STONEY-MILLER CONSULTANTS, INC

GEOTECHNICAL ENGINEERING & ENGINEERING GEOLOGY

SAN ELIJO VALLEY GROUNDWATER PROJECT

Prepared for:

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EXECUTIVE SUMMARY

On behalf of Olivenhain Municipal Water District (OMWD), Stoney Miller Consultants, Inc. (SMC) conducted an evaluation of potential groundwater resources in the San Elijo and San Dieguito Valleys. This report addresses the potential for withdrawing 1,600 acre feet per year (AFY) of brackish groundwater from deep bedrock aquifers underlying San Elijo Valley, as well as from the alluvial aquifers of San Elijo or San Dieguito Valleys. The feasibility of the project (the Project) relies on a well field that can sustainably produce 1,600 acre-feet per year (AFY) of treatable groundwater. The Project may require disposal of production brine from the treatment system.

As a part of our evaluation, SMC studied the hydrogeologic properties of the four aquifers that might potentially be used as a resource for the brackish water desalination Project. Our investigation included field research to investigate well development and usage in the area, location and characterization of groundwater quality of existing wells and locating an existing deep well in order to test pump the deep bedrock aquifer. As part of this work, field samples were collected and tested to determine aquifer properties and further aquifer analyses were retrieved from an extensive set of well logs. This Project also included evaluating the two existing groundwater flow models for San Dieguito Valley to help identify the best location for a sustainable Project well field and continues the work of the San Elijo Lagoon Brackish Water Treatment Project by Carollo Engineers (2012) and the preliminary findings made by the US Geological Society..

The key findings of the evaluation for each valley are summarized below.

San Elijo Valley Shallow Alluvial Aquifer

San Elijo Valley was the original preferred location of the proposed San Elijo Valley Groundwater Brackish Water Desalination Project. This area was originally chosen due to the presence of shallow alluvial groundwater of moderate brackish character adjacent to or near the San Elijo JPA Ocean Outfall. The Project requirement for 1,600 AFY of water would be a major impact to the existing groundwater storage of 3,644 acre-feet. However, groundwater recharge from a continuous flow of water in Escondido Creek is deemed more than adequate to continuously recharge the groundwater to ensure sustainability of the basin. As such, the San Elijo Valley appears to be a viable option for the project and two potential locations have been identified to consider for a well field. The well field would need to be composed of three to five wells depending on individual well yield.

San Dieguito Valley Alluvial Aquifer

Based on the available data and modeling, groundwater levels and estimates of safe yield, during both wet and dry periods, indications are such that that 1,600 AFY is available. Records of existing pumping in the basin, or estimates of consumptive use are needed to support this conclusion; however, at this time, we believe that there is a sustainable groundwater supply available to support the Project. The San Diego County Water Authority's Hodges Olivenhain Pumped Storage Project will drastically decrease the more frequent, small spills from Lake Hodges, that were a significant source of recharge for the basin, and this also needs to be accounted for.

Based on our evaluation, the most sustainable Project may involve the utilization of existing private wells in the northern (forebay) region of San Dieguito Valley, generally north of El Apajo Road. Other alternatives include identifying a property in the lower Osuna Valley (Morgan Run Golf Course) or another forebay site where well interference can be minimized and field production can be maximized. Candidate sites include the area tested for the Aquifer Storage and Recovery (ASR) study in 2004 with Coast Sand Quarry and the western portion of El Apajo being slightly more desirable if ownership and environmental issues can be managed.

The City of San Diego considered an Indirect Potable Reuse (IPR) project in the San Dieguito Valley but decided not to pursue the project for permit and other environmental reasons. Use of locally treated Community Service District effluent in the Valley may create an opportunity for IPR use with the Project if permit and hydrogeological and water quality issues can be managed. A critical element for Project success would be the identification of a cost-effective brine management alternative.

Deep Aquifer

The potential for a deep aquifer well field was also studied and determined to have potential to meet District needs. However, wells in deep aquifers are more costly to construct and maintain and would require more wells than an alluvial aquifer to deliver the required supply of groundwater. Deeper water appears to be less saline and the resource is extensive but its long-term recharge potential is unknown and, therefore, the long-term sustainability of the project is unknown. Lab tests and analysis of existing wells indicate that 8-10 deep wells would be needed to meet the Project raw water requirements and, prior to that, a thorough research of recharge potential would be needed. Although it is likely that some dewatering or "mining" may occur, the disconnection between surface-shallow alluvial aquifers and the deeper zones of groundwater make it less likely to create settlement or environmental impacts in the region. This option is considered problematic and a focus on the alluvial systems is recommended.

Project Options

Our studies have allowed us to formulate a likely sequence of options for the Project. Each potential Project location has its own benefits and challenges but, overall, the following sequence is our recommendation for Project development. The options are presented from highest to lowest potential. The decision matrix is included as Table 14.

Option A: Using existing San Dieguito Valley private wells. The wells have produced approximately 120 AFY and the project would increase this to approximately 1,600 AFY. A cost-effective brine disposal method needs to be identified for this option to be feasible. The project could initially be developed for non-potable uses and later converted to a potable project.

Option B: San Dieguito Valley alternative sites in the forebay, or secondarily within the pressure zone of the alluvial aquifer.

Option C: Shallow groundwater wells in alluvium of San Elijo Valley at either La Bajada Bridge or below Manchester Preserve and La Orilla Creek. These areas will require cooperation with the San Elijo Lagoon Conservancy who now owns much of the land where a well field would operate.

Option D: Deep groundwater development from the southern end of Escondido Creek with wells through the Lusardi Formation. This option is not recommended unless the other options are unable to provide the District with the resource needed.

Based on the findings or our investigation, the following recommendations are presented for consideration by the District.

San Dieguito Project Area

- Determine water chemistry, pump production and geophysical logs for the Via de Santa Fe wells. Should additional studies indicate a sustainable supply, evaluate the cost-benefit of purchasing the Via de Santa Fe/El Apajo private wells for the project.

- Inventory production from existing wells.

- Develop an annual groundwater monitoring program in order to establish base flows, recharge dynamics and basin water budget including river flow and climate.

- Conduct a resistivity study between Morgan Run Golf Course and the area west of El Camino Real to determine the current location of high saline water.

- Use the Hargis Associates model to run flow time-distance movement for a potential IPR project using the Community Service District treated effluent and

estimate subsurface flow time from Community Service District Ponds to potential project sites.

San Elijo Valley Project Area

- Install and monitor three shallow wells to develop baseline data to support a potential project in the San Elijo Valley shallow alluvial aquifer: one in the alluvium of La Orilla Creek near the intersection of El Camino Real and La Orilla Road, and two in Escondido Creek with one near Rancho Santa Fe Road and La Bajada in the creek bed and the other within the creek along the easement for the high tension power lines north of Stonebridge Lane.

- Continue to monitor Escondido Creek River flow

- Model the flow and recharge conditions for Escondido Creek and La Orilla Creek to the lagoon area to identify flow time from potential IPR sites.

- Evaluate potential environmental impacts of project.

- Monitor deep aquifer conditions.

Evaluate cost benefit values for brine disposal options for the design project.

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1.0 PROJECT DESCRIPTION

The following report presents the results of Stoney-Miller Consultants, Inc. (SMC) groundwater investigation of the San Elijo and San Dieguito Valleys as described in our proposal dated June 26, 2013. The area of study includes the coastal groundwater basins within the Carlsbad and San Dieguito watersheds, as well as the potential for deep bedrock formation aquifers that underlie San Elijo Valley. In particular, and as a result of studies conducted by the Olivenhain Municipal Water District (OMWD), this study was intended to locate a likely location for a test hole in the Lusardi Formation within San Elijo Valley and to review the potential for an alternative site in San Dieguito Valley where an alluvial well field could be developed.

Prior to the current project, OMWD had considered an Aquifer Storage and Recovery Project (ASR) in the Osuna Valley area of San Dieguito Valley between Morgan Run Golf Course and Fairbanks Ranch Golf Course. This project developed to the point of issuing a Final Environmental Impact Report backed by groundwater studies and modelling of the basin but was halted by Board action. The San Dieguito Valley area is also of interest because the owner of two wells had approached the District about a possible sale and the wells reportedly produce sufficient water for the project needs as recorded in the well completion reports.

As a result of the above conditions, our proposal divided the project into two major work efforts with several tasks in each phase. The San Elijo Valley phase of the project is designed to collect background information on the potential location and productivity of a bedrock well field location in San Elijo Valley. We have also updated the alluvial aquifer potential of the area and evaluated the possibility for Indirect Potable Reuse (IPR) and recharge potential in the upstream area of Escondido Creek. The San Dieguito phase of the Project included a review of the prior EIR including an analysis of the groundwater information and groundwater model and the potential for brine disposal in the valley as access to the Joint Powers Authority San Elijo Ocean Outfall is out of range for a project in the San Dieguito Valley.

1.1 Description of Study Area

The San Elijo Valley Groundwater Project (the Project) was originally conceived to withdraw and treat 1.44 million gallons per day (MGD), about 4.5 acre-feet per day, from the shallow alluvial aquifers within the Escondido Creek Groundwater Basin (formally named the San Elijo Valley Groundwater Basin; groundwater basin 9-23 per the California State Water Resources Control Board) with the intent of using the San Elijo Ocean Outfall to discharge brine. The San Elijo Groundwater Basin includes the alluvial fill within Escondido Creek from Val Sereno to the east basin of San Elijo Lagoon and into La Orilla Creek to the area where El Camino Real intersects La Orilla. The Project was originally planned to withdraw brackish water from alluvial wells and distribute it through pipelines to a new reverse osmosis (RO) treatment plant to be built near Manchester Road and I-5. A complete description of the project can be found in Technical Memoranda 1-4 by Carollo (2010). The project area is shown on Figure 1. The

District also considered other alternatives including a non-alluvial deep well project within the San Elijo Valley Groundwater Basin as well as reconsideration of a project in the San Dieguito Groundwater Basin (State Water Resources Control Board Groundwater Basin 9-12) from the area of Lusardi Canyon southwestwards to the west end of Fairbanks Ranch Golf Course near El Camino Real. The current study area and well locations in the study area are shown on Figure 2 and the watersheds containing the areas of study are shown on Figure 3.

Environmental concerns related to withdrawal of water from the San Elijo Lagoon and Escondido Creek sediments required the District to consider other alternatives. Concurrently, the Water Resources Division of the U.S. Geological Survey proposed to the District that water resources may be held in the sedimentary formations of Eocene and older age in the vicinity of the Project. Other collaborative studies by the USGS and water agencies in the San Diego area have shown the potential for large groundwater reserves in sedimentary rock reservoirs (Flint, et al., 2012). As a result, OMWD and the U. S. Geological Survey (USGS) collaborated on the installation of two shallow piezometers and a 1,190 foot deep eight-inch diameter monitoring well in a single boring in San Elijo Lagoon. The well was tested for aquifer water production, water quality and samples of borehole lithology were collected at set intervals including a continuous core of the lagoon sediments.

Based on groundwater production results from the USGS drilling and well testing, the District decided to expand their project scope beyond the original investigation to identify a potential site for bedrock water resources and to include a review and update of the Aquifer Storage and Recovery project once planned for San Dieguito Valley as well as a reassessment of the potential for an alluvial project in the La Orilla and San Elijo Valleys. This project was designed to incorporate those considerations with a field program to identify the groundwater quality and distribution in San Elijo Valley with a geophysical survey of the valley and a thorough investigation of the wells within the basin. This report contains the data from both the San Elijo Valley and San Dieguito Valley with an assessment of groundwater potential for the design project.

1.2 Previous Studies

1.2.1 U.S. Geological Survey Well in San Elijo Lagoon

The collaborative USGS-OMWD project was conducted during 2012 and resulted in isolated alluvial monitoring wells nested with a deep multi-screened monitoring well located in the center of the lagoon on the lower upstream fill pad for Interstate 5. The location of the monitoring is shown on Figure 2. The deep well was completed to 1,140 feet and screened in four places to intercept potential aquifer zones. As completed, the deep well was artesian with a flow at the surface of 2 to 3 gpm. Inflow to the well totaled about 42 gpm, with the highest flow coming from a 20 to 30 foot thick sandy zone at 650 feet. Under aquifer test conditions, the well capacity was measured to range from 0.08 to 0.15 gpm per foot of drawdown and the aquifer transmissivity was determined to be 428 gpd/foot of aquifer. The water chemistry measured as total dissolved solids (TDS) was very consistent at 1300 parts per million (ppm) with a surface water measured as

1430 ppm. The geology of the well was determined to be alluvial to a depth of 125 feet where it passed through 175 feet of greenish-gray silty sand of the Eocene age Delmar Formation. Below 250 feet, the well was in Cretaceous sediments and below 600 feet was entirely in the semi-compacted conglomeratic sandstone of the Lusardi Formation. Other than a thin zone of sand at 400 feet, all of the inflow of water was from the Lusardi Formation. The USGS data are summarized in their memorandum to the District (USGS, 2013).

1.2.2 Cardno-Entrix Geophysical Survey

To help understand the relationship of the USGS-SDSE well results with the geology and aquifer distribution surrounding the well, Cardno-Entrix was contracted to perform a geophysical study of the lagoon (Cardno-Entrix, 2013). Cardno-Entrix conducted a gravity survey of the lagoon area going partially up Escondido Creek and La Orilla Creeks. The survey was able to distinguish basic rock types from one another based on modeled density contrasts and revealed a secondary zone of weathering and fracturing in the Santiago Peak Formation below the Lusardi Formation. This zone is several hundred feet thick and is a zone from which many bedrock wells draw water throughout the Rancho Santa Fe area. The Lusardi Formation was mapped with a density between that of the Eocene rocks above it and the weathered Santiago Peak rocks. At the site of the OMWD-USGS SDSE well, the Lusardi Formation is shown to lie at a depth of 600 feet and the Santiago Peak weathered rock is at a depth of about 1,500 feet which is consistent with SDSE borehole geology. The survey was unable to distinguish between the Upper Cretaceous shales of the Rosario Group (Cabrillo Formation, Point Loma Formation and Lusardi Formation) from the Eocene Delmar Formation due to similarities in density. Structurally, the gravity survey shows a fairly flat lying sequence dipping about 5° southeast bringing the Lusardi into surface exposures throughout Rancho Santa Fe. This also is consistent with regional mapping of the area. Based on the survey, it was decided that the Lusardi Formation would be best exploited farther up Escondido Creek where multiple shallower less expensive wells could be sited.

1.2.3 San Dieguito Water Storage and Recovery Project EIR

In the early 1990's, OMWD proposed an Aquifer Storage and Recovery Project for the San Dieguito Basin. The proposed project was based on negotiated contracts for recycled water from various North San Diego County agencies to supply water to emerging markets. The project is summarized in a report by Dudek and Associates (September, 1992). At the same time, a study by CH2M Hill (1992), for the San Diego County Water Authority presented a groundwater model of the San Dieguito Basin showing the groundwater changes through time and the potential impacts of recharge and discharge events through time. Subsequently, the District funded a study by Kleinfelder, Inc. and EDAW, Inc. (August, 2004) and contracted Hargis + Associates, Inc. (August, 2004) to conduct a groundwater survey of the area. The survey included a groundwater model to predict the impacts of design injection and extraction events at the Project Design location near Morgan Run Golf Course. The Draft EIR was published and circulated in

August of 2004 and the Final EIR with the public comments incorporated was published in December 2004.

2.0 SAN ELIJO VALLEY GROUNDWATER PROJECT AREA

The following sections summarize our field and laboratory work as well as our review of existing geologic, hydrogeologic, and hydrologic data and information for an area surrounding Escondido Creek between Val Sereno and San Elijo Lagoon. Collectively, this information will be used to update the existing conceptual hydrogeologic model developed by past investigators (Izbicki, 1983; Foster, 1996) from which alternative water resources can be identified and potentially developed by OMWD. As part of this work, alternatives for using IPR to recharge the basin will be evaluated.

2.1 Scope of Work Performed

Work tasks completed by SMC and included in this section of the report are identified in the proposed scope of work as Task 1 of SMC's *Proposal for Task Specific Consulting Services* (SMC, 2013) and include the following subtasks:

1. A multi-method geophysical survey upstream from the lagoon area and previous gravity survey;
2. A search for, and analysis of, a previously reported deep well near the lagoon-river boundary at Manchester Avenue called the Turner #1 Well which was originally an oil exploration well;
3. An effort to determine the hydrologic properties of the Lusardi Formation;
4. A cost-estimate for the development of a pilot test hole and production well field;
5. An analysis of the potential for Indirect Potable Reuse and other recharge needs and methods for the project; and
6. A simple groundwater model of the area.

Findings and recommendations relative to these tasks are presented later in this report.

2.2 Geophysical Investigation

SMC contracted with Dr. John Jansen (formerly with Cardno-Entrix Inc.) at Leggett, Brashear's & Graham (LBG) to provide a geophysical survey of the San Elijo Valley Groundwater Project area. The field work for the study was completed in January, 2014, and included gravity, Time-domain Electromagnetic Induction (TEM) and high resolution resistivity. The report is attached as Appendix A.

The objectives of the study were to identify and characterize the subsurface geology and hydrogeology of the San Elijo Valley area with the ultimate objective of determining where the most likely location for bedrock well and well field might be. To do this, LBG used two high resolution resistivity lines to map the lateral and vertical grain size distribution of the upper 300 to 400 feet for several hundred feet north of La Bajada Bridge and east of Manchester Road on the west edge of the river basin near Manchester Preserve. TEM was used to map and interpret grain size distributions to depths up to

1,200 feet. A gravity survey was used to map the depth to basement rock and variations in bedrock densities. As completed, the data set was used to map the thickness and location of the permeable zones of the Lusardi Formation and any sand or sandstone units above the Lusardi where present as well as the location of the upper zone of weathered fractured rock of the Santiago Peak Metavolcanic rocks.

2.2.1 High Resolution Resistivity Survey

The resistivity of rock and soil is a measure of its grain size and mineral composition, moisture content and formation water quality. Porous saturated materials containing fresh water (TDS less than 1.000 ppm) have lower resistivity values than unsaturated materials and materials with brackish water have lower values than those with fresh water. More details relative to rock and water properties are presented in the report (Appendix A). For this investigation, two resistivity "lines" were surveyed to understand the subsurface properties of the upper 300 to 400 feet. Due to right of entry restrictions, the surveyed lines were confined to the more southwesterly portion of the basin where the line length was sufficient to achieve the desired depth and access was granted by the San Elijo Lagoon Conservancy to lands under their control. Line locations are shown in the LBG report Figure 3.

Resistivity line R1 was run parallel to Manchester Avenue on the edge of the basin and Figure 3 in the LBG report is a cross section that depicts the interpretation. The modeled profile shows a continuous unit of unconsolidated sands and gravels from the surface to a depth of 35 feet at the southwest end to over 50 feet at the northeast end saturated with brackish water. This zone is separated from a lower sand and gravel zone of fresh water by a confining unit of silt and clay that is 15 to 25 feet thick. The lower unit is traceable to a depth of 100 to 130 feet. The unit is truncated or grades sharply into low resistivity material composed of fine-grained sediment and or brackish water.

Line R2 was run along the east perimeter of the creek north from La Bajada Bridge. This modeled profile is very similar to R1 with the zone of sand and fresh water continuous throughout the profile. The two profiles indicate that a continuous zone of water bearing sandstone, most likely Lusardi Formation, is present under Escondido Creek that is about 200 feet thick and thins to the north to about 100+ feet thick. Wells and short duration aquifer tests conducted during an earlier study (Foster, 1996; wells now abandoned) showed similar geology with TDS values generally at 2,500 ppm from 3 closely spaced samples.

2.2.2 TEM Survey

TEM surveys utilize a closed rectangular transmitter loop 20 meters on a side to create a signal that will penetrate to much greater depths than high resolution resistivity at a single survey point. In all, ten surveys were completed. Based on these individual survey results, LBG composed a modeled profile (see Appendix A, Figure 5) along the survey traverse showing their interpreted geology to a depth of around 700 feet along the whole extent of the study area. Four units were interpreted from the field survey which include a continuous shallow zone of unconsolidated material; unit two underlies one but

is also unconsolidated or highly fractured to weathered bedrock and is not interpreted to be a source of fresh water; unit three is present from 20 feet to 360 feet with isolated zones of fresh water which correlate to the fresh water zones in the resistivity profiles; and unit four is competent crystalline bedrock.

The contact between the Lusardi Formation, which is exposed throughout the area, and the upper Santiago Peak Formation is clearly shown on the profile at a depth of 400 feet at the southwest end of the area to a depth decreasing to 600 feet near Lake Val Sereno. In addition, the profile shows a possible fault to be present at the very southwest end of the profile. Other potential shear zones appear midway up the basin and spotty sections in places in the Lusardi may indicate a coarser zone of conglomerate or consolidation in those areas related to the fanglomerate nature of the Lusardi Formation. LBG interprets the lower resistivity zones in the Lusardi Formation to be freshwater targets. The area at the northeastern end of the profile is near Lake Val Sereno and is potentially a zone of freshwater infiltration within the Lusardi. Here, the zone is relatively shallow at a depth of 50 feet and has a thickness of about 150 feet.

2.2.3 Gravity Survey

The gravity survey was conducted in the field at a series of 19 stations from the intersection of Manchester Road and El Camino Real to the upland areas north of Lone Jack Road. The gravity survey shows a consistent rise in the basement rock along the northeast trend of the survey line. However, the profile shown by LBG (Appendix A, Figure 7) does not calibrate with surface geological mapping at the northeast end of the profile. In actuality, Lusardi Formation rocks are exposed throughout the area around Val Sereno and likely do not grade out as shown in the section. This suggests the specific gravity of the two formations may be too similar in places to distinguish between them based purely on gravity measurements.

2.2.4 Geophysical Survey Conclusions and Recommendations

LBG concludes that siting a well east of the lagoon is problematic owing to the absence of Lusardi Formation and other sedimentary formations from their modeled profiles. Based on TEM data, there may be sections of more highly fractured rock or sandstone zones with fresh water in it that is potentially a candidate for development. Given the results and synthesis of all of the LBG field information, there are several locations of further study and exploration for a production well and well field. These potential production zones include the following:

- Area near TEM 1,4,5,and 6 and R-2 (area of La Bajada Bridge):
  The geophysical results in this area show a zone of about 200 feet of fresh water saturated sandstone. Gravity results also show a thickening of sandstone of the Lusardi Formation here also.

- Area near the southwest portion of R-1 (Manchester Preserve):
  This resistivity profile shows 200 foot thick sandstone with fresh water especially at the west end of the profile. The gravity profile in this area shows this to be Delmar

Formation; however, an interpretation of the geologic maps of the area make it more likely to be Lusardi Formation at this depth. Additionally, the TEM data indicate strong fracturing of the bedrock and a fresh water zone in sandstone below 150 feet.

- Areas near TEM 2 and 7 and gravity stations 13 and 16 (Val Sereno):
  Val Sereno is the low lying area where Escondido Creek turns abruptly 90° south from a west trend. TEM data show a 500 foot thick section of Delmar Formation although geologic maps of the area indicate this is likely to be Lusardi Formation.

- Area near gravity station 17 (all fractured bedrock above Val Sereno):
  The gravity low in this area is interpreted to mean the rock is very fractured and therefore potentially water bearing. The rock is mapped as Santiago Peak Formation and generally not considered a high production water bearing unit.

- Area near gravity stations 14 to 12 and 15 (below Camino del Norte):
  This area is fractured on the TEM cross section and has a deep zone of potential fresh water sandstone. The TEM survey shows two significant fracture zones through the area. Again, gravity is low and may be indicating highly fractured bedrock.

- Area near TEM 8E or 8W or gravity stations 7 and 8 (south end of study area):
  These TEM soundings were near the high transmission lines and a pipeline that passes through the Manchester Preserve area and may reflect interference. However, the readings indicate and support the resistivity reading from the southern profile and may indicate an increasing thickness and abundance of freshwater in the sandstone formation below the site.

