2.1 Guidelines for the Determination of Significance**

#### **3.2.1.1 *Well Interference in Alluvial or Sedimentary Basins***

County Guidelines have been developed to address significant impacts associated with potential well interference in alluvial or sedimentary basins stating:

As an initial screening tool, offsite well interference will be considered a significant impact, if after a five-year projection of drawdown, the results indicate a decrease in water level of 5 feet or more in the offsite wells. If site specific data indicates alluvium or sedimentary rocks exist which substantiate a saturated thickness greater than 100 feet in offsite wells, a decrease in saturated thickness of 5% or more in the offsite wells would be considered a significant impact.

To evaluate impacts from pumping for the project, the County requested a five-year projection of drawdown at the nearest offsite wells and groundwater dependent habitat, and a demonstration that the wells have the capacity to be able to produce the groundwater required for the project.

The offsite wells are situated in two clusters within large-lot, residential parcels on the southern side of the Project site. Lakes wells #15a and #15b are about 1,875 and 1,100 feet, respectively, from the nearest offsite well in the westernmost cluster of wells, though these wells are located in Phase 1, subphase 1b and will be abandoned early in the Project to make way for mining in that area. The nearest offsite well to the Lakes #11 well, which will remain throughout the Project and continue to be a groundwater monitoring point for the SWA, is located approximately 1600 feet away. Ivanhoe well #8 is about 1,375 feet from the nearest offsite well in the second more easterly offsite well cluster (Figure 5). The remaining site wells are further away.

The Project has been developed to proceed over a period of 10 years within three continuous mining phases, with three to four sub-phases within each major phase that are each less than 30 acres. Operations would begin west of the Steele Canyon Road bridge, and then generally proceed in a southwest-to-northeast direction across the project site, with approximately 20 to 30 acres subject to mining at any one time. Reclamation would begin as soon as possible following completion of each mining phase and will include irrigation of the native vegetation for an additional two years following completion of the mining operations.

The estimated water use by the Project is 64 afy of process water and incorporates an additional 20.3 afy of ET loss for a total of 84.3 afy, each year during the 10-year mining operation. An estimated 55.6 afy would be applied for irrigation of the plants within the reclamation areas for a total of 139.9 afy (EnviroMine, 2020).

Although the Project may use any or all of its eight wells on site for its water supply, for the well interference analysis, assumptions were made to evaluate drawdown to the nearest offsite well. Based on the location of the processing area, near the middle of the property, north of the Steele Canyon bridge, the process water may be provided by the Ivanhoe #8 and/or Ivanhoe #1 wells for the majority of the Project operations, before the operations move into that area of the site. GLA assumed that the entire annual volume of process water (84.3 afy) would be obtained from the Ivanhoe #8 well, a well that is closer to some of the offsite wells, and assumed that it would be pumping continuously at that rate for five years. Reclamation will begin on the southern end of the property, in the Phase 1 area, which is closer to offsite wells. Groundwater

for irrigation may be provided by the Lakes #11 well, supplemented by Lakes #15a and/or #15b in the first year before they are abandoned in the second year, or groundwater could be pumped from one or more of the Ivanhoe wells to the north of the Phase 1 area. GLA reviewed the mining subareas and identified Phases 1b (26.5 acres) and 1c (30.4 acres) as being the two largest areas to be reclaimed, and also located in close proximity to offsite well users. Although each area will be irrigated sequentially for two years, with only one year of overlap, it was assumed that all 56.9 acres within these two subphases would be irrigated for two full years using the Lakes #11 well alone. Using irrigation water consumption factors for this acreage, an upper estimated 62.5 afy of groundwater was calculated and assumed to be pumped continuously for two years.

Well interference analyses were performed using the computer software modeling program, MODFLOW to assess the drawdown associated with groundwater extraction from the Project site wells on the nearest offsite wells. A discussion of the methods is presented in Section 3.2.2.

On the basis of the substantially higher historical groundwater use on the Cottonwood Golf Course (804 afy), it can be demonstrated that the wells on the Project site have the capacity to provide the necessary groundwater to support the project. This is supported by the fact that the quantities of groundwater that are proposed for the Project represent less than 20 percent of the permitted quantity of groundwater that has been used historically at the Cottonwood Golf Course.

### ***3.2.1.2 Groundwater-Dependent Habitat Guidelines for the Determination of Significance***

The County Guidelines list the following conditions that could result in a significant impact for groundwater-dependent habitat:

“The project would draw down the groundwater table to the detriment of groundwater-dependent habitat, typically a drop of 3 feet or more from historical low groundwater levels.”

As stated above, the groundwater drawdown significance threshold as written in the County’s Biological Resources Guidelines for Determining Significance for groundwater-dependent habitat is three feet below historical low groundwater levels (HLGL). The three-foot protective threshold is based on publications that address riparian vegetation and groundwater supply: the Committee on Riparian Zone Functioning and Strategies for Management (CRZFSM) 2002 publication *Riparian Areas: Functions and Strategies for Management* and the 2001 *Integrated*

Urban Forestry report "Adaptability of Native Plant Species to Groundwater Fluctuations for Sycamore Ranch". Riparian areas, as defined by the CRZFSM, are "transitional between terrestrial and aquatic systems" and are "adjacent to perennial, intermittent, and ephemeral streams..." (CRZFSM 2002).

Native southern cottonwood willow riparian forest and southern willow scrub habitats dominate the riparian zone in the southwestern corner of the site. Typical species occurring within southern cottonwood willow riparian forest on-site include tall, mature western cottonwood (*Populus fremontii*), western sycamore (*Platanus racemosa*), arroyo willow (*Salix lasiolepis*), and black willow (*Salix gooddingii*). The most abundant plants in the southern willow scrub habitat consist of shrubby to tall willows, including arroyo willow, black willow, and sandbar willow (*Salix exigua*). Given that surface flows are controlled by the upstream dam, the existing habitat is heavily dependent upon groundwater. Despite only periodic surface flows, the highly sandy soils allow for deep root growth, and vegetation in both riparian habitats is healthy.

The HLGL in the vicinity of the riparian forest area is not known over the period corresponding to the life of the vegetation. However, between 2007 and 2019, the SWA has performed water level monitoring at the Lakes #11 well, which is closest to this habitat. The water level data in this well exhibit fluctuations on the order of 20 feet during some years, potentially associated with seasonal rainfall and releases by the SWA from Loveland Reservoir into the Sweetwater River, which recharges the underlying alluvial aquifer. The data indicate that the lowest water level was measured in January 2013 at 25.6 feet below top of casing, or an elevation of 306.4 feet msl.

### 3.2.2 Methodology

Because there are no known long-term constant rate well tests on the Project site, the County provided the hydrogeologic investigation report prepared by Earth Tech (2004) for the adjacent Steele Canyon Golf Course and Homeowners Association, where a long-term (seven day) well test was performed, providing aquifer parameters that could be used in lieu of a new well test for this Project.

The well test closest to the Project site involved pumping from two wells (PW-9 and PW-10; Figure 10) at a combined rate of 140 gpm, with two observation wells (PW-2 and PW-6) located at distances from 312 feet and 104 feet, respectively from the nearest pumping well. Information is available on the two test wells and is provided in Table 3-2.

**Table 3-2**  
**Steele Canyon Well Test Completion Details**

Well Name	Completion Depth (ft)	Depth to Water (ft)	Discharge Rate (gpm)	Alluvium (ft bgs)	Residuum (ft bgs)	Fractured Granite
PW-9	118	22.9	75	0-10	10-118	NA
PW-10	101	22.8	65	0-16	16-100	100-101

The two test wells are primarily screened across the residuum, which is generally less productive aquifer material than the alluvium screened by the wells on the Project site. The Earth Tech (2004) aquifer test analyses of the nearby PW-9 and PW-10 wells indicated estimates of transmissivity (T) in the range of 150 to 3,820 ft<sup>2</sup>/day (or average hydraulic conductivity [K] in the range of 2 to 38 ft/day), assuming 100 ft of saturated aquifer thickness at each well. Estimates of storage coefficient (S) were in the range of 0.01 to 0.02 (characteristic of residuum). Other aquifer tests performed as part of the Steele Canyon report had estimates of S as high as 0.25 (characteristic of alluvium). The corresponding estimates of sustained groundwater production capacity for these wells were in the range of 35 to 70 gpm. Production (i.e., gpm) rates of the proposed wells for this Project have not been documented, but a four-hour air-lift capacity test of an 85-foot deep, on-site well indicated an estimated production rate of 300 gpm. This well is identified as “Premier Golf” on the well log and thought to be the same well as Ivanhoe #1 (Figure 9). Given the (order of magnitude) higher estimated capacity of the Ivanhoe #1 well, it is expected that the alluvial aquifer material that other site wells are screened within also yields higher production capacities (e.g., has higher values of K and/or S) than the residuum aquifer material screened by the PW-9 and PW-10 wells.

### 3.2.2.1 Well Test Description

As presented above, for the well interference analysis, although there are eight wells on the Project site, for the analysis it was assumed that all of the groundwater would be pumped from the Lakes #11 (irrigation water) and Ivanhoe #8 (mine processing) wells. These wells were selected because they were closest to off-site wells and/or groundwater dependent habitat. For the purpose of evaluating expected groundwater level responses (i.e., drawdown) due to the pumping of the Ivanhoe #8 and Lakes #11 wells, GLA constructed a MODFLOW-2005 (Harbaugh, 2005) numerical groundwater flow model to estimate alluvial aquifer conditions beneath and in the vicinity of the site during Project implementation. Due to the limited information available at the Project site, the model was not formally calibrated and was setup as

a drawdown model, which assumes an initially flat water table that simulates the changes in groundwater flow conditions (i.e., drawdown) as a result of pumping.

The 100-foot thick single-layer model was constructed with active cells representing the alluvial aquifer material, discretized horizontally with 100 foot by 100-foot gridded cells. The model simulates groundwater levels within the alluvial aquifer assuming constant T and S values for the active cells, which are bounded by a no-flow boundary along the contact between alluvial material and adjacent low-permeability granitic rocks and a General Head Boundary (GHB) at the western downstream edge of the model, far enough from the pumping well locations such that water level changes at this boundary are small.

The model was simulated with the upper values calculated from the Steele Canyon Golf Club aquifer testing since they were performed in lower permeability residuum and fractured bedrock and likely not representative of higher permeability sandy alluvium present beneath the project site. A K of 40 ft/day (T of 4,000 ft<sup>2</sup>/day) and an S of 0.25 was selected to represent the alluvial aquifer. The 40 ft/day K value is the geometric mean of the range of K values for clean sand (Freeze and Cherry [1979]) and is similar to the upper range of K estimated during aquifer testing of nearby PW-10. The S of 0.25 is the upper range estimated from aquifer testing of nearby well PW-4 in Mexican Canyon and an average value of unconsolidated sand materials as suggested by Johnson (1967).

### **3.2.2.2 Well Test Analysis**

The time series of simulated drawdown at pumping well Lakes #11 and Ivanhoe #8 during the base case scenario (base case scenario is described in Section 3.2.1.1 and assumes Lakes #11 is pumped at 62.5 afy for two years and then ceases and then Ivanhoe #8 is pumped at 84.3 afy for five years) are shown on Figure 10; the highest volume of water required for the project. For the analysis, although groundwater may be extracted from any of the eight on-site wells, to evaluate the "most conservative," maximum drawdown, only the Lakes #11 was assumed to pump at a continuous rate of 62.5 afy over a two-year period to irrigate the two largest phase areas (Phases 1b and 1c), even though there would actually only be a one-year overlap, meaning that the actual water demand would be lower than modeled. To support mining operations, the Ivanhoe #8 was assumed to pump continuously at a rate of 84.3 afy for five years, even though other wells could be used. Only these two wells were included in the model based on their proximity to off-site wells and/or groundwater dependent habitat to assess maximum impacts (drawdown) to these off-site sources. Under this scenario, after two years of pumping at Lakes #11 and Ivanhoe #8, an estimated drawdown of 2.4 ft is calculated at Lakes #11 and a

drawdown of 3.7 ft is estimated at Ivanhoe #8. After five years of pumping from Ivanhoe #8, a drawdown of 5.4 ft is expected to occur at this well, while drawdown is expected to have decreased at Lakes #11 (due to the cessation of pumping at Lakes #11 as the mining operations move northward) to about 1.2 ft. Simulated drawdowns throughout the Project area after two years and five years of pumping are shown on Figures 11a and 11b, respectively. As shown on these figures, the cone of depression surrounding each of these wells is very small around the pumping wells and the drawdown is reduced greatly within a very short distance away from the pumping wells. For example, the estimated drawdown of 5.4 ft at Ivanhoe #8 after five years, only occurs in the immediate vicinity of the well and is less than five feet a short distance away. Similarly, the maximum drawdown of 2.4 feet at Lakes #11 after two years is reduced rapidly away from this well.

Based on these results, the amount of drawdown expected to occur beneath the riparian preservation and rehabilitation areas is projected to be less than the 2.4 feet in Lakes #11 and therefore is less the County drawdown threshold of three feet below HLGL (Figure 11b). As the groundwater flow model simulates the alluvial formation only, with a no-flow boundary assumed along the interface between alluvium and crystalline bedrock, it is implicitly assumed that a large contrast in the hydraulic conductivity exists at that interface. This large contrast in hydraulic conductivity between the two formations limits the drawdown propagation in the model from the alluvium into the granitic bedrock. Extrapolation of the drawdown contours to outside the simulated model domain, the maximum amount of drawdown expected to occur at the nearest off-site water well from Lakes #11 (labeled LWELL-7055 located about 1,600 ft east northeast of Lakes #11 [Figures 11a and 11b]) is projected to be two feet, if it were assumed that this well was completed in alluvium. However, based on the geologic map and well log (Appendix B), this offsite well was completed within granitic bedrock, and a large contrast of hydraulic conductivity is expected between alluvium and bedrock (i.e., smaller hydraulic conductivity of granitic material compared with alluvium). The simulated grid was extended beyond the alluvial footprint to include a portion of the bedrock where this nearest well is located and a lower K value of 0.1 ft/day and S of 0.01 were assigned to the bedrock. Under this simulation, as shown in Figure 11c, the bedrock area practically becomes a no-flow area to the alluvium and the drawdown is projected to be about 1 foot. The larger the contrast between hydraulic conductivity in both formations, the less propagation of drawdown effects into the granitic bedrock.

At the nearest off-site well from Ivanhoe #8 (labeled LWELL-6061 located about 1,375 ft to the south-southwest; Figures 11a and 11b) the drawdown is less than four feet (Figure 11b). As

shown on Figure 11b, drawdown after five years of pumping is less than the County's drawdown threshold of five feet for all off-site wells. The magnitude of drawdowns simulated by the model likely overestimate future conditions, due to:

- no simulation of, natural recharge (i.e., precipitation) or return flows (i.e., recharge from irrigation),
- simulation of no-flow boundary along the sides and bottom of the active model cells (i.e., contact between alluvial and bedrock/residuum aquifers), and
- pumping focused at two wells instead of potential distributed among up to eight on-site wells.

### **3.2.3 Significance of Impacts Prior to Mitigation**

#### ***3.2.3.1 Well Test and Well Interference Analysis Significance of Impacts Prior to Mitigation***

Based on the results of the well interference analysis, under the above conditions, it was calculated that the maximum drawdown at the nearest offsite well located 1,600 feet from Lakes #11 pumping at a rate of 62.5 afy (39 gpm) to irrigate reclaimed Phase 1b and 1c areas is 2 feet after two years of groundwater extraction. The drawdown from pumping of the Ivanhoe #8 at a rate of 84.3 afy (52 gpm) after two years at the nearest off-site well (1,375 feet away) is less than 3 feet (Figure 11a). Additional pumping from the Ivanhoe #8 well for five years is calculated to be less than 4 feet at the nearest offsite well, 1,375 feet away (Figure 11b).

Therefore, the five-foot threshold value established by the County for off-site well interference is not predicted to be exceeded over a 5-year period with the proposed project pumping rates or under this more conservative two well pumping scenario. It is concluded that well interference from groundwater production will not exceed the County threshold of a significant decrease in water levels (e.g., 5 feet or more) in off-site wells after a five-year projection of drawdown. This is considered a less-than-significant impact based on the County of San Diego well interference threshold.

#### ***3.2.3.2 Groundwater-Dependent Vegetation Significance of Impacts Prior to Mitigation***

Based on the results of the well interference analysis, under the above conditions, it was calculated that the maximum drawdown at the nearest groundwater dependent habitat located

adjacent to Lakes well #11 (the well closest to the groundwater dependent habitat), pumping at a rate of 62.5 afy (39 gpm) to irrigate reclaimed Phase 1b and 1c areas is less than 2.4 feet after two years of groundwater extraction. This would not induce drawdown to levels of 3 feet below historical low water levels and therefore would be considered a less than significant impact based on the County of San Diego groundwater dependent habitat threshold.

### **3.2.4 Mitigation Measures and Design Considerations**

Based on the well interference analysis, and information obtained on the Project water demand, which assumed maximum pumping to support the mining operations and irrigation of the largest reclamation area, the Project is not predicted to exceed the County threshold of significance criterion of five feet of drawdown at the nearest offsite well user. It may be supported by the substantially reduced quantity of water required in comparison with the current permitted groundwater use.

Although the HLGL is not known in the vicinity of the groundwater dependent habitat, the Lakes #11 well, in close proximity to the groundwater dependent habitat, has exhibited fluctuating groundwater levels of around 20 feet; rising to near ground surface. The lowest water level measured in 2013 of 306.4 feet above mean sea level (about 23 feet below ground surface) measured during a regional drought may be used as the surrogate HLGL. Understanding that the Project will pump considerably less groundwater than is currently being pumped, a three-foot decline in the static water level, three feet below the HLGL is not likely to be exceeded. Under normal or wet hydrologic conditions, the simulated drawdown will not approach the surrogate HLGL, and therefore the County's significance threshold of three-feet of drawdown would not be exceeded in either case, and the Project will not impact the existing groundwater dependent habitat. No mitigation measures are required. However, during the course of the project, biological monitoring will be performed to assess the health of the plant community in the reclamation areas and including the existing riparian habitat. This monitoring will continue at least two years after the mining operations have been completed and would continue until revegetation standards are met after the final phase.

### **3.2.5 Conclusions**

Using available well test data from two wells on the adjacent Steele Canyon golf course site, screened primarily in the residuum, and extrapolating reasonable aquifer properties of T and S to be more representative of the alluvial material found on the Project site, the well interference analysis concluded that the drawdown at the nearest off-site well and at the groundwater dependent habitat will not exceed a County drawdown threshold. The impacts to the project

from pumping will be less than significant and no mitigation measures are required. Biological monitoring of the reclamation areas and existing groundwater dependent habitat will be conducted, including a limited time after pumping has ceased, and until vegetation standards established by the reclamation plan are met.

## 4. Water Quality

The project will not use groundwater as a potable source, but will obtain limited potable water for operational staff from imported water from the Otay Water District. Because Project groundwater is not required to be potable, discussion of water quality and an impact analysis has not been conducted and is therefore omitted from this report. However, soil samples from three borings, three groundwater and three surface water samples were collected at the north, middle and south ends of the Project site as a separate study for the project. The results of these sampling events are summarized in separate Water Quality Evaluation Report (GLA, 2021). The report concluded that water quality at the Project site generally meets WQOs and Federal and State MCLs, with the exception of exceedances of some secondary MCLs (established for aesthetics) for specific conductance, TDS, iron, and manganese and one exceedance of pH in surface water. Surface water pH was just below the federal MCL of 6.5 at the midstream surface water sample location. Based on these results, generally the water quality related to dissolved content (as monitored by specific conductance and TDS concentrations) and iron and manganese is relatively poor, most likely associated with naturally occurring metals from the surrounding bedrock, while all other constituents appear to meet drinking water standards.

## 5. Summary of Project Impacts and Mitigations

As presented in Section 2.4, the proposed Project will result in a substantial reduction in the historical groundwater that has been used to support the Cottonwood Golf Course. The mining project estimates that on average it will use 139.9 afy for its mining operations and for irrigation to establish the plant community in the reclaimed areas. A peak pumping rate of 146.9 afy may occur, when the largest reclamation area is being irrigated. In comparison, the golf course estimates that it has been recently using 804 afy. Once the project is complete after 10 years of mining and up to an additional two years of plant irrigation, no further groundwater extraction is proposed. However, following completion of the mining project, groundwater loss from ET associated with the established and planted native groundwater dependent vegetation, is

calculated to be about 337 afy; still 58 percent less than the prior permitted groundwater used for irrigation of the Cottonwood golf course.

The following presents a summary of the potential groundwater impacts evaluated associated with the Cottonwood Sand Mine Project. Included is a discussion of the analysis of the groundwater in storage, well interference and potential impacts to offsite well users and groundwater dependent habitat.

## **5.1 50% Reduction in Groundwater Storage Impacts Summary**

As presented in Section 3.1, based on a reduction in annual groundwater extraction of over 80 percent while the Project is in operation, and of about 58 percent associated with the ongoing native groundwater dependent plant groundwater use following completion of the project the Project will not exceed the 50 percent reduction in groundwater storage threshold, but will likely increase groundwater in storage, and therefore, groundwater impacts to storage will be less than significant.