The results of the geophysical work indicate water in the subsurface in various rocky formations. However, the findings point to the subsurface formations in the southern end of Escondido Creek as the most promising groundwater resource location. Also, when this study is combined with the previous geophysical study done in the San Elijo Lagoon area, it can be concluded that wells drilled in the southwest portion of Escondido Creek near the lagoon are more likely to hit much thicker Lusardi Formation aquifer materials than those drilled to the northeast. The thicker the groundwater aquifer is the more water can be produced from it.

2.3 Identification and Evaluation of Turner #1 (Deep Well 13S04W24P1)

Previous reports have referred to a deep well in Escondido Creek that was originally drilled in 1926 to be an oil well described in mimeographs and well logs as Cardiff Oil Company #1 Turner Well (hereafter generally referred to as Turner #1) that was later partially backfilled and converted to a water production well. Water conditions at the well were reported by Izbicki (1983) who reported the water quality to be relatively fresh water with a TDS of 1,150 mg/L (milligrams per liter, roughly ppm). The well was found to be on property This deep well was drilled into bedrock down to 2,806 feet deep. It was then converted to a water well about 1,200 feet deep and perforated at 1,000 to 1,100

feet. Finding and testing this well, if it indeed still existed, was deemed an important element of the study.

2.3.1 Historical Records of Well

The original notice of well location is in the "Report on Proposed Operations", No. P-1-13348 records the well as Well No. "Turner " #1 (named after Mr. Stanley Turner, the President of Cardiff Oil Corporation) with the location as Section 24, T13S, R4W and states "the well is approximately in center of the S.E.¼ of the S.W.¼. The elevation of the derrick floor above sea level is about 100 feet". The log handwritten on this form shows it entered hard sand at 560 feet, conglomerate at 842 feet and hard rock at 988 feet.

The "Log of Oil or Gas Well" dated March 15, 1928, shows a very different log of the drilled formations indicating that the well ended in fossiliferous shales at the 2,806 foot depth with good oil cuts. However, the log also indicates that the well entered its first water sand between 1,287 feet and 1,298 feet. The log indicates the drillers were successful at shutting off water in the well at the 1,284 foot depth but at 2,061 feet where they shifted from 8¼" casing to 6¼" casing they could not shut off the water. The field operators pulled the 6¼" casing and sealed the well below 2,061 feet and perforated the 8¼" casing from 1,500 feet down to 2,051 feet and the "Notice of Intention to Abandon Well" dated March 31, 1928, indicates in a note that "the well now pumps fresh water".

The California Department of Water Resources "Well Index" card for the well assigns a well identification number for the well as 13S04W24P01 S B&M (San Bernardino Baseline and Meridian) which is a general location as well as an identifier. A note on the card gives the location as "SW¼, SE¼ of Section 24; 2500' E of Lux Canyon Bl (now El Camino Real) intersection along Rancho Santa Fe Road (now Manchester Road) 150' SE of Rancho Santa Fe road (S10)" and also notes the well is "700' N/o & 2100' W/o SE Cor Sec 24". It further states that the well is plugged at 1,120 feet and perforated from 1,000 feet to 1,100 feet.

Note that the location of the well given for the oil well is the SE¼ of the SW¼ of Section 24 but the note for the same well as a water well says it is in the SW¼ of the SE¼ of section 24. The actual depth and perforated interval of the well is also inconsistent between the two reporting agencies. A hand written note on the DWR fax of the index card notes that the well casing is 1,280 feet deep with a diameter of 8", while the original well log indicates 8¼" casing was placed below 1,284 feet with 12½" casing set from the surface to 1,284 feet.

2.3.2 Well Location and Analysis

A field effort to find this well was a fundamental element of the proposed set of tasks. Since initial surveys had failed to locate the well, SMC searched the aerial photograph collection held by the County of San Diego which holds historical photographs of San Diego County, including the area of the well. A well derrick was identified on Frames C6 and C7 of Flight Line 37 of the 1928 set of images. The derrick has since been removed but the derrick in the image is near the locations described above for the well.

Based on these results, the well was plotted and the owner of the well and parcel number for the well site was identified to be Burtech Real Estate Investments and the owner is Mr. Dominic Burtech. A combined effort to find the well by Mr. Burtech and OMWD has resulted in identifying a buried well on property surrounded by Mr. Burtech's. The property is on APN 26206134 and is jointly held by the Patrick D. O'Keefe Trust and Carlos E. Figuieredo Trust.

2.4 Hydrogeological Properties of the Potential Aquifers

Three potential aquifers exist in the San Elijo Valley Groundwater Basin. These include the alluvial aquifer systems of Escondido Creek and La Orilla Creek, the Lusardi Formation, and the Santiago Peak Metavolcanic Rocks. Each formation is distinctly different and presents different challenges for the extraction of water for the Project. Initially, it was proposed to hand sample the Lusardi Formation in the field and attempt to run permeameter tests on the samples in the lab to estimate the hydraulic conductivity and transmissivity of the rock aquifer. However, fresh outcrops in areas where samples could be taken were limited and only two locations were used to collect samples. To augment and support the lab results, it was decided to retrieve and utilize the water well records and pump tests conducted on actual wells within each of the formations to develop a data base of information from which to derive our estimates. Therefore, all well records for the Escondido Creek-Rancho Santa Fe-San Dieguito Basin were retrieved and summarized for Project use in Tables 1-8. Many of the well records contain data of use for the project including water quality information, pump test results and well construction and lithology. A summary of the aquifer properties and test results are provided in Tables 9 and 10. These tables contain test information as well as conclusions as to project design requirements for the various aquifer systems. The following descriptions of the aquifer properties are derived from these logs and tests.

2.4.1 Alluvial Aquifer Properties

Alluvium in Escondido Creek and La Orilla Creek is derived from elevated basement rocks to the east composed of the Santiago Peak Volcanics, Lusardi Formation and to some extent the Eocene formations that lie on these basement rocks. A detailed study done by Foster (1995) shows that alluvium in Escondido Creek is about 75 feet thick near La Bajada Bridge Crossing where several CPT borings and five wells were drilled through the alluvium and into lower formations. The alluvium is composed of an upper zone of clay and clayey sand below the river channel deposits on top of a lower zone of silty gravel composed of angular clasts of Santiago Peak Volcanics up to boulder size (greater than 1 foot in diameter). CPT probes were unsuccessful in penetrating the gravels below about 40 feet but the wells were drilled through and terminated in Delmar Formation silty sandstone. Alluvium gradually thickens southwestward towards San Elijo Lagoon and thins to 50 feet or less northeastward towards Val Sereno. The creek bed is narrow and contains only stream wash sand and gravel through the mountainous region and into Harmony Grove.

An evaluation of tests on wells in the alluvium ranges greatly in hydraulic conductivity and transmissivity but average 50 feet/day and 2,500 gpd/foot. However, a single well in

Section 19 near the lagoon end of Escondido Creek has a transmissivity of 12,187 gpd/foot and a specific capacity of about 8 gpm/foot of drawdown. The well log shows clay to 27 feet, then sand and gravel to about 60 feet. It is drawing 325 gpm with a total drawdown in the well of 40 feet. The well is constructed with 40 feet of slotted screen through about 30 feet of sand and gravel and if pumped to capacity, could draw 468,000 gpd from the shallow aquifer. Wells in the San Elijo Valley Groundwater Basin and adjacent area are shown on Figure 2. Table 9 shows the values for Transmissivity and Specific Capacity for wells within the study area with an average excluding the highest and lowest values. Since only two wells from the alluvial aquifer in San Elijo Valley are available as logs, the average is not considered meaningful and more value should be placed on the individual well performances.

2.4.2 Lusardi Formation Aquifer Properties

The Lusardi Formation crops out over the Rancho Santa Fe area from Lusardi Canyon northwestwards to the area west of Val Sereno where it begins to be covered by the Eocene Formations. Although it is exposed, it is very weathered and loose and does not really represent the deeper occurrence of the rock as described in the well logs throughout the area or as was reported in the drilling of the USGS-SDSE well in San Elijo Lagoon. Its' transmissive properties are best represented by the aquifer tests done on completed wells in the area. The rock is easily recognizable and distinguishable from rocks above and below the formation based on its distinctive color and conglomeratic nature versus the softer shaly rocks above and the hard metamorphosed volcanic rocks below. Most of the wells that draw water exclusively from the Lusardi Formation, including the USGS-SDSE well, yield water at a rate of about 50 gpm (David Matthews, Fain Drilling, personal communication) and in places have failed to yield water at all.

The transmissivities calculated from the wells in the area range from 180 to 45,000 gpd/foot of aquifer and the wells have specific capacities ranging from 0.09 to 30 gpm/foot of drawdown. The average values (after deleting the lowest and highest values) are 410 gpm/foot and 0.21 gpm/foot with a drawdown in the well of 193 feet to pump 30 gpm. In order to draw sufficient water per well, each well will need to draw from 500 feet of aquifer and eight wells are needed to meet the project demands for a sustainable well field. According to the geophysical survey of the basin, the best location to find this thickness of Lusardi is near the creek-lagoon boundary area near where the deep well described above is located. However, even doubling the aquifer thickness may not greatly decrease the number of wells needed given that drawdown is high for water recovered and the aquifer is not consistently transmissive as shown by the water flow into the SDSE well during pumping. Although the Lusardi Formation can supply significant water, the depth of formation and number of wells needed to supply the project volumes makes it a less tenable alternative to an alluvial well.

<u>Lusardi Formation Lab Test Results</u>

Samples of Lusardi Formation were collected from exposures near the mouth of Lusardi Canyon in order to test the rock for its physical properties. The four samples were tested for grain size, permeability and porosity in order to determine averages for specific yield,

hydraulic conductivity and transmissivity. Three drive samples were collected and one bag sample was taken from the field exposure.

The gradation sample tested out to be a poorly graded gravel with sand (GP in soil terminology) with coefficients of uniformity and curvature that confirm the lab analysis. Poorly graded gravels with very few fines typically have high porosity allowing water to flow easily through it (high permeability). The ring samples tested out to have even higher porosities. An average specific yield (amount of water that can be extracted from saturated pore space) of about 10% and an average permeability of 27 feet/day were calculated for the samples. Transmissivity is a function of aquifer thickness, T=kb, where k is permeability (hydraulic conductivity) and b is the thickness of the aquifer. An aquifer 500 feet thick would have a transmissivity of 13,500 feet^2/day which is equal to 1,800 gpd/foot. Field values average less than this but given the variation of both methods it is a reasonable estimate.

2.4.3 Santiago Peak Volcanics Aquifer Properties

Many wells throughout the Rancho Santa Fe area rely on water from the fracture systems in the Santiago Peak Volcanic Rocks. These rocks are exposed in the hills east of the project area and underlie all younger rocks. The upper surface of the formation is tilted southwestward and deepens towards the coast. Santago Peak metavolcanic rock was not penetrated during the drill of USGS-SDSE in the lagoon though from geophysical interpretations it was within a few hundred feet of the bottom of the well.

Tests conducted on wells throughout the project area that are either entirely screened in Santiago Peak Metavolcanics or are primarily drawing water from that rock have transmissivities that range from 4.62 to 6,250 gpd/foot and average 360 gpd/foot excluding the highest and lowest values. Specific capacities range from 0.00 to 3.13 gpm/foot. It is, therefore, difficult if not impossible to predict the yield from a well drilled in this formation. Wells have reported over 1,000 gpm but without drawdown or test times, it is hard to know just how sustainable such a volume is. Private homeowners can easily sustain their needs with low flow wells but the District could not be assured of finding sufficient water from this rock fracture system. This formation is, therefore, not considered a viable alternative source for the project.

2.4.4 Location and Cost Estimate for Proposed Well Field in San Elijo Valley

Groundwater conditions in the San Elijo Valley present several opportunities to place and test a pilot well for the design project (see Figure 10). An extraction well system in alluvium would be able to utilize a shallow well system that would be considerably less expensive and more productive per well than a system in either the Lusardi Formation or the Santiago Peak Volcanics. Additionally, the recharge for alluvial wells is more directly managed than recharge to deeper aquifer formations. The primary negative aspect of using an alluvial well field is that it needs to be sited towards the southwest region of the basin and near the center of either creek system. This location places the well field near the lagoon and within the lands of the San Elijo Lagoon Conservancy.

2.4.5 Alluvial Well Field

Wells in a well field in alluvium would require at least 20 foot deep sanitary seal. Because of this, a well within the alluvial system of La Orilla or Escondido Creek would only be able to draw water from a 50-60 foot screened interval. Also, given that drawdown in the well could be as much as 40-50 feet, the pump would need to be set at 60 feet, near the bottom of the well and total yield may be less than anticipated. A test well and two adjacent monitoring wells will be needed to determine the efficiency of the area to supply the project. The costs for these wells are estimated below based on numbers supplied by local drilling companies. The costs do not do not include consultant costs.

Estimated Test and Monitoring Well Costs – Three Wells

• Drill three 8" borings to 70 feet (210 foot at $22/foot)	$5,620
• Set casing and screens (40 foot at $7/foot and 170 foot at $9/foot)	$1,810
• Develop wells	$2,000
• Provide and install surface seals	$1,800
• Conduct 24 hour pump test	$6,000
• Store and dispose of test water (est. 100gpm=144,000 gal)	$20,000
• OR, dispose of at SEJPA facility	
• Water quality samples (per truck load; est. 5)	$1,000
• Well abandonment (clean-up and removal)	$6,000
Total Cost	**$44,230**

As can be seen in the estimate, the cost for disposal of the pump test water is a large part of the costs. If other disposal or discharge methods can be arranged, such as use of the SEJPA facility, then costs would be significantly lower.

Assuming four production wells is sufficient, the costs for each well is estimated to be $50,000 and the cost of the individual pump assembly for the well is $75,000. A four well production field would cost $500,000 not inclusive of consultant costs (estimated to be 10% of construction costs).

2.4.6 Lusardi Formation Well Field

As discussed earlier in the report, a well in the Lusardi Formation appears problematic. Low flows throughout the area (50 gpm or less) coupled with the low flow results of the USGS well in San Elijo Lagoon (42 gpm) may not provide sufficient water for the project as budgeted. Nonetheless, a conversation with Dave Matthews of Fain Drilling revealed that wells originally estimated to yield 50 gpm in the Lusardi Formation have produced up to 100 to 200 gpm on final development and release of overpressure from drilling. His recommendation for wells in this formation is to drill an 8" diameter test hole rather than the normal 6½" boring to prevent high pressure impacts to the aquifer. A well field in the Lusardi Formation, however, is likely to require between eight and ten wells to provide the project design water volume at the lower flow rates.

The preferred location of a well field in the Lusardi Formation must take advantage of a maximum thickness of the aquifer as well as a location where the formation is closer to the surface. Based on the geophysical survey, the area in and around the mapped location of the Turner #1 well where Escondido Creek flows into San Elijo Lagoon, is the best location for such a well field. A test well in this area drilled to upwards of 1,000 feet deep would cost about $100,000, excluding consultant costs, and due to the cost would be tested as a single well test to derive site specific aquifer and well efficiency characteristics. If the testing shows that a well field has the potential to satisfy the project demands, then a second well will need to be drilled to determine well interference distances for the number of wells. The estimate of flow and number of wells for the project is based on intercepting 500 feet of saturated Lusardi Formation with an average transmissivity of 410 gpd/foot.

The cost to install a 1,000 foot deep pilot test well is estimated to be $100,000 and the aquifer testing of the well will cost an estimated $40,000 including consultant costs for analysis. Once again, these costs are not adjusted for prevailing wage requirements. The total costs to drill, case, develop and test the well is estimated to be $100,000 with water chemistry and handling of the test water. Some reduction in costs could result from a less expensive discharge process. If the well demonstrates an appropriate set of aquifer properties, a well field would be designed and tested with an addition deep monitoring well. Once field testing is complete, the test well will be reamed and set with steel casing and appropriate screen sections.

Cost Summary of Methods

• Pilot Test Well	$100,000
• Single Well Test	$40,000
• Monitoring Well and Well Field Testing	$150,000
• Reeming of Test Well and Development of Production Well	$250,000
• Drilling and Development of six additional wells	$2,100,000
• Installation of 200 gpm pumps and well heads	$360,000
Total Cost	$3,000,000

These cost values are likely low based on using local drilling companies. Costs will be significantly higher and may double if the District seeks to use surface turbines which require very rigidly maintained vertical walls for the well.

2.5 Potential for Artificial Recharge Including Indirect Potable Reuse

Indirect Potable Reuse (IPR) of water includes the use recycled water that meets regulatory guidelines for non-potable use, treating it further to meet potable water standards then blending it with an untreated potable water supply such as a reservoir, lake or groundwater. Given sufficient time (currently 6 months per RWQCB-DHS regulations), the recycled water will blend with the reservoir water or groundwater and can then be extracted, further treated, then distributed in potable supply systems. Orange County Water District has developed a 70 mgd IPR system treating wastewater and

injecting 35 mgd of this through percolation basins in the Anaheim forebay area of the Orange County aquifer system and injecting 35 mgd to create a sea water barrier near the coast to prevent sea water intrusion. Smaller scale efforts like the one in Orange County have been proposed by the City of San Diego. A San Dieguito Groundwater Basin IPR was evaluated to use treated recycled water from the North City West Treatment Plant blended with potable water and spread into recharge ponds in the basin and later removed and treated to be used in the City's potable water system. However, due to a need to seek an amendment to the RWQCB's Basin Plan and challenges with implementation, the City has abandoned this concept (PBS&J, 2006; Brown and Caldwell, 2012).

In the San Dieguito Valley, recycled water is present at the District's 4S Ranch Wastewater Treatment Facility San Diego's North City West Reclamation Plant and the Santa Fe Valley Reclamation Facility. However, recycled water from these facilities is currently fully utilized and additional resources from them are not likely to be available in the near future. Treated water is currently discharged to ponds by the Rancho Santa Fe Community Services District (RSFCSD), Fairbanks Ranch Community Services District (FRCSD) and Whispering Palms Community Service District (WPCSD). The combined output currently from these facilities is approximately 800,000 gpd discharged into ponds with authorization to treat 1.125 mgd. The authorized total is near the project needs. The water would need to be treated to potable standards (tertiary treatment) and would need to be blended with groundwater for a period of six months before it reaches a pumping well. As the City of San Diego determined, the area has numerous wells but most are north of Morgan Run Golf Course and the confined groundwater at depth could provide an opportunity for IPR to support the project.

IPR for the District project in San Elijo Valley could be implemented through recharge into the Lake Val Sereno wetland area. Alluvium is not very thick in this area and individual home owners downstream have their own wells for water supply so modeling of the transit path for blended water would be a critical element of the plan. The District has recycled water lines in the area which could supply the water for IPR but the recycled water is currently fully utilized. Additional recycled water may not be available so for several reasons, an IPR project in support of the Brackish Water Desalination Project seems unlikely for this basin.

2.6 Groundwater Model of Basin Hydrogeology

Not many private or public wells appear to be drawing water directly from the San Elijo Valley Groundwater Basin (that is the alluvial aquifer system of Escondido and La Orilla Creeks). In addition, water appears to flow year round (see Figure 5), a chart of data supplied by San Elijo Lagoon Conservancy who are measuring the river flow at the Camino Del Norte crossing of Escondido Creek below Val Sereno. Base flow (the lowest sustained flow in the creek) is approximately 27 cubic feet per second (cfs) although in autumn of 2007, it was 0.033 cfs as measured for the month of October. High flow peaks at a maximum of 1841 cfs in 2010. No measurements are made at La Orilla Creek. The average annual flow of the river as measured at Camino del Norte is about 20,000 acre-feet and as much as 40,000 acre-feet flowed in 2010. The values recorded for the water

years 2004 through 2011 provided by the San Elijo Lagoon Conservancy show that water discharge has actually increased substantially in Escondido Creek. As noted by Izbicki (1983), water flow decreased following the installation of the Joint Powers Authority (JPA) Ocean Outfall that follows the creek from the City of Escondido to offshore of San Elijo Lagoon. However, increased urbanization has caused a notable increase in water supply in the river by as much as three times the values given by Izbicki (1983).

Most of this water discharges into San Elijo Lagoon and then into the Pacific Ocean. A portion of the flow recharges the San Elijo Valley Groundwater Basin. Other sources of recharge include agricultural runoff, surface storm runoff, urban runoff, and precipitation. Flows out of the basin include evaporation and transpiration, well water withdrawal and outflow to the ocean. A detailed modeling of the basin water budget is possible using regional data from the San Diego County GIS library. However, for all practical purposes, all recharge to the groundwater basin comes through the river recharge.

2.6.1 Alluvial Basin Model

The basin is estimated by Izbicki (1983) to hold a total of 8,500 acre-feet of water in the alluvium of San Elijo Lagoon, Escondido Creek and La Orilla Creek but most of the water is in the brackish water of the lagoon basin. The volume of sediment in Escondido Creek and La Orilla Creek basins is 28,029 and 8,263 acre-feet, respectively. Using Izbicki's (1983) specific yield number of 0.13 for these basins yields a volume in storage for each basin of 3,644 acre-feet for Escondido Creek and 1,074 acre-feet for La Orilla Creek. Compared to the annual river flow of 20,000 acre-feet per year, a project use of 1,500 acre-feet per year is a sustainable project goal. Since recharge cannot happen unless space is available for the recharging waters to enter, actively and consistently extracting water for the project will provide storage for recharge, otherwise the basin water is discharged to the ocean. This simple water budget model for the basin indicates that an alluvial basin extraction project is sustainable under natural conditions without artificial recharge to the basin.

Under a stream gradient of .004 feet/foot and with a hydraulic conductivity of approximately 100 feet/day (2.95×10^{-2} cm/sec) the recharging waters would travel from the Val Sereno area in the sediment at a rate of 3 feet per day ($V= i\ k/ne$; where 'V' is linear velocity in feet per day, 'I' is hydraulic gradient, 'k' is hydraulic conductivity in feet/day and 'n_e' is effective porosity in %). At this rate, the recharging waters would take about 2,500 days to reach a well field near La Bajada Bridge (Alluvial Well Field A) and 3,000 days to reach the well field near the southwest end of Escondido Creek (Alluvial Well Field B).

2.6.2 Lusardi Formation Water Model

The water flow into and out of the Lusardi Formation aquifer is not easily determined from existing data. Although the rock formation is greatly exposed throughout the Project region, it lies in a region not subject to long sustained rainfall sufficient to saturate the soil enough to recharge the rock aquifer. In fact, at several places throughout Rancho Santa Fe, wells drilled into the formation have not recovered any water. It,

therefore, appears that most of the recharge of this deep aquifer comes through rainfall and river recharge in the higher hills and mountains around the City of Escondido. The rainfall map (Figure 4) shows the project area as within a rainfall zone of 6-8 inches per year with the mountainous region above Val Sereno at 14-16 inches per year on average. Infiltration through the rock exposures depends on vegetation interception, runoff, and soil moisture and rock properties such as porosity and fracture density. Rock of the Santiago Peak Formation is closely fractured throughout with diminished vegetation and therefore does provide a direct pathway for recharge.

The groundwater elevations and depth to groundwater in the bedrock of the project area are shown on Figures 6 and 7, respectively. These maps show the depth to groundwater increasing north and south of the project area and generally at consistent depths from the bedrock high areas east of the project area to the shoreline. The overall pattern seems to indicate that the further away from the primary river channels of Escondido Creek and San Dieguito River a well is, the deeper it is to groundwater. This would also indicate that recharge to the deeper aquifer is a function of inflow from the river systems and standing water bodies within or near them such as Val Sereno, San Dieguito Reservoir, Olivenhain Reservoir and Lake Hodges.

The total volume of water in storage in the Lusardi Formation is difficult to quantify. In places it is fully saturated and in other places it is fully unsaturated. However, the unsaturated area appears to be in the central Rancho Santa Fe area and the aquifer, at least in the higher ground exposures of the rock formation generally north of Camino del Norte Road, seems to be dry while south of the road it appears to become saturated and is entirely saturated below the Escondido Creek and San Dieguito River basins. The Lusardi Formation has an average transmissivity estimated to be 4,506 gpd/foot which indicates a hydraulic conductivity of about 10 feet/day. The water yield from the rock formation is estimated to be 0.10 based on general ranges reported for consolidated sandstones and from laboratory tests of samples of the formation (see Table 9) although this can vary significantly throughout its known areal distribution.

The rock system is exposed from Lusardi Canyon south and east of the San Dieguito River Basin to north of Escondido Creek and is shown in the logs of wells north of Escondido Creek but is either absent or at depths too great to be shown on the logs of wells farther north than about 0.5 miles north of the creek. The approximate areal extent of the Lusardi Formation for the area is 4,286 acres. The average thickness is estimated to be 500 feet and, based on that, the volume of rock is 2,143,000 acre-feet of formation. Using the specific yield of 10% for the aquifer results in a water reservoir of approximately 214,300 acre-feet. Water velocity in the formation is estimated to be about 1 to 3 feet per day. Total recharge per year is estimated to be 350 acre feet per year from precipitation directly onto the formation. Other sources of recharge include agricultural infiltration and river flow. Recharge to the Lusardi Aquifer is less than the extraction for the design project and overall dewatering or (mining) of water is expected. At 1,500 acre-feet a year withdrawal and 350 acre-feet a year recharge, the aquifer will decrease in volume by 1,150 acre feet a year. However, there are a number of other wells in the Lusardi Formation and lower formation and that number is likely to increase.

Assuming these wells draw significant amounts as well, the mining of water could be much more significant.

3.0 SAN DIEGUITO RIVER PROJECT AREA UPDATE

SMC reviewed existing geologic, hydrogeologic, and hydrologic information for the San Dieguito Basin within Osuna Valley (see Figure 2) to identify alternative water resources and areas to artificially enhance recharge so as to maximize production out of the Basin. Collectively, the information developed by this study will further update the existing conceptual hydrogeologic model for the Basin from which alternative water resources can be identified and developed.

3.1 Scope of Work Performed

Work tasks completed by SMC were identified in Task 2 of SMC's *Proposal for Task Specific Consulting Services* (SMC, 2013) and include the following subtasks:

1. Review and evaluate San Dieguito Water Storage and Recovery Project Environmental Impact Report (EIR) Project (Kleinfelder and EDAW, 2004) and support documents;
2. Review and evaluate 2004 groundwater model developed by Hargis + Associates, Inc. (H+A) for the San Dieguito Basin ASR Program.
3. Conduct field investigations to check and update information to the extent possible since the 2004 EIR was published;
4. Update and assimilate water well levels and water quality information from existing wells to the extent available;
5. Determine, to the extent possible, extraction rates over times and water quality for the Via de Santa Fe supply wells;
6. Evaluate options for the disposal of water treatment brine using ponds within the Osuna Valley in coordination with Fairbanks Ranch Country Club.

Findings and recommendations for additional water resources and new wells are summarized in Section 4.

3.2 Review of Past Hydrogeologic Investigations

A number of reports exist that summarize past hydrogeologic investigations. These investigations produced a large body of information that is useful in advancing our understanding of subsurface hydrogeology in the Project area. For San Dieguito Basin, these reports include the following key documents:

Izbicki, John A., 1983, Evaluation of the San Dieguito, San Elijo, and San Pasqual Hydrologic Subareas for Reclaimed Water Use, San Diego County,

California, U. S. Geological Survey Water-Resources Investigation Report 83-4044, 131 p.

CH2M Hill, 1995. Final Report San Dieguito Basin Groundwater Model. April.

Hargis + Associates, Inc., 2004. Hydrogeologic Report Aquifer Storage and Recovery Project, San Dieguito Basin, San Diego County, California. September 14 (Volume 1 and II).

Kleinfelder, Inc. 2004. Final Environmental Impact Report for the San Dieguito Water Storage and Recovery Project San Diego, California. December.

A brief summary of key information from these repots is presented below.

3.2.1 U.S. Geological Survey – 1983 Water Resources Investigation

In 1983, the USGS produced a summary hydrogeologic report for several small subareas in San Diego County including the San Dieguito Hydrologic Subarea. The purpose of the report was to compile existing geologic and hydrologic data, inventory wells, and springs and collect groundwater level and quality data. From this work, the suitability of each subarea for reclaimed water use was evaluated.

For the San Dieguito Subarea, Izbicki's study is the first comprehensive inventory of hydrologic (i.e., surface water) and hydrogeologic data (i.e., groundwater) for the Basin and formed the basis for subsequent groundwater investigations conducted by CH2M Hill and Hargis and Associates.

In the 1983 report, Izbicki identified that several aquifer types exist in the San Dieguito Subarea including an unconfined and confined alluvial aquifer with specific capacities ranging to 60 gpm/foot with some wells yielding as much as 1,800 gpm in the central portion of the Basin. He concluded that the clean sands and gravels that occurred in buried river channels along the Creek were the most productive groundwater zones in the Subarea with transmissivities (i.e., a measure of the rate that water transmits through a unit width of aquifer under unit gradient) ranging to 15,000 square feet/day with an average transmissivity of 4,500 square feet/day. These values are typical of aquifers that are highly productive.

Izbicki also realized that groundwater recharge for the highly productive groundwater zones was from San Dieguito River and that for periods of little to no river flow (i.e., for periods when no spillage from Lake Hodges Damn occurred), recharge to the alluvial aquifer was drastically cut and was predominately from underlying marine sedimentary rocks and from local irrigation.

Based on existing water levels and estimated basin thickness, Izbicki concluded that the Basin was essentially full in early 1982 with approximately 52,000 acre-feet of storage.

For reclaimed water use, Izbicki concluded that because the Subarea has relatively poor groundwater quality (i.e., high TDS from high concentration of chloride, sulfate and sodium chloride either from recharge from underlying marine bedrock and/or saltwater intrusion), the use of reclaimed water as irrigation water would be beneficial, but since storage in the Basin is relatively small there would be little room for reclaimed water during wet weather periods where the aquifer could refill naturally in one season given adequate recharge from the Creek. For extended dry weather periods, ample available storage in the aquifer would exist for reclaimed water which would counteract seawater intrusion and poor water recharge from the underlying marine sedimentary rocks.

3.2.2 CH2M Hill 1995 Groundwater Modeling

In 1995, CH2M Hill with support from Dr. David Huntley (Professor Emeritus of Geological Sciences at San Diego State University) developed a groundwater flow model largely based on the information tabulated by Izbicki (1983). The model was part of a multiple phase project to develop a groundwater management plan for the San Dieguito Basin. This work was performed for the San Diego County Water Authority in partnership with the San Dieguito Groundwater Management Task Force.

The conceptual geologic model developed for the project was a four layer aquifer system (i.e., four lithologic units) with the productive alluvium aquifer identified by Izbicki represented as Layer 3 with transmissivity values ranging between 1,600 and 24,500 sqft/day. The principal source of recharge for this layer was river inflow coinciding with spillage from Lake Hodges.

In the modeling approach, steady state groundwater elevations were simulated for April 1982 and transient groundwater elevations were simulated between September 1944 and April 1982 using a traditional modeling approach that used constant head boundaries for the inflow and outflow boundaries (i.e., eastern upgradient Basin boundary and the Pacific Ocean) with no flow boundaries along the northern and southern edges of the Basin. Precise pumping information was not known and it was assumed that agricultural pumping for the Basin was consistent between 1944 and 1982 at approximately 3.367 acre-feet/day (1,338 acre-feet/year) from wells at Whispering Palms, Chino Farms, and the Griset property.

To calibrate the model, predictive water levels were fitted to levels measured in 1982 by adjusting key parameters until an acceptable match was obtained. These parameters include the following:

- Hydraulic conductivities (K);
- Storage coefficients; and
- Creek leakance parameters.

The results of the model are well documented by CH2M Hill in their 1995 report. In general, the transient and steady state model accurately predicted water levels for the time periods simulated and the model is seen as an excellent tool to understand what caused saltwater intrusion in the Basin in the 1960s and 1970s.

3.2.3 CH2M Hill Model Evaluation by SMC

The computer files for the CFEST model used by CH2M Hill to simulate groundwater flow were obtained by SMC and have been downloaded and evaluated to the extent possible. The CFEST (Coupled Fluid, Energy, and Solute Transport) groundwater flow and transport code is a 3D finite element code used for the simulation of complex groundwater systems and has been historically used over the last 25 years at a number of complex DOD, EPA, and DOE sites. In general terms, the PCFEST code used in 1995 by CH2M Hill (PC for personal computer) is a Fortran or Unix based code and is obsolete as compared to other more commonly used groundwater models such as MODFLOW. CFEST is currently available in an updated format that interfaces with plotting programs like TecPlot and EVS (Environmental Visualization System) and other grid generating programs (e.g., Argus One). CFEST however is currently not a groundwater program commonly used by groundwater professionals.

A water balance for the transient groundwater simulation presented by CH2M Hill between 1944 and 1982 is summarized in Table 11. This water budget in acre-feet per day is also summarized on Figure 11.

As shown on Figure 11, between 1944 and 1982, the alluvial aquifer received virtually no river water until 1978 when Lake Hodges flowed over the spillway. As indicated on Figure 12, the model predicts that groundwater was exiting the Basin at the ocean boundary until around 1961 when the ocean balance became positive as saltwater started flowing into the Basin; a result of increasing heavy pumping (shown as well outflow on Figure 12).

Assuming that the total storage of the Basin simulated is 52,000 acre-feet as estimated by Izbicki (1983) and that the Basin was full in the spring of 1982 (i.e. at 100% storage capacity), estimates of basin storage were made using the water balance presented by CH2M Hill. These estimates are presented in Table 11 and on Figure 12.

As indicated on Figure 12, the long dry recharge period from 1944 thru 1978 shows steadily declining storage with minor recharge events occurring in 1952, 1966, and 1968. In early 1978, Basin storage was potentially as low as 15% with approximately 7,700 acre-feet of groundwater storage remaining (see Table 11). As predicted by Izbicki (1983) and shown on Figure 12, the Basin refilled in less than two years (between February 1978 and January 1980) with spills from Lake Hodges. The volume of water historically released from Lake Hodges (see Table 11) was used by CH2M Hill as guidance in modifying the river conductance function in the model until the model was calibrated with known water levels in the Basin.

As indicated in Table 11, the actual recharge balance from the Creek is in "general" agreement with available discharge data. Time weighted daily creek flow balances were estimated for the Basin based on average daily discharges from Lake Hodges when water was flowing over the spillway and on the Creek balances obtained from the calibrated transient model developed by CH2M Hill. As indicated on Table 11, 9% of the water allowed to spill into the Creek recharges the underlying aquifers during these wet periods

when space is available in the aquifer. This recharge volume is generally supported by recharge estimates developed elsewhere.

Using the values derived above, average daily water balances for periods of wet and dry weather conditions were calculated and are shown graphically on Figures 13 and 14 respectively. As shown on Figure 13, for a period of wet weather (early 1982) considerable river inflow could have occurred as compared to the amount of water that would have left the Basin at the Ocean boundary (approximately 1%) or through pumping (approximately 11%). It would appear that about 36% or 11.65 acre-feet per day of river water may be available for water supply during wet periods of Lake Hodges overflow.

For periods of dry weather, the water balance suggested by CH2M Hill is dramatically different as shown on Figure 14. For late 1977 and early 1978, the model suggests that saltwater intrusion is significant when no available river water is available to meet pumping demands. The availability of river water appears to be the most sensitive recharge feature in the Basin.

3.2.4 Hargis and Associates 2004 Groundwater Model

As part of efforts to evaluate and support the feasibility of an ASR project for 150 acre-feet of water in the San Dieguito Basin, H+A conducted a detailed hydrogeological study of the Basin that included the following:

- Inventory Basin wells;
- Install observation wells to evaluate water levels at select locations;
- Monitor water and river levels at select locations;
- Sample and evaluate groundwater quality at select locations;
- Conduct a geochemical evaluation for ASR water compatibility;
- Conduct a test boring evaluation to verify lithology at select locations;
- Install a test well for ASR testing;
- Conduct aquifer test to characterize aquifer properties;
- Conduct two ASR pilot tests to evaluate impacts on water levels, well capacity, and water recoverability; and
- Revise and re-calibrate a numerical groundwater model of the basin to evaluate ASR project performance and potential groundwater impacts.

The results of this work were presented by H+A (2004) in two volumes which were included in the Kleinfelder, Inc. Final EIR (2004).

Following the ASR pilot tests conducted in Test Well 1 at Morgan Run, H+A concluded the following:

1. No discernable rise in the shallow water table aquifer occurred during the ASR tests in the vicinity of the test well indicating that the overlying confining clay layer (Layer 2 in CH2M Hill and H+A numerical models) is competent;
2. Some limited water table rise occurred in areas north of the test well indicating that the confining layer in this area is less competent (leaky);
3. Injecting and recovering 150 acre-feet annually will not likely affect water levels and water quality in the San Dieguito River (i.e., ASR is unlikely to cause any significant seepage into the Creek); and
4. Groundwater quality in the vicinity of the ASR project would improve; however, recovered water would have slightly higher TDS until a "zone" of improved groundwater quality in the vicinity of the test well develops.

To assess potential impacts of ASR on groundwater and the river and to support the support the EIR, H+A developed a numerical groundwater model for the Basin. The new model was based on CH2M Hill's 1995 work with substantial modifications based on new information collected by H+A. Of significance, H+A dynamically changed the spatial distribution/orientation of high transmissivity zones within the alluvial aquifer (Layer 3) from that originally suggested by Izbicki and used by CH2M Hill in their 1995 model. In 1983, Izbicki contoured the higher transmissivity zones representing clean sand and gravels as relatively large, extensive features that dominated the width of the Basin. Based on lithologic information obtained from H+A's boring program, the zone of high transmissivity in Layer 3 (alluvium aquifer) was reduced to a relatively narrow strip along the San Dieguito River.

In addition to significant changes in transmissivity, H+A also significantly increased pumping in the numerical model based on their hydrogeologic study which included an inventory of Basin wells. As compared to CH2M Hill's model that assumed constant pumping from agricultural and irrigation wells at 3.66 acre-feet/day, H+A assumed quarterly pumping on an annual basis ranging between 4.9 (1st quarter), 1.22 (2nd quarter), 7.35 (3rd quarter), and 11.02 acre-feet/day (4th quarter). Average annual pumping in the model was approximately 6.12 acre-feet/day. This average annual pumping is almost double that considered by CH2M Hill in their 1995 simulations.

Two simulation types were developed by H+A to calibrate their model as follows: first, a steady state groundwater flow simulation was developed and compared against 1982 water levels (a period of relatively wet weather). Heads from this "wet model" were used as a starting point for the subsequent transient groundwater simulation which was develop and calibrated against water levels for relatively dry weather conditions that occurred between 2001 and 2003. This "dry model" was also compared against available 1998 water levels which H+A indicates was a moderately wet weather year. H+A concluded that the calibration of the dry model was reasonable with respect to wet conditions despite the fact that only a limited amount of data was available for the evaluation.

Based on the models developed, H+A concluded the following:

1. Groundwater injection could increase heads in aquifer Layer 3 (confined alluvial aquifer layer) about 10 to 15 feet above the top of a few wells located south of the point of injection (i.e. in and around the Rancho Santa Fe Polo Club);
2. The results of the recovery simulations indicate that drawdown in the confined aquifer Layer 3 (confined alluvial aquifer layer) would not likely affect the capacity of existing nearby production wells (i.e. limited well interference);
3. The maximum increase in the shallow water table aquifer (Layer 1) was less than one foot in areas north of the injection wells; and
4. Injected water would not reach existing production wells for approximately 13 years.

Based on observations from the ASR pilot tests and the modeling results, H+A concluded that it was feasible to inject and recover 150 acre-feet of reclaimed water annually in the southeast corner of Morgan Run Golf Course.

3.2.5 H+A Model Evaluation by SMC

The computer files for H+A's wet and dry weather groundwater flow models were obtained by SMC along with initial head files required to run both the wet and dry weather simulations. The models were developed using Environmental Simulations, Inc. (ESI) Groundwater Vista's version of the USGS's finite difference MODFLOW code. Groundwater Vista is a groundwater modeling software package that is readily available and commonly used by groundwater professionals to run MODFLOW groundwater simulations.

To evaluate the sensitivity of the model and to compare the model in general terms against the work developed by CH2M Hill, the transient water balance for the both the wet and the dry flow simulations were obtained and evaluated. The results are presented in Figures 15 through 18 for the wet weather simulations and Figures 19 through 22 for the dry weather simulations. No ASR simulations were obtained from H+A for evaluation.

Wet Weather Simulations: The water balances for sensitive hydrogeologic features in the Basin (i.e., river inflow and outflow and pumping) for 10 years of simulated wet weather conditions equivalent to 1998 are presented on Figures 15 through 18. As shown on Figure 15, river inflow and outflow are heavily dependent on pumping. More detail of this dependency including changes in storage (i.e., changes in water storage on a cell by cell basis) is provided on Figure 16 for Year 8 and 9. As indicated on Figure 16, as pumping increases, water is removed from storage to meet demand in addition to increasing river inflow and decreasing river outflow. As shown on Figure 16, recharge inflow from precipitation is held consistent in the H+A model. The net water balance for the river and for storage for Year 9 is presented on Figure 17. In conclusion, changes in pumping directly impact the amount of water recharging from the river. This conclusion is in contrast to the conclusions made by H+A based on the ASR pilot tests.

The average annual water balance (i.e., inflow vs outflows) for periods of wet weather are presented on Figure 18. As indicated, inflow vs outflow for the model domain appears to be balanced indicating pumping on the order of 17 acre-feet per day (well outflow plus river outflow) is the perhaps a conservative "safe yield" for the Basin during wet years. This conclusion is tentative given that the model only approximately simulates leakage from the creek and uses MODFLOW's drain function to remove excess water from the river in the upper basin areas (i.e., more water may be available for creek inflow than predicted). More so, given available water in the creek, additional pumping would increase creek inflow and decrease creek outflow, resulting in a potentially larger safe yield for pumping from the Basin. For this Basin, safe yield may not be the best management criteria for maximizing yield from the Basin given that the basin recovers extremely quickly (i.e., with a couple of season of wet weather conditions) from huge over draft conditions as indicated originally by Izbicki and as demonstrated by CH2M Hill's model.

Dry Weather Simulations: The water balances for sensitive hydrogeologic features (i.e., river inflow and outflow and pumping) for 10 years of simulated dry weather conditions equivalent to 2001 through 2003 are presented on Figures 19 through 22. As shown on Figure 19, no river inflow was present for dry weather conditions and river outflow (i.e., water entering the river) is limited and responds negatively with increasing quarterly pumping. This response is shown in more detail on Figure 20 which includes changes in storage on a cell by cell basis. As shown on Figure 20, with increased pumping, storage inflow increases and outflow decreases. Net balances for storage and the river for Year 9 are shown on Figure 21. The trends observed on Figure 20 are similar to those observed for periods of wet weather but with less water available from the river; the amount of water flowing into cells actually increases. It is believed that this may be a phenomenon of the model as water becomes less readily available and is drawn into low water cells as the peripheral areas dewater due to pumping. A more detailed evaluation is needed to confirm this hypothesis.

The average daily water balance (i.e., inflow vs. outflows) for periods of dry weather is presented on Figure 22. For periods of dry weather, approximately 10 acre-feet per day is suggested as the balancing point between available inflow vs. outflow. This is suggested as a conservative "safe yield" for the Basin during dry years. Again this conclusion is tentative given that the model only approximately simulates leakage from the river.

3.3 Recent Water Level Measurements – San Dieguito Basin

Depth to groundwater in available monitoring wells located at Morgan Run was measured by SMC in December 2013. This data is presented with historical groundwater measurements collected by H+A in Appendix B.

As indicated by groundwater elevation recently collected in the piezometers at Morgan Run, it appears that groundwater elevations are equivalent to those observed in March 2004. At this time, the Basin was experiencing a wet weather period although the Basin was at full storage capacity.

3.4 Technical Review of Alternative Sites for Additional Water Supply and Aquifer Recharge

As part of our Task 2, alternative ASR sites identified in the EIR by Kleinfelder were technically assessed by SMC as potential locations for additional production wells and for possible locations to artificially enhance aquifer recharge. This assessment focused on identifying favorable hydrogeologic factors for water production and aquifer recharge and did not integrate cultural and/or social factors into our assessment as typically required in an environmental impact assessment under CEQA. This evaluation is qualitative in nature and is seen as general guidance for selecting alternative locations.

The following issues were considered in this evaluation:

- Well interference (i.e., interference with existing production wells);
- General water quality (i.e., TDS);
- Well head protection (i.e., overlying protective confining layer);
- Land settlement and possible high water (i.e., pressure head) impacts associated with extracting and recharging water;
- Proximity to natural recharge potential (i.e., interaction with San Dieguito River); and
- Hydrogeologic factors (i.e., transmissivities, aquifer thicknesses, storage capacity, ease of injection/recharge, impact on shallow water levels, susceptibility to saltwater intrusion, recoverability of injected/recharged water).

Generally, the alternative ASR sites considered in the EIR coincide with potential well field areas capable of producing additional water supply. The amount of production depends on location and on underlying aquifer characteristics. Given the likelihood that any additional production from the Basin may need to be balanced or offset by some type of enhanced aquifer recharge feature (i.e., ASR or other), the suitability of any of the areas listed below for enhanced aquifer recharge is deemed an important component of developing and maximizing future water supplies. To this end, the location of extraction may not necessarily coincide with recharge as discussed below.

The following general areas were considered in the EIR as alternative Sites for ASR:

- Coast Sand Quarry area;
- Western and Eastern El Apajo area;
- Morgan Run Golf Course area;
- Rancho Paseana area;
- Fairbanks Golf Course area; and
- North Polo Fields area.

The alternative areas are presented on Figure 23.

To compare the areas and identify favorable hydrogeologic locations for additional production wells and for aquifer recharge, a suitability ranking similar to that used in the EIR was applied to rank each of the areas.

Coast Sand Quarry Area: The former quarry is located in the northern portion of the Basin and has generally good groundwater quality (i.e., relatively low TDS) and abundant groundwater storage with an existing surface water pond and an underlying alluvial aquifer that is highly transmissive (i.e., sands and gravels), with little fines, and with no confining layer. Alluvium in this area is potentially very thick with the base of alluvium report by Izbicki (1983) as being -60 to -70 feet mean sea level (i.e., 110 feet thick alluvium). This site is relatively large in size (approximately 37 acre site with a 15 acre surface pond) and groundwater appears to be directly connected with San Dieguito River making this location an excellent location for enhancing aquifer recharge. In general, this northern Basin area can be seen as the forebay area (i.e., recharge area) for the Basin. In this area, water from the Creek and from other sources (precipitation and treated water sources) directly recharges both the shallow unconfined water table aquifer and the deeper alluvial aquifer. The forebay area extends downgradient to the south towards Morgan Run where a confining layer of silts and silty clays separates the water table aquifer and the deeper confined alluvial aquifer. The occurrence of this confining layer marks the down gradient extent of the forebay area since surface water downgradient of this point does not directly recharge the deeper confined alluvial aquifer. The northern extent of the confining layer is presented on Figure 23.

Few production wells are located in close proximity of the former gravel quarry with only two key production wells (the Via de Santa Fe wells) approximately ¼ mile south of the former quarry (see Figure 13). These wells are reported to have high yields with production rates up to 800 gpm each. While the zone of influence of these wells is unknown, it not expected to be very significant given the large amount of storage present in the shallow water table aquifer.