## **5.2 Well Interference Impacts Summary**

As presented in section 3.1, although local water users receive water supply from the Otay Water District, some also were identified as also having a well on their property. The nearest off-site well users are located within about 1,375 feet from the Ivanhoe #8 well, and within about 1,600 feet from the Lakes #11 well. Although the Project may use up to eight on site wells, as presented in Section 3.2.2, the well interference analysis conservatively assumed that only the Lakes #11 and Ivanhoe #8 wells, closest to off-site well users would be pumped, during the period of peak water demand. Based on this analysis, the drawdown at the nearest off-site well to the Lakes #11 well (1,600 feet away) would be about 1 foot after two years of continuous pumping using a model simulation incorporating crystalline bedrock in the vicinity of that location. The drawdown would be less than three feet to the nearest offsite well to the Ivanhoe #8 well (1,375 feet away) over this same time. After five years, with Ivanhoe #8 continuing to pump in support of the mining operations, the drawdown to the nearest offsite well (1,375 feet away) would be less than four feet.

Because the predicted drawdown values are less than the County's well interference drawdown threshold of five feet for offsite wells, the Project's groundwater demand would be considered to be a less than significant impact to offsite well users.

### 5.3 Groundwater-Dependent Habitat Impacts Summary

As presented in Section 3.2.1.2, there is an area of potentially groundwater dependent habitat on the southwest side of the property. Although the HLGL is not known over the life of this vegetation, water level data has been collected by the SWA in the Lakes #11 well, adjacent to a portion of this vegetation. Over the course of the monitoring period, water levels have fluctuated seasonally by about 20 feet, rising to nearly ground surface on several occasions and a lowest water levels measured during the start of a drought in 2012. Although a HLGL cannot be determined precisely, the low measured in 2013 may be a reasonable surrogate HLGL. It should be noted that with the significantly lower pumping rates associated with the project, this HLGL may not be reached.

Well interference modeling was performed to assess the drawdown from Project pumping at the highest estimated rate associated with irrigation of the largest reclamation area. Based on the results of the well interference analysis, it was calculated that the maximum drawdown at the nearest groundwater dependent habitat located adjacent to the Lakes well #11, is less than 2.4 feet after two years of groundwater extraction. Therefore, the County's significance threshold of three-feet of drawdown below historical low groundwater levels would not be exceeded, and the Project will not impact the existing groundwater dependent habitat.

Because the predicted drawdown is less than the County's well interference drawdown threshold of three feet below HLGL for groundwater dependent habitat, the Project's groundwater demand would be considered to be a less than significant impact to this habitat.

### 5.4 Mitigation Measures Summary

The results of this analyses described above indicate that there are no significant groundwater quantity impacts associated with the proposed Project. As a result, no mitigation measures are required. However, the Project includes monitoring of the vegetation within the reclaimed areas of the site and would also include monitoring of the existing groundwater dependent habitat on the south side of the Project area. The vegetation monitoring, would continue until vegetation standards established in the reclamation plan have been met.

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## 7. List of Preparers

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Principal Hydrogeologist, Geo-Logic Associates



**Explanation**

- Site location

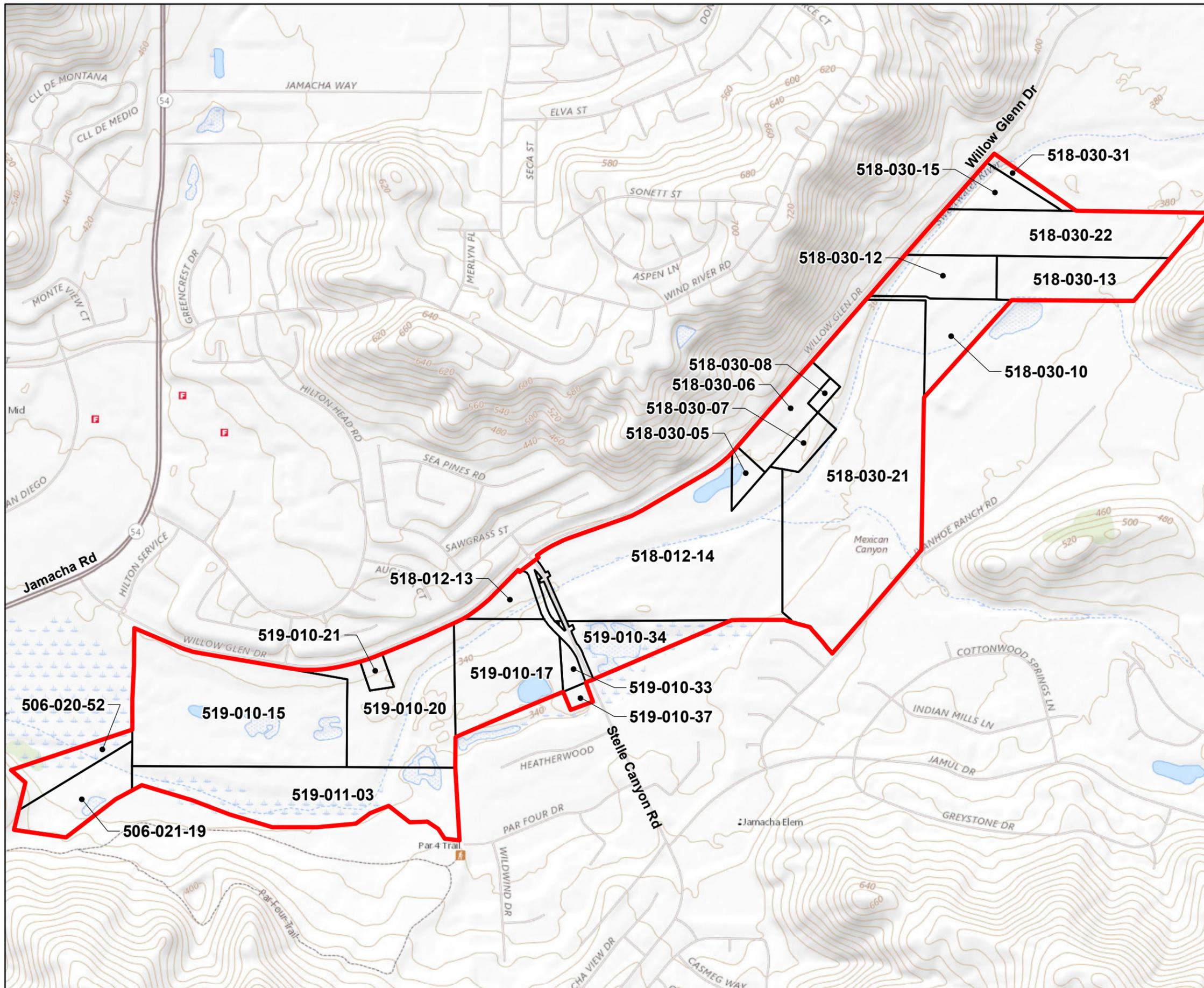
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community



**Geo-Logic**  
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**Figure 1**  
**Site Location Map**

**Cottonwood Sand Mine**

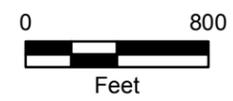


**Explanation**

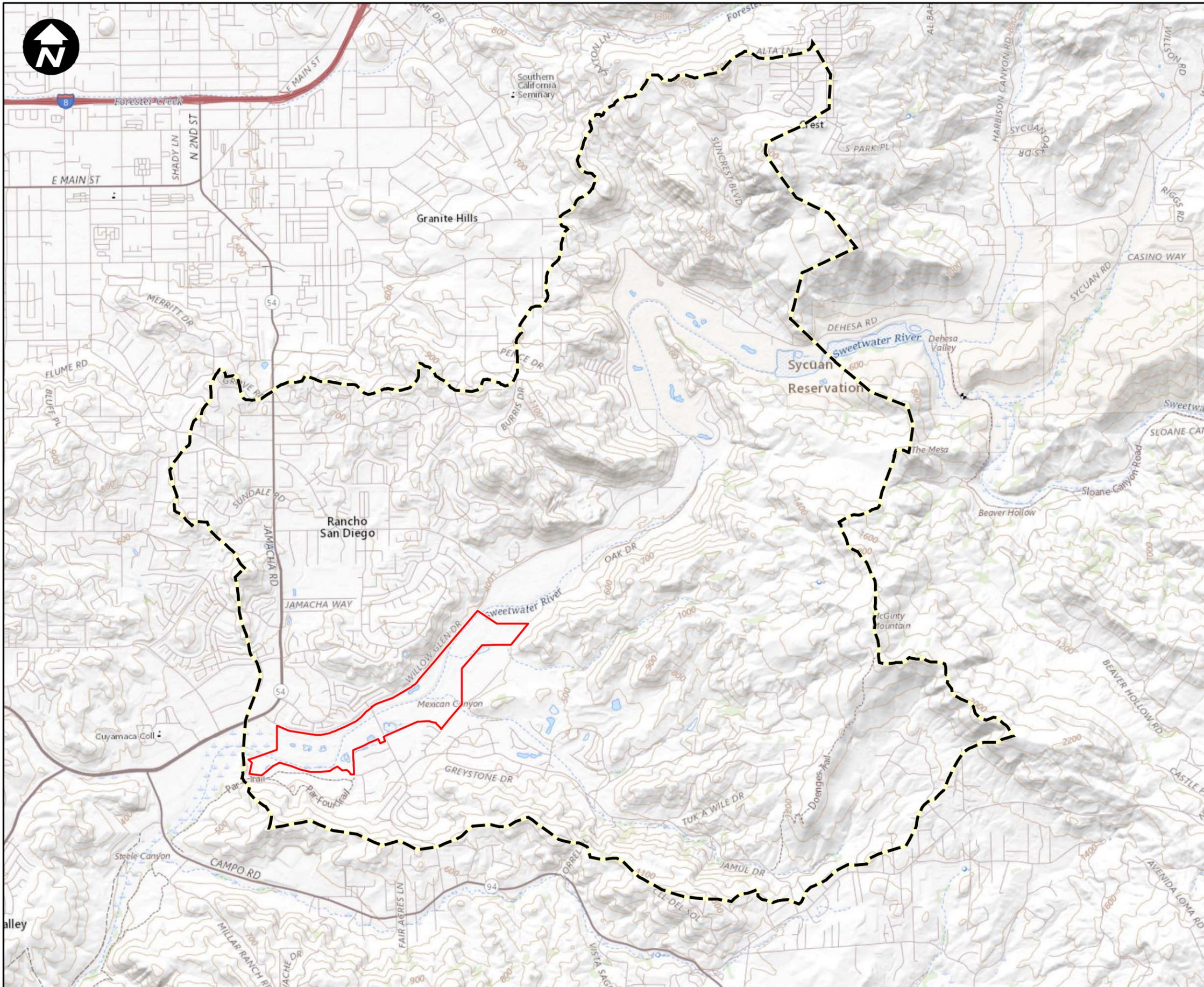
- Cottonwood Project
- Parcel

APN#: XXX-XXX-XX

Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation



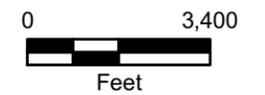
  
**Figure 2**  
**Project Site**  
**Assessor Parcel Numbers (APNs)**  
**Map**  
**Cottonwood Sand Mine**



**Explanation**

- Cottonwood Project
- Project sub-watershed

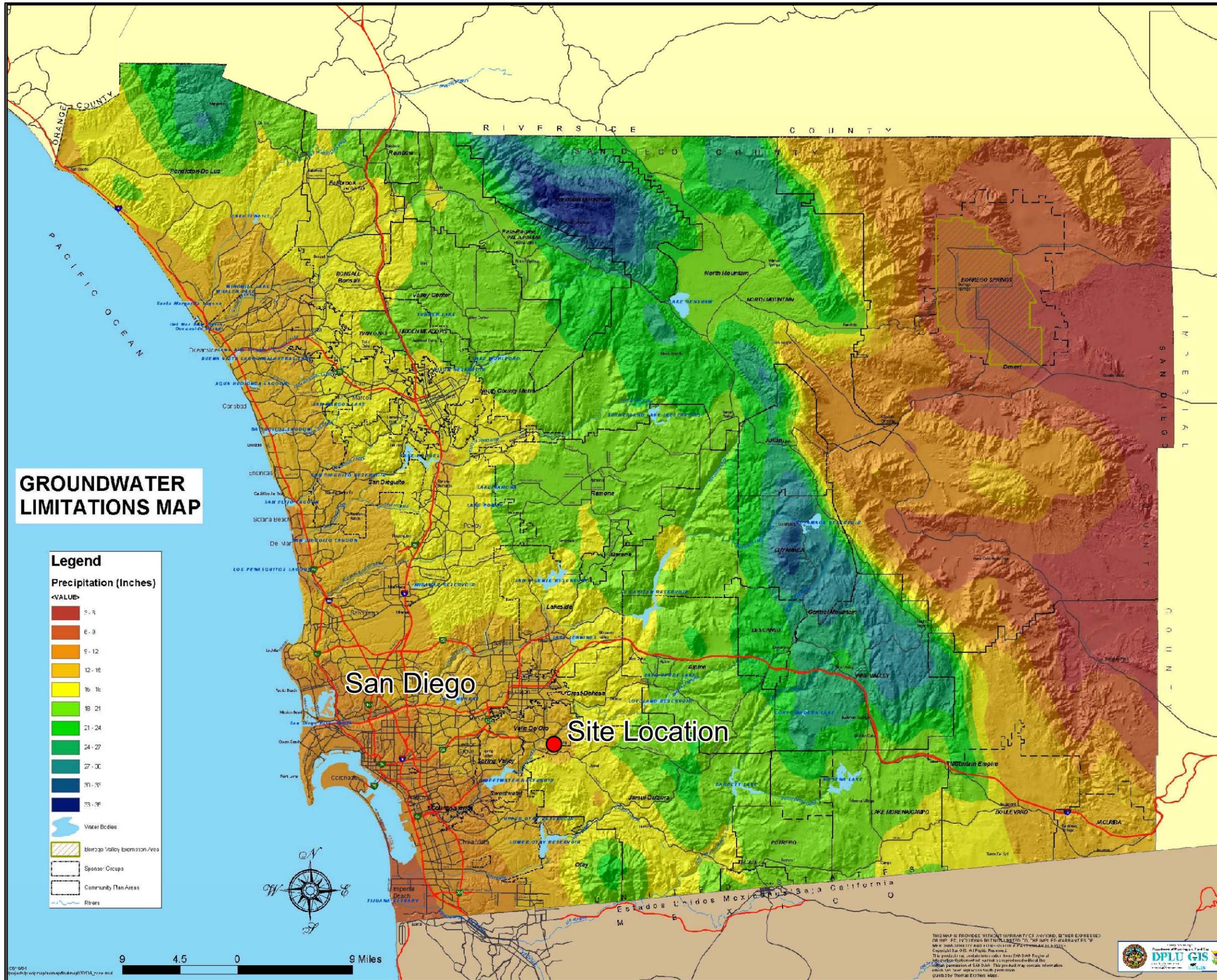
Service Layer Credits: USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.



**Geo-Logic**  
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**Figure 3**  
**Topographic Map**

**Cottonwood Sand Mine**



**Explanation**

● Site location

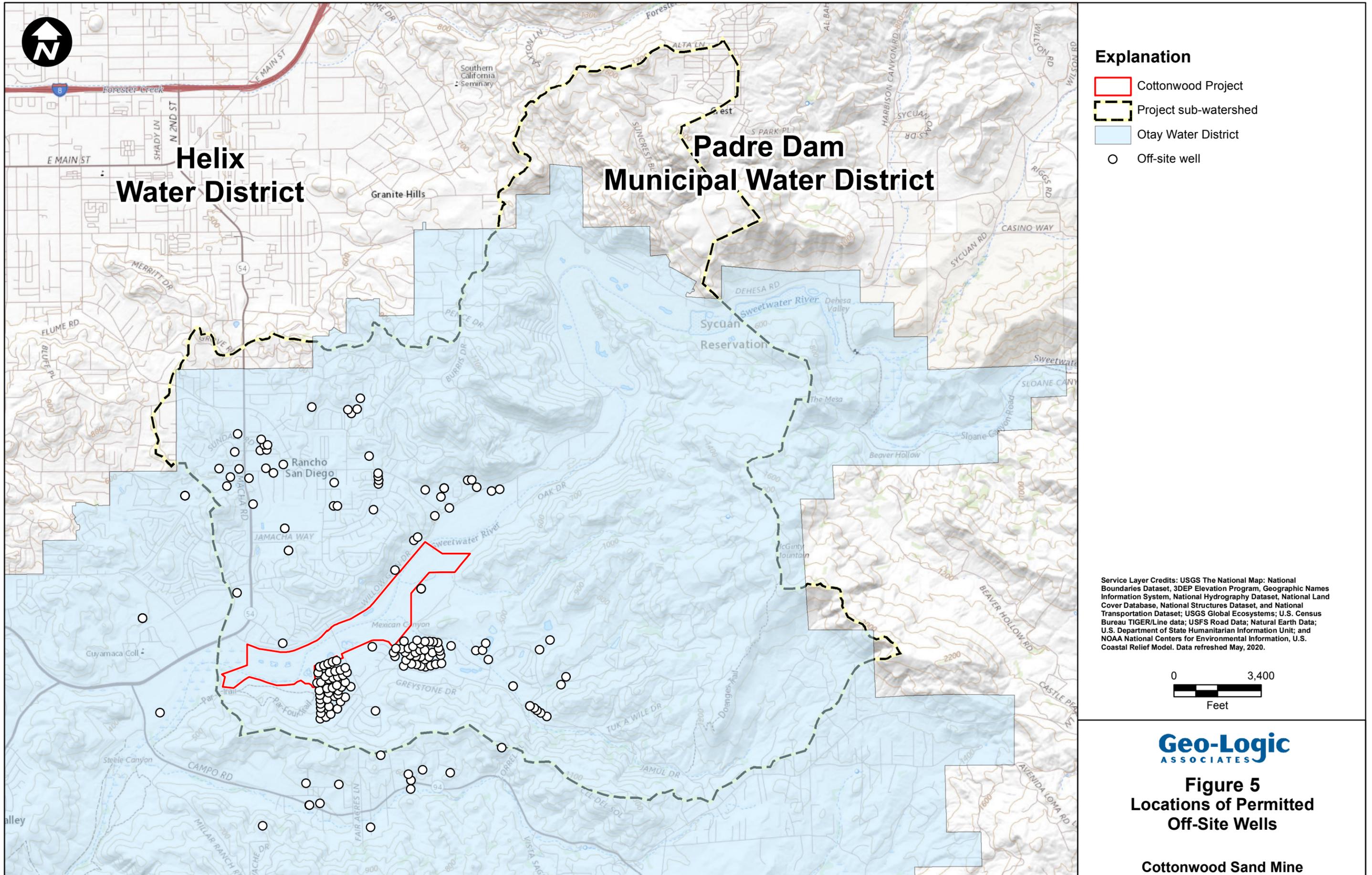
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 Department of Planning and Landuse

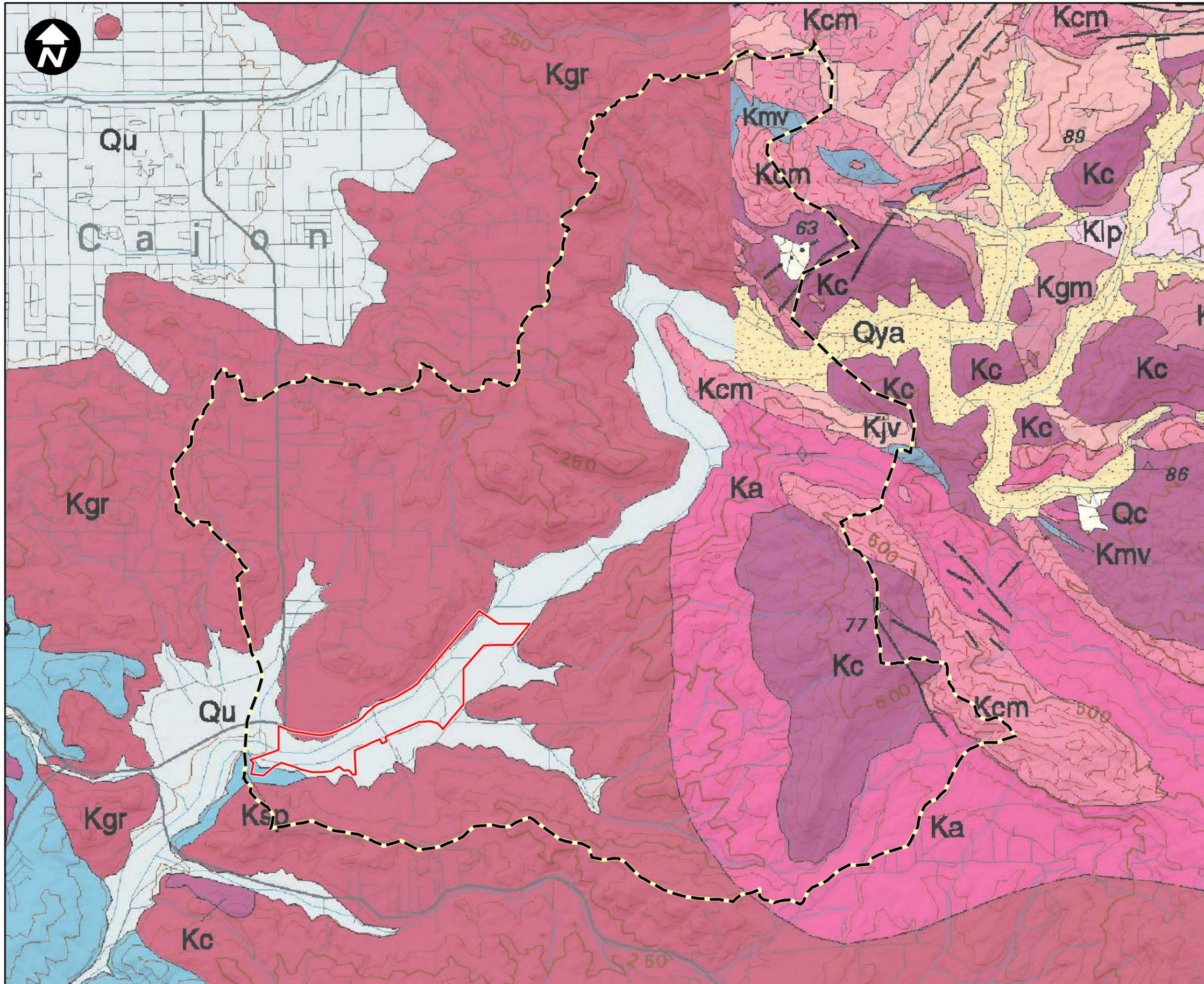
**Geo-Logic**  
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**Figure 4**  
**Groundwater Limitations**