Since the alluvial aquifer at the Quarry is predominately sands and gravels and in direct contact with the Creek, enhancing aquifer recharge at this location would not require deep injection wells. However, because the confining clay layer is not present at this location, no well head protection exists for any water supply well. The lack of any well head protection may not be a critical factor since the area appears to be primarily residential with little to no industrial and/or commercial land use present. Risk of contamination from an industrial or commercial spill (i.e., contamination from leaking underground storage tank, etc.) is therefore considered low. However, directly adjacent to the pond is the Rancho Santa Fe Community Services District which treats wastewater and discharges on average 0.275 mgd of treated effluent on site into disposal ponds. The effluent is non-potable but falls within the general standards for secondary drinking water (<1000 ppm TDS).

Since the aquifer is unconfined and predominately sands and gravels, little settlement potential exists at this location. Likewise, since no confining layer exists, little injection pressure would occur from any artificial recharge activity. Any significant rise in the water table with recharge may be naturally mitigated by the Creek which would gain water accordingly with increasing water levels. As indicated by the models developed by CH2M Hill and H+A, the Creek is the major recharge mechanism for the underlying aquifers in the Basin. Recharging the Creek therefore essentially recharges the aquifers.

El Apajo Area: The El Apajo area (El Apajo Road) is very similar hydrogeologically to the Coast Sand Quarry area and adjacent to the Via de Santa Fe well field. Both are located in the upper Basin area and in the forebay area, and in close proximity of the Creek. While little technical information was presented in the EIR by Kleinfelder (2004) concerning groundwater at this area, the underlying aquifer at this location is also unconfined and also likely consists of highly transmissive sands and gravels. An enhanced recharge facility in this area could potentially recharge large volumes of water without the need for deep injection wells. Similar to the adjacent quarry site, no well head protection exists at this location; however, the area is predominately residential on the eastern portion of the El Apajo and vacant/undeveloped land in the western portion.

The residential/eastern portion of El Apajo area is physically closer to the two Via de Santa Fe production wells than the Quarry area. New production wells located in this area may experience considerable interference. Few production wells exist in close proximity of the western portion of El Apajo. Any new production wells on the northwestern side of the Creek may not be influenced by any existing production wells based on available well inventory data.

Because the aquifer is unconfined, little settlement or pressure impacts would exist at El Apajo. Similar to the Quarry area, the western area may be ideal for enhancing recharge to the underlying unconfined water table aquifer since it is in the forebay area and in close proximity of the Creek which ultimately controls shallow water levels.

Morgan Run Golf Course Area: Considerable hydrogeological information is available in the Morgan Run area and it has been demonstrated that an ASR program in this area is technically feasible (H+A, 2005). Work performed by H+A focusing on Test Well 1 indicates that the alluvial aquifer at this location is confined and has reasonably good water quality relative to very poor water quality located further to the west. The underlying alluvial aquifer in this location consists of sands and gravels that appear to extend along the Creek. Available specific capacity data for Test Well 1 indicates the deeper confined aquifer is very transmissive (transmissity values greater than 53,000 gpd/feet) and that production wells in this area are potentially very efficient (see Figure 24) indicating that injection into the confined aquifer is feasible.

Based on the limited water level data presented by H+A, it appears that some production well interference does exist in this area; however, it is does not appear to be significant although a more complete evaluation (i.e., long term monitoring) may be needed to determine the zone of influence of existing production wells. During the ASR pilot tests performed by H+A, the overlying confining layer appeared to be very competent, offering excellent well head protection for any production well in this area. Numerical modeling performed by H+A indicates that the confining layer also allows the lower aquifer to develop considerable injection pressures without significant impacts to shallow water.

H+A observed that the ASR pilot test did not impact the Creek and therefore direct interaction between the deeper alluvial aquifer and river is not suspected. Recharging the confined aquifer in this area would, therefore, require deep injection wells unlike the

forebay area where the Creek is in direct connection with both the water table aquifer and the deeper alluvium aquifer. Given this, a location where the Creek's ability to recharge the basin is greater during wet periods when sufficient water exists is potentially more desirable.

Because the aquifer in the vicinity of Morgan Run is confined with considerable overlying fines silts and silty clays that form the confining layer, settlement issues may be significant if these materials are repetitively wetted and dewatered. The confining layer in this area offers good protection against underlying head pressures from injecting water into the formation. Numerical work by H+A does indicates that heads after injection may be well above ground surface requiring some abandoned wells to be properly sealed if an ASR project were to be developed.

Water quality in this area is relatively poor and degrades (i.e., increases in TDS) with distance to the south (i.e., down gradient towards the Ocean). Water quality data collected by H+A from monitoring wells within the Study Area are presented on Figure 24. As shown on Figure 24, TDS values range between 1,800 and 5,000 ppm within the Study area with separate trend lines occurring with respect to TDS vs. lateral distance away from the Creek. The reason for these separate trends shown on Figure 24 is not known; however, it may be related to the limited amount of time-data available.

As part of the ASR pilot test, H+A indicated that injecting water at Test Well 1 into the deep alluvium aquifer will improve the overall quality of recovered water as a zone of diluted recharge water develops within otherwise high TDS groundwater.

Rancho Paseana Area: Rancho Paseana is a large farm area located east of the Morgan Run Golf Course with little residential and/or commercial land use. As part of the work performed by H+A in 2002, it was discovered this area does not have extensive coarse grained aquifer materials at any depth. This discovery is consistent with remarks made by the facility manager as presented in the EIR by Kleinfelder which indicates the southwestern portion of the farm has poor drainage and remains wet most of the year. This area most likely consists of silts and silty clays consistent with the confining unit observed elsewhere in the Basin.

Based on existing information, this area is not suitable for water production or aquifer recharge.

Fairbanks Golf Course Area: The Fairbanks Golf Course is similar to the Morgan Run area and is a large open area located along the Creek with numerous surface water features and few nearby productions wells. The underlying water table aquifer in this area is relatively shallow and is separated from the deeper alluvial aquifer by the silty confining layer which appears to be competent and extensive to the south.

Water quality in this area is poor and increases in TDS with distance downgradient. As indicated by Izbicki and subsequent studies by CH2M Hill and H+A, the transmissivity of the underlying alluvium decreases significantly with distance downgradient and to the south under this area. In addition, as the distance from the forebay area increases,

production wells in this area would be closer to the Ocean and therefore more susceptible to saltwater intrusion issues if production is not balanced with recharge.

North Polo Fields Area: The North Polo Fields Area is similar to the Fairbanks Golf Course area and is the furthest south (i.e., downgradient) of all the alternative sites considered in the EIR. This area has poor water quality, may have significant saltwater intrusion areas if heavily pumped, and less transmissive aquifer materials (i.e., is composed of fine-grained material) as compared to alternative areas farther up gradient to the north. As indicated on Figure 23, this area may have a few production wells in operation and may have considerable production well interference depending on the nature of the underlying aquifer. Due to the fine-grained nature of the underlying aquifer, this area is not a desirable location of new production wells or aquifer recharge.

3.4.1 Ranking of Alternative Sites

A general comparison of the alternative sites for new production wells and locations to recharge the aquifer is presented below. The ranking uses a three-tiered system similar to that used by Kleinfelder in the EIR to rank the suitability of alternative ASR sites.

The process of ranking the suitability qualitatively consists of assigning a numerical value from 1 to 3 (a score of 1 for low suitability and a score of 3 for high suitability) to each of the criteria as presented in Table 13.

As shown in Table 13, it appears that potential locations in the forebay area of the Basin (i.e., areas where the confining layer is absent) are slightly favored over locations in the pressure zone where the confining layer exists (i.e., Morgan Run Golf Course). Morgan Run was favored in the EIR primarily due to negative cultural and soils suitability factors assigned to the Coast Sand Quarry and El Apajo areas such as a higher population density, lack of well head protection from a confining bed and proximity to the Rancho Santa Fe Community Services effluent ponds. As indicated on Figure 23, an abundance of existing production wells are located just north of Morgan Run where the confining layer is absent. While wells in this area have no well head protection and likely have considerable well interference, they have high potential yields as indicated by the two Via de Santa Fe production wells which are reported to produce up to 800 gpm each.

For potential recharge areas, based on the qualitative suitability rankings presented in Table 13, it also appears that locations in the northern portion forebay area are slightly favored to locations where the confining layer exists (i.e., the pressure zone). As indicated on Table 13, the ease of enhancing recharge in these areas is a key factor given that only relatively shallow wells may be needed to recharge available water in the forebay area. In this area, the Creek likely controls groundwater levels in the shallow alluvium and removes groundwater when levels are high (i.e., gaining stream effect during wet weather periods) or recharges water during periods of low groundwater (i.e., losing stream effects during dry weather periods). Areas in the pressure zone (i.e., Morgan Run) do not recharge directly from the Creek because of the confining layer.

As indicated by the qualitative suitability rankings, it may be technically feasible to add recharge and production in different areas of the Basin depending on the sensitivity of the criteria used. In the comparison presented, all criteria were weighted equally. Given the potential ease of injection in the forebay area, adding water into the existing Sand Quarry ponds or injecting water into shallow wells for extraction downgradient at El Apajo or even Morgan Run may be desirable if well head protection is important. A more detailed numerical analysis is recommended (see recommendation in Section 5.2 below) to investigate these alternatives.

4.0 POTENTIAL FOR ARTIFICIAL RECHARGE INCLUDING INDIRECT POTABLE REUSE

Indirect Potable Reuse (IPR) of water includes the use recycled water that meets regulatory guidelines for non-potable use, treating it further to meet potable water standards then blending it with an untreated potable water supply such as a reservoir, lake or groundwater. Given sufficient time (currently 6 months per RWQCB-DHS regulations), the recycled water will blend with the reservoir water or groundwater and can then be extracted, further treated, then distributed in potable supply systems. Orange County Water District has developed a 70 mgd IPR system treating wastewater and injecting 35 mgd of this through percolation basins in the Anaheim forebay area of the Orange County aquifer system and injecting 35 mgd to create a sea water barrier near the coast to prevent sea water intrusion. Smaller scale efforts like the one in Orange County have been proposed by the City of San Diego. A San Dieguito Groundwater Basin IPR was evaluated to use treated recycled water from the North City West Treatment Plant blended with potable water and spread into recharge ponds in the basin and later removed and treated to be used in the City's potable water system. However, due to a need to seek an amendment to the RWQCB's Basin Plan and challenges with implementation, the City has abandoned this concept (PBS&J, 2006; Brown and Caldwell, 2012).

In the San Dieguito Valley, recycled water is present at the District's 4S Ranch Wastewater Treatment Facility San Diego's North City West Reclamation Plant and the Santa Fe Valley Reclamation Facility. However, recycled water from these facilities is currently fully utilized and additional resources from them are not likely to be available in the near future. Treated water is currently discharged to ponds by the Rancho Santa Fe Community Services District (RSFCSD), Fairbanks Ranch Community Services District (FRCSD) and Whispering Palms Community Service District (WPCSD). The combined output currently from these facilities is approximately 800,000 gpd discharged into ponds with authorization to treat 1.125 mgd. The authorized total is near the project needs. The water would need to be treated to potable standards (tertiary treatment) and would need to be blended with groundwater for a period of six months before it reaches a pumping well. As the City of San Diego determined, the area has numerous wells but most are north of Morgan Run Golf Course and the confined groundwater at depth could provide an opportunity for IPR to support the project.

IPR for the District project in San Elijo Valley could be implemented through recharge into the Lake Val Sereno wetland area. Alluvium is not very thick in this area and individual home owners downstream have their own wells for water supply so modeling of the transit path for blended water would be a critical element of the plan. The District has recycled water lines in the area which could supply the water for IPR but the recycled water is currently fully utilized. Additional recycled water may not be available so for several reasons, an IPR project in support of the Brackish Water Desalination Project seems unlikely for this basin.

5.0 BRINE DISPOSAL ALTERNATIVES

A major concern to developing a brackish water desalination project in the San Dieguito Valley is the management of brine water developed during the treatment process. According to Carollo (2010), the system will treat 1,230,000 gpd with an 83% recovery and of that 17% will be brine at a TDS on the order of three to four times that of the feed water. The Carollo report (2010) discusses the system alternatives including brine disposal in a detailed manner related to total capital costs as well as costs of operation and maintenance. In addition, new projects and concepts have emerged for brine treatment and disposal that may present the District with options beyond what have already been analyzed by Carollo.

5.1.1 Discussion of Carollo (2010) San Dieguito Valley Brine Disposal Alternatives

Carollo (2010) lists three alternatives for brine disposal for a project based in San Dieguito Valley based on using currently active production wells as a groundwater resource. The report describes several methods for handling the disposal of brine including surface water discharge, sewer discharge, deep well injection, evaporation ponds, thermal evaporation, zero-liquid discharge (ZLD), and treatments that approach ZLD. Based on the proposed project location, Carollo recommended the use of brine ponds as the final step in a ZLD scheme. This system would require an additional 19% capitalization for a brine minimization which would also increase the operation and maintenance by 82%. Brine minimization would decrease the brine discharge from 17% down to as little as 2-3% or from 210,000 gpd down to 25,000 gpd.

Carollo proposed a ZLD system with an evaporation pond in the San Dieguito Valley. They also have designed and overseen construction of a similar plant which produces 0.8 MGD and sends brine through a concentrator which reduces it to 4 gpm. The brine slurry then goes to a pond which is about 4 acres in extent. A standard non-ZLD brine pond would need to be far larger to handle the quantity of discharged brine, on the order of 50 acres. The large acreage is due to the fact that evaporation requires great surface area and hence shallow ponds over large square acreage to make it work properly. A third possible method proposed by Carollo is to treat the brine is a two phase RO system with chemical softeners. Carollo engineers have tested this approach in other California settings and achieved a 93% recovery and expect up to a 97% recovery from San Dieguito Valley groundwater. The settled solids are then removed and disposed of in a landfill.

The Carollo proposed options are listed below:

- Disposal of brine from a single RO system in a 50-acre brine pond for evaporation.
    - **Rejected** based on the cost and impact of so much land.
- Zero-Liquid Discharge and 4-acre brine pond for evaporation of slurry.
    - **Selected** as the most economical for the project area.
- Two Phase RO with Intermediate Softeners and solids disposal in a landfill.
    - **Rejected** as too expensive a process.

Other options for brine disposal exist and some were described by Carollo but not considered effective or cost efficient for the San Dieguito basin project. These options include disposal to the local sewer line as proposed by the City of San Diego for their project at North City West Wastewater Facility; disposal to the lagoon in cooperation with the San Dieguito Lagoon Conservancy and Deep Injection Well disposal to the Lusardi Formation.

6.0 CONCLUSIONS

The following conclusions relate to the San Elijo Valley Groundwater Project and the San Dieguito Project areas.

6.1 San Elijo Valley Project Area

Conclusions presented below for the San Elijo are for both the alluvial and deep bedrock aquifer systems.

- The San Elijo Valley Groundwater Basin is a shallow alluvial basin (approximately 80 feet thick) that includes most of Escondido Creek Valley from Val Sereno into the East Basin of San Elijo Lagoon and La Orilla Creek basin below San Dieguito Reservoir. The basin holds approximately 8,000 acre feet of water with a sediment effective porosity or yield estimated to be 0.13. The average flow per year in Escondido Creek is approximately 20,000 acre-feet per year mostly during storm flow events and this is the primary source of recharge to the alluvial basin sediments. Extraction of 1,500 acre-feet of water per year from the basin is potentially sustainable based on the recharge volumes and the limited use of the basin waters.
- Deep aquifer resources in San Elijo Valley include the Lusardi Formation and the Santiago Peak Volcanics. Lusardi Formation conglomerate and sandstone is semi-consolidated with a porosity of approximately 25% and a specific yield of about 10%. Transmissivities range from 180 gpd/ft to as much as 45,000 gpd/ft with an average value of 410 gpd/ft. On average, it would take 8 wells in 500 feet of saturated aquifer to yield the project design flows of 1,440,000 gpd. In the target area for development of a well field, the formation lies at a depth of about 500 feet and is approximately 500 feet thick based on the log of an existing deep well and the geophysical results from the LBG investigation.
- The Santiago Peak Volcanics are a suite of hydrothermally metamorphosed andesitic flows and tuffs that are moderately to closely fractured in places. Transmissivities range from 50 gpd/ft to 6,250 gpd/ft and average 360 gpd/ft from fracture flow. This makes the formation very difficult to predict for well placement and production and the general depth to the formation of greater than 1000 feet makes drilling expensive. A well field of at least 8-10 wells would need to be drilled an average of 1,000 feet into fractured rock system given the average flow from a Santiago Peak Volcanic well of 360 gpd/ft. Granted that wells are known to produce upwards of 1,000 gpm from this formation in a couple places but the predictability of finding such a location is low.
- TDS in groundwater in the basin ranges from a low of 740 ppm to a high of 5000 ppm and averages about 1,550 ppm. The high value is from a well drilled 400 feet deep into the Santiago Peak Volcanics in Rancho Santa Fe adjacent to and east of San Dieguito Reservoir. TDS in the San Elijo Valley alluvium is consistently around 2,500 ppm and the deeper formation waters of the Lusardi Formation tend to be less brackish at 1,500 ppm.
- The potential for using IPR in the San Elijo Valley is considered low due to the thin alluvium and number of private wells along the narrow alluvial basin.

6.2 San Dieguito River Project Area

Based on the scope of work performed, the following conclusions are presented for San Dieguto Basin:

- The balance between water production and Basin storage is heavily dependent on recharge from the San Dieguito River. During periods of dry weather, insufficient flow exists in the Creek to recharge the alluvial aquifer and excessive production can reverse gradients in the lower portion of the Basin causing saltwater intrusion. During periods of wet weather, flow in the Creek can rapidly recharge the Basin and prevent saltwater intrusion despite heavy pumping.
- Recharge to the deep alluvial aquifer occurs mostly in areas of the upper Basin where there is no confining layer. The majority of the existing production wells in the Basin are located in this area, tentatively called the forebay area.
- The ASR pilot tests conducted in the deep alluvial aquifer at Morgan Run Golf Course indicates that the confining layer is competent and isolates the Creek and shallow water table aquifer from deep aquifer pumping and/or injection. The lateral extent of this confining layer appears to be significant in the middle and lower portion of the Basin, forming a large down gradient pressure area.
- Spill volumes from Lake Hodges adjusted to the numerical daily river balance obtained from CH2M Hill's numerical model indicates that it only takes 9% of the water spilling over Lake Hodges Dam to recharge the aquifer on average. Based on water balances obtained from H+A's numerical models, a safe yield of about 17 acre feet per day is suggested for periods of wet weather. For periods of dry weather, approximately 10 acre-feet per day is suggested as a reasonable safe yield.
- Based on the qualitative ranking of alternative locations for additional production, it appears that potential locations in the forebay area of the Basin (i.e. areas where the confining layer is absent) are slightly favored over locations in the pressure zone where the confining layer exists (i.e. Morgan Run Golf Course). Wells in the forebay area do not have any natural well head protection however they have high potential yields as indicated by the two Via de Santa Fe production wells which are reported to produce up to 800 gpm each.
- Although others have considered and discarded an IPR groundwater project for the area, it is possible that an IPR could be managed if the three community service district effluent discharge could be used and the model of the subsurface flow and blending time period can be shown to work for the deep aquifer portion of the alluvial aquifer system near Morgan Run Golf Course.

7.0 RECOMMENDATIONS

The following recommendations are made for each subarea based on the scope of work performed.

7.1 San Elijo Valley Project Area

- Install and monitor three shallow wells: one in the alluvium of La Orilla Creek near the intersection of El Camino Real and La Orilla Road, and two in Escondido Creek with one near Rancho Santa Fe Road and La Bajada in the creek bed and the other within the creek along the easement for the high tension power lines north of Stonebridge Lane.
- These wells should have transducers in them for long-term data collection and each should monitor simple groundwater quality on a monthly basis. These potential well field locations should be monitored to determine true site groundwater elevations and fluctuations over time and should be tested to evaluate aquifer physical properties. These data will allow for a decision to be reached as to what location best physically suits the project demands and sustainability of the resource.
- A deep well in the Lusardi Formation is not recommended for the project due to the cost and lack of hydrogeologic data about the sustainability of such a well field.

7.2 San Dieguito Project Area

- Evaluate the cost-benefit of purchasing the Via de Santa Fe wells for the project. Although these wells are located where an IPR would most likely not be approved, they have benefits such as being in a thick sand and gravel zone adjacent to a pond and in a position that is probably up gradient of the community service district ponds. The flow could be evaluated using the H+A model or an extension of that model.
- Inventory existing production wells: A full assessment should be made of all production wells in the San Dieguito Valley along with seasonal pumping rates. The amount of extraction in the Basin is uncertain and varies dramatically between historical researchers;
- Develop an annual groundwater monitoring program: In order to develop the existing numerical models, basic hydrogeologic information is needed at key locations. This includes at a minimum, deep and shallow groundwater elevations, groundwater quality, precipitation, and river flow. The monitoring wells are already installed and the monitoring of the Basin here is important to establish the groundwater fluctuation and recharge impacts of both baseline and precipitation or spill from Lake Hodges. In addition, the monitoring will establish a baseline by which the current safe yield can be determined and evaluated against the well pumpage in the area and the project design pump quantities. CASGEM guidelines specify the need for such a monitoring program and if possible the program should include other wells in the vicinity to fully assess the basin geology and hydrogeology.
- Saltwater wedge study: A resistivity study should be considered west of El Camino Real to determine the current location of high saline water and indicator/monitoring well should installed and instrumented to measure changes in salinity over time; and

- Use the H+A numerical model to determine the flow rate for the deep aquifer under project level pumping conditions (1,000 gpm). Alternatively, conduct tracer dye tests in the deep aquifer. These results will be a basis for an IPR using the treated Community Service District effluent discharge.
- Evaluate the cost benefit options for project design brine disposal.

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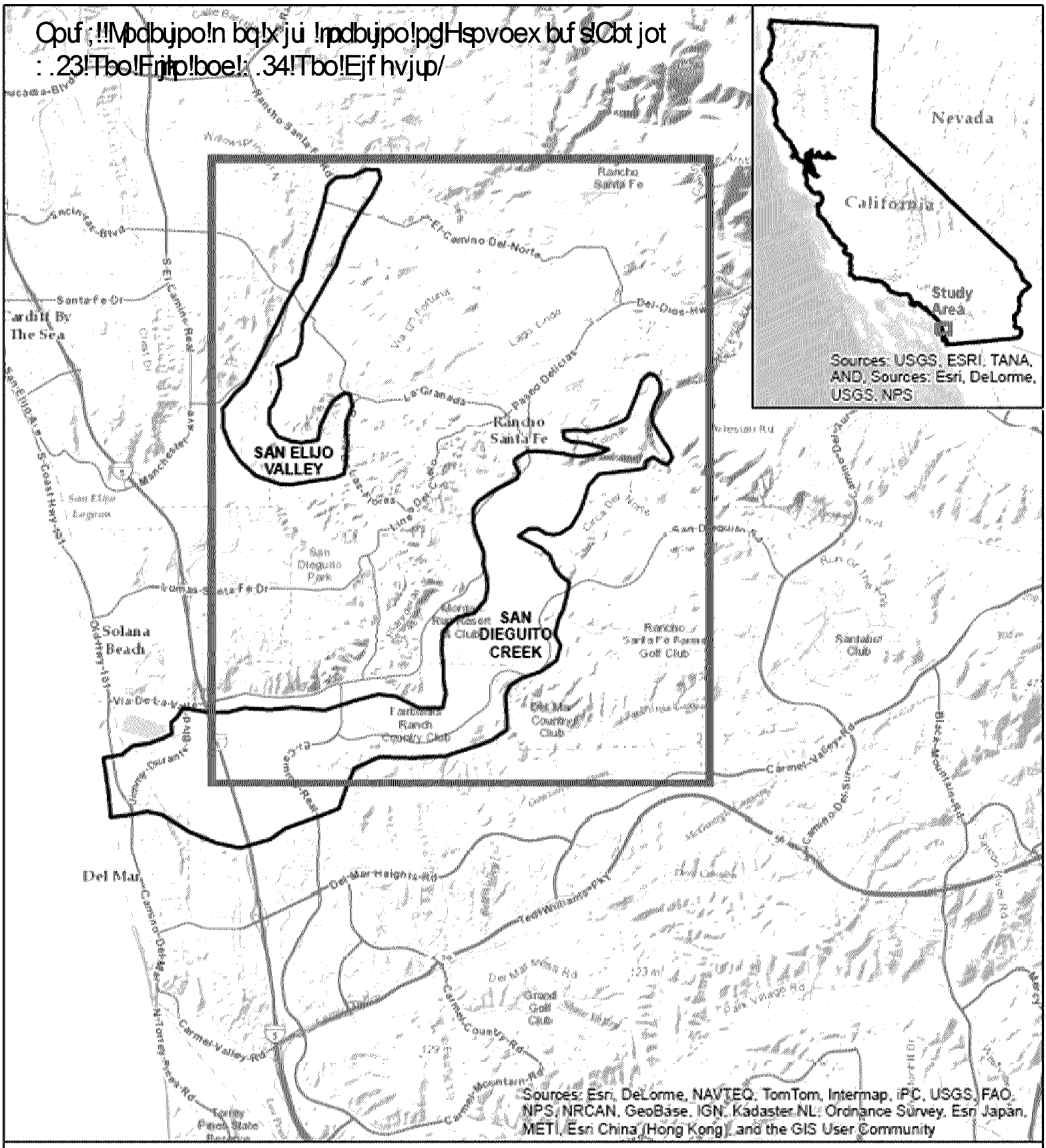


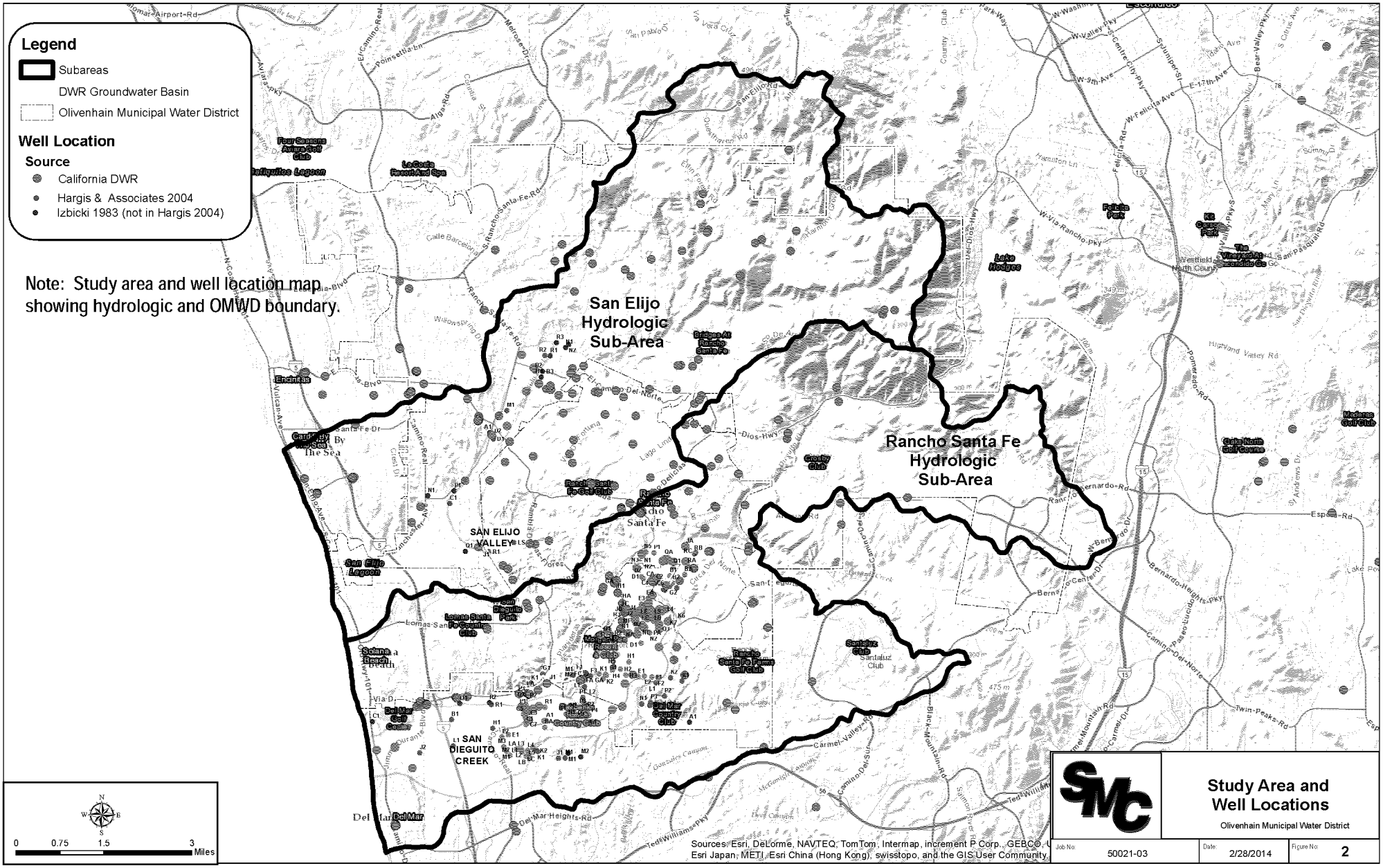
0 0.5 1 2 Miles

Legend

Study Area

Location Map

Job No:	50021-03	Date:	February 21, 2014	Figure No:	1



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Study Area and Well Locations

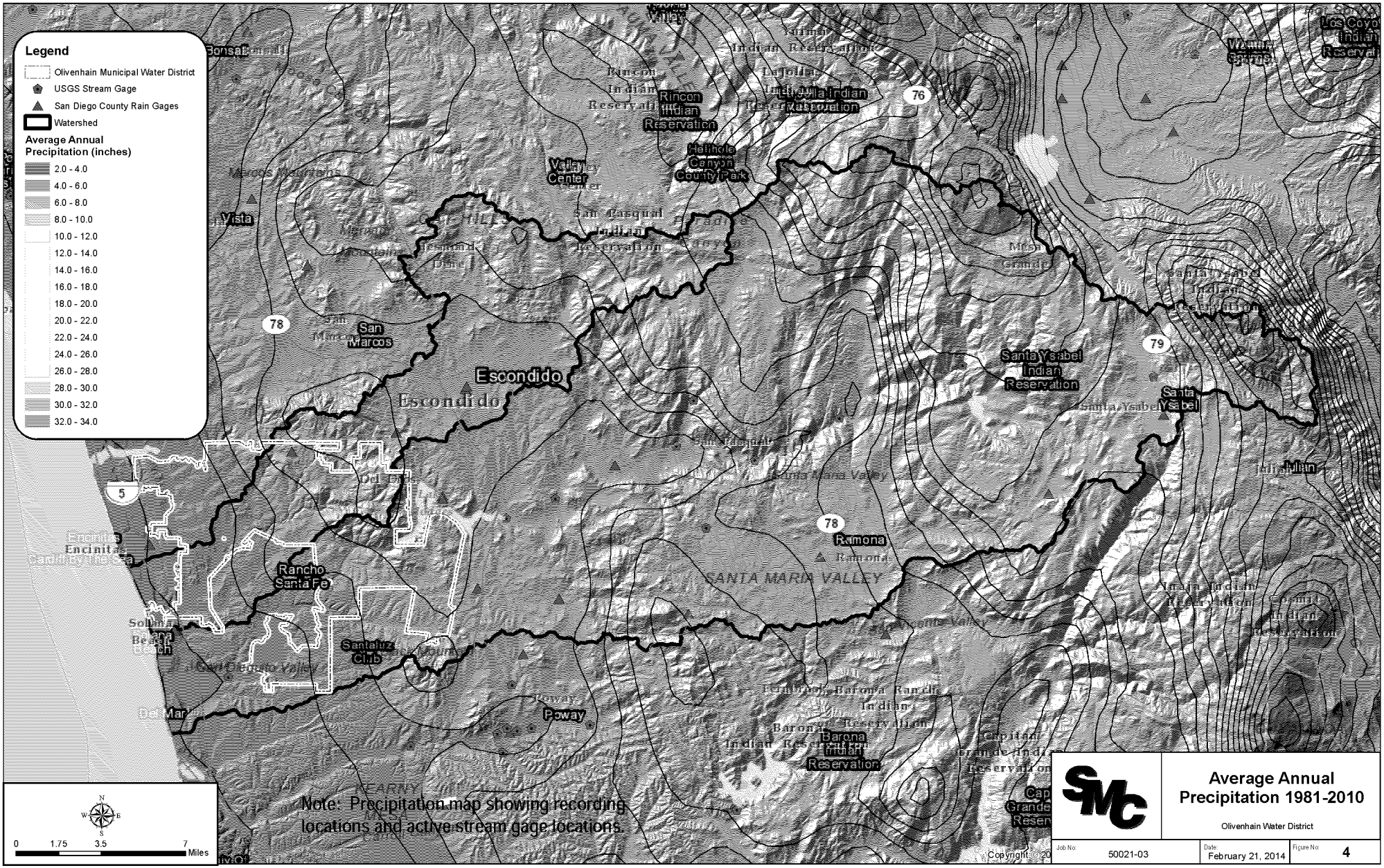
Olivenhain Municipal Water District

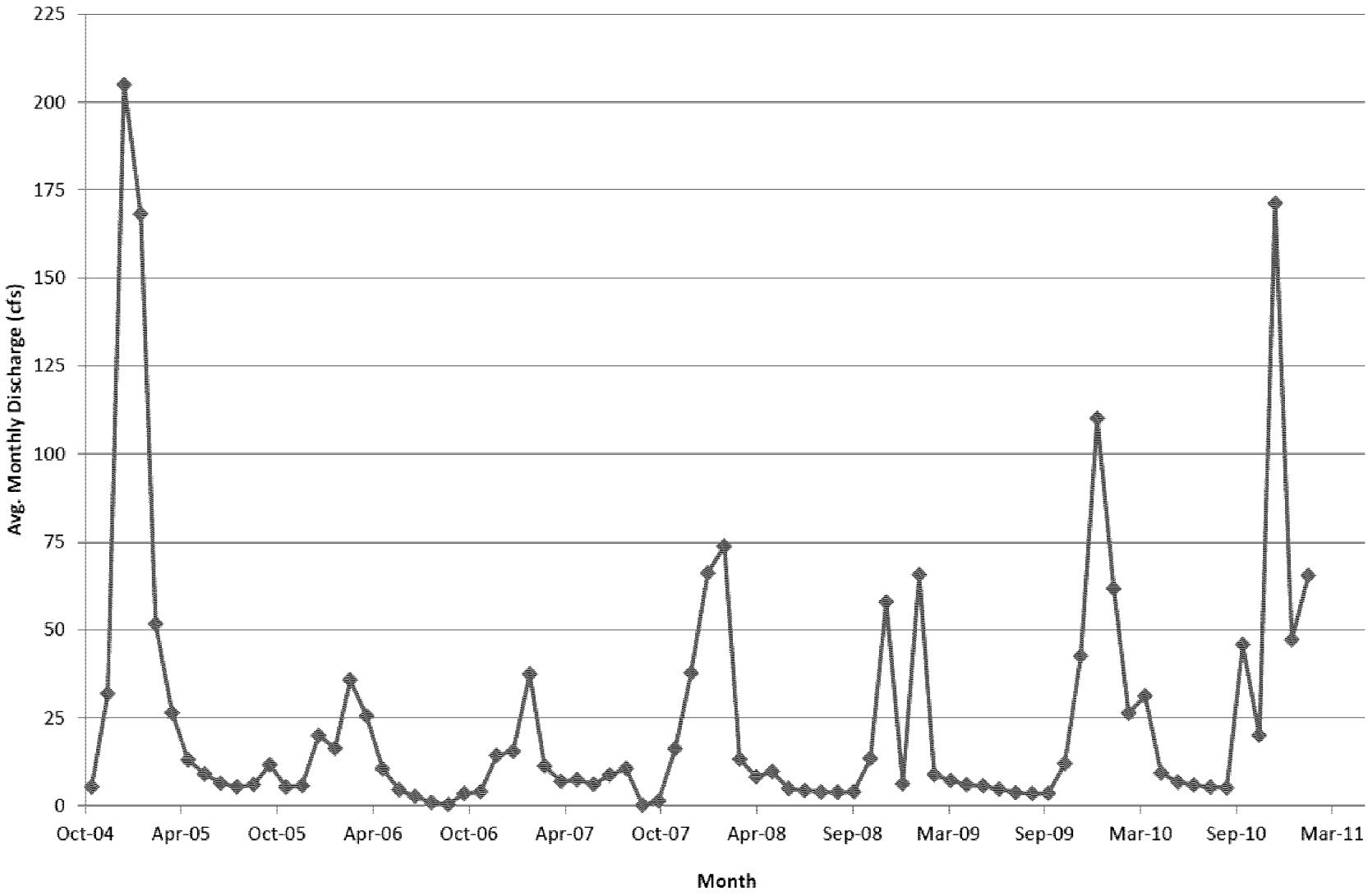
Job No	Date	Figure No
50021-03	2/28/2014	2

Project Area Watershed and Groundwater Basins

Olivenhain Water District

Job No.	Date	Figure No.
50021-03	February 21, 2014	3

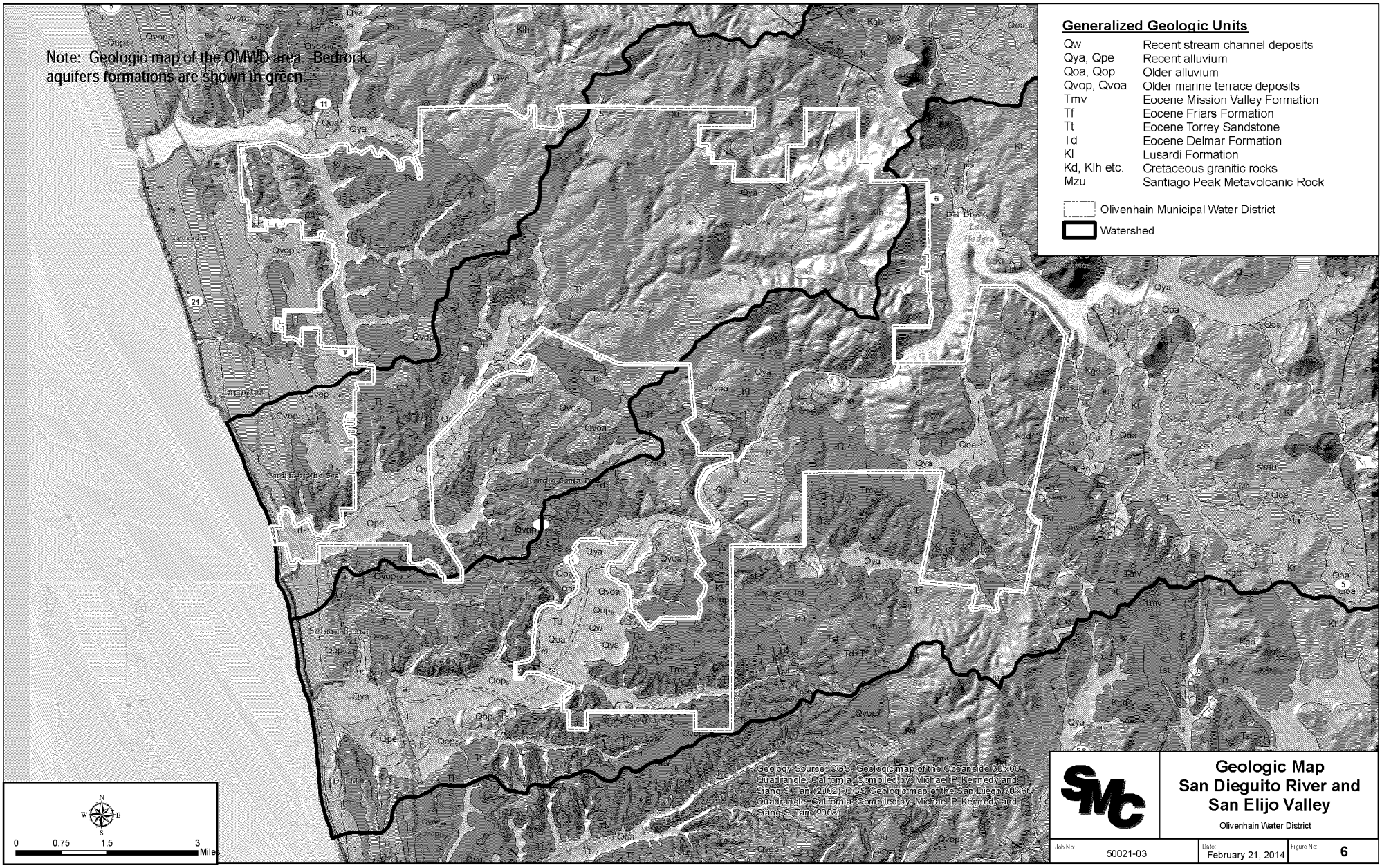

Legend
Olivenhain Municipal Water District
USGS Stream Gage
San Diego County Rain Gages
Watershed
Average Annual Precipitation (inches)
2.0 - 4.0
4.0 - 6.0
6.0 - 8.0
8.0 - 10.0
10.0 - 12.0
12.0 - 14.0
14.0 - 16.0
16.0 - 18.0
18.0 - 20.0
20.0 - 22.0
22.0 - 24.0
24.0 - 26.0
26.0 - 28.0
28.0 - 30.0
30.0 - 32.0
32.0 - 34.0
Escondido
San Marcos
Vista
Rancho Santa Fe
Santaluz Club
Poway
Ramona
Julian
Santa Ysabel
Santa Ysabel Indian Reservation
Rincon Indian Reservation
Barona Indian Reservation
Del Mar
Encinitas
SANTA MARIA VALLEY
Mesa Grande
Valley Center
Helihole Canyon County Park
76
78
79
5
N
S
E
W
0
1.75
3.5
7
Miles
Note: Precipitation map showing recording locations and active stream gage locations.
Copyright © 20
SMC
Average Annual Precipitation 1981-2010
Olivenhain Water District
Job No: 50021-03
Date: February 21, 2014
Figure No: 4

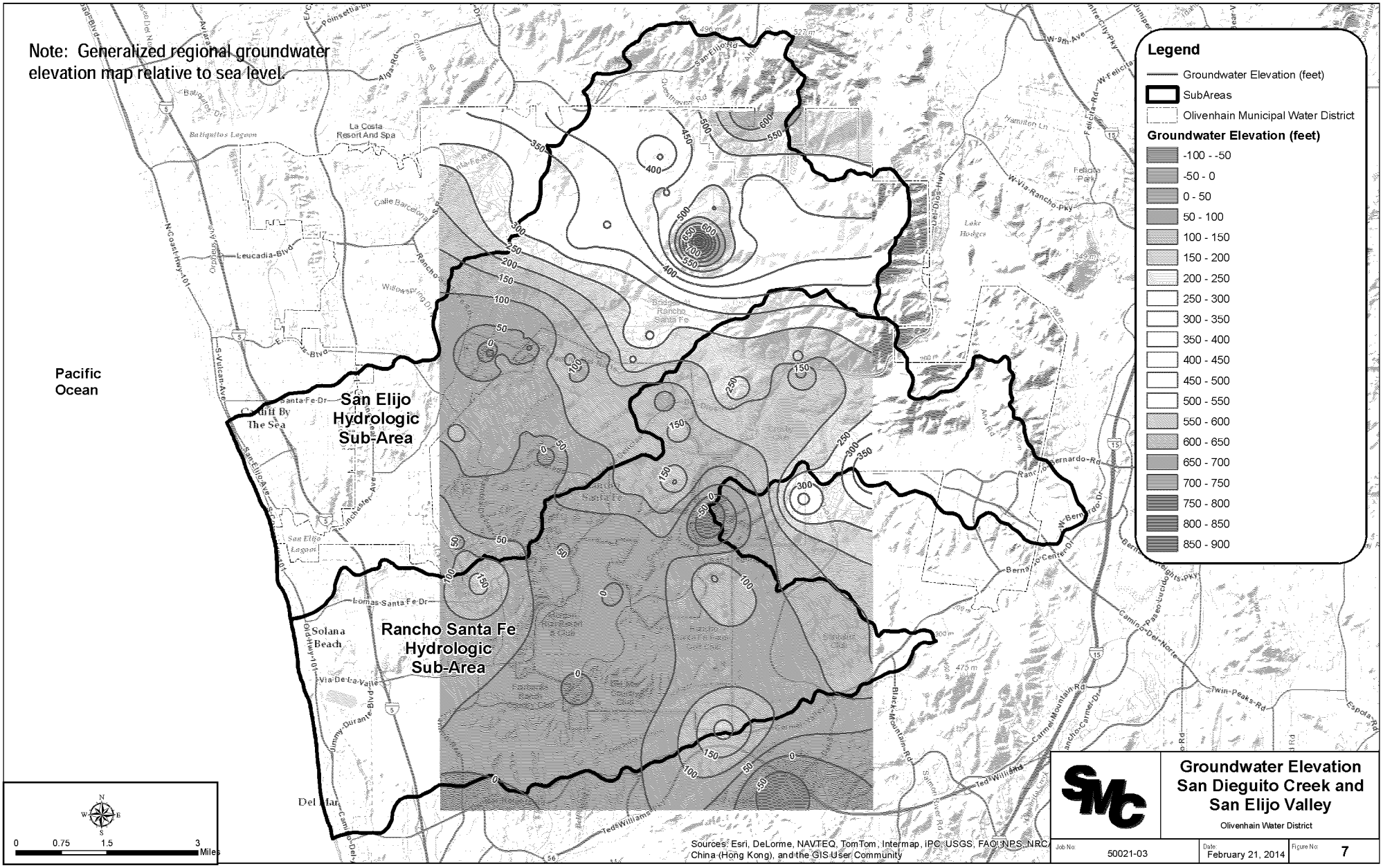


Note: El Camino Del Norte stream gauge from San Elijo Lagoon Conservancy. Shows cycles of high and low flow in the Escondido Creek River Basin. Shows that generally the creek has a baseflow in it.