**Cottonwood Sand Mine**







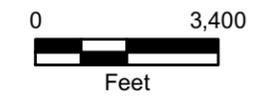
**Explanation**

- Cottonwood Project
- Project sub-watershed

- Qya** Young alluvium (Holocene)—Sand, silt, and gravel in modern streambeds and washes. Includes recent material accumulated on active alluvial fans.
- Qu** Alluvium and colluvium, undivided (Holocene and Pleistocene)—Younger and older alluvium and colluvium not mapped separately
- Kc** Cuyamaca Gabbro (Early Cretaceous)—Troctolite, anorthositic gabbro, gabbro, hornblende gabbro; minor hornblende diorite and leucodiorite. Inner parts of bodies are hornblende-bearing troctolite; anorthositic gabbro ±amphibole ±orthopyroxene ±olivine; and amphibole-olivine gabbro. Margins and smaller bodies are mainly fine- to medium-grained hornblende gabbro ±orthopyroxene ±clinopyroxene ±biotite. Moderately to strongly foliated
- Kcm** Corte Madera Monzogranite (Early Cretaceous)—Biotite leucomonzogranite, leucogranodiorite, and syenogranite; trace hornblende. Medium to coarse grained; weakly to strongly foliated, locally protomylonitic. Forms lensoid plutons and fringing dikes. Color index varies from 1 to 11
- Kjv** Japatul Valley Tonalite (Early Cretaceous)—Biotite-hornblende tonalite containing relict pyroxene; hornblende-biotite tonalite; and lesser hornblende-biotite granodiorite. Average color index about 22. Medium to coarse grained; equigranular but much is moderately to strongly foliated. Grades into tonalite of Alpine (Ka) and Chiquito Peak Monzogranite (Kcp)
- Ka** Tonalite of Alpine (Early Cretaceous)—Biotite-hornblende tonalite, lesser quartz diorite, and scarce granodioritic tonalite. Medium to coarse grained; moderately to strongly foliated; mafic inclusions. Average color index 30. Unit is heterogeneous in outcrop and hand specimen
- Kgr** Granitoid rocks (Early Cretaceous)—Undivided tonalite and granodiorite; most lithologically similar to tonalite of Alpine (Ka), Japatul Valley Tonalite (Kjv), and Corte Madera Monzogranite (Kcm). Includes lesser gabbro and metavolcanic rocks

Geology from:  
 USGS Open-File Report 2004-1361  
 SCAMP - Southern California  
 Areal Mapping Project

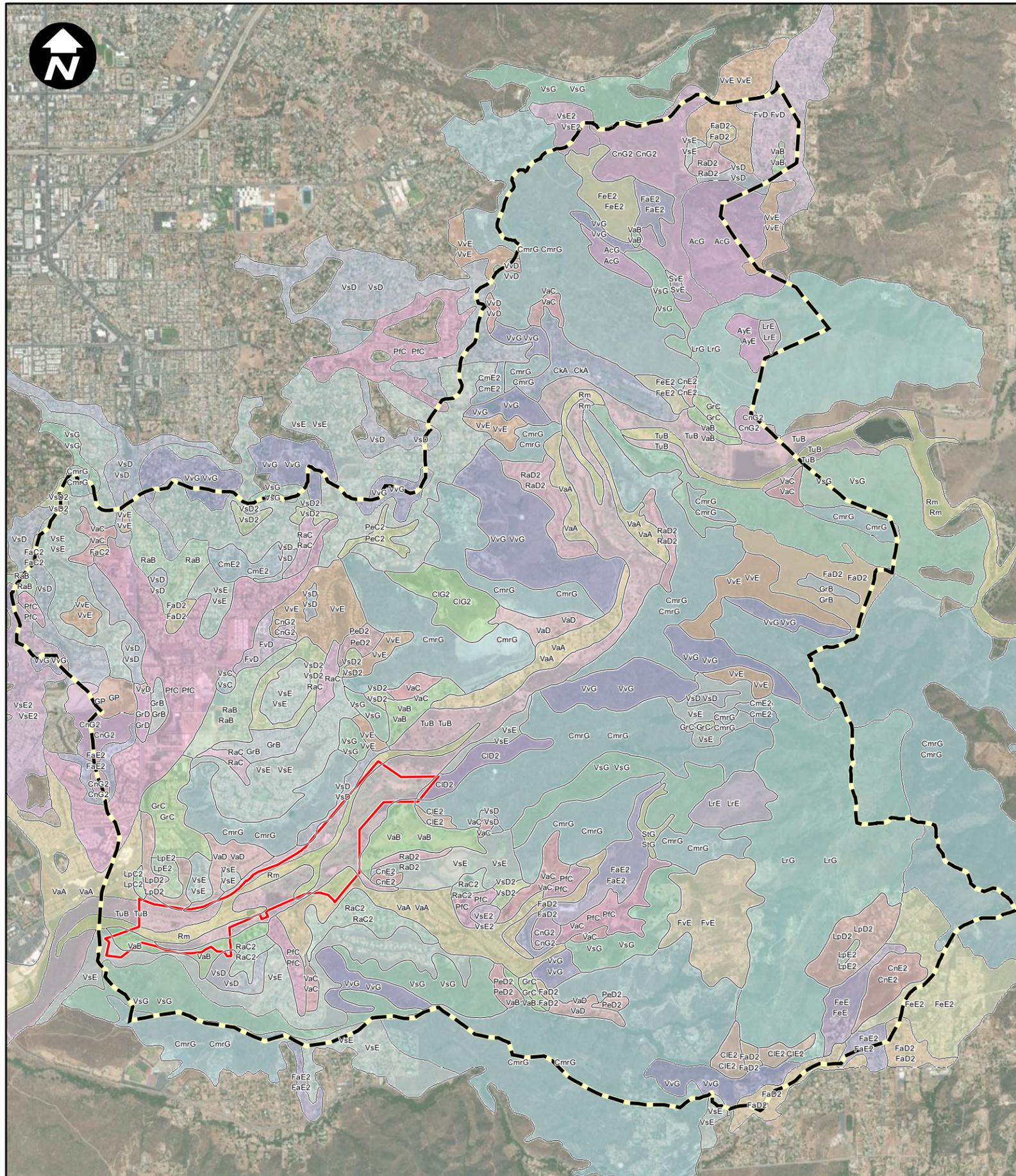
Service Layer Credits: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed January, 2020.



**Geo-Logic**  
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**Figure 6**  
**Geology Map**

**Cottonwood Sand Mine**



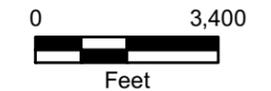
## Explanation

- Cottonwood Project
- Project sub-watershed

### USDA SSURGO Soil Classification

- AcG: Acid igneous rock land
- CkA: Chino silt loam, saline, 0 to 2 percent slopes
- CID2: Cieneba coarse sandy loam, 5 to 15 percent slopes, eroded
- CIE2: Cieneba coarse sandy loam, 15 to 30 percent slopes, eroded
- CIG2: Cieneba coarse sandy loam, 30 to 65 percent slopes, eroded
- CmE2: Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, eroded
- CmrG: Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes
- CnE2: Cieneba-Fallbrook rocky sandy loams, 9 to 30 percent slopes, eroded
- CnG2: Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded
- FaC2: Fallbrook sandy loam, 5 to 9 percent slopes, eroded
- FaD2: Fallbrook sandy loam, 9 to 15 percent slopes, eroded
- FaE2: Fallbrook sandy loam, 15 to 30 percent slopes, eroded
- FeE2: Fallbrook rocky sandy loam, 9 to 30 percent slopes, eroded
- FeE: Fallbrook rocky sandy loam, 9 to 30 percent slopes
- FvD: Fallbrook-Vista sandy loams, 9 to 15 percent slopes
- FvE: Fallbrook-Vista sandy loams, 15 to 30 percent slopes
- GrB: Greenfield sandy loam, 2 to 5 percent slopes
- GrC: Greenfield sandy loam, 5 to 9 percent slopes
- GrD: Greenfield sandy loam, 9 to 15 percent slopes
- LpC2: Las Posas fine sandy loam, 5 to 9 percent slopes, eroded
- LpD2: Las Posas fine sandy loam, 9 to 15 percent slopes, eroded
- LpE2: Las Posas fine sandy loam, 15 to 30 percent slopes, eroded
- LrE: Las Posas stony fine sandy loam, 9 to 30 percent slopes
- PeC2: Placentia sandy loam, 5 to 9 percent slopes, eroded
- PeD2: Placentia sandy loam, 9 to 15 percent slopes, eroded
- PfC: Placentia sandy loam, thick surface, 2 to 9 percent slopes
- RaB: Ramona sandy loam, 2 to 5 percent slopes
- RaC2: Ramona sandy loam, 5 to 9 percent slopes, eroded
- RaC: Ramona sandy loam, 5 to 9 percent slopes
- RaD2: Ramona sandy loam, 9 to 15 percent slopes, eroded
- Rm: Riverwash
- StG: Steep gullied land
- SvE: Stony land
- TuB: Tujunga sand, 0 to 5 percent slopes
- VaA: Visalia sandy loam, 0 to 2 percent slopes
- VaB: Visalia sandy loam, 2 to 5 percent slopes
- VaC: Visalia sandy loam, 5 to 9 percent slopes
- VaD: Visalia sandy loam, 9 to 15 percent slopes
- VsC: Vista coarse sandy loam, 5 to 9 percent slopes
- VsD2: Vista coarse sandy loam, 9 to 15 percent slopes, eroded
- VsD: Vista coarse sandy loam, 9 to 15 percent slopes, MLRA 20
- VsE2: Vista coarse sandy loam, 15 to 30 percent slopes, eroded
- VsE: Vista coarse sandy loam, 15 to 30 percent slopes, MLRA 20
- VsG: Vista coarse sandy loam, 30 to 65 percent slopes, MLRA 20
- VvD: Vista rocky coarse sandy loam, 5 to 15 percent slopes
- VvE: Vista rocky coarse sandy loam, 15 to 30 percent slopes
- VvG: Vista rocky coarse sandy loam, 30 to 65 percent slopes

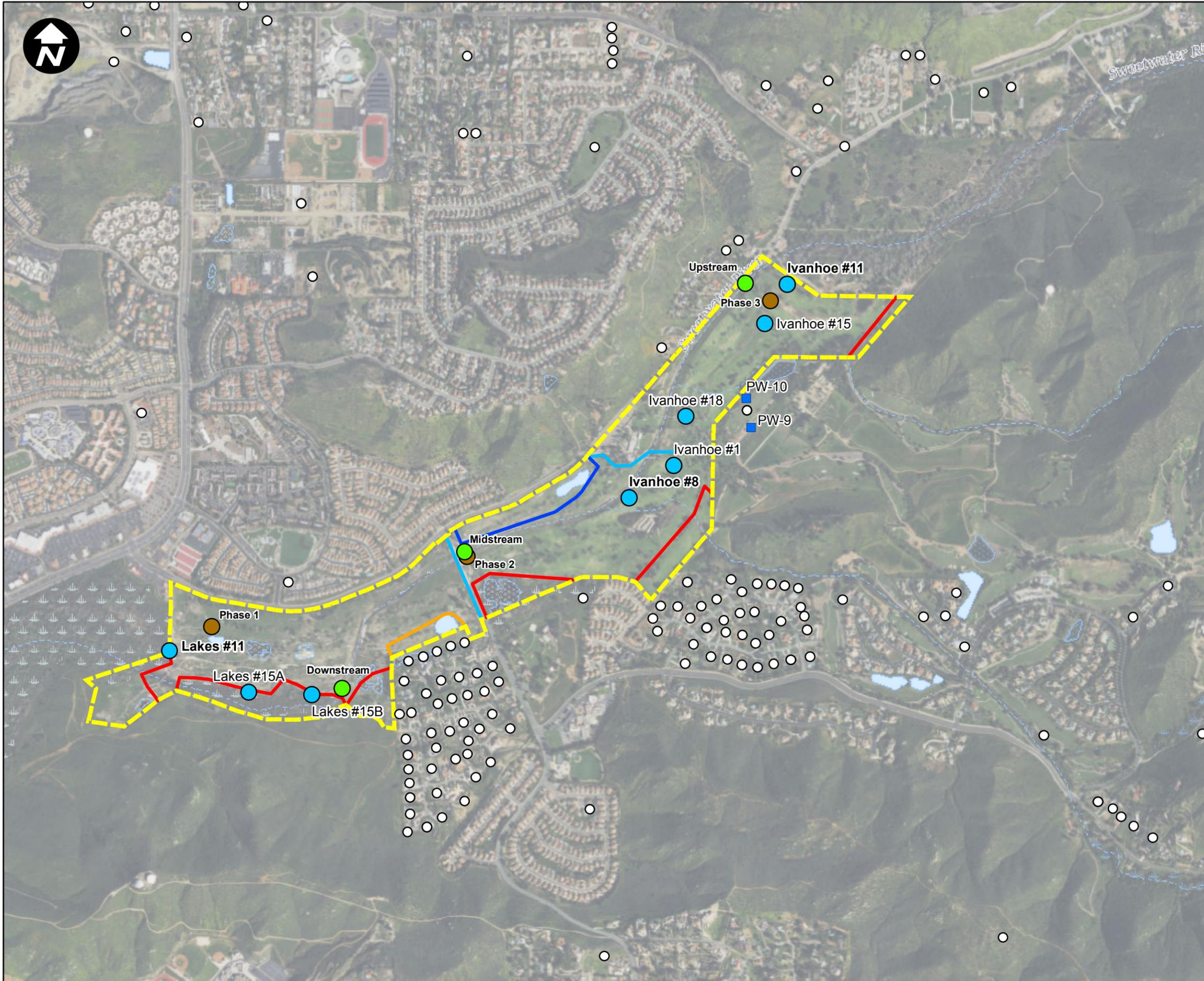
Service Layer Credits: USGS ImageryTopo



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## Figure 7 Soils Map

**Cottonwood Sand Mine**



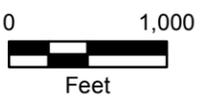
**Explanation**

- Surface water sample
- Water well
- Soil boring
- Steele Canyon well (2004)
- Off-site well

**Project Areas**

- No mining areas
- Mined prior to 1966
- Cottonwood Project boundary
- Project phasing lines
- Proposed plant location

Service Layer Credits: USGS The National Map: National Hydrography Dataset. Data refreshed March, 2020.  
 USGS The National Map: Orthoimagery. Data refreshed October, 2020.



**Geo-Logic**  
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**Figure 8**  
**Site Plan**

**Cottonwood Sand Mine**

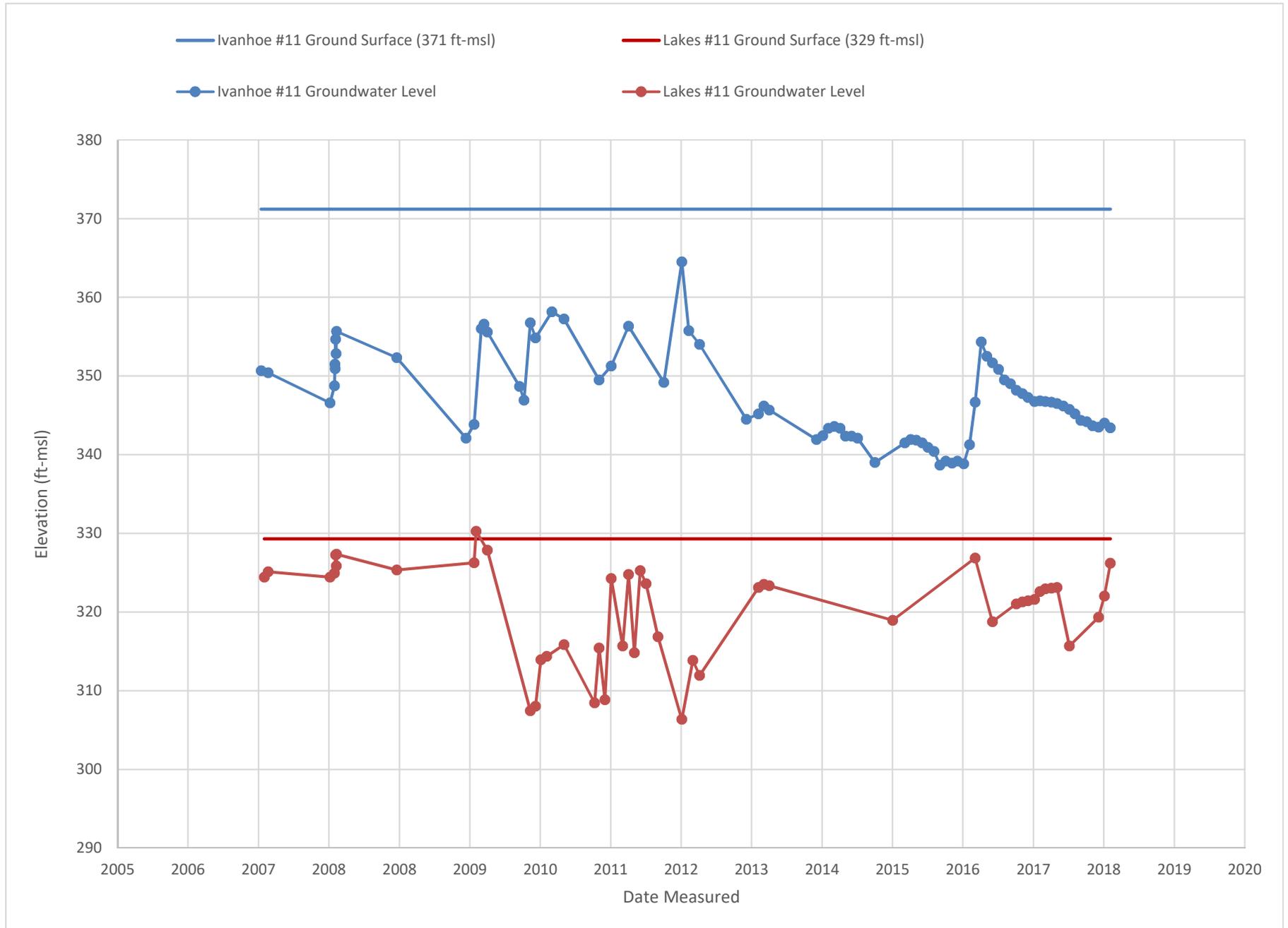


Figure 9 - Hydrographs of water wells Ivanhoe #11 and Lakes#11

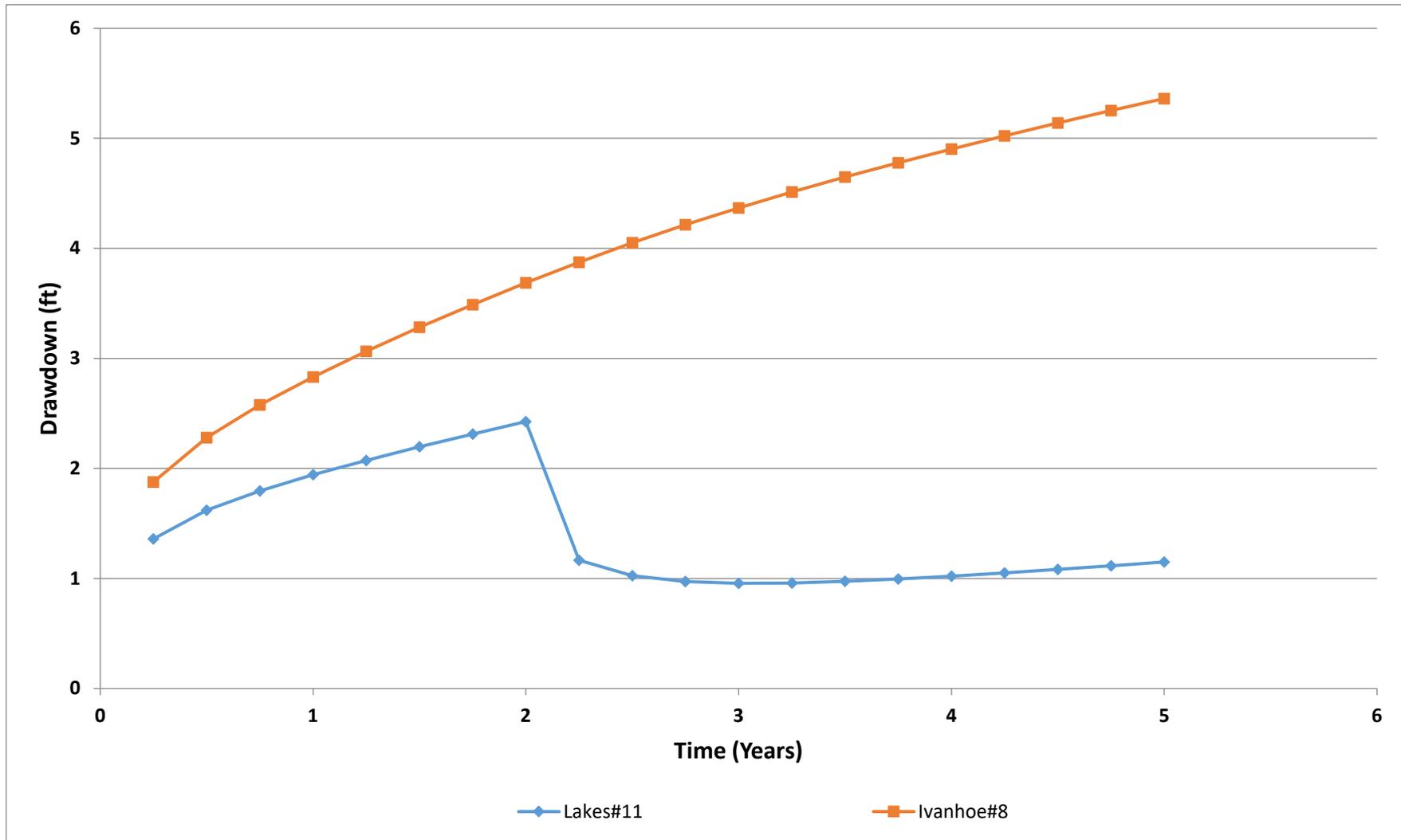
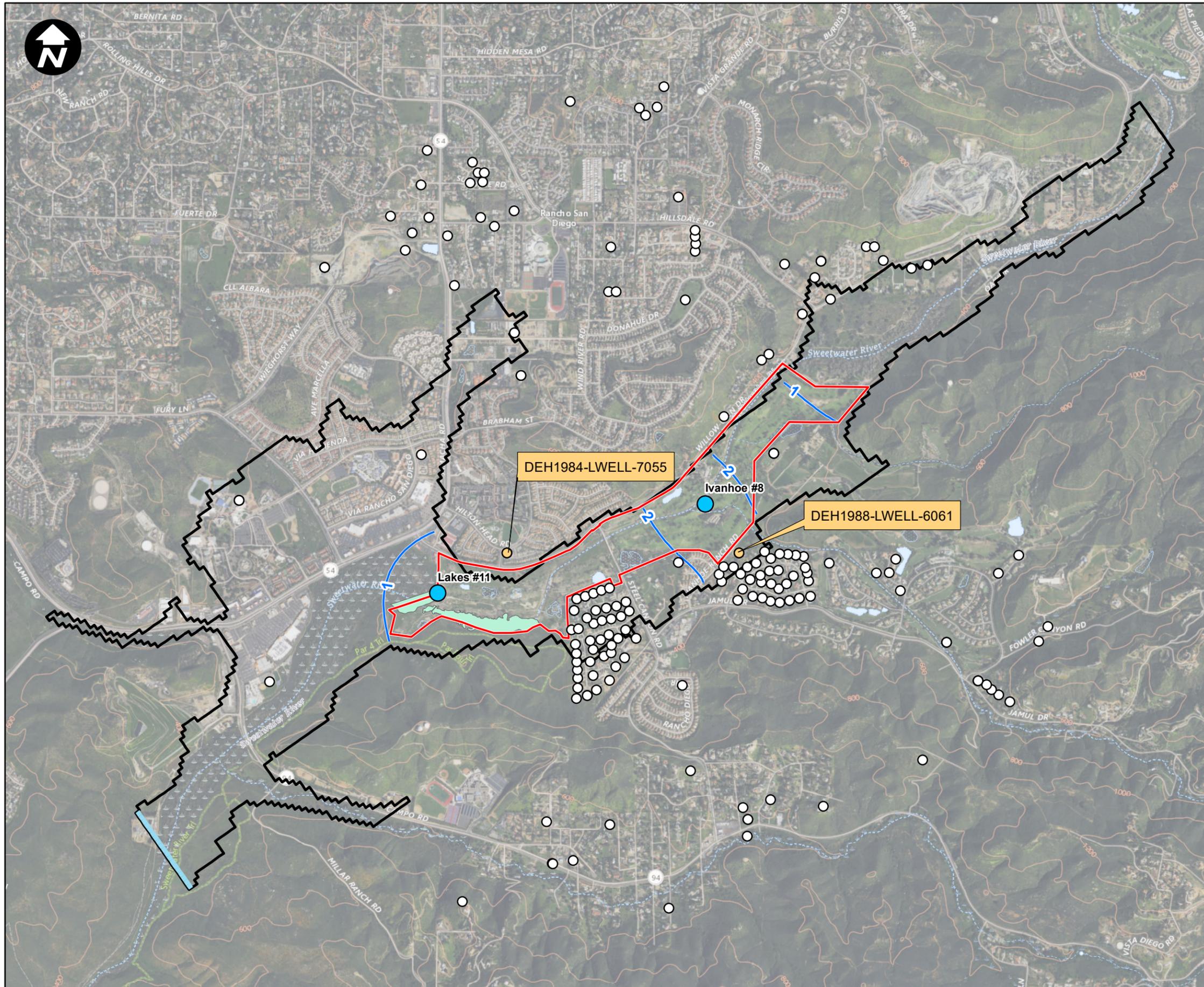


Figure 10 - Simulated Drawdown For The Base Case Scenario



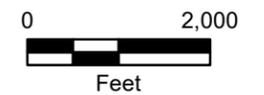
### Explanation

- Water well
- Nearest off-site well (see text)
- Off-site well
- Cottonwood Project
- Active model grid
- Drawdown contour (ft)
- General Head Boundary
- Riparian preservation/rehabilitation

### Notes:

- Model thickness = 100 ft.
- Model assumes all irrigation water will be provided by Lakes #11 at a continuous rate of 62.5 ac-ft/yr and operations water will be provided by Ivanhoe #8 at a continuous rate of 84.3 ac-ft/yr.

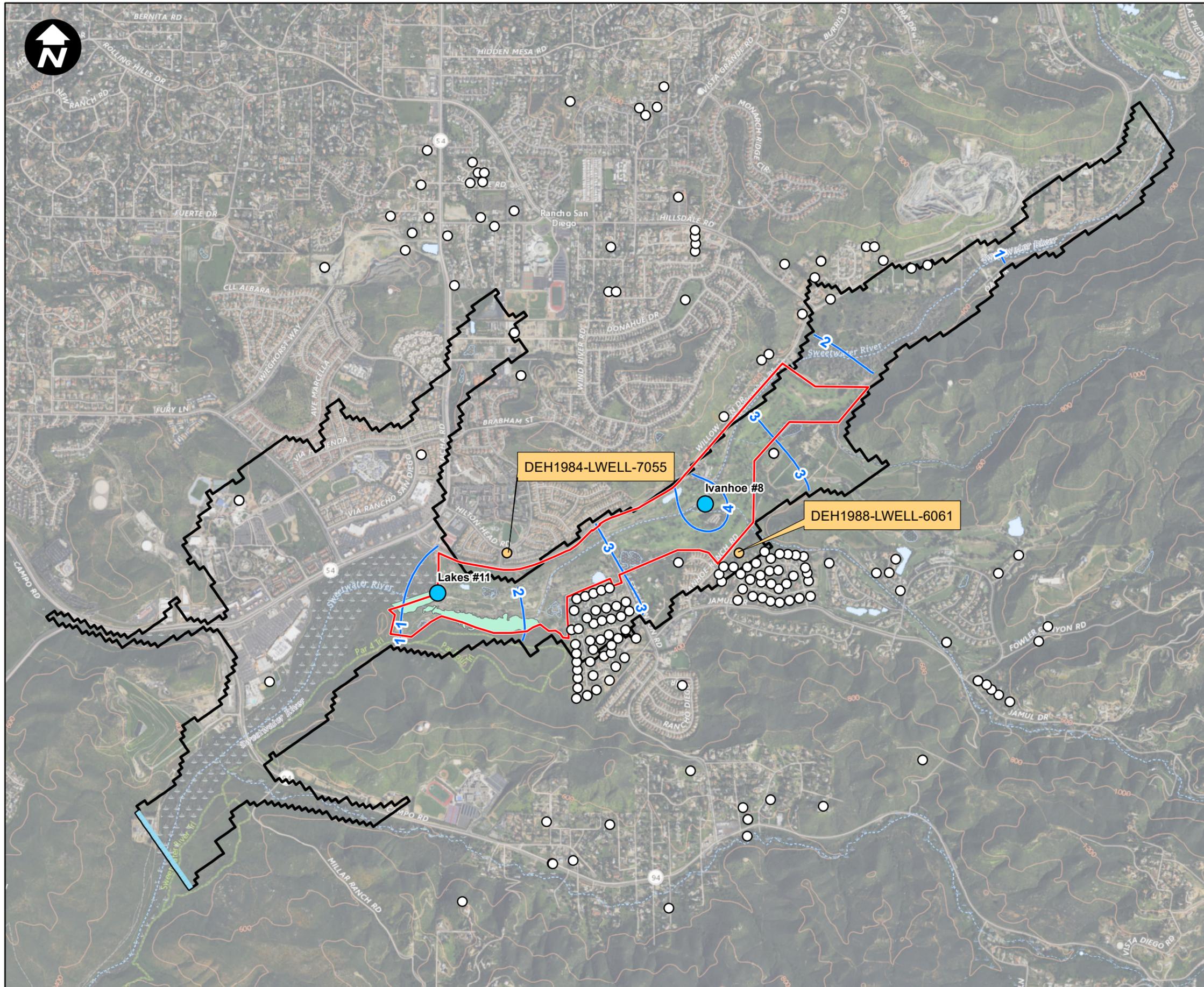
Service Layer Credits: USGS The National Map: Orthoimagery and US Topo. Data refreshed September, 2019.  
 USGS The National Map: National Hydrography Dataset. Data refreshed February, 2021.



**Geo-Logic**  
 ASSOCIATES

**Figure 11a**  
**Simulated Groundwater Drawdown**  
**after 2 Years of Pumping**

**Cottonwood Sand Mine**



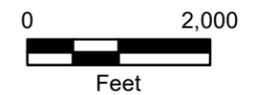
**Explanation**

- Water well
- Nearest off-site well (see text)
- Off-site well
- Cottonwood Project
- Active model grid
- Drawdown contour (ft)
- General Head Boundary
- Riparian preservation/rehabilitation

**Notes:**

- Model thickness = 100 ft.
- Model assumes all irrigation water will be provided by Lakes #11 at a continuous rate of 62.5 ac-ft per year for two years and operations water will be provided by Ivanhoe #8 at a continuous rate of 84.3 ac-ft/yr.

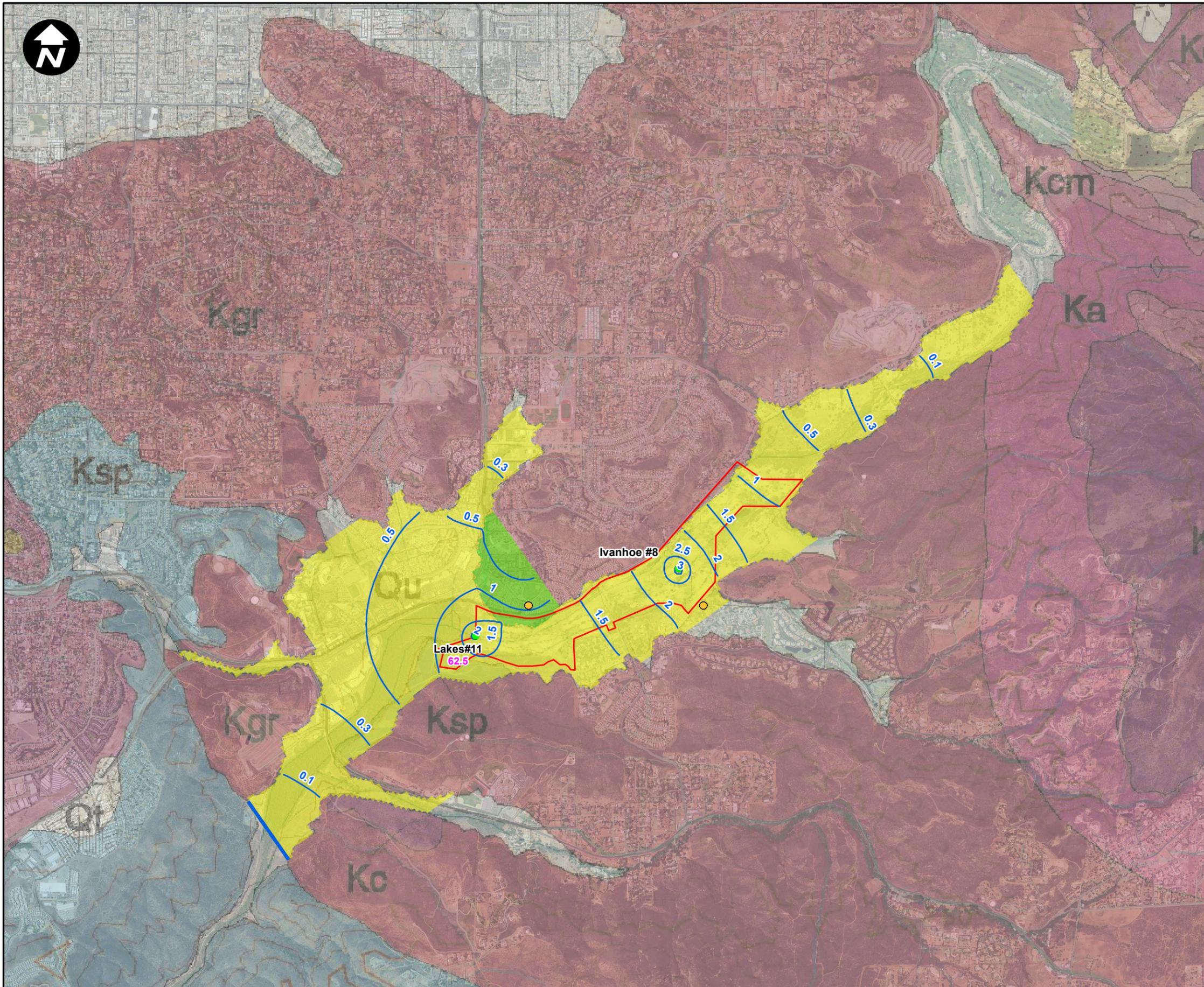
Service Layer Credits: USGS The National Map: Orthoimagery and US Topo. Data refreshed September, 2019.  
 USGS The National Map: National Hydrography Dataset. Data refreshed February, 2021.



**Geo-Logic**  
 ASSOCIATES

**Figure 11b**  
**Simulated Groundwater Drawdown**  
**after 5 Years of Pumping**

**Cottonwood Sand Mine**

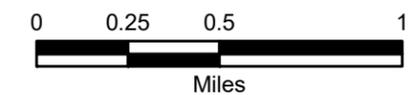


### Explanation

- Well (pumping in ac-ft/yr)
- Drawdown (ft)
- Cottonwood property
- General head boundary
- K = 40 ft/day, Sy = 0.25
- K = 0.1 ft/day, Sy = 0.01
- Nearest off-site well (see text)

### Notes:

- Model thickness = 100 ft.
- Model assumes all irrigation water will be provided by Lakes #11 at a continuous rate of 62.5 ac-ft/yr and operations water will be provided by Ivanhoe #8 at a continuous rate of 84.3 ac-ft/yr.
- The simulation boundary was extended to assess drawdown at the nearest off-site wells.



**Geo-Logic**  
ASSOCIATES

**Figure 11c**  
**Simulated Groundwater**  
**Drawdown After Two Years**  
**(Modified Base Case)**  
**Cottonwood Sand Mine**

Appendix A  
County Correspondence



County of San Diego, Planning & Development Services  
Project Planning Division

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**Memorandum**

**TO:** Heather Steven, Project Manager/Planner  
**FROM:** Jim Bennett, Water Resources Manager  
**SUBJECT:** P18-023 Cottonwood Sand Mine – Groundwater Review and Scoping  
**DATE:** February 4, 2020

---

Information/Document	No. of Copies	Flash Drive with Word and PDF Doc	Lead Review /Section or Dept.
Groundwater Investigation	2	X	Planner (1), Groundwater Geologist (1)

---

Staff has reviewed the Draft Groundwater Use Analysis, Cottonwood Sand Mine, prepared by EnviroMINE, Inc., dated August 5, 2019, and received by PDS on December 9, 2019. The analysis was requested to aid PDS in scoping groundwater investigation requirements for the project which are provided below. Attached is a review of the draft Groundwater Use Analysis in electronic tracked changes in strikeout-underline. Staff would like to have a meeting with the applicant's team that prepared this letter to go over the water demand assumptions and discuss the scope of groundwater investigation.

**Groundwater Investigation**

General Project Information: Based on the potential impacts the project may have to groundwater resources, a groundwater investigation is required to evaluate the significance of potential impacts. The groundwater investigation report must be completed using the County's approved Guidelines for Determining Significance and Report Format and Content Requirements which can be found on the World Wide Web at <http://www.sdcounty.ca.gov/dplu/docs/GRWTR-Guidelines.pdf> (Guidelines) <http://www.sdcounty.ca.gov/dplu/docs/GRWTR-Report-Format.pdf> (Report Formats).

The project is also subject to the Groundwater Ordinance. The investigation must meet the requirements of the SAN DIEGO COUNTY GROUNDWATER ORDINANCE NO. 9826 (NEW SERIES). This document is available at <http://www.sdcounty.ca.gov/dplu/docs/GROUNDWATER-ORD.pdf>

The project is considered a "water intensive use" as defined by the Groundwater Ordinance. Groundwater Ordinance Section 67.722.B. requires a groundwater

investigation in which the following finding must be made: “for a water intensive use, that groundwater resources are adequate to meet the groundwater demands both of the project and the groundwater basin if the basin were developed to the maximum density and intensity permitted by the General Plan.”

**Groundwater Investigation Requirements:** Below is a list of items which must be analyzed in the investigation as described in detail in the Guidelines for Determining Significance and Report Format Guidelines and Content Requirements for Groundwater Resources:

50% Reduction of Groundwater in Storage: An evaluation of the long-term groundwater availability is typically required for the project’s tributary watershed which takes into consideration groundwater recharge, estimated groundwater in storage, and groundwater demand at maximum buildout of the General Plan. The project is going to result in substantial reduction in groundwater use as compared to the permitted groundwater use for a 36-hole golf course. It can therefore be demonstrated that groundwater conditions within the basin with implementation of the project would be improved. Additionally, the project site and vicinity are within the County Water Authority (CWA) and therefore has access to imported water supplies from CWA member agencies. Therefore, rather than a water balance analysis, it is requested to document the changes in groundwater demand in the report to demonstrate improved groundwater conditions as a result of the project.

Additionally, in order to meet the findings of Section 67.722.B of the Groundwater Ordinance, include a figure showing the tributary watershed and evaluate buildout potential under the General Plan that would be reliant on groundwater. Include on the figure the portion of the tributary watershed that is within the CWA and would have access to imported water supplies vs. area that is entirely dependent on groundwater. Include evaluation on whether the project would impact the basin’s ability for land that is entirely groundwater dependent to be developed to the maximum density and intensity permitted by the General Plan.

Well Testing: According the applicant, the site has eight production wells that have historically been used for irrigation of the golf course. The project reportedly intends on using two production wells, Well #11 Ivanhoe and #11 Lakes, which will concentrate groundwater use for the project from these two wells. Well interference analysis is required to evaluate potential impacts on the nearest offsite wells and to groundwater dependent habitat. Per County Guidelines, a 5-year projection of drawdown at the nearest offsite wells and groundwater dependent habitat shall be conducted. Additionally, the investigation should document whether these wells have the capacity to be able to produce the project’s proposed groundwater use.