Source: San Elijo Lagoon Conservancy

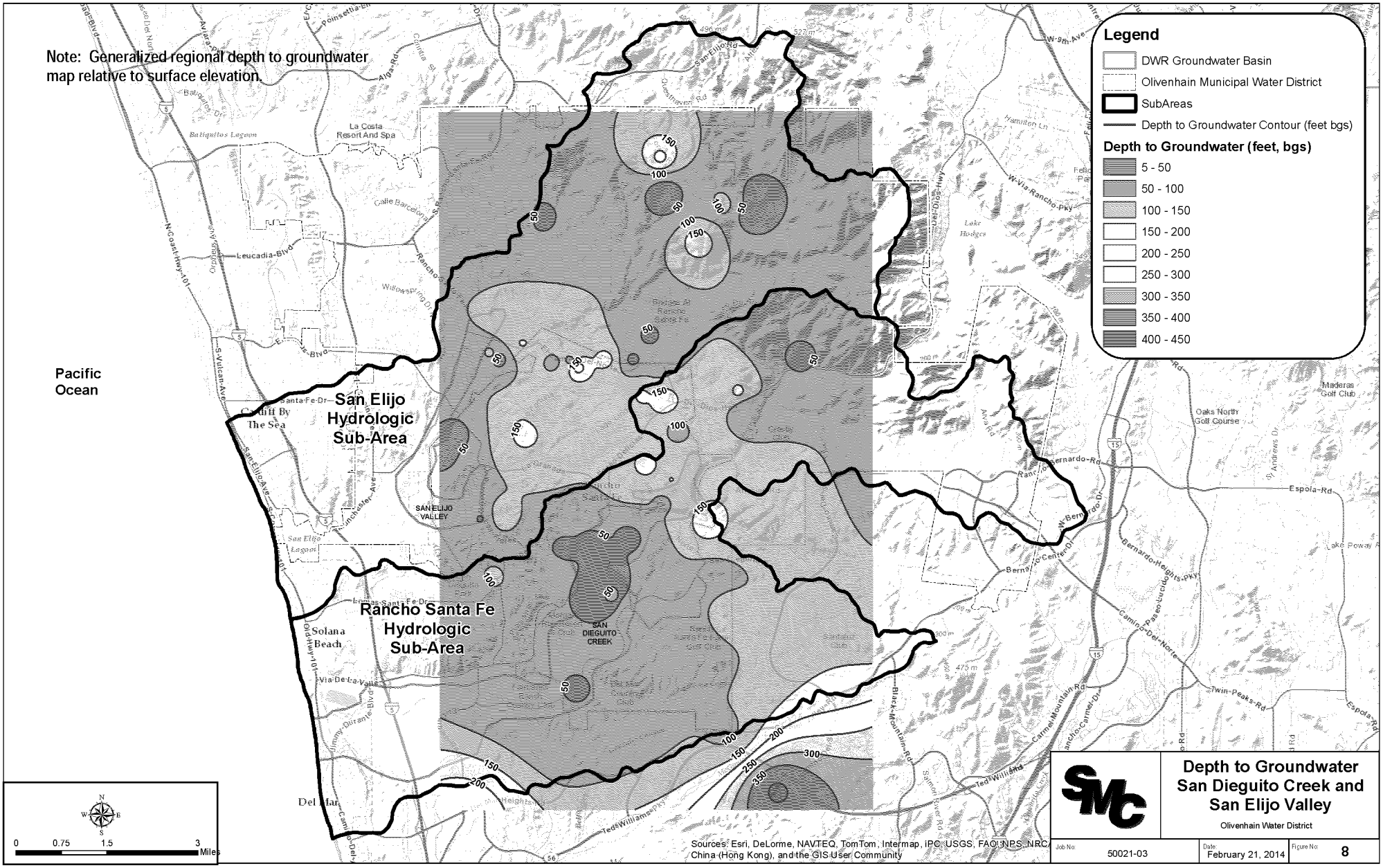
SMC	**El Camino Del Norte Stream Gauge** Olivenhain Municipal Water District		
Job No: 50021-03	Date: February 21, 2014	Figure No: **5**	


Note: Geologic map of the OMWD area. Bedrock aquifers formations are shown in green.
Generalized Geologic Units
Qw Recent stream channel deposits
Qya, Qpe Recent alluvium
Qoa, Qop Older alluvium
Qvop, Qvoa Older marine terrace deposits
Tmv Eocene Mission Valley Formation
Tf Eocene Friars Formation
Tt Eocene Torrey Sandstone
Td Eocene Delmar Formation
Kl Lusardi Formation
Kd, Klh etc. Cretaceous granitic rocks
Mzu Santiago Peak Metavolcanic Rock
Olivenhain Municipal Water District
Watershed
Geology Source: CGS. Geologic map of the Oceanside 30'X60' Quadrangle, California. Compiled by: Michael P. Kennedy and Siang S. Tan (2002). CGS. Geologic map of the San Diego 30'X60' Quadrangle, California. Compiled by: Michael P. Kennedy and Siang S. Tan (2008).
0 0.75 1.5 3 Miles
Geologic Map
San Dieguito River and
San Elijo Valley
Olivenhain Water District
Job No. 50021-03
Date February 21, 2014
Figure No. 6



Groundwater Elevation
San Dieguito Creek and San Elijo Valley
Olivenhain Water District

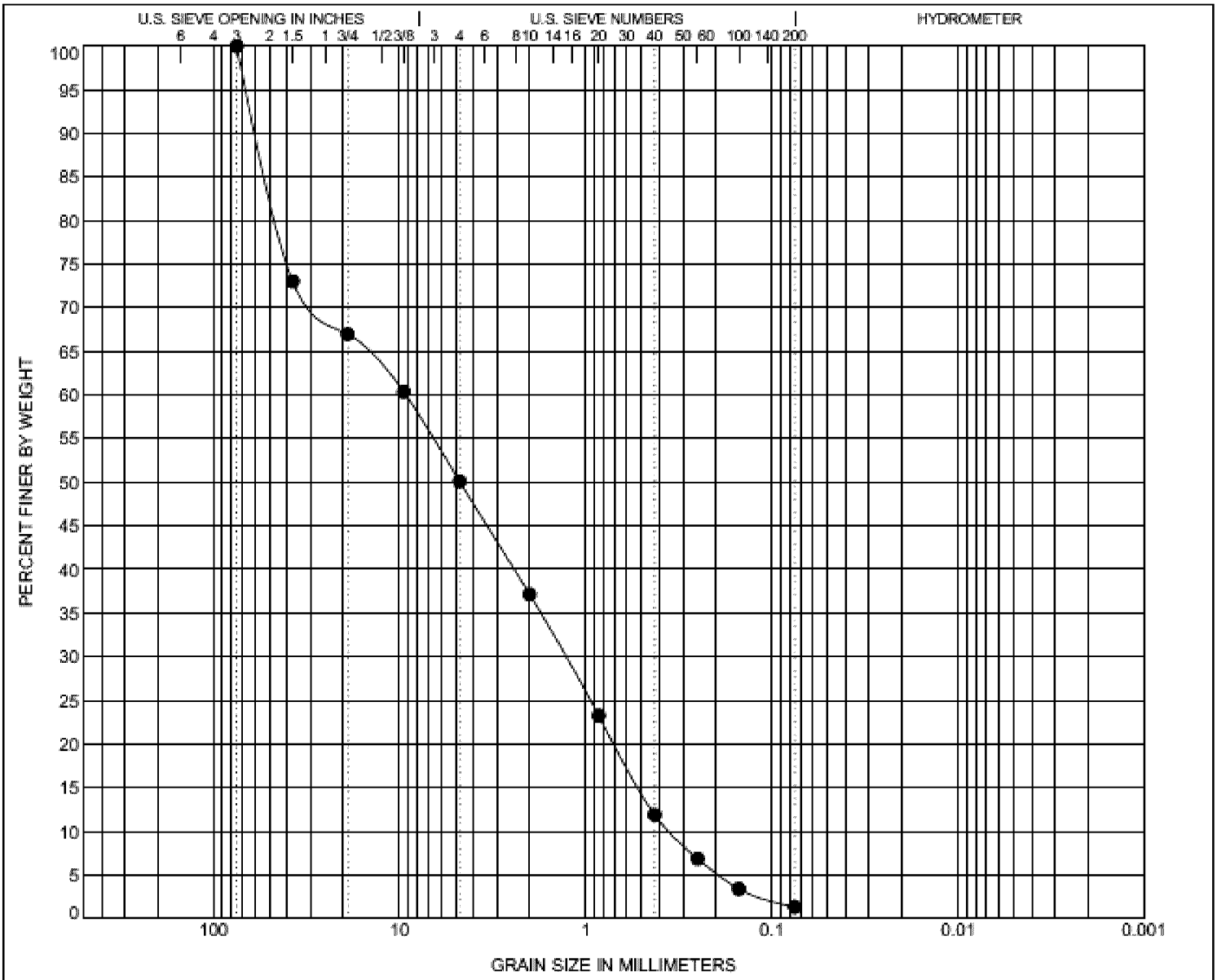
Job No.	Date	Figure No.
50021-03	February 21, 2014	7



Depth to Groundwater San Dieguito Creek and San Elijo Valley

Olivenhain Water District

Job No.	Date	Figure No.
50021-03	February 21, 2014	8



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● Lusardi-1	0.0	POORLY GRADED GRAVEL with SAND(GP)				0.51	26.66

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● Lusardi-1	0.0	75	9.274	1.289	0.348	49.9	48.8	1.3	

Note: Lusardi Formation grain size chart. Formation is sedimentary classified as a poorly graded gravel. This is generally a very efficient groundwater aquifer.

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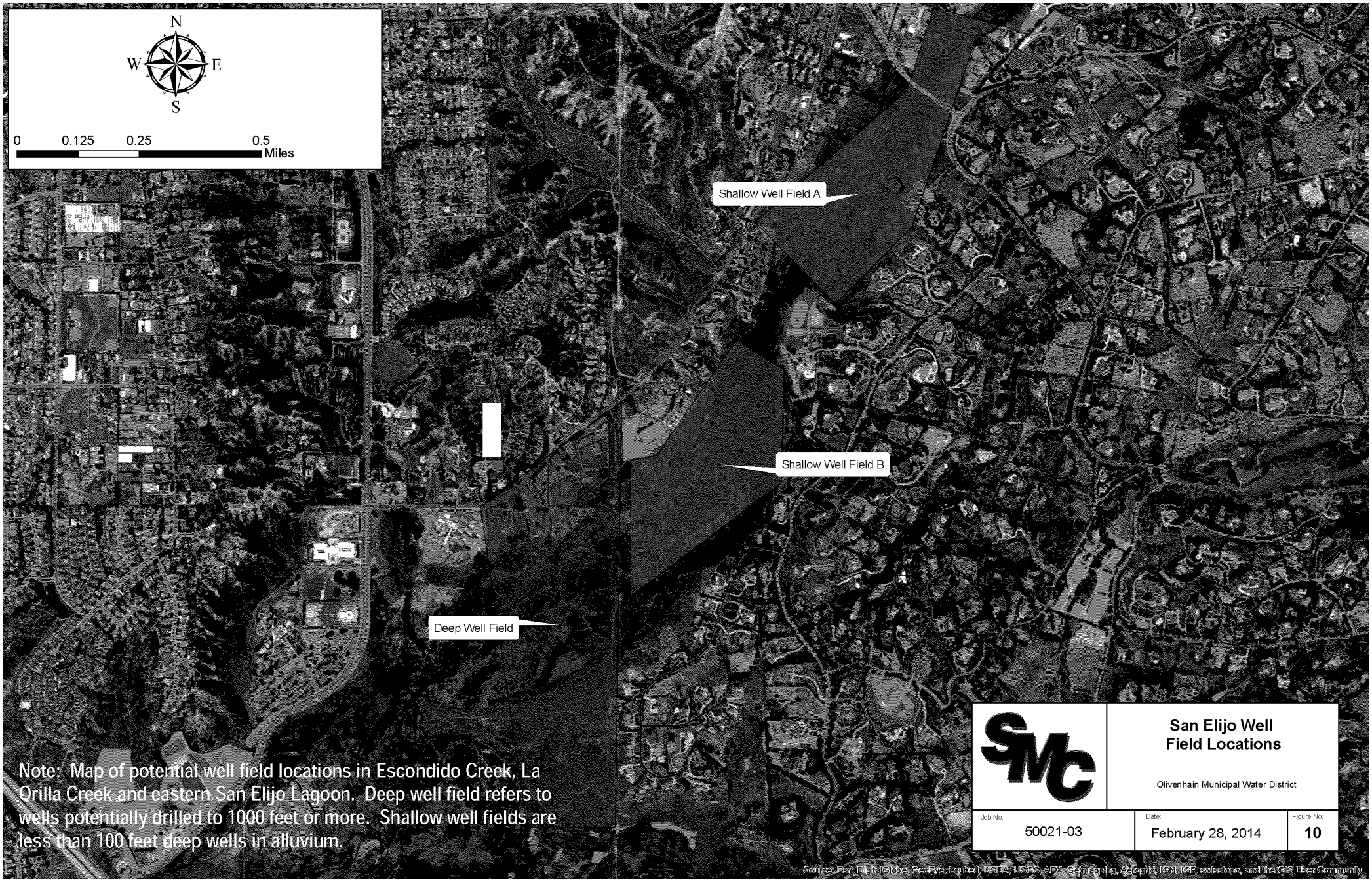
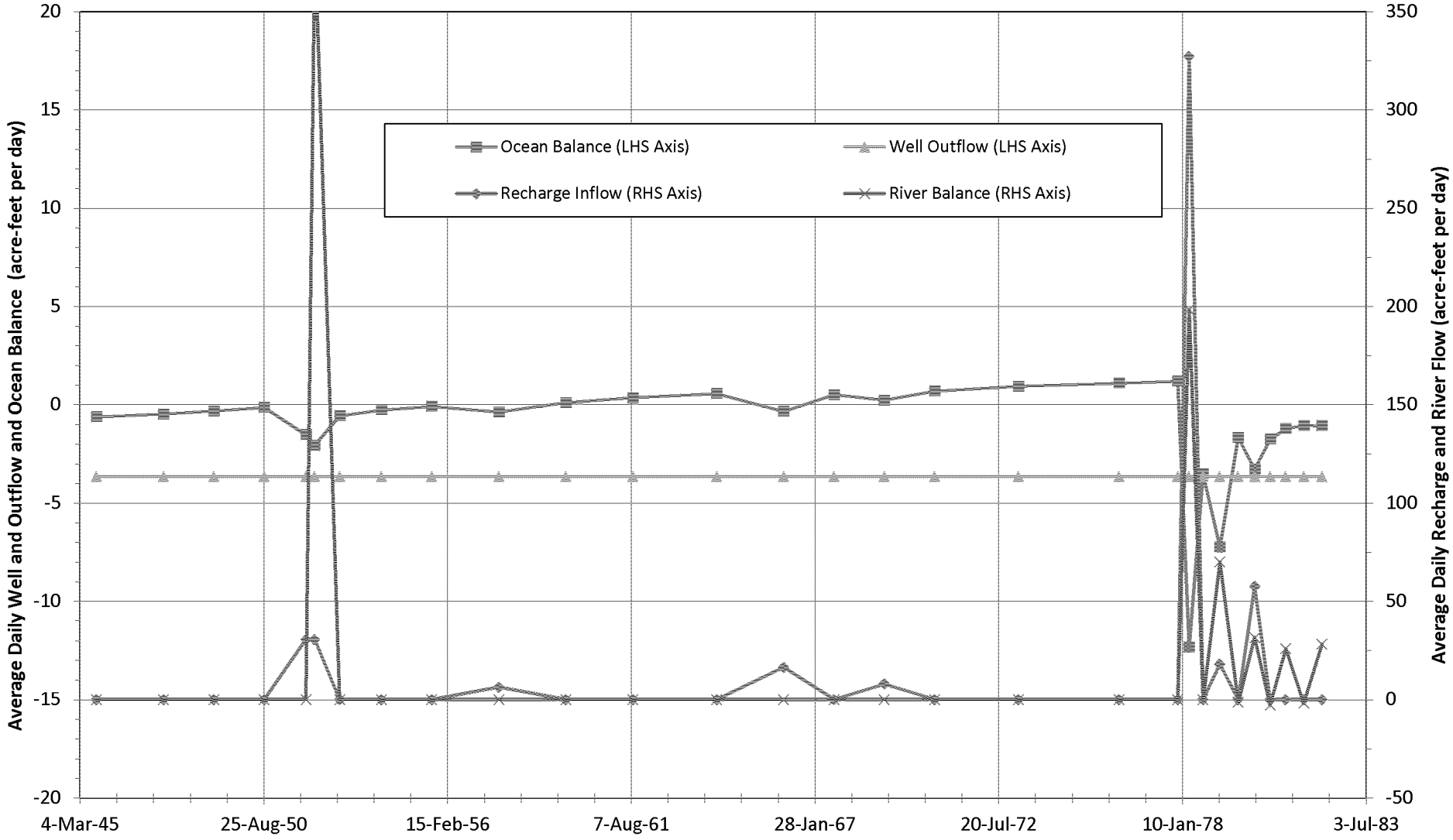


Note: Map of potential well field locations in Escondido Creek, La Orilla Creek and eastern San Elijo Lagoon. Deep well field refers to wells potentially drilled to 1000 feet or more. Shallow well fields are less than 100 feet deep wells in alluvium.

San Elijo Well Field Locations

Olivenhain Municipal Water District

Job No:	Date:	Figure No:
50021-03	February 28, 2014	10



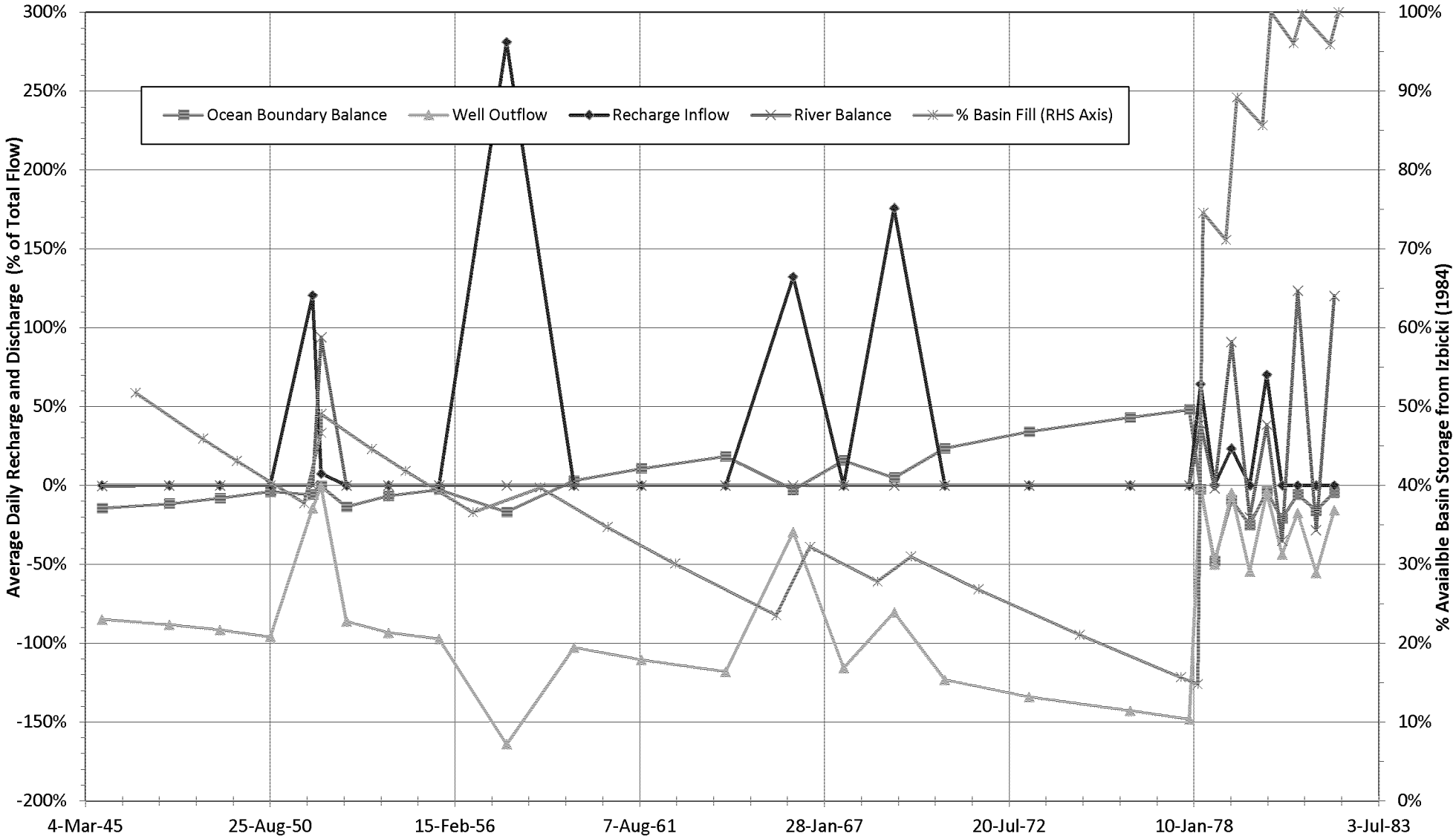
Notes:
Balance = Inflow (+ve) + Outflow (-ve)

Note: Numerical Flow Balance from CH2M-Hill model. Figure shows water recharge from separate sources related to pumping of alluvial aquifer in San Dieguito Valley. By 1961, heavy pumping had depleted the basin groundwater to the point that ocean water was flowing into the basin (Seawater Intrusion). However, in 1978 heavy storm runoff shown as river balance (red) and recharge inflow (blue line) followed by several more wet years had refilled the basin and seawater no longer was intruding into the fresh aquifer.

Numerical Flow Balance
CH2M Hill Groundwater Flow Model
Olivenhain Municipal Water District

Job No:	Date:	Figure No:
50021-03	February 28, 2014	**11**

Note: This figure shows a similar time interval as Figure 11 but with the basin volume as a percentage overlaid. By 1978, before Lake Hodges spilled for the first time in many years, the basin was depleted to about 15% of its capacity. Within two years of the onset of a wet cycle, the basin had refilled with fresh to brackish water to 100% of capacity.

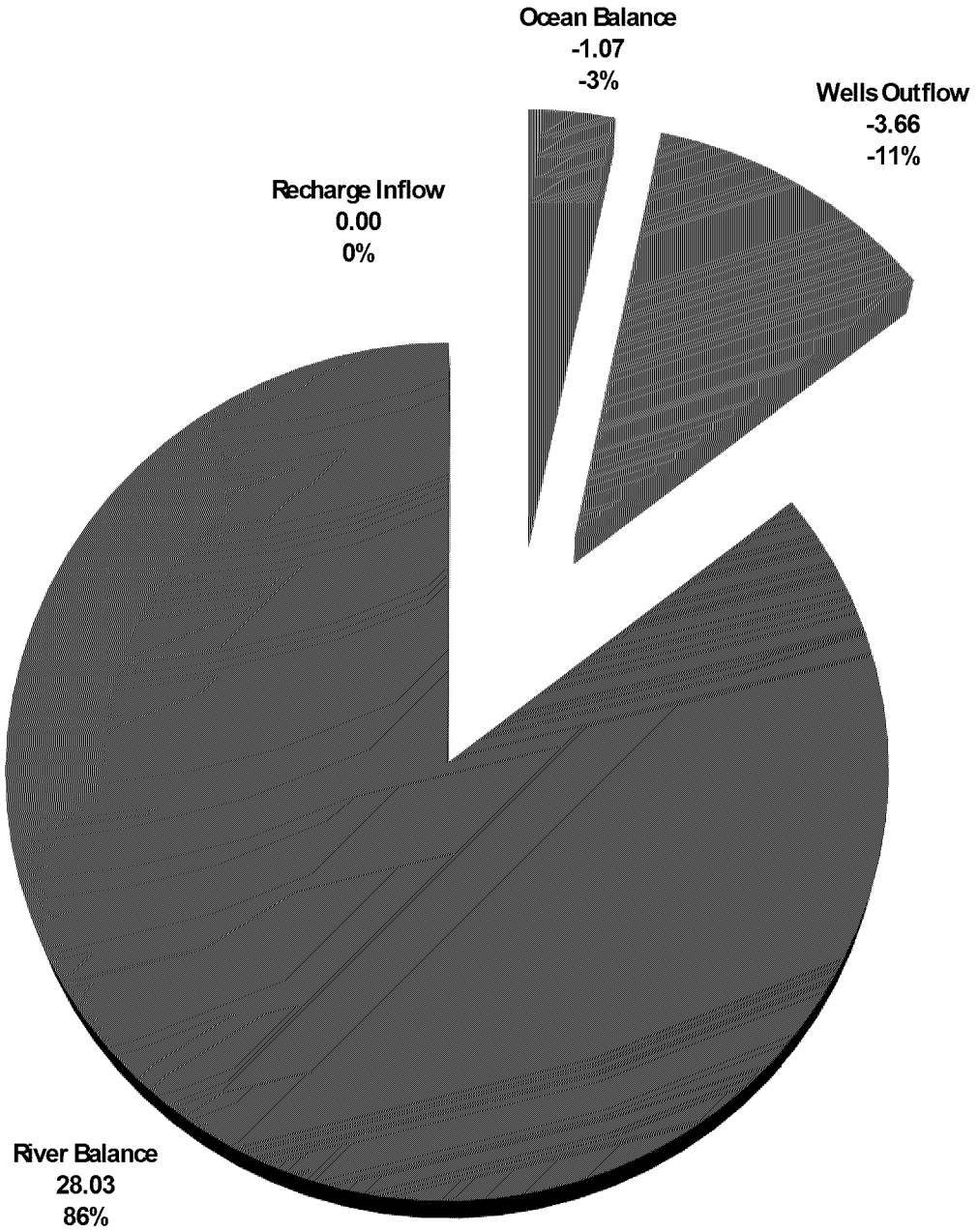


Notes:
Balance = Inflow (+ve) + Outflow (-ve)

Numerical Flow Balance vs. Basin Storage CH2M Hill Groundwater Flow Model

Olivenhain Municipal Water District

Job No:	Date:	Figure No:
50021-03	February 21, 2014	**12**

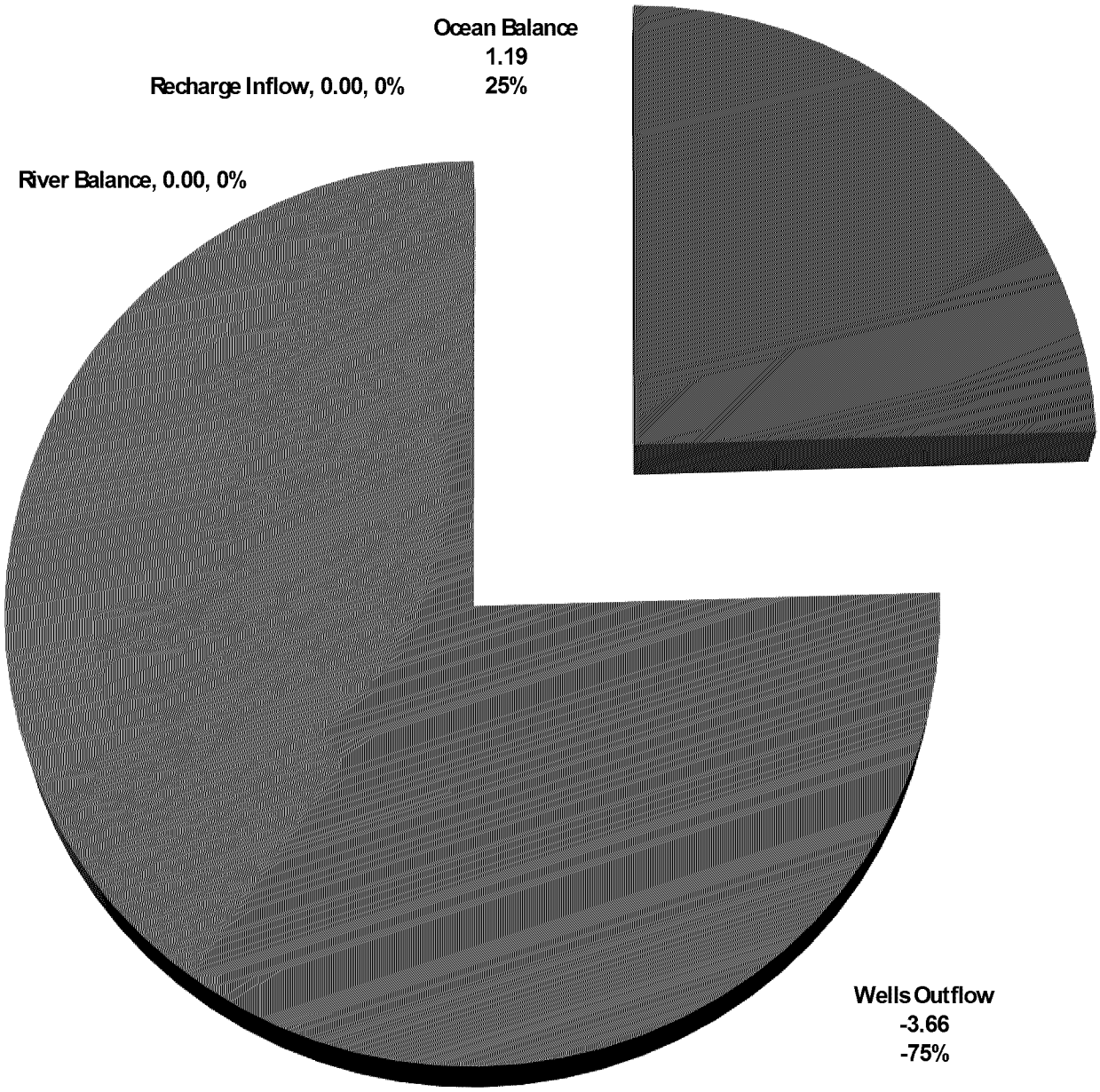


Note: This figure illustrates the model predicted outflow (in red) versus inflow or recharge (in blue) for the first quarter of 1982 (a wet year). Much more water is coming into the Basin than is leaving indicating active recharge.

NOTE:
Values in RED represent outflow.
Values in BLUE represent inflow.
All values in acre-feet per day (Af/d) and % of total numercial flow balance (inflow + outflow).

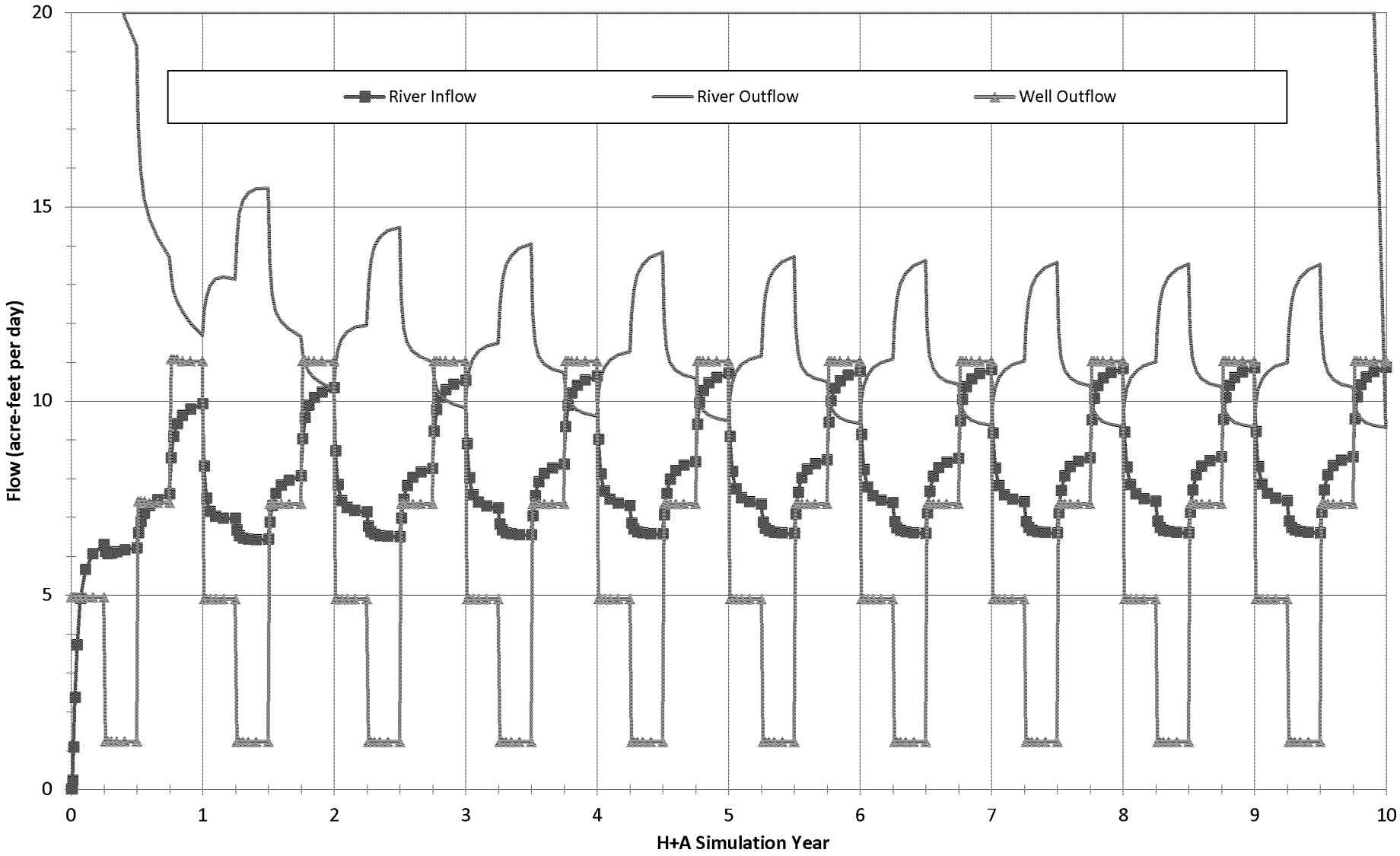
Average Daily Flow Balance
CH2M Hill's Wet Weather
Transient Simulations
January 1982 – April 1982

Note: In comparison to Figure 13, in this figure the model predicts that during a dry period similar to that of August 1977 to February 1978 the Basin system would have been losing water from pumping (in red) and saltwater (in blue) was coming in to refill the basin.



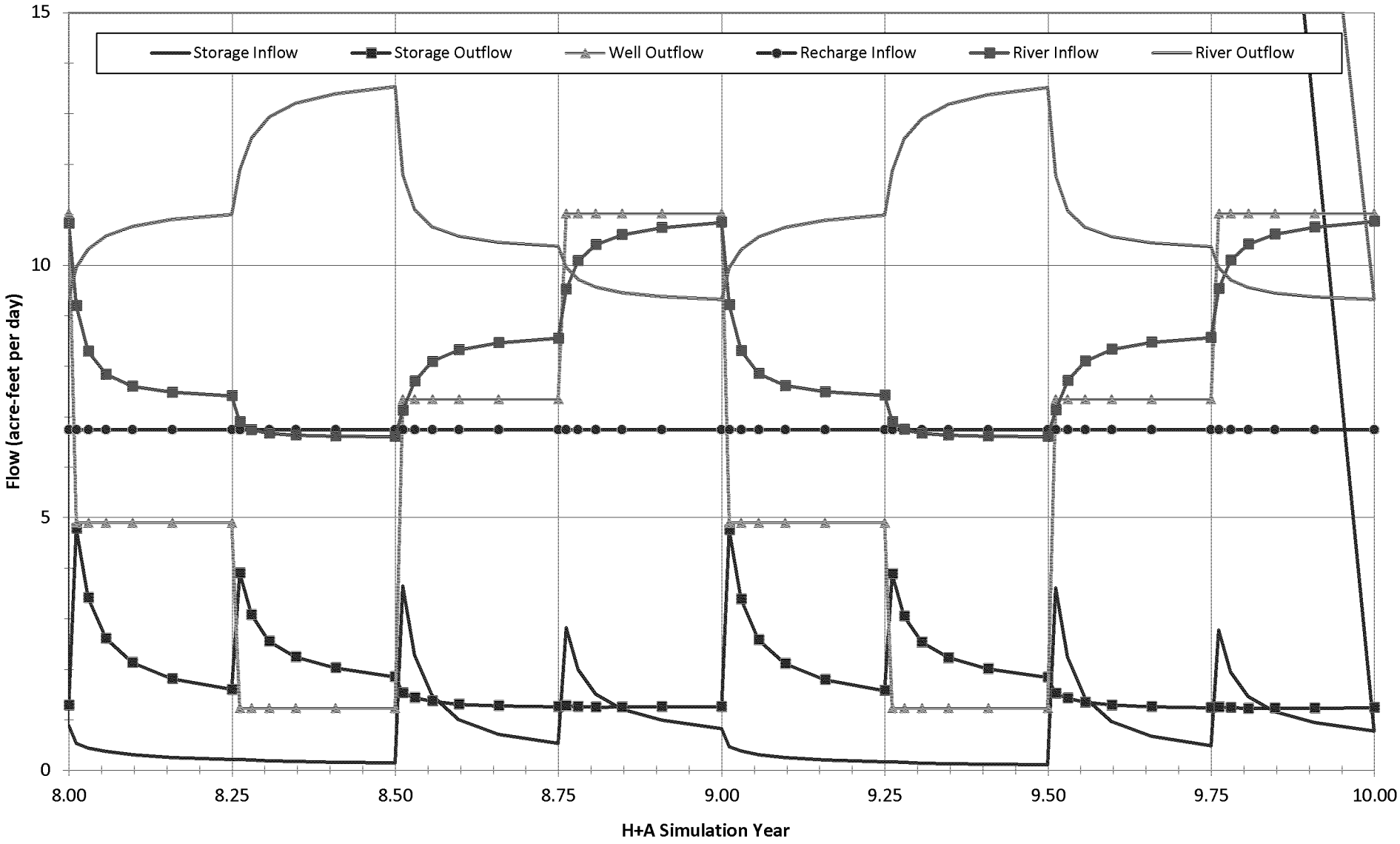
NOTE:
Values in RED represent outflow.
Values in BLUE represent inflow.
All values in acre-feet per day (Af/d) and % of total numercial flow balance (inflow + outflow).

Average Daily Flow Balance
CH2M Hill's Dry Weather
Transient Simulations
August 1977 – February 1978



Note: This figure depicts the model of Hargis and Associates who look specifically at the Morgan Run area of the San Dieguito basin for a wet weather 10 year projection and reflect findings from their pump test and analysis of the long term effects of an aquifer storage and recovery project (ASR). This figure shows cyclic nature of natural recharge versus pumping from the project well. Note that well outflow and river inflow both increase in the second half of a project year and that river outflow peaks as well use declines for the project.

SMC	**Numerical Flow Balance H+A's Wet Weather Transient Simulation** Olivenhain Municipal Water District		
Job No: 50021-03	Date: February 21, 2014	Figure No: **15**	



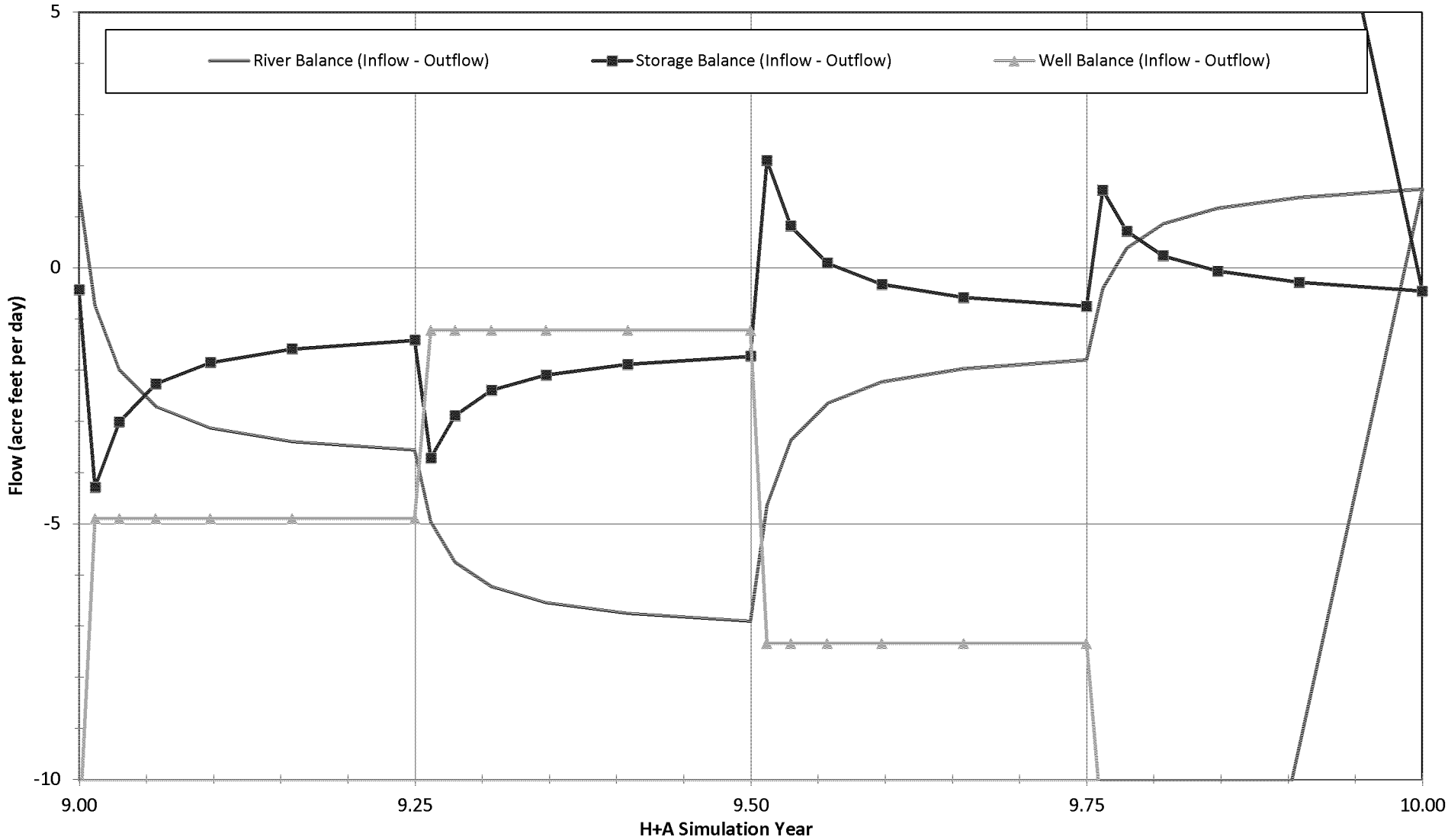
Note: This figure from the Hargis model shows details for years 8 through 9 for a wet weather simulation. Note that as river outflow (red) peaks, well outflow or pumping (gray) is minimal as is river inflow. The figure also shows that stored water (brown) declines as pumping or well outflow (gray) continues but river inflow (blue) declines to keep the overall recharge inflow (purple straight line). Storage inflow is pumping of recycled water into the deep aquifer; storage outflow is pumping of stored water out of the deep aquifer; well outflow is overall pumping of the aquifer from wells operating in the region; recharge inflow is natural recharge from precipitation, irrigation and artificial storage; river inflow is recharge to the aquifer from the San Dieguito River and River outflow is flow in the river westward out of the local ASR basin.

Detail Water Flows for Year 8-9 H+A's Wet Weather Transient Simulation

Olivenhain Municipal Water District

Job No:	Date:	Figure No:
50021-03	February 21, 2014	16

Note: This figure shows a detailed water balance transience for wet Year 9 (begins Oct 1) of the model by Hargis & Associates. Each line is a result of the inflow minus the outflow components of the ASR project. In particular note that the storage balance is negative in the first half of the water year (October to March) and then recovers to a balanced condition as the well balance (gray) decreases (outflow is greater than inflow). Recharge by pumped storage is shown by the well balance increase in the dry season as water is pumped into the aquifer.



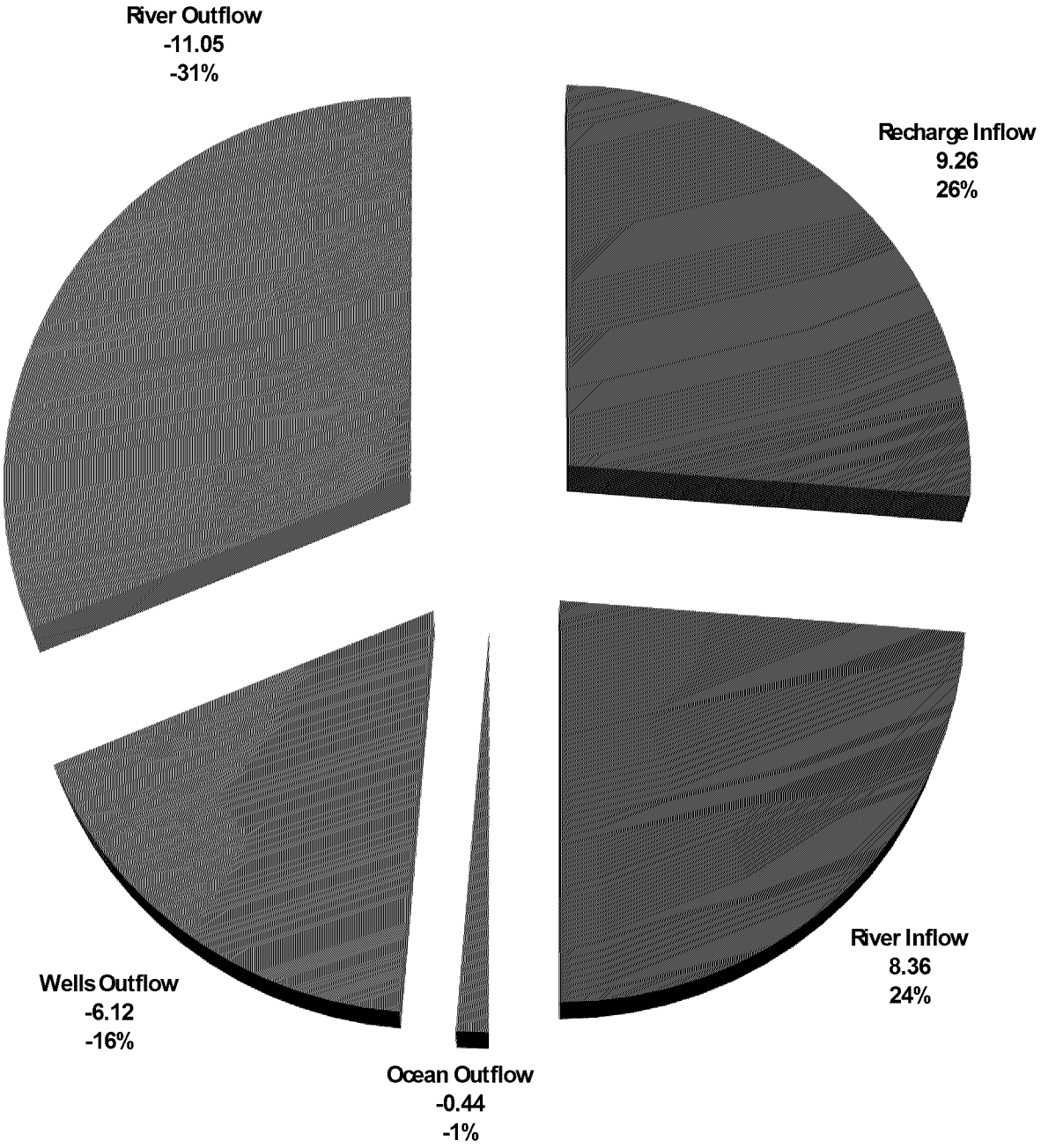
Note:
+ve flow is inflow
-ve flow is outflow

Numerical Water Balance for 9 H+A's Wet Weather Transient Simulation

Olivenhain Municipal Water District

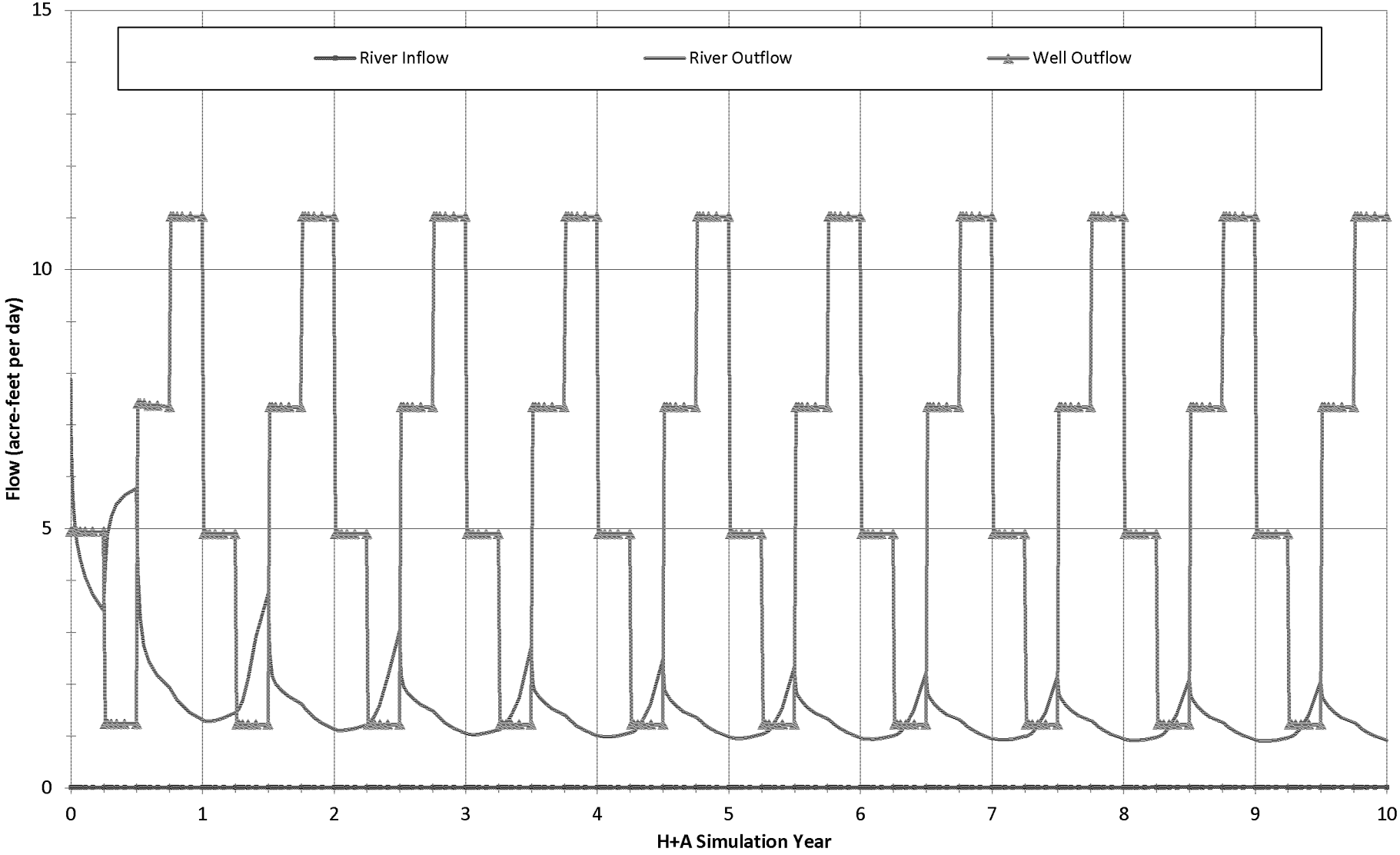
Job No:	Date:	Figure No:
50021-03	February 21, 2014	**17**

Note: This figure shows the water budget for the ASR for the wet weather simulation of year 9.