To perform well interference analysis, projects typically are required to perform aquifer tests from onsite wells. It is staff’s understanding that there may be aquifer test data available that could be used in lieu of new well testing. As a first step, please provide any previous constant rate aquifer test data from wells at Cottonwood Golf Course or within the immediate vicinity of the project site for review by County staff. Staff would then

review whether previously collected data is appropriate for well interference analysis rather than having to perform new well testing.

Water Quality: Describe all proposed potable water uses and the source(s). If onsite groundwater is a source, PDS will scope water quality testing requirements. If proposed from Otay Water District, please include a will serve letter from the District.

Groundwater Investigation Report: The report shall follow the items outlined in the County Report Formats. Sections 3 and 4 of the report shall include impacts analysis for 50% Reduction in Storage, analysis of offsite well interference, and analysis of impacts to groundwater dependent vegetation. A GMMP will be prepared as necessary based on the results of the groundwater investigation.

Well Destruction Permit: Planning and Development Services (PDS) has determined that the project site will require a Well Destruction Permit for any wells not be used as part of this project. To apply for a well destruction permit, please contact the Department of Environmental Health (DEH) Land and Water Quality Division at (858) 565-5173. DEH can also provide the current fee that is required to be collected for the permit. The permit must be obtained by a C57 Licensed Contractor who is listed on the DEH approved Well Driller's List at:

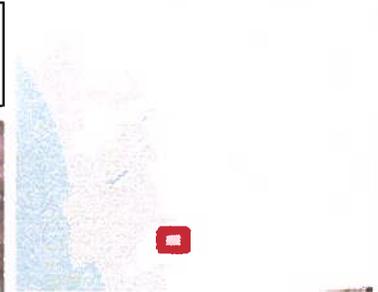
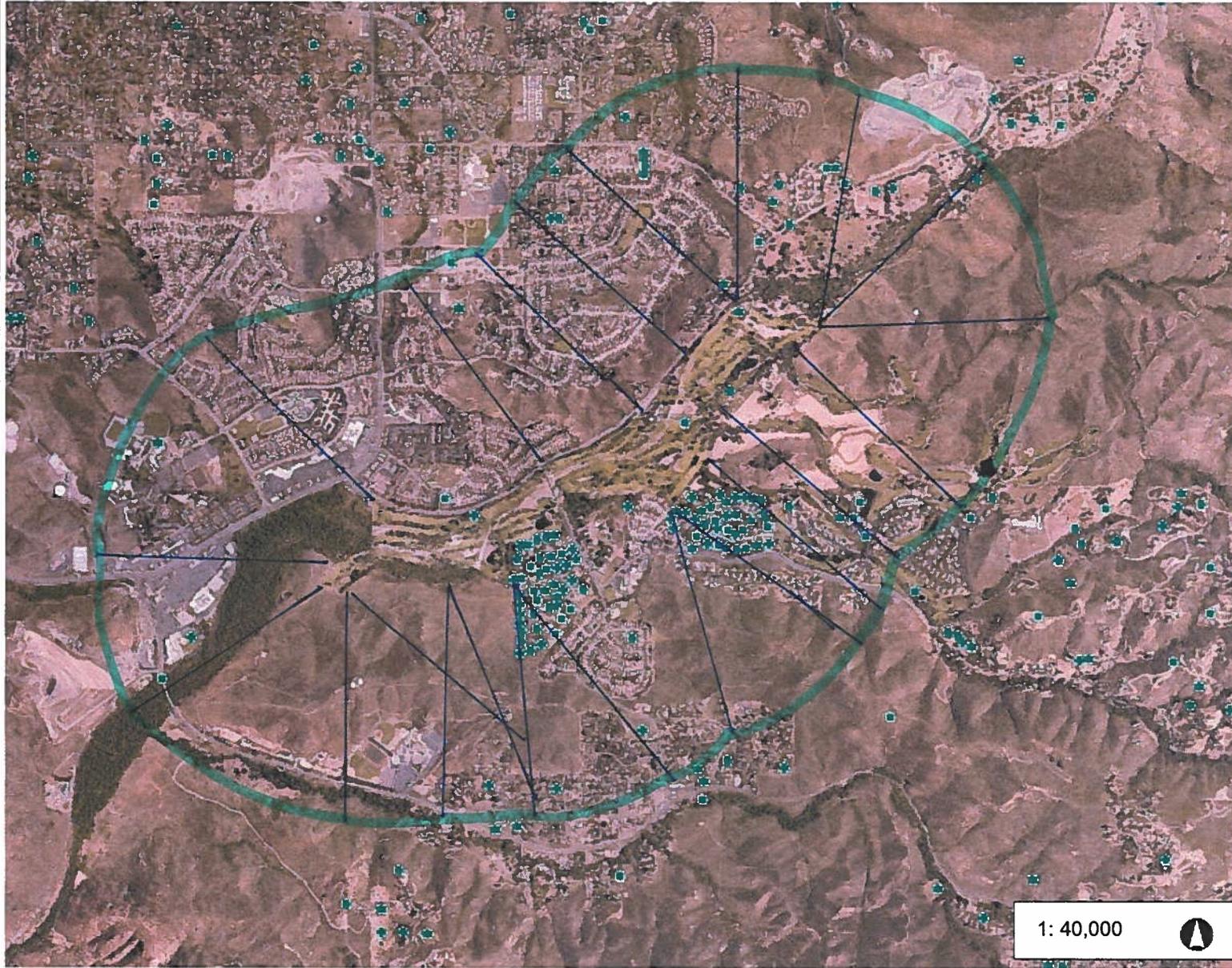
<https://www.sandiegocounty.gov/content/dam/sdc/deh/lwqd/Well%20Drillers%20List%201-10-17.pdf>

A formal letter from the DEH must be submitted to PDS identifying either that the permit has been approved or is in the process of approval. In addition, prior to the approval of any mining in each phase, proof of completion of the well destruction for wells in the upcoming mining phase will be conditioned within this permit.

**The Memorandum of Understanding must be executed by the applicant and consultant and subsequently submitted with the first iteration review.**

Appendix B  
Well Logs Provided by the  
County

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**Legend**

- LWQD Well Permits

*≥ 118 well permits within ~1 mile of the property.*

1: 40,000 

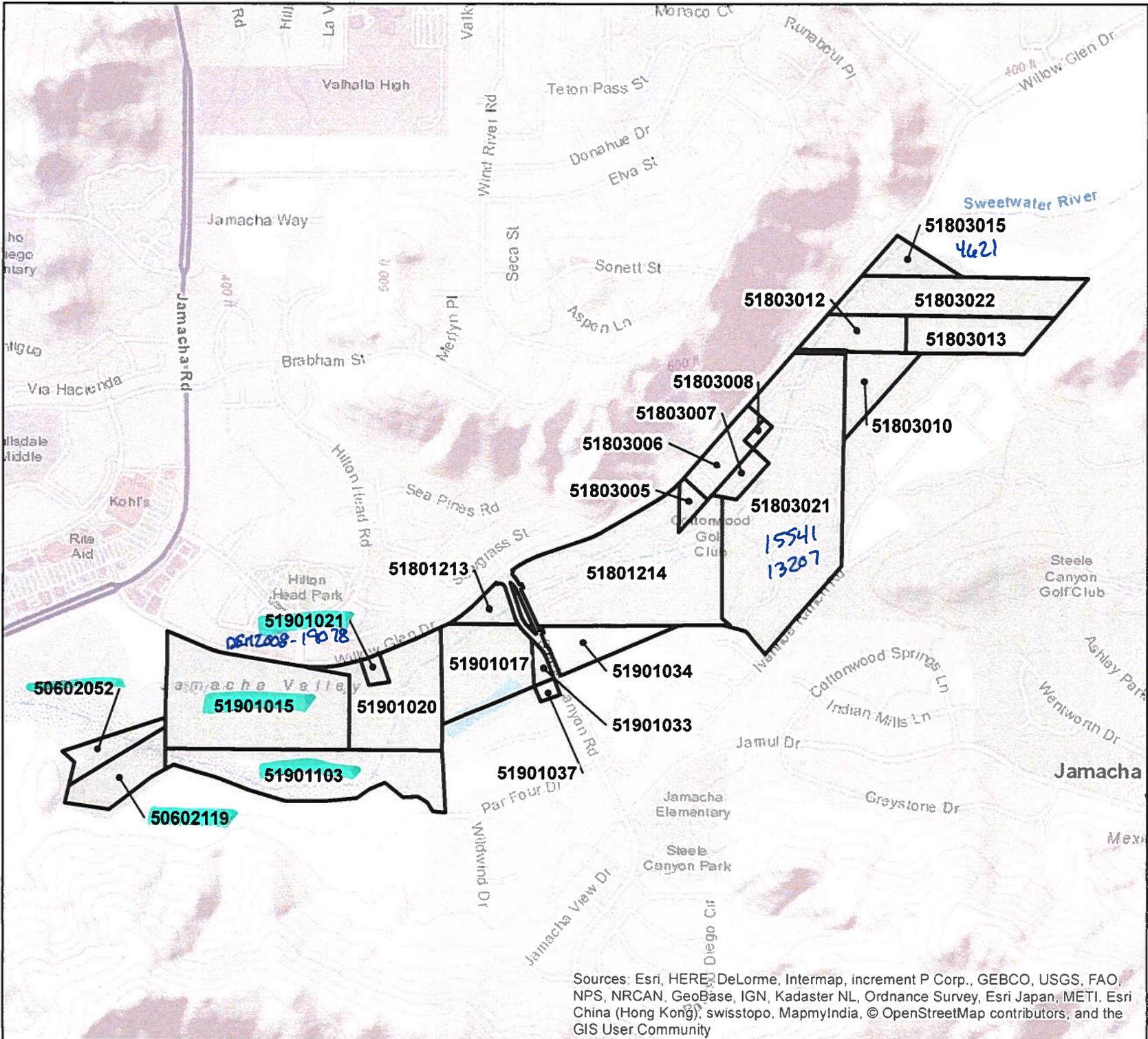
1.3 0 0.63 1.3 Miles

WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere  
 Department of Environmental Health

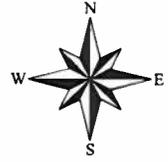
This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.  
**THIS MAP IS NOT TO BE USED FOR NAVIGATION**

**Notes**

**Figure 1.2-1  
Cottonwood  
Sand Mine  
Assessor's Parcel  
Map & Ownership**



**Legend**  
 APN #: XXXXXXXX



0 625 1,250 Feet

1 inch = 1,250 feet



Date: 11/9/2018

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community



COUNTY OF SAN DIEGO  
DEPARTMENT OF ENVIRONMENTAL HEALTH  
WELL PERMIT APPLICATION

LWEL 19078

DEH USE ONLY  
PERMIT # W 06825  
WELL COMPUTER #  
FEE: \_\_\_\_\_  
WATER DIST: \_\_\_\_\_

- Property Owner: REYNOLDS COMMUNITIES Phone: 619-596-2400  
1908 FRIENDSHIP DR SUITE A EL CAJON CA 92020  
Mailing Address City Zip
- Well Location - Assessors Parcel Number: 51900-25  
3628 WILLOW GLEN RD EL CAJON CA 92020  
Site Address City Zip
- Well Contractor - Well Driller Bud Morrison Company Name: MORRISON DRILLING INC  
PO Box 117 ALPINE CA 91903  
Mailing Address City Zip  
Phone #: 619-445-0265 C-57 #: 771901 Cash Deposit:  Bond Posted:
- Use:  Private  Public  Industrial  Cathodic  Other \_\_\_\_\_
- Type of Work:  New  Reconstruction  Destruction Time Extension: 1st:  2nd:
- Type of Equipment: \_\_\_\_\_
- Depth of Well: Proposed: \_\_\_\_\_ Existing: \_\_\_\_\_
- Proposed: Casing Conductor Casing Filter/Filler Material Perforations  
Type: \_\_\_\_\_  Yes  No  Yes  No  
Depth: \_\_\_\_\_ ft. From: \_\_\_\_\_ To: \_\_\_\_\_ From: \_\_\_\_\_ To: \_\_\_\_\_  
Diameter: \_\_\_\_\_ in. Diameter: \_\_\_\_\_ in. Type: \_\_\_\_\_ From: \_\_\_\_\_ To: \_\_\_\_\_  
Wall/Gauge: \_\_\_\_\_ Wall/Gauge: \_\_\_\_\_ From: \_\_\_\_\_ To: \_\_\_\_\_
- Annular Seal: Depth \_\_\_\_\_ Ft. Sealing Material: \_\_\_\_\_  
Borehole Diameter: \_\_\_\_\_ in. Conductor Diameter: \_\_\_\_\_ in. Annular Thickness: \_\_\_\_\_ in.
- Date of Work: Start: \_\_\_\_\_ Complete: \_\_\_\_\_

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: Bud Morrison Date: 9-8-2000

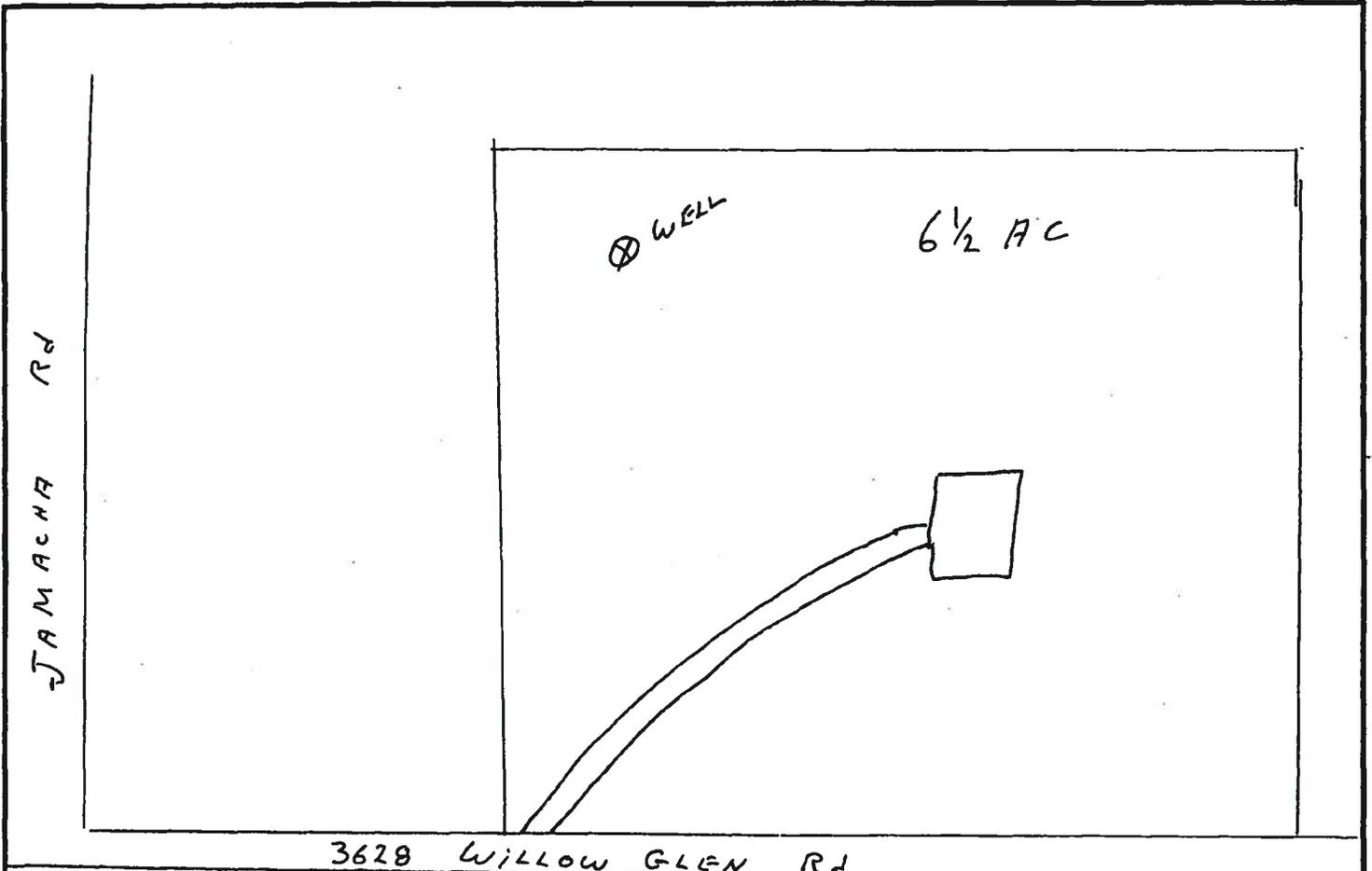
LWEL 19078

REYNOLDS COMMUNITIES

DISPOSITION OF APPLICATION (Department of Environmental Health Use only)  
 Approved  Denied Special Conditions: cut casing 5' below grade minimum, pump well with concrete  
Approved by: [Signature] Date: 9/2/00

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, easements, water bodies or water courses, drainage pattern, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.



REYNOLDS COMMUNITIES  
PHONE 619-596-2400

MORRISON DRILLING INC  
PHONE 619-445-0265

QUADRUPPLICATE  
For Local Requirements

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**

Refer to Instruction Pamphlet

No. **534898**

Page 1 of 3

Owner's Well No. REYNOLDS

Date Work Began 9/15/00, Ended 9/15/00

Local Permit Agency SAN DIEGO HEATH DEPT

Permit No. W06825 Permit Date 9/12/00

DWR USE ONLY -- DO NOT FILL IN

STATE WELL NO./STATION NO.									
LATITUDE					LONGITUDE				
APN/TRS/OTHER									

**GEOLOGIC LOG**

**WELL OWNER**

ORIENTATION (✓)  VERTICAL  HORIZONTAL  ANGLE \_\_\_\_\_ (SPECIFY)

DRILLING METHOD \_\_\_\_\_ FLUID \_\_\_\_\_

DEPTH FROM SURFACE		DESCRIPTION <i>Describe material, grain, size, color, etc.</i>
Fl.	to Fl.	
		WELL DESTRUCTION METHOD
		CUTDOWN FIVE FEET
		FILL WITH 6 SACK CEMENT MIX
		BACKFILLED FIVE FEET WITH A
		MUSHROOM LID
<div style="border: 1px solid black; padding: 5px;"> <p><b>Completed Well Construction</b></p> <p>Date <u>10-11-00</u></p> <p>Date Inspected _____</p> <p>Comments <u>DESTRUCTION</u></p> <p>Water Sample Taken? _____</p> <p>Reviewed By <u>[Signature]</u></p> </div>		
TOTAL DEPTH OF BORING _____ (Feet)		
TOTAL DEPTH OF COMPLETED WELL _____ (Feet)		

Name REYNOLDS COMMUNITIES

Mailing Address 1906 FRIENDSHIP DR. STE H

EL CAJON CA 92020

CITY STATE ZIP

WELL LOCATION

Address 3628 WILLOW GLEN RD

City EL CAJON CA 92020

County SAN DIEGO

APN Book 519 Page 010 Parcel 25

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_

DEG. MIN. SEC.      DEG. MIN. SEC.

**LOCATION SKETCH**

NORTH

WEST

EAST

SOUTH

ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR

Deepen

Other (Specify) \_\_\_\_\_

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

PLANNED USES (✓)

WATER SUPPLY

Domestic  Public

Irrigation  Industrial

MONITORING \_\_\_\_\_

TEST WELL \_\_\_\_\_

CATHODIC PROTECTION \_\_\_\_\_

HEAT EXCHANGE \_\_\_\_\_

DIRECT PUSH \_\_\_\_\_

INJECTION \_\_\_\_\_

VAPOR EXTRACTION \_\_\_\_\_

SPARGING \_\_\_\_\_

REMEDICATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

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

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER \_\_\_\_\_ (Fl.) BELOW SURFACE

DEPTH OF STATIC \_\_\_\_\_

WATER LEVEL \_\_\_\_\_ (Fl.) & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE \_\_\_\_\_

TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Fl.)

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)							
		TYPE (✓)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
Fl.	to Fl.	BLANK	SCREEN	CON. DUCTOR	FILL PIPE				

DEPTH FROM SURFACE	ANNULAR MATERIAL				
	TYPE				
Fl.	to Fl.	CE- MENT (✓)	BEN- TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)

**ATTACHMENTS (✓)**

Geologic Log

Well Construction Diagram

Geophysical Log(s)

Soil/Water Chemical Analysis

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 MORRISON DRILLING, INC.

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. BOX 117      ALPINE      CA      91903

ADDRESS      CITY      STATE      ZIP

Signed [Signature]      09/19/00      771901

WELL DRILLER/AUTHORIZED REPRESENTATIVE      DATE SIGNED      C-57 LICENSE NUMBER



**COUNTY OF SAN DIEGO  
DEPARTMENT OF ENVIRONMENTAL HEALTH  
WELL PERMIT APPLICATION**

DEH USE ONLY  
PERMIT # LWEL15541  
WELL COMPUTER # \_\_\_\_\_  
FEE: \_\_\_\_\_  
WATER DIST: \_\_\_\_\_

1. Property Owner: Cotton Wood AT RANCHO SAN DIEGO Phone: 619-447-0012  
3121 WILLOW GLEN DRIVE EL CAJON 92019  
Mailing Address City Zip

2. Well Location - Assessors Parcel Number #518-030-21  
3121 WILLOW GLEN EL CAJON 92019  
Site Address City Zip

3. Well Contractor - Well Driller WYATT ALLEN Company Name: MORRISON DRILLING  
P.O. BOX 117 ALPINE CA. 92001  
Mailing Address City Zip

Phone#: 619-445-0265 C-57#: ✓  Cash Deposit  Bond Posted

4. Use:  Private  Public  Industrial  Cathodic  Other IRRIGATION AT GOLF C.

5. Type of Work:  New  Reconstruction  Destruction Time Extension:  1st  2nd

6. Type of Equipment: BUCKET AUGER IMT AF 18 DRILL

7. Depth of Well: Proposed: 100' OR Bed ROCK Existing: \_\_\_\_\_

8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: <u>P.V.C.</u>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Depth: <u>100'</u>	Depth: <u>10'</u> ft.	From: <u>20'</u> To: <u>100'</u>	From: <u>21'</u> To: <u>100'</u>
Diameter <u>12"</u> in.	Diameter <u>48"</u> in.	Type: <u>3/8 COARSE WIRE</u>	From: _____ To: _____
Wall/Gauge: _____	Wall/Gauge: <u>1/2"</u>	Wall/Gauge: _____	From: _____ To: _____

9. Annular Seal: Depth: 20' ft. Sealing Material: CEMENT  
Borehole diameter: 30" in. Conductor diameter: 48" in. Annular Thickness 9" in.

10. Date of Work: Start: SEPT 3-03 Complete: SEPT. 26-03

**On sites served by public water, contact the local water agency for meter protection requirements.**

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: Bud Morrison By Wyatt Allen Date: 9/2/03

LWEL 15541

COTTON WOOD

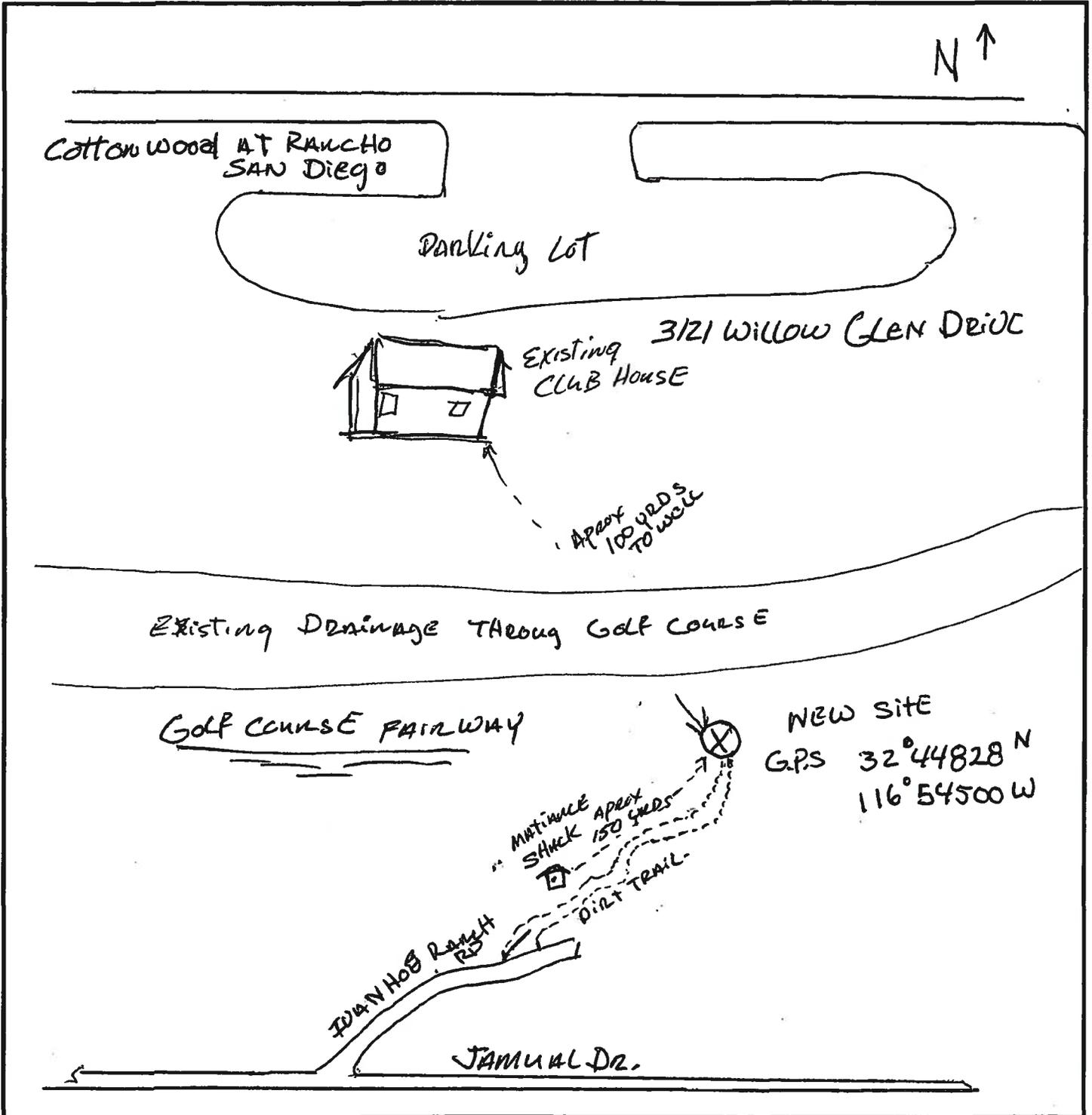
**DISPOSITION OF APPLICATION (Department of Environmental Health Use only)**

Approved  Denied Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies. WELL FOR IRRIGATION ONLY, NOT FOR POTABLE USE

Specialist: [Signature] Date: 9/20/03

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.



QUADRUPLICATE  
For Local Requirements

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

DWR USE ONLY -- DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

Page 1 of 1

Owner's Well No. **PREMIER GOLF**

No. **E004954**

Date Work Began \_\_\_\_\_, Ended \_\_\_\_\_

Local Permit Agency **SAN DIEGO COUNTY HEALTH DEPART**

Permit No. **15541** Permit Date **9/2/2003**

**GEOLOGIC LOG**

**WELL OWNER**

ORIENTATION (✓)  VERTICAL  HORIZONTAL  ANGLE \_\_\_\_\_ (SPECIFY)  
DRILLING METHOD **AIR** FLUID \_\_\_\_\_

Name **PREMIER GOLF PROPERTIES** **1272 C4**

Mailing Address \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

DEPTH FROM SURFACE \_\_\_\_\_  
Fl. to Fl.

**DESCRIPTION**

Describe material, grain, size, color, etc.

Address **3121 WILLOW GLEN**

City **EL CAJON CA 92019**

County **SAN DIEGO**

APN Book **518** Page **030** Parcel **21**

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

Latitude \_\_\_\_\_

DEG. MIN. SEC. DEG. MIN. SEC.

**LOCATION SKETCH**

NORTH

ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR

— Deepen

— Other (Specify)

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

**PLANNED USES (✓)**

**WATER SUPPLY**

Domestic  Public

Irrigation  Industrial

MONITORING \_\_\_\_\_

TEST WELL \_\_\_\_\_

CATHODIC PROTECTION \_\_\_\_\_

HEAT EXCHANGE \_\_\_\_\_

DIRECT PUSH \_\_\_\_\_

INJECTION \_\_\_\_\_

VAPOR EXTRACTION \_\_\_\_\_

SPARGING \_\_\_\_\_

REMEDICATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

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

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER \_\_\_\_\_ (Fl.) BELOW SURFACE **1**

DEPTH OF STATIC WATER LEVEL **34** (Fl.) & DATE MEASURED **9/28/2003**

ESTIMATED YIELD **300** (GPM) & TEST TYPE **AIRLIFT**

TEST LENGTH **4** (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Fl.)

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

TOTAL DEPTH OF BORING **85** (Feet)

TOTAL DEPTH OF COMPLETED WELL **85** (Feet)

DEPTH FROM SURFACE		BORE-HOLE DIA. (Inches)	CASING (S)				ANNULAR MATERIAL			
FL	to FL		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)
0	20	24"	CON-DUCTOR	STEEL	6 5/8	188	✓	✓	✓	

**ATTACHMENTS (✓)**

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- 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 **MORRISON DRILLING**

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

P.O. BOX **117**

ADDRESS

**ALPINE**

CITY

**CA**

STATE

**91903**

ZIP

Signed *[Signature]*

WELL DRILLER/AUTHORIZED REPRESENTATIVE

**01/04/05**

DATE SIGNED

**771901**

C-57 LICENSE NUMBER

333  
32 74718  
-116 90965

15541  
LWEL 7307



# 13201

COUNTY OF SAN DIEGO DEPARTMENT OF ENVIRONMENTAL HEALTH WELL PERMIT APPLICATION

DEH USE ONLY PERMIT # W 06594 WELL COMPUTER # FEE: WATER DIST:

- 1. Property Owner: STEELE CANYON GOLF COURSE Phone: 619-441-6900 3199 STONEFIELD DR. Mailing Address City Zip JAMVL 91935
2. Well Location - Assessors Parcel Number: 518-030-21 SAME Site Address City Zip
3. Well Contractor - Well Driller COURT WILLOUGHBY Company Name: ACME DRILLING 748 S. VINEWOOD ST., SUITE "B", ESCONDIDO 92029 Mailing Address City Zip Phone #: 760-489-5104 C-57 #: 526886 Cash Deposit: X Bond Posted:
4. Use: X Private Public Industrial Cathodic Other
5. Type of Work: X New Reconstruction Destruction Time Extension: 1st: 2nd:
6. Type of Equipment: MUD ROTARY
7. Depth of Well: Proposed: 100 Existing:
8. Proposed: Casing Conductor Casing Filter/Filler Material Perforations Type: PVC Yes No Yes No Depth: 100 ft. From: 20 To: 100 Diameter: 8 in. Diameter 16 in. Type COARSE AQUARIUM From: To: Wall/Gauge: SDR 21 Wall/Gauge: .250 From: To:
9. Annular Seal: Depth 20 Ft. Sealing Material: SAND-CEMENT GROUT Borehole Diameter: 14 in. Conductor Diameter: 20 in. Annular Thickness: 2 in.
10. Date of Work: Start: 2/15/2000 Complete: 2/18/2000

On sites served by public water, contact the local water agency for meter protection requirements.

I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: Robert Lundberg Date: 1/26/2000

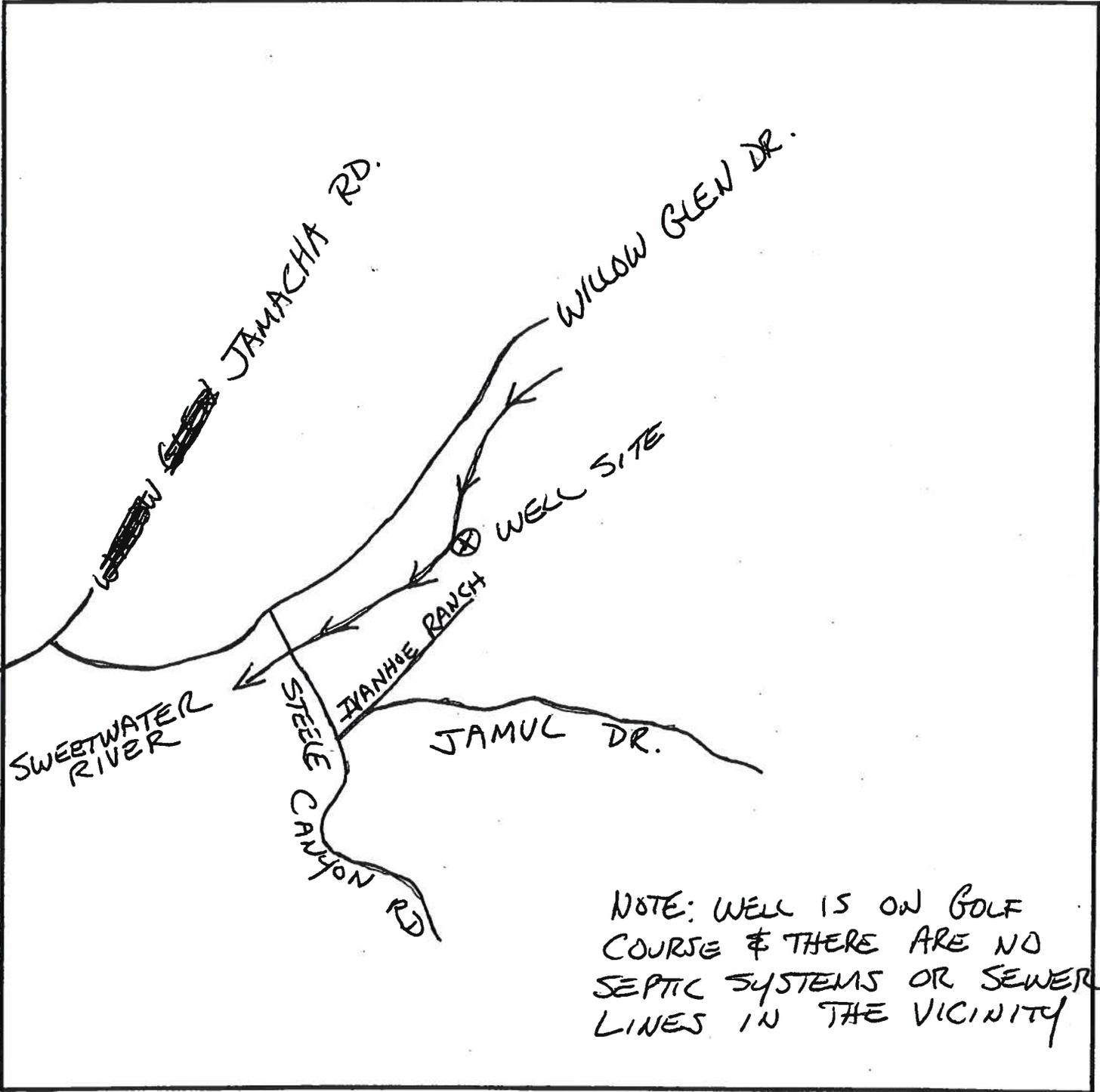
70221 7307

STEELE CANYON GOLF COURSE

DISPOSITION OF APPLICATION (Department of Environmental Health Use only) X Approved Denied Special Conditions: Approved by: Date: 3/1/00

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, easements, water bodies or water courses, drainage pattern, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.



QUADRUPPLICATE  
For Special Requirements

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**

Refer to Instruction Pamphlet

No. **1081468**

Page 1 of 1

Owner's Well No. 2

Date Work Began 2/17/2000, Ended 2/22/2000

Local Permit Agency S.D. Co. Dept. of Environmental Health

Permit No. 06594 Permit Date 3/7/2000 approved

DWR USE ONLY — DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE

LONGITUDE

APN/TRS/OTHER

**GEOLOGIC LOG**

**WELL OWNER**

ORIENTATION (✓)		DRILLING METHOD	FLUID	ANGLE (SPECIFY)
XX VERTICAL			XXXX	
DEPTH FROM SURFACE		DESCRIPTION		
Ft.	to Ft.	Describe material, grain size, color, etc.		
0	15	Topsoil, Sandy Clay w/ dark brown Sand, grains of Quartz, p. ag. cl. mafics and mica		
15	25	Boulders		
25	73	Coarse grained Decomposed Granite		
73	98	Hard Rock		

Name Steele Canyon Golf Course

Mailing Address 3199 Stonefield Drive

City San Luis Obispo, California STATE 91935 ZIP

Address Same

City

County San Diego

APN Book 518 Page 030 Parcel 21

Township 16S Range 1E Section 29

Lat. DEG. MIN. SEC. N Long. DEG. MIN. SEC. W

**LOCATION SKETCH**

NORTH

Completed well construction: \_\_\_\_\_

Date \_\_\_\_\_

Date inspected \_\_\_\_\_

Comments \_\_\_\_\_

Water sample received? \_\_\_\_\_

Sanitarian's approval: \_\_\_\_\_

SOUTH

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 (✓)**

XX NEW WELL

MODIFICATION/REPAIR

Deepen \_\_\_\_\_

Other (Specify) \_\_\_\_\_

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

USES (✓)

WATER SUPPLY

Domestic \_\_\_\_\_ Public \_\_\_\_\_

Irrigation \_\_\_\_\_ Industrial \_\_\_\_\_

MONITORING \_\_\_\_\_

TEST WELL \_\_\_\_\_

CATHODIC PROTECTION \_\_\_\_\_

HEAT EXCHANGE \_\_\_\_\_

DIRECT PUSH \_\_\_\_\_

INJECTION \_\_\_\_\_

VAPOR EXTRACTION \_\_\_\_\_

SPARGING \_\_\_\_\_

REMEDIATION \_\_\_\_\_

OTHER (SPECIFY) \_\_\_\_\_

**WATER LEVEL & YIELD OF COMPLETED WELL**

DEPTH TO FIRST WATER Unknown (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL unknown (Ft.) & DATE MEASURED \_\_\_\_\_

ESTIMATED YIELD \* \_\_\_\_\_ (GPM) & TEST TYPE Output test by Early-Tec

TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Ft.)

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

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)							
		TYPE (✓)			MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	
0	20	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	Steel	15.5"	.250	
0	78		X			PVC	7.981	.322	.092
78	98		X			PVC	7.981	.322	

DEPTH FROM SURFACE	ANNULAR MATERIAL			
	TYPE			
0	20	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)
0	98	XXXX	XXX	Type I-II coarse Aquabium Sand

**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 Acme Drilling Co. Inc.

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

748 S. Vineyard Street - Suite B - Escorido, Ca. 92029-1929

ADDRESS CITY STATE ZIP

Signed [Signature] DATE SIGNED 2/19/2008 LICENSE NUMBER 526886

C-57-LICENSED WATER WELL CONTRACTOR

#462  
Computer Down 578 020 19 Control # W05255  
APN 518 030 15

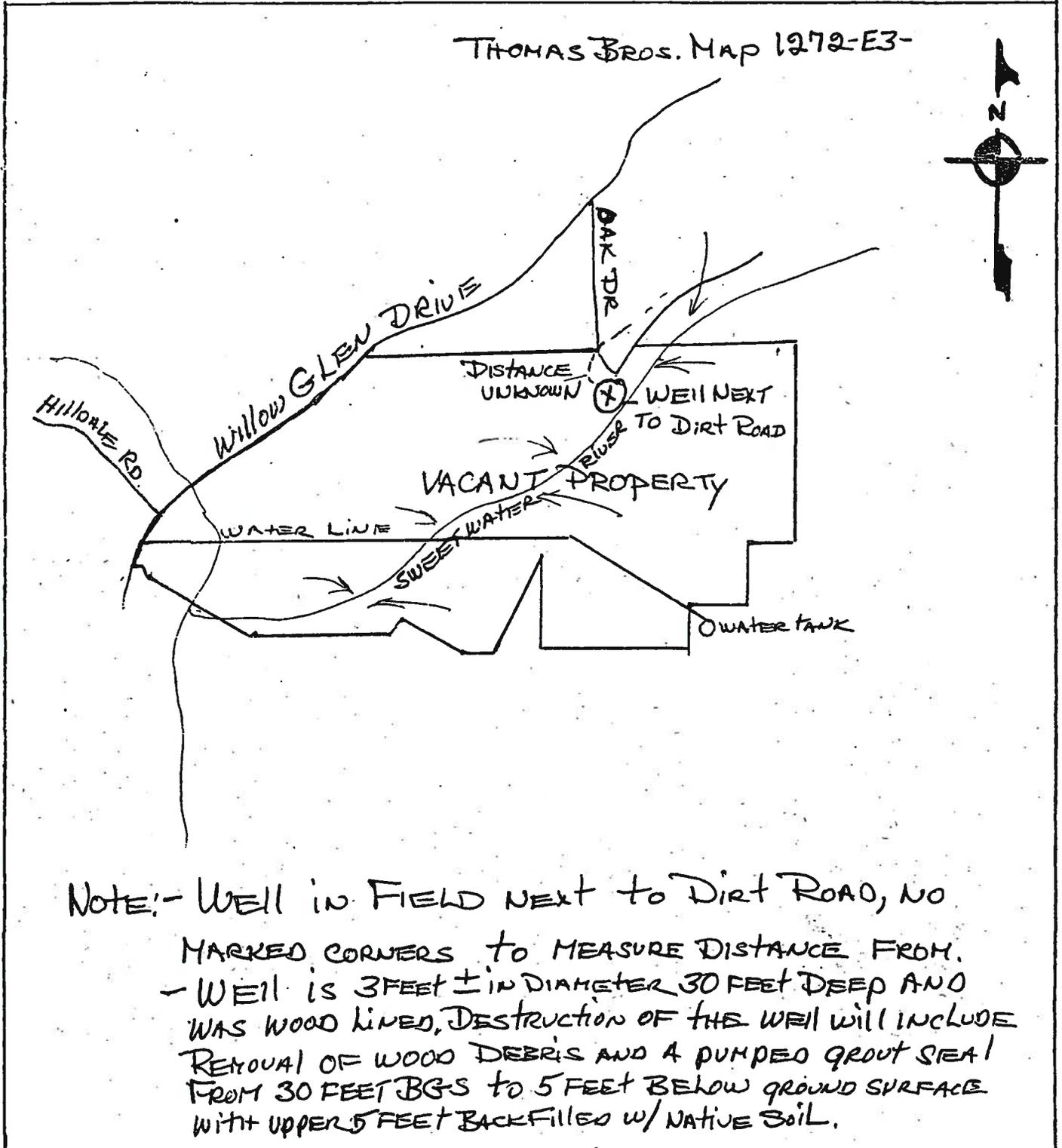
<p>TYPE OF WORK (Check)</p> <p>New Well <input type="checkbox"/></p> <p>Repair or Modification <input type="checkbox"/></p> <p>Time Extension <input type="checkbox"/></p> <p>Destruction <input checked="" type="checkbox"/></p>	<p>USE (Check)</p> <p>Individual Domestic <input type="checkbox"/></p> <p>Agricultural <input checked="" type="checkbox"/> Community <input type="checkbox"/></p> <p>Industrial <input type="checkbox"/> Other _____</p>	<p>EQUIPMENT (Check)</p> <p>Rotary <input type="checkbox"/></p> <p>Cable Tool <input type="checkbox"/></p> <p>Other <input checked="" type="checkbox"/></p>
<p>PROPOSED WELL DEPTH</p> <p>Max. _____ Min. _____ (Feet)</p>	<p>PROPOSED CASING</p> <p>Type _____ Depth _____ Diameter _____ Wall or Gage _____</p>	
<p>PROPOSED SEALING ZONE(S)</p> <p>From <u>-5</u> to <u>-30 TD</u> Feet</p> <p>From _____ to _____ Feet</p> <p>From _____ to _____ Feet</p>	<p>SEALING MATERIAL (Check)</p> <p>Neat Cement Grout <input type="checkbox"/> Bentonite Clay <input type="checkbox"/></p> <p>Sand Cement Grout <input type="checkbox"/> Concrete <input checked="" type="checkbox"/></p> <p>Other-Specify: <u>(7 SACK PEACOCK PUMP MIX)</u></p>	
<p>PROPOSED PERFORATIONS OR SCREEN</p> <p>From _____ to _____ Feet</p>	<p>DATE OF WORK</p> <p>Start <u>12/29/95</u></p> <p>Completion <u>12/29/95</u></p>	
<p>NAME OF WELL OWNER <u>THE TRUST FOR PUBLIC</u> <u>LAND, 116 NEW MONTGOMERY, Suite 300, SAN FRANCISCO, CA 94105-5660</u></p>	<p>NAME OF WELL DRILLER <u>JOHN KRATZ</u> <u>484-9775</u></p>	
<p>LOCATION OF WELL <u>REPTSD THOMAS BROS. MAP</u> <u>Willow Glen SMOOT 1372 - E3</u></p>	<p>COMPANY <u>TRI-COUNTY DRILLING</u></p>	
<p>DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)</p> <p><input type="checkbox"/> APPROVED <input type="checkbox"/> DENIED</p> <p><input checked="" type="checkbox"/> APPROVED WITH CONDITIONS</p> <p>Report Reason(s) for Denial or Necessary Conditions Here:</p> <p>_____</p>	<p>BUSINESS ADDRESS <u>9921 CARMEL MOUNTAIN RD. SO, 92129</u></p> <p>LICENSE NUMBER <u>547737</u></p> <p>Cash Deposit <input type="checkbox"/></p> <p>Bond Posted <input checked="" type="checkbox"/></p> <p><u>\$235</u> Fee paid on <u>12/28/95</u> <u>JK</u></p>	
<p>OTAY M.W.D.</p> <p><u>[Signature]</u> HEALTH OFFICER</p> <p><u>12-28-95</u> DATE</p>	<p>I hereby agree to comply with all regulations of the Department of Health Services and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction; repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Health Services with a complete and accurate log of the well.</p> <p><u>[Signature]</u> APPLICANT'S SIGNATURE</p> <p><u>12/28/95</u> DATE</p>	

Permit APRN 518-030-19

WEL 462

LOCATION

- INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.



NOTE:- Well in Field next to Dirt Road, NO MARKED CORNERS TO MEASURE DISTANCE FROM.  
- WELL IS 3 FEET ± IN DIAMETER 30 FEET DEEP AND WAS WOOD LINED. DESTRUCTION OF THE WELL WILL INCLUDE REMOVAL OF WOOD DEBRIS AND A PUMPED GROUT SEAL FROM 30 FEET BGS TO 5 FEET BELOW GROUND SURFACE WITH UPPER 5 FEET BACKFILLED W/ NATIVE SOIL.

ORIGINAL  
File with DWR

Page 1 of 2

Owner's Well No. NA

Date Work Began 12/29/95 Ended 12/29/95

Local Permit Agency SAN DIEGO COUNTY DEPT. OF ENVIRON. HEALTH

Permit No. W 05255 Permit Date 12/28/95

STATE OF CALIFORNIA  
**WELL COMPLETION REPORT**  
Refer to Instruction Pamphlet

No. 475184 #1621

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

**GEOLOGIC LOG**

**WELL OWNER**

ORIENTATION (∠)  VERTICAL  HORIZONTAL  ANGLE (SPECIFY)

Name THE TRUST FOR PUBLIC LAND  
Mailing Address 116 NEW MONTGOMERY SUITE 301  
SAN FRANCISCO CA

DEPTH TO FIRST WATER (FL) BELOW SURFACE \_\_\_\_\_  
DESCRIPTION  
Describe material, grain size, color, etc.

WELL LOCATION  
Address WILLOW GLEN RD  
City EL CATION  
County SAN DIEGO

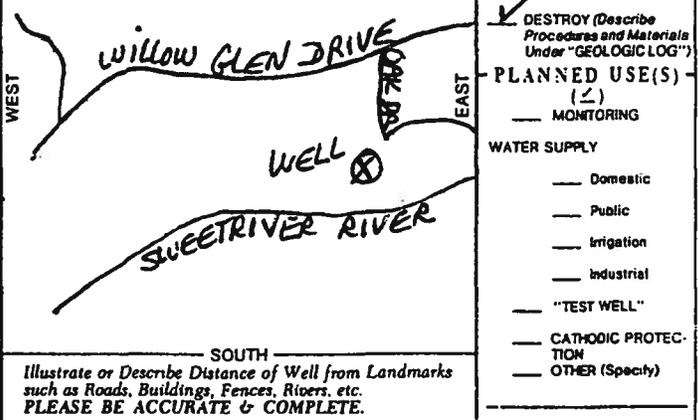
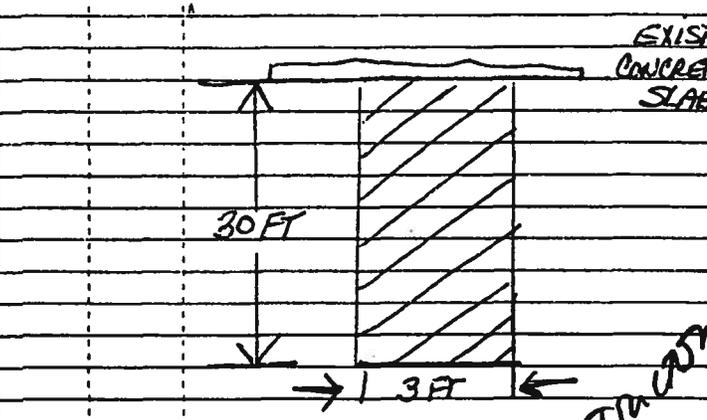
0 30 3 FOOT DIAMETER DUG WELL

WELL WAS DESTROYED BY REMOVING DEBRIS FROM BORE CONFIRMING DEPTH AND PUMPING GROUT (7 SACK SAND AND CEMENT MIX) TO FILL ENTIRE BORE TO EXISTING CONCRETE SLAB SURROUNDING BORE.

APN Book 518 Page 030 Parcel 15  
Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_  
Latitude \_\_\_\_\_ NORTH Longitude \_\_\_\_\_ WEST

CALCULATED BORE VOLUME WAS 7.85 CU YARDS ACTUAL VOLUME PLACED WAS 12.1 CU YDS.

LOCATION SKETCH  
NORTH  
THOMAS BROS MAP SAN DIEGO CO. 1995 #1272-E3



TOTAL DEPTH OF BORING \_\_\_\_\_ (Feet)  
TOTAL DEPTH OF COMPLETED WELL 30 (Feet)

ACTIVITY (∠)  
 NEW WELL  
 MODIFICATION/REPAIR  
 Deepen  
 Other (Specify)  
 DESTROY (Describe Procedure and Materials Under "GEOLOGIC LOG")  
PLANNED USE(S) (∠)  
 MONITORING  
WATER SUPPLY  
 Domestic  
 Public  
 Irrigation  
 Industrial  
 "TEST WELL"  
 CATHODIC PROTECTION  
 OTHER (Specify)

DRILLING METHOD \_\_\_\_\_ FLUID \_\_\_\_\_  
WATER LEVEL & YIELD OF COMPLETED WELL \_\_\_\_\_  
DEPTH OF STATIC WATER LEVEL \_\_\_\_\_ (Ft.) & DATE MEASURED \_\_\_\_\_  
ESTIMATED YIELD\* \_\_\_\_\_ (GPM) & TEST TYPE \_\_\_\_\_  
TEST LENGTH \_\_\_\_\_ (Hrs.) TOTAL DRAWDOWN \_\_\_\_\_ (Ft.)  
\* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE Ft. to Ft.	BORE-HOLE DIA. (Inches)	MATERIAL GRADE	CASING(S)		
			INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0 to 30	3	CONCRETE			

DEPTH FROM SURFACE Ft. to Ft.	ANNULAR MATERIAL TYPE			
	CE- MENT (∠)	BEN- TONITE (∠)	FILL (∠)	FILTER PACK (TYPE/SIZE)
0 to 30				

- ATTACHMENTS (∠)
- Geologic Log
  - Well Construction Diagram
  - Geophysical Log(s)
  - Soil/Water Chemistry Analysis
  - Other

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

NAME TRI-COUNTY DRILLING INC.  
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 9921 CARMEL MON. RD. SD CA 92129  
CITY STATE ZIP

Signed [Signature]  
WELL DRILLER/AUTHORIZED REPRESENTATIVE

DATE SIGNED \_\_\_\_\_  
C-57 LICENSE NUMBER 547737

LWELL - 000545

DEH USE ONLY
PERMIT # W
WELL COMPUTER #
FEE: _____
WATER DIST: _____



**SCANNED**  
**COUNTY OF SAN DIEGO**  
**DEPARTMENT OF ENVIRONMENTAL HEALTH**  
**WELL PERMIT APPLICATION**

DATE: 6/3/14

1. Property Owner: Premier Golf Properties - Cottonwood Golf Club Phone: 619-912-6081  
3121 Willow Glen Dr. El Cajon 92019  
Mailing Address City Zip

2. Well Location - Assessors Parcel Number 518-030-21  
3121 Willow Glen Dr. El Cajon 92019  
Site Address City Zip

3. Well Contractor - Well Driller Mike Thing Company Name: Mike Thing Well Drilling  
P.O. Box 2671 Alpine 91903  
Mailing Address City Zip

Phone#: 619-478-2566 C-57# 083908  Cash Deposit  Bond Posted

4. Use:  Private  Public  Industrial  Cathodic  Other Irrigation

5. Type of Work:  New  Reconstruction  Destruction Time Extension:  1st  2nd

6. Type of Equipment: Air rotary

7. Depth of Well: Proposed: 100' Existing: \_\_\_\_\_

8. Proposed:

Casing	Conductor Casing	Filter/Filler Material	Perforations
Type: <u>Steel</u>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Depth: <u>20'</u>	Depth: _____ ft.	From: _____ To: _____	From: _____ To: _____
Diameter: <u>12</u> in.	Diameter: _____ in.	Type: _____	From: _____ To: _____
Wall/Gauge: <u>.156</u>	Wall/Gauge: _____	Wall/Gauge: _____	From: _____ To: _____

9. Annular Seal: Depth: 20 ft. Sealing Material: Cement  
 Borehole diameter: 15 in. Conductor diameter: \_\_\_\_\_ in. Annular Thickness 2 1/2 in.

10. Date of Work: Start: 6/2/14 Complete: 6/2/14

**On sites served by public water, contact the local water agency for meter protection requirements.**  
 I hereby agree to comply with all regulations of the Department of Environmental Health, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work, I will furnish the Department of Environmental Health with a complete and accurate log of the well. I accept responsibility for all work done as part of this permit and all work will be performed under my direct supervision.

Contractor's Signature: [Signature] Date: 5/23/14

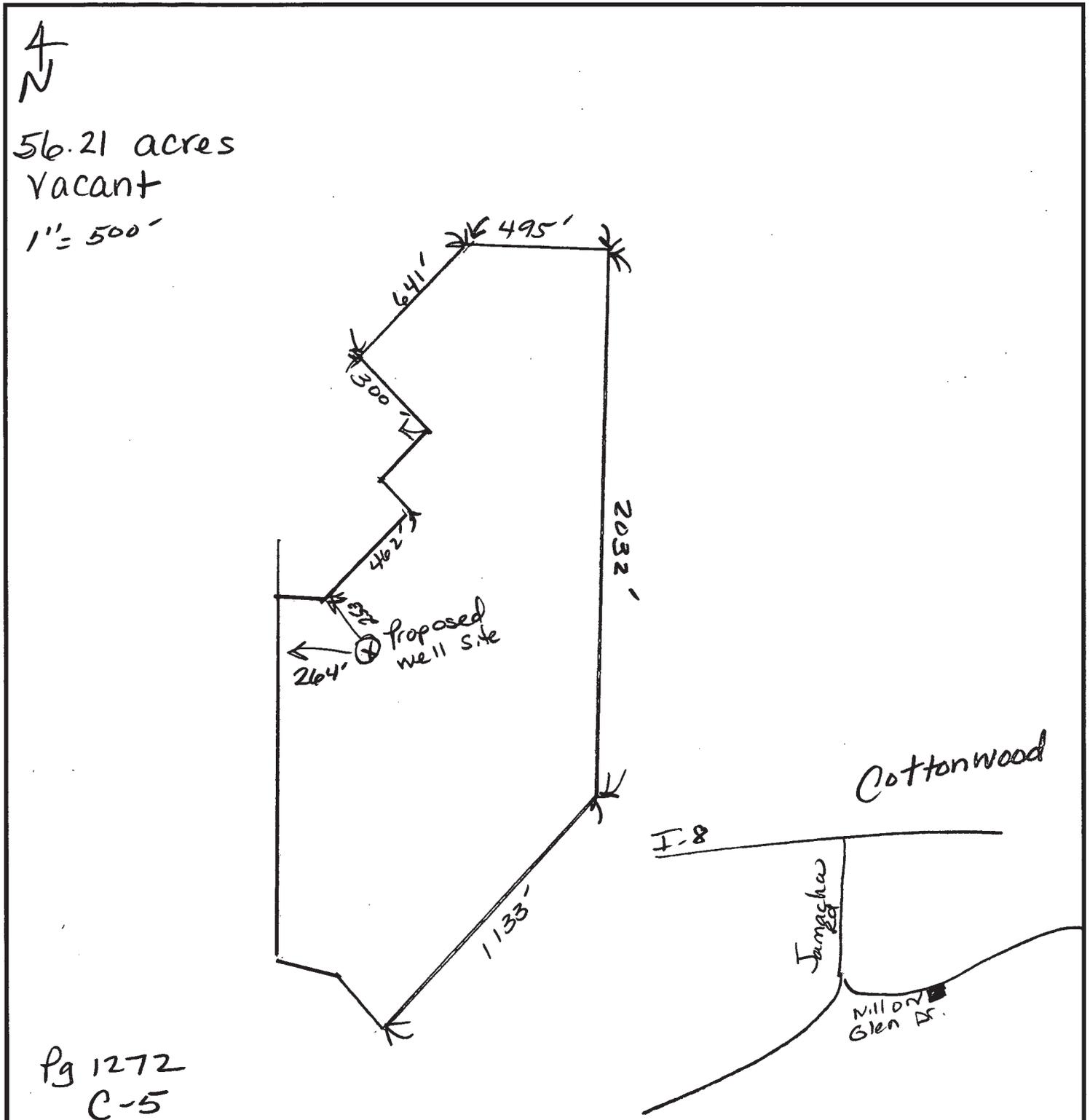
**DISPOSITION OF APPLICATION (Department of Environmental Health Use only)**

Approved  Denied Special Conditions: Grading and clearing associated with access to, or the construction, maintenance or destruction of water wells, may require additional permits from the County of San Diego and/or other agencies. \_\_\_\_\_

Specialist: [Signature] Date: 6-3-14

LOCATION

Indicate below the vicinity and exact location of well with respect to the following items: Property lines, water bodies or water courses, drainage pattern, easements, roads, existing wells, sewers and private sewage disposal systems and other potential contamination sources, including dimensions.





# County of San Diego

## STORMWATER & DISCHARGE MANAGEMENT PLAN FOR WATER WELLS

*This form must be submitted with all Well Permit Applications*

### Department Use Only

Well Permit Application Number: 545

Assessor's Parcel Number: 578-030-21

### SECTION 1. Required Information from Contractor or Consultant:

Longitude & Latitude: 32° 44' 48.65 N 116° 54' 53.39 W How obtained?  GPS  Map  Other

1. Are there any watercourses or water bodies within 50 feet of the limits of soil disturbance?  YES  NO
2. Does the plat show the project boundaries? (A "detail inset" is acceptable for a large parcel or lot.)  YES  NO
3. Does the plat show footprints of any existing structures and facilities within 100 feet of the wellhead position?  YES  NO
4. Does the plat show locations where run-off may enter stormdrains, drainage courses and/or receiving waters?  YES  NO
5. Is grading required to access site or install well?  YES  NO
6. Does the project conform to the local grading ordinance?  YES  NO
7. Will drilling additives be used to drill the well?  YES  NO
8. Are the Best Management Practices attached to this permit application?  YES  NO

### SECTION 2. Best Management Practices

The goal of stormwater and discharge control management planning while drilling and installing wells is to reduce pollution to the maximum extent practicable using Best Management Practices (BMPs). Construction related materials, sediments, chemical residues such as drilling foam, wastes, and spills must be retained within the property boundaries to eliminate transport from the site to nearby streets, drainage courses, receiving waters and adjacent properties. It is the responsibility of the property owner and the contractor to determine which BMPs will be used in order to ensure that all contaminants are retained on-site.

Examples of Best Management Practices to contain well installation run-off include, but are not limited to, installation of a sediment basin to contain run-off, using geotextile fabric to contain sediments and drilling mud, or eliminating the use of drilling foam. (Website information is available at [www.projectcleanwater.org](http://www.projectcleanwater.org))

### SECTION 3. Certification

I have read and understand the following: *(Please check each box after concurrence.)*

- Selected BMP's will be implemented so that water quality is not negatively impacted by well construction activities.
- I am aware the selected BMP's must be installed, maintained, monitored and revised as necessary so they are effective.
- I understand that non-compliance with the San Diego County Watershed Protection Ordinance may result in enforcement actions by the County. These may include fines, citations, stop-work orders, or other actions.
- DEH inspectors and personnel from other regulatory agencies are authorized to enter my property at any time for purposes associated with this well permit until such time the well is completed to the satisfaction of DEH.
- Should DEH determine during the field review that the well installation procedures contradict this Discharge Management Plan or the well permit application, the well drilling permit may be suspended or revoked. Further activity will require a new permit fee and amendment to the existing permit.

Contractor Mike [Signature] Date 5/20/14

Property Owner Premier Golf Properties, L.P. Date 5/20/2014

Reviewed by DEH [Signature] Date 6-3-14

File Original with DWR

State of California  
**Well Completion Report**

Refer to Instruction Pamphlet  
No. XXXXXXX

Page 1 of 1

Owner's Well Number \_\_\_\_\_

Date Work Began 06/23/2014 Date Work Ended 6/27/2014

Local Permit Agency San Diego County Environmental Health Department

Permit Number Lwel-000545 Permit Date 6/3/14

DWR Use Only - Do Not Fill In

State Well Number/Site Number \_\_\_\_\_

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_

APN/TRS/Other \_\_\_\_\_

**Geologic Log**

Orientation  Vertical  Horizontal  Angle Specify \_\_\_\_\_

Drilling Method Direct Rotary Drilling Fluid Polymer mud

**Depth from Surface**      **Description**

Feet to Feet      Describe material, grain size, color, etc

0	60	Sand
60	70	Bedrock
70	72	Fracture 100 GPM
72	80	Bedrock

SCANNED

DATE \_\_\_\_\_

Approved \_\_\_\_\_  
Department of Environmental Health  
Specialist \_\_\_\_\_ Date 11-20-14

**Well Owner**

The information in this grayed area has been blocked from public viewing pursuant to section 13752 of the Water Code and the Information Practice Act of 1977, to protect personal information.

**Well Location**

Address 3121 Willow Glen Drive

City El Cajon County San Diego

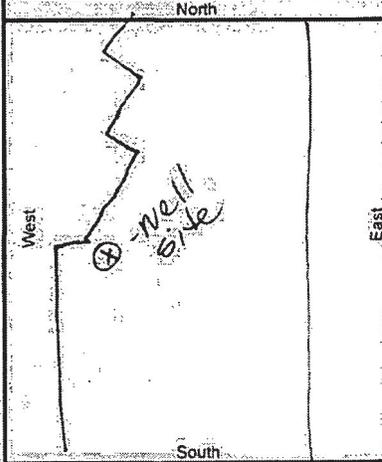
Latitude \_\_\_\_\_ N Longitude \_\_\_\_\_ W

Datum \_\_\_\_\_ Dec. Lat. \_\_\_\_\_ Dec. Long. \_\_\_\_\_

APN Book 518 Page 030 Parcel 21

Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_

**Location Sketch**  
(Sketch must be drawn by hand after form is printed.)



**Activity**

New Well  
 Modification/Repair  
     Deepen  
     Other \_\_\_\_\_  
 Destroy  
Describe procedures and materials under "GEOLOGIC LOG"

**Planned Uses**

Water Supply  
     Domestic  Public  
     Irrigation  Industrial  
 Cathodic Protection  
 Dewatering  
 Heat Exchange  
 Injection  
 Monitoring  
 Remediation  
 Sparging  
 Test Well  
 Vapor Extraction  
 Other \_\_\_\_\_

Illustrate or describe distance of well from roads, buildings, fences, rivers, etc. and attach a map. Use additional paper if necessary. Please be accurate and complete.

**Water Level and Yield of Completed Well**

Depth to first water 70 (Feet below surface)

Depth to Static \_\_\_\_\_

Water Level \_\_\_\_\_ (Feet) Date Measured \_\_\_\_\_

Estimated Yield 100 (GPM) Test Type \_\_\_\_\_

Test Length 3.0 (Hours) Total Drawdown \_\_\_\_\_ (Feet)

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

Casings								Annular Material			
Depth from Surface Feet to Feet	Borehole Diameter (Inches)	Type	Material	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth from Surface Feet to Feet	Fill	Description	
0	20	Blank	Low Carbon Steel	188	12			0	20	Cement	
0	80	Screen	Class 250 PVC	SDR 17	10	Milled Slots	0.032	0	80	Filter Pack Pea gravel	

**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 Mike Thing Well Drilling

Person, Firm or Corporation \_\_\_\_\_

PO Box 2671 Address Alpine City CA State 91903 Zip

Signed [Signature] Date Signed 7/9/2014 C-57 License Number 783908

C-57 Licensed Water Well Contractor

Received

JUL 9 9 REC'D  
County of San Diego  
Dept. of Environmental Health  
Land & Water Control Div.

4/13  
Log Road  
to El Cajon

# 7055  
COUNTY OF SAN DIEGO  
DEPARTMENT OF PUBLIC HEALTH

519-010-25

Page 1 of 2 pages

LWA - 7055

WELL PERMIT APPLICATION  
1600 PACIFIC HIGHWAY SAN DIEGO, CA. 92101

Permit No. W00313

<b>TYPE OF WORK (Check)</b> New Well <input checked="" type="checkbox"/> Repair or Modification <input type="checkbox"/> Time Extension <input type="checkbox"/> Destruction <input type="checkbox"/>	<b>USE (Check)</b> Individual Domestic <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> Agricultural <input type="checkbox"/> Community <input type="checkbox"/> Industrial <input type="checkbox"/> Other <input type="checkbox"/>	<b>EQUIPMENT (Check)</b> Rotary <input type="checkbox"/> Cable Tool <input type="checkbox"/> Other <input checked="" type="checkbox"/>
---	---	---

<b>PROPOSED WELL DEPTH</b> Max. <u>200</u> Min. <u>200</u> (Feet)	<b>PROPOSED CASING</b> Type <u>Steel</u> Depth <u>20</u> Diameter <u>7"</u> Wall or Gage <u>145</u>
--	--

**PROPOSED SEALING ZONE(S)**

From 20 to 20 Feet

From \_\_\_\_\_ to \_\_\_\_\_ Feet

From \_\_\_\_\_ to \_\_\_\_\_ Feet

**PROPOSED PERFORATIONS OR SCREEN**

From \_\_\_\_\_ to \_\_\_\_\_ Feet

**SEALING MATERIAL (Check)**

Neat Cement  Puddled Clay   
 Cement Grout  Concrete

**DATE OF WORK**

Start 4-1-84

Completion \_\_\_\_\_

**NAME OF WELL OWNER**  
Ernest Kotnik

**NAME OF WELL DRILLER**  
Jack VanMatte

**LOCATION OF WELL** 3628 Willow Glen Dr  
El Cajon

**COMPANY**  
County Well Drilling

**DISPOSITION OF APPLICATION (FOR HEALTH OFFICERS USE ONLY)**

APPROVED  DENIED

APPROVED WITH CONDITIONS

**BUSINESS ADDRESS**  
Box 198 Alamo

**LICENSE NUMBER** 424587 **Cash Deposit**   
**Bond Posted**

Report Reason(s) for Denial or Necessary Conditions Here:

Well to meet all state & County Regulations

60  
\$25 Fee paid on 3-15-84  
0393053

I hereby agree to comply with all regulations of the Department of the Public Health and with all ordinances and laws of the County of San Diego and of the State of California pertaining to well construction, repair, modification and destruction. Immediately upon completion of work I will furnish the Department of Public Health with a complete and accurate log of the well

Jack VanMatte  
APPLICANT'S SIGNATURE  
3-14-84  
DATE

[Signature]  
HEALTH OFFICER  
3/15/84  
DATE

519-010-04

Kotnik, Ernest

550E 73M7

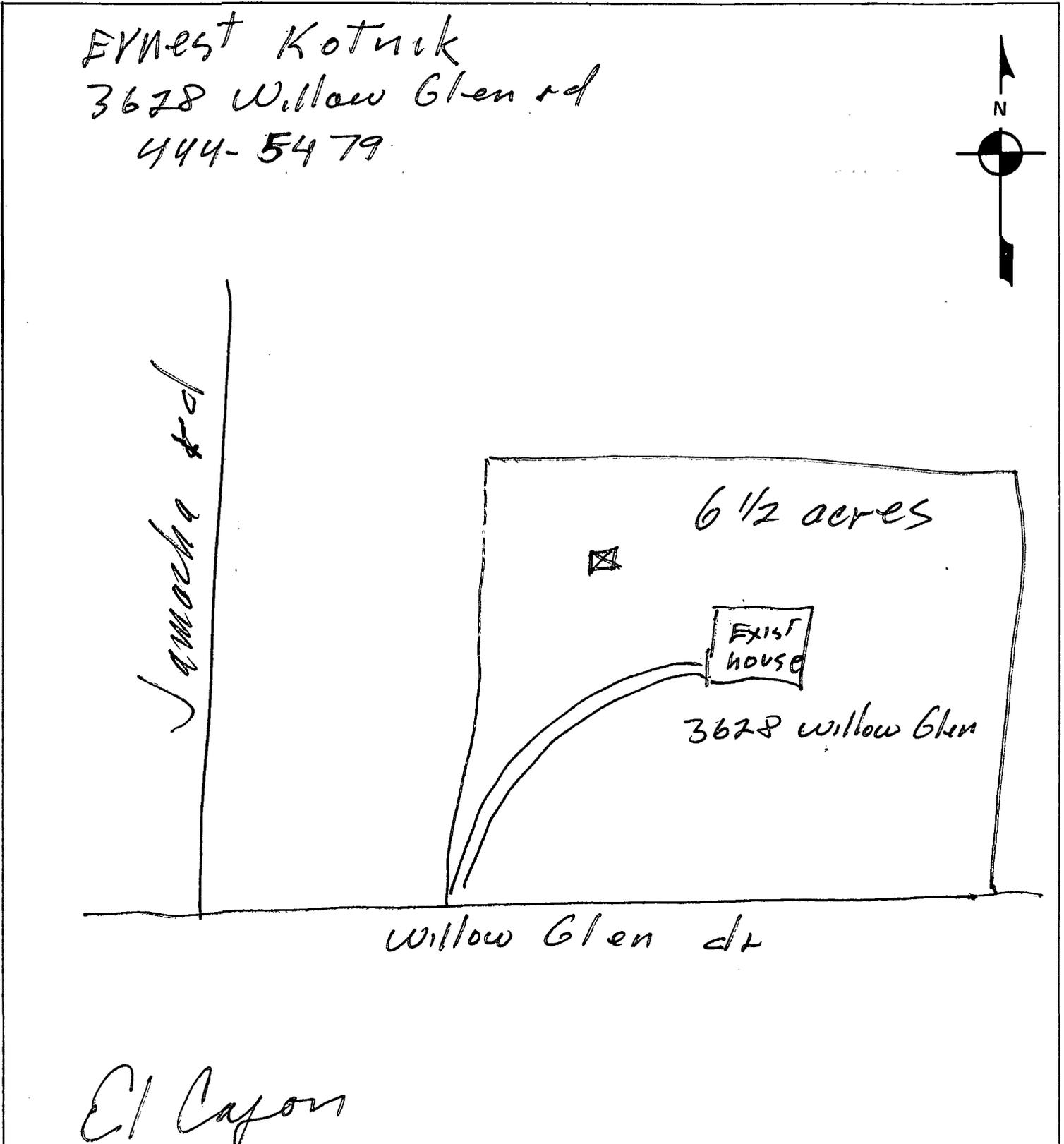
Padre

Permit No. W00313

Assessor's Parcel No. 519-10-25

LOCATION

INDICATE BELOW THE EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS. INCLUDE DIMENSIONS.



FIRST CARBON COPY

Katruk  
W00313

COUNTY OF SAN DIEGO  
DEPARTMENT OF HEALTH SERVICES  
1700 PACIFIC HIGHWAY, SAN DIEGO, CA 92101

ASSESSORS PARCEL NUMBER:

519 10 25

Notice of Intent No. W00313  
Local Permit No. or Date \_\_\_\_\_

WATER WELL DRILLERS REPORT  
(INSERT under ORIGINAL PAGE w/carbon of State Form)

State Well No. 1  
Other Well No. \_\_\_\_\_

The information in this grayed area has been blocked from public viewing pursuant to section 13752 of the Water Code and the Information Practice Act of 1977, to protect personal information.

(12) WELL LOG: Total depth \_\_\_\_\_ ft. Depth of completed well \_\_\_\_\_ ft.  
from ft. to ft. Formation (Describe by color, character, size or material)

(2) LOCATION OF WELL (See instructions):

County SD Owner's Well Number \_\_\_\_\_

Well address if different from above \_\_\_\_\_

Township 519 Range 10 Section 25

Distance from cities, roads, railroads, fences, etc. \_\_\_\_\_

0-4 Top Soil  
4-20 Unconsolidated  
20-240 D.C. Quartz

DEPARTMENT USE ONLY

Completed Well Construction:

Date 3/26/84

Date Inspected 4/25/84

Comments Annular seal to ground surface

Water Sample Taken? No

Sanitarian's Approval: [Signature]

(3) TYPE OF WORK:

- New Well  Deepening
- Reconstruction
- Reconditioning
- Horizontal Well

Destruction  (Describe destruction materials and procedures in Item (2))

(4) PROPOSED USE:

- Domestic
- Irrigation
- Industrial
- Test Well
- Stock
- Municipal
- Other

J.D.G.P.M.

(5) Equipment:

- Rotary  Reverse
- Cable  Air
- Other  Bucket

(6) Gravel Pack:

Yes  No  Size \_\_\_\_\_  
Diameter of above \_\_\_\_\_  
Packed from \_\_\_\_\_ to \_\_\_\_\_ ft.

(7) Casing Installed:

Steel  Plastic  Concrete

(8) Perforations:

Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Wall	From ft.	To ft.	Slot Size
<u>0</u>	<u>20</u>					

(9) WELL SEAL:

Was surface sanitary seal provided? Yes  No  If yes, to depth 80 ft.

Were strata sealed against pollution? Yes  No  Interval \_\_\_\_\_ ft.

Method of sealing Cement

Work started 3-25-84 Completed 3-26-84

(10) WATER LEVELS:

Depth of first water, if known 80 ft.

Standing level after well completion 80 ft.

WELL DRILLERS STATEMENT: I hereby declare under penalty of perjury that the information provided in this report is true. This water well was installed in compliance with San Diego County Code and State of California, Department of Water Resources, Bulletin No. 74.

(11) WELL TESTS:

Was well test made? Yes  No  If yes, by whom? driller

Type of test Pump  Bailer  Air lift

Depth to water at start of test 80 ft. At end of test 80 ft.

Discharge 20 gal/min after 1 hours Water temperature \_\_\_\_\_

Chemical analysis made? Yes  No  If yes, by whom?

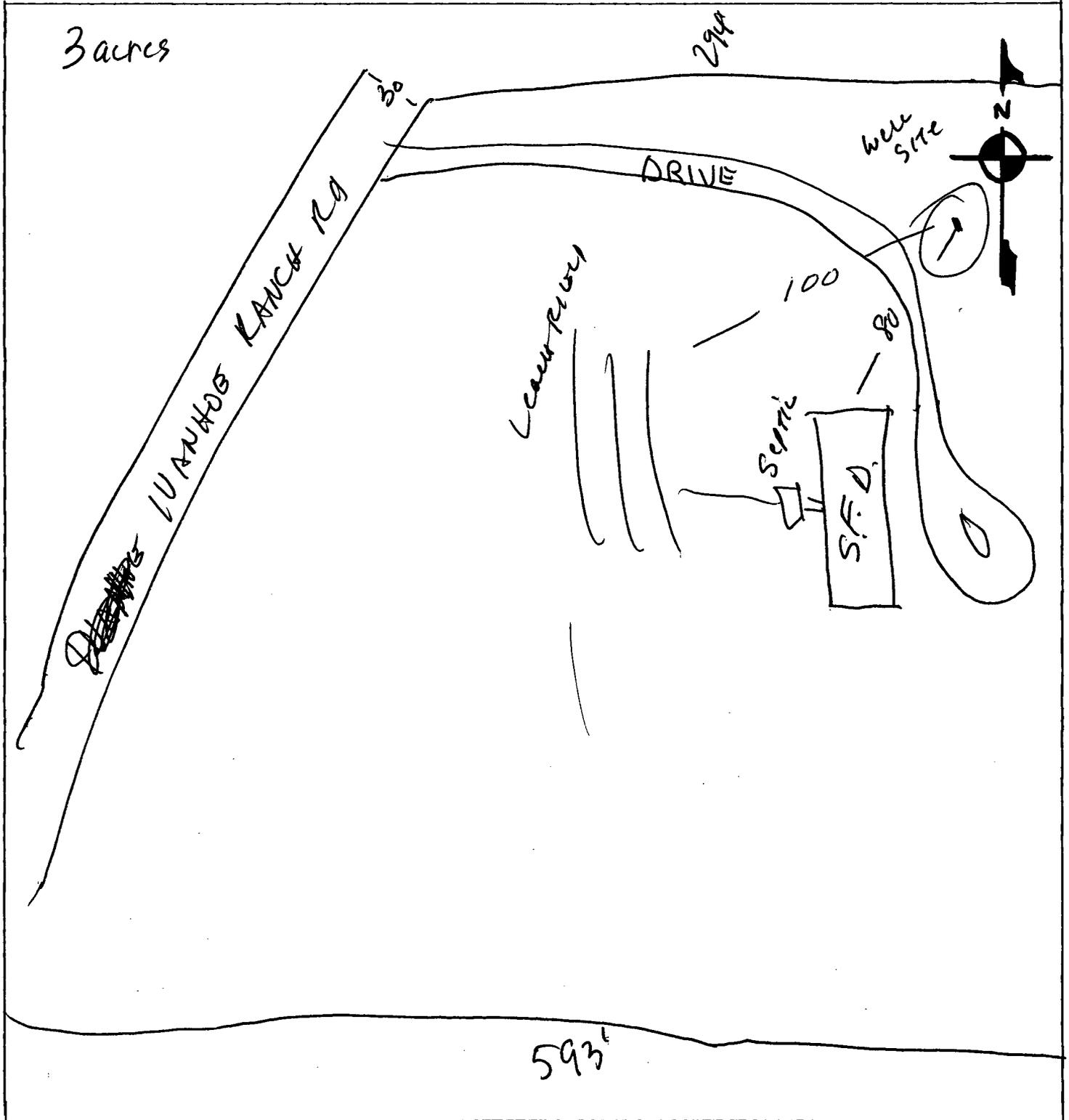
Was electric log made? Yes  No  If yes, attach copy to this report

SIGNED [Signature]  
NAME County Well Drillers  
(Person, firm, or corporation) (Typed or printed)  
Address PO Box 198  
City Alpine CA  
License No. 424587 Date of this report 4-17-84



LOCATION

INDICATE BELOW THE VICINITY AND EXACT LOCATION OF WELL WITH RESPECT TO THE FOLLOWING ITEMS: PROPERTY LINES, WATER BODIES OR WATER COURSES, DRAINAGE PATTERN, ROADS, EXISTING WELLS, SEWERS AND PRIVATE SEWAGE DISPOSAL SYSTEMS AND OTHER POTENTIAL CONTAMINATION SOURCES, INCLUDING DIMENSIONS.



WDR to EC  
11-17-88  
W07535 File

518 030 26

FIRST CARBON COPY

COUNTY OF SAN DIEGO  
DEPARTMENT OF HEALTH SERVICES  
1700 PACIFIC HIGHWAY, SAN DIEGO, CA 92101-2417

Notice of Intent No. \_\_\_\_\_  
Local Permit No. or Date \_\_\_\_\_

WATER WELL DRILLERS REPORT  
(INSERT under ORIGINAL PAGE w/carbon of State Form)

State Well No. \_\_\_\_\_  
Other Well No. \_\_\_\_\_

The information in this grayed area has been blocked from public viewing pursuant to section 13752 of the Water Code and the Information Practice Act of 1977, to protect personal information.

(2) LOCATION OF WELL (See instructions):

County SAN DIEGO Owner's Well Number \_\_\_\_\_  
Well address if different from above \_\_\_\_\_  
Township \_\_\_\_\_ Range \_\_\_\_\_ Section \_\_\_\_\_  
Distance from cities, roads, railroads, fences, etc. \_\_\_\_\_

(12) WELL LOG: Total depth 220 ft. Depth of completed well 220 ft.  
from ft. to ft. Formation (Describe by color, character, size or material)

0-6 OVERBURDEN  
6-34 DC  
34-69 BLK + WH + BRN GRANITE  
69-74 MIXED "  
74-117 BLK + WH "  
117-122 BLK "  
122-220 BLK + WH "

DEPARTMENT USE ONLY

Completed Well Construction:

Date \_\_\_\_\_  
Date Inspected 12-14-90

Comments Well appears to be properly sealed and constructed in accordance with state and county codes.

Water Sample Taken? No

Sanitarian's Approval: James T. [Signature]  
accordance with state and county codes.

(3) TYPE OF WORK:

- New Well  Deepening
- Reconstruction
- Reconditioning
- Horizontal Well
- Destruction  (Describe destruction materials and procedures in Item (12))

(4) PROPOSED USE:

- Domestic
- Irrigation
- Industrial
- Test Well
- Stock
- Municipal
- Other

(5) Equipment:

Rotary  Reverse   
Cable  Air   
Other  Bucket

(6) Gravel Pack:

Yes  No  Size 3/8  
Diameter of above 4"  
Packed from 0 to 220 ft.

(7) Casing Installed:

Steel  Plastic  Concrete

(8) Perforations:

Type of perforation or size of screen

From ft.	To ft.	Dia. in.	Gage or Well	From ft.	To ft.	Slot Size
0	40	6.58	1.88			

(9) WELL SEAL:

Was surface sanitary seal provided? Yes  No  If yes, to depth 40 ft.  
Were struts sealed against pollution? Yes  No  Interval \_\_\_\_\_ ft.  
Method of sealing CEMENT GROUT

Work Started 10-30-88 Completed 10-31-88

WELL DRILLERS STATEMENT: I hereby declare under penalty of perjury that the information provided in this report is true. This water well was installed in compliance with San Diego County Code and State of California, Department of Water Resources, Bulletin No. 74.

(10) WATER LEVELS:

Depth of first water, if known 70 ft.  
Standing level after well completion 35 ft.

SIGNED James T. Manos  
(Well Driller)

(11) WELL TESTS:

Was well test made? Yes  No  If yes, by whom? DRILLER  
Type of test Pump  Sailer  Air lift   
Depth to water at start of test 35 ft. At end of test \_\_\_\_\_ ft.  
Discharge 15 gal/min after 1 hours Water temperature COOL  
Chemical analysis made? Yes  No  If yes, by whom?  
Was electric log made? Yes  No  If yes, attach copy to this report

NAME Manos Drilling  
(Person, firm, or Corporation) (Type or Print)

ADDRESS 16052 LAWSON VLY RD

CITY SAN VICENTE ZIP 92035

LICENSE NO. 276462 DATE THIS REPORT 10-31-88