NOTE:
Values in RED represent outflow.
Values in BLUE represent inflow.
All values in acre-feet per day (Af/d) and % of total flow (inflow + outflow).

Average Daily Flow Balance for Year 9 H+A's Wet Weather Transient Simulation

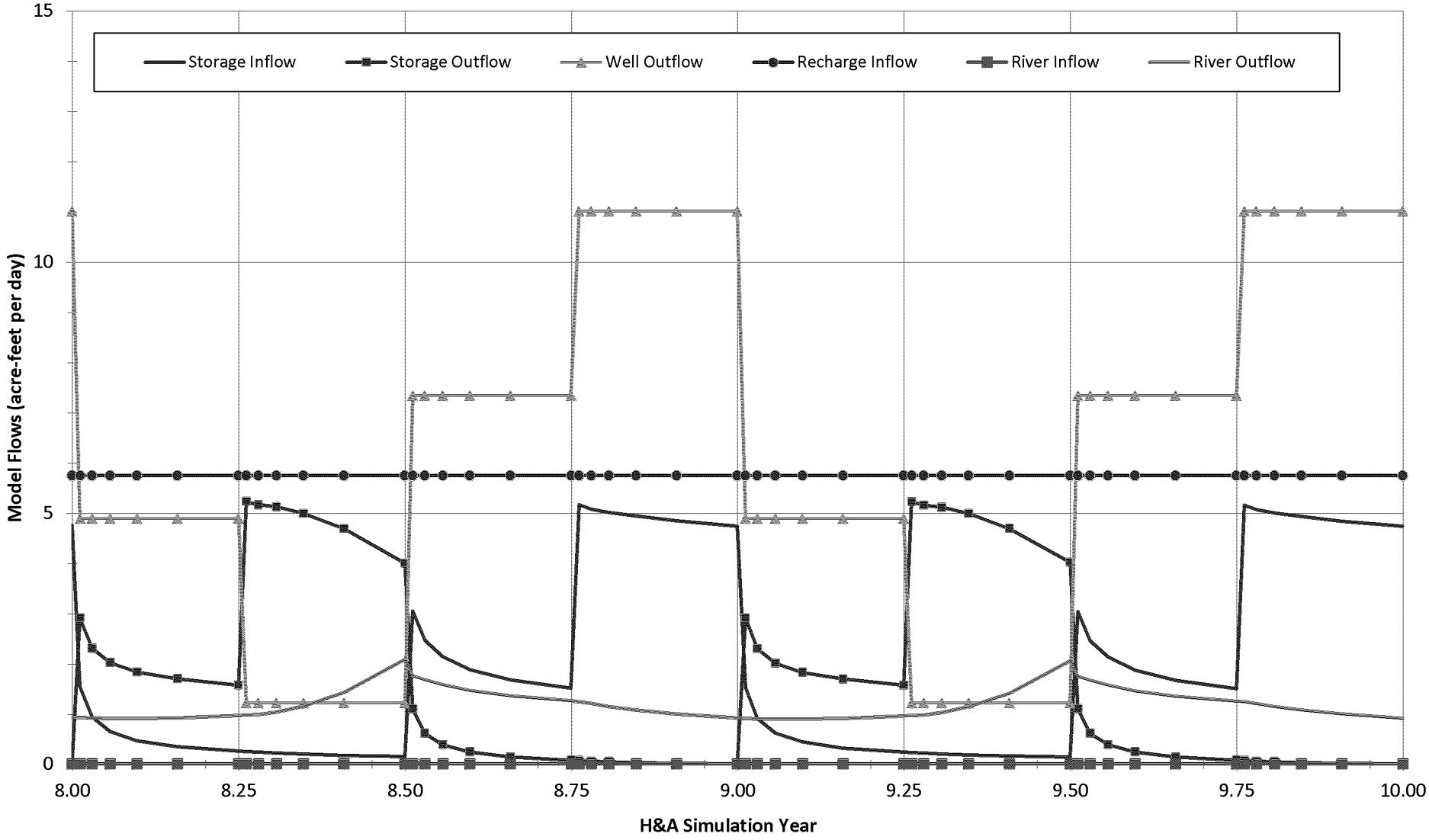


Note: This is the Hargis and Associates 10 year dry year model of the ASR Project. Compared to Figure 15, the 10-year wet year model, note that the inflow from the river is negligible and the river outflow also is negligible while well outflow is the same as the wet year model.

Numerical Flow Balance for H+A's Dry Weather Transient Simulation

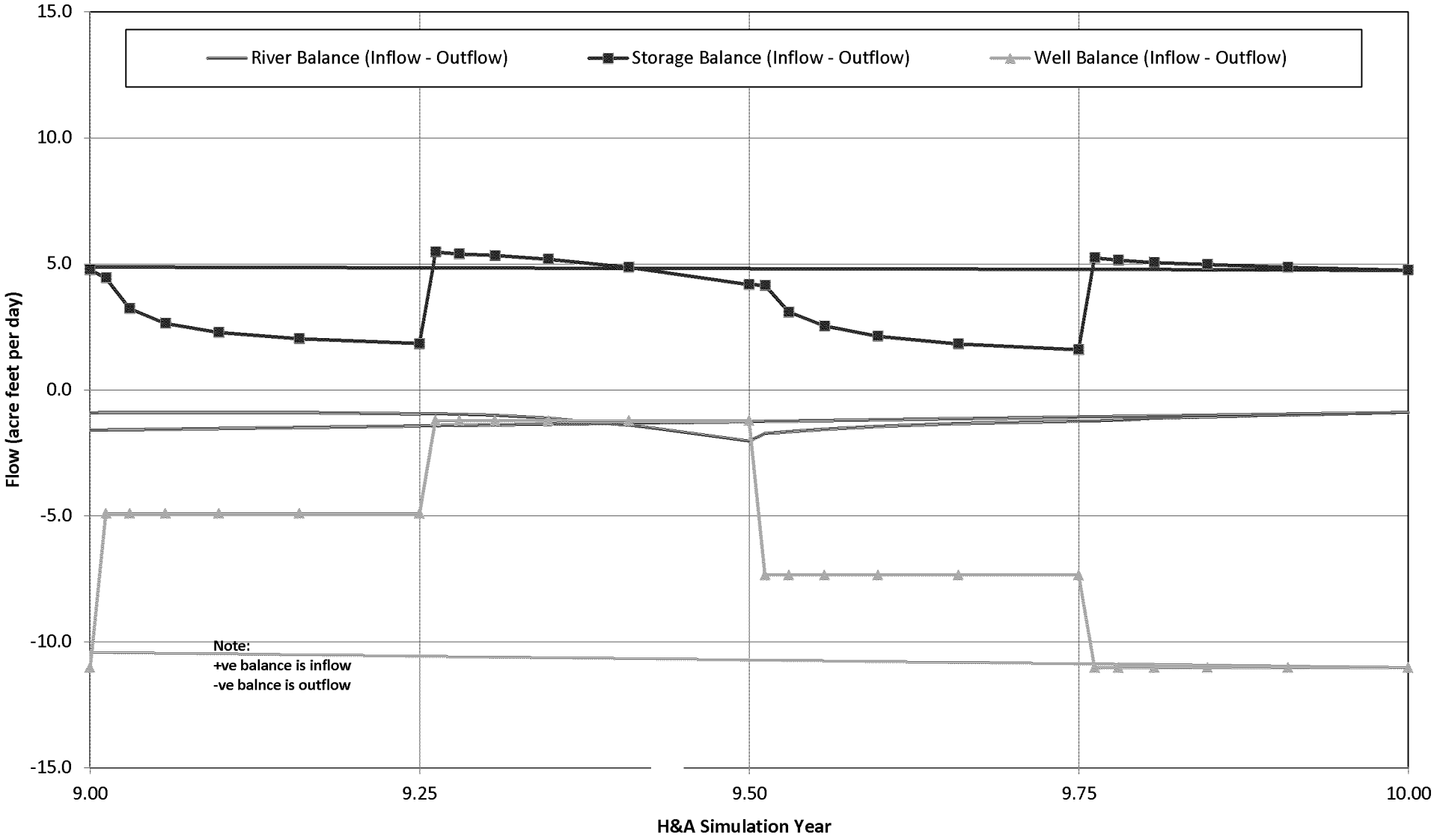
Olivenhain Municipal Water District

Job No:	Date:	Figure No:
50021-03	February 21, 2014	19



Note: This is the dry Year 8 and 9 Model showing that storage inflow (brown line) is balanced against well outflow (gray line) with storage outflow accounting for the recharge inflow balance during the dry part of the year. Recharge inflow is constant and there is no inflow from the river with minor river baseflow out of the basin. Storage inflow and storage outflow are the only means of meeting the ASR project needs.

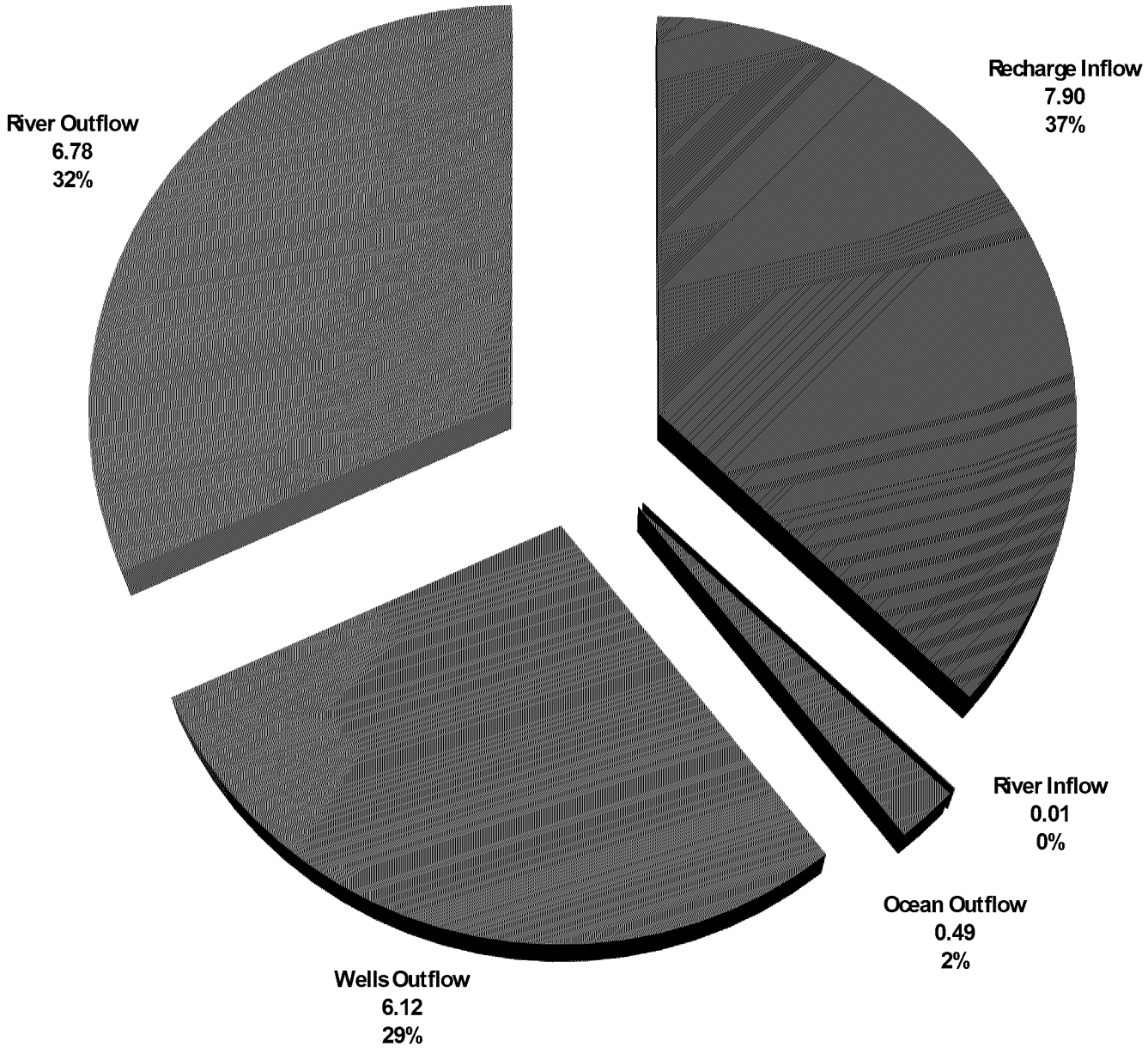
SMC	**Detail Water Flows for Year 8-9 H+A's Dry Weather Transient Simulation** Olivenhain Municipal Water District	
Job No: 50021-03	Date: February 21, 2014	Figure No: **20**



Note: Year 9 of the dry weather simulation shows the storage balance of the three water parameters - river, well extraction and natural recharge, and pumped storage and extraction. Natural conditions result in no river flow and low groundwater levels balanced by the artificial recharge system.

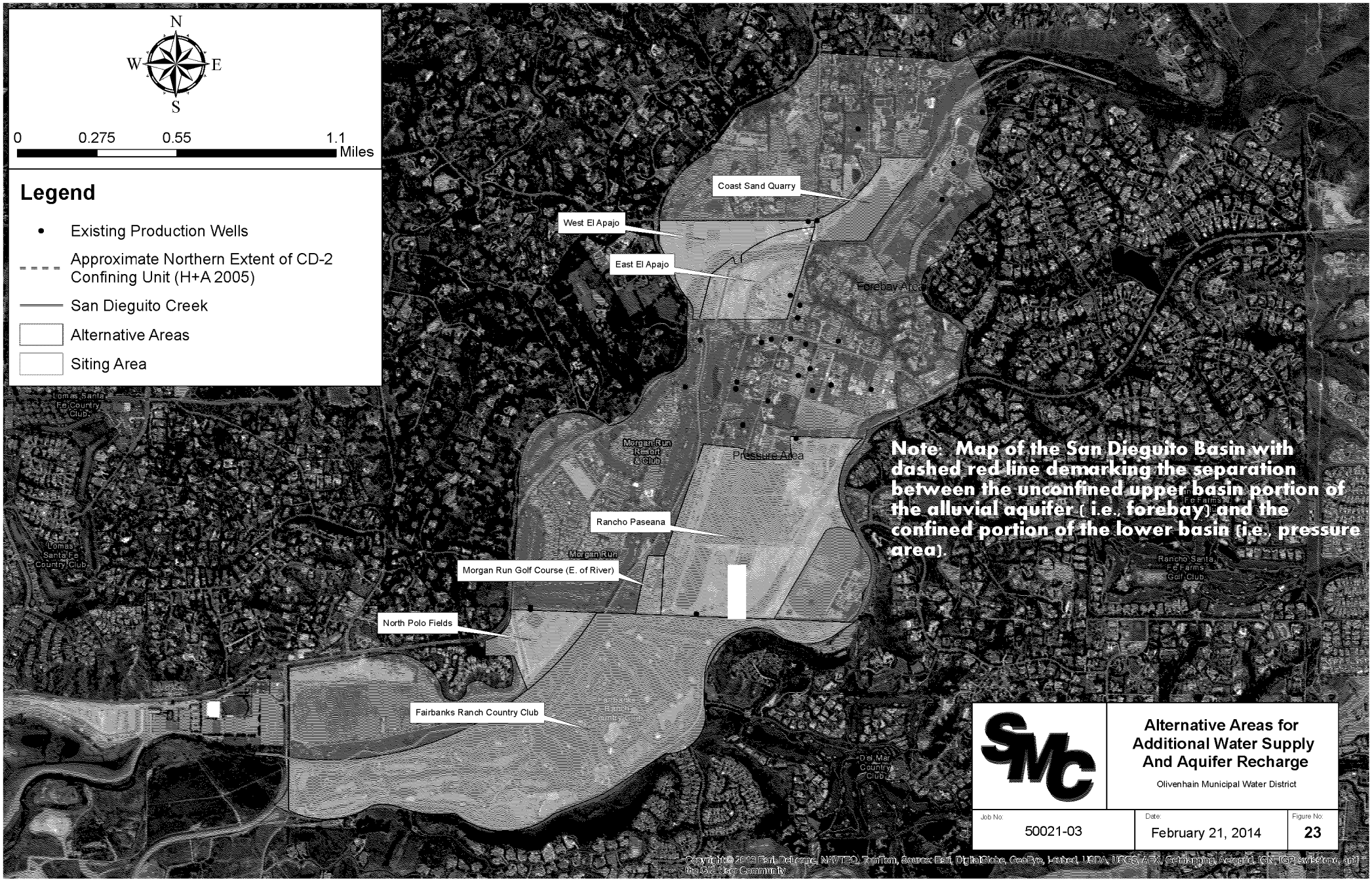
SMC	**Numerical Flow Balance for Year 9 H+A's Dry Weather Transient Simulation** Olivenhain Municipal Water District	
Job No: 50021-03	Date: February 21, 2014	Figure No: **21**

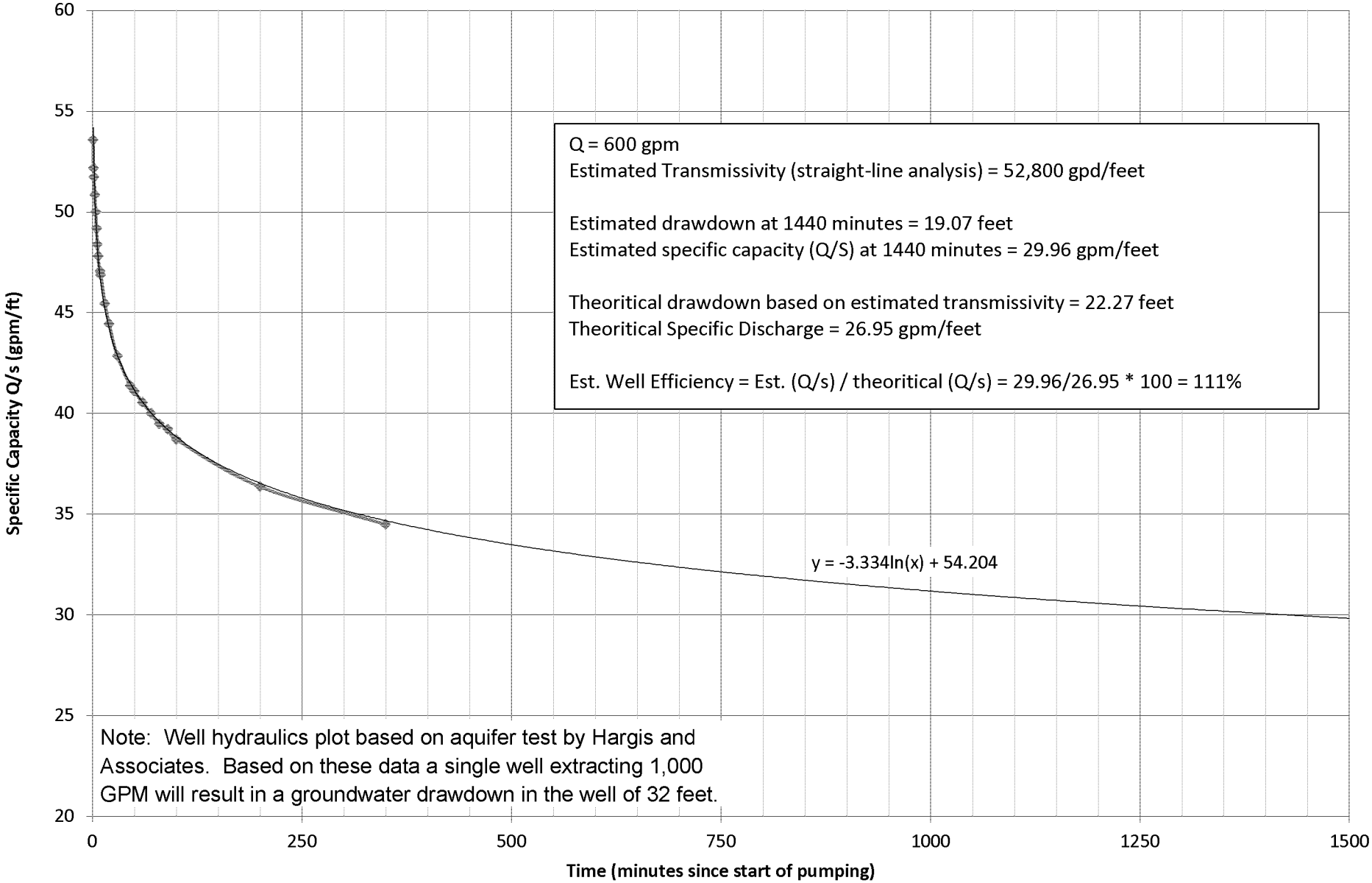
Note: A general diagram showing the balances with greater outflow than inflow to the system during dry weather (Year 9).



NOTE:
Values in RED represent outflow.
Values in BLUE represent inflow.
All values in acre-feet per day (Af/d) and % of total flow (inflow + outflow).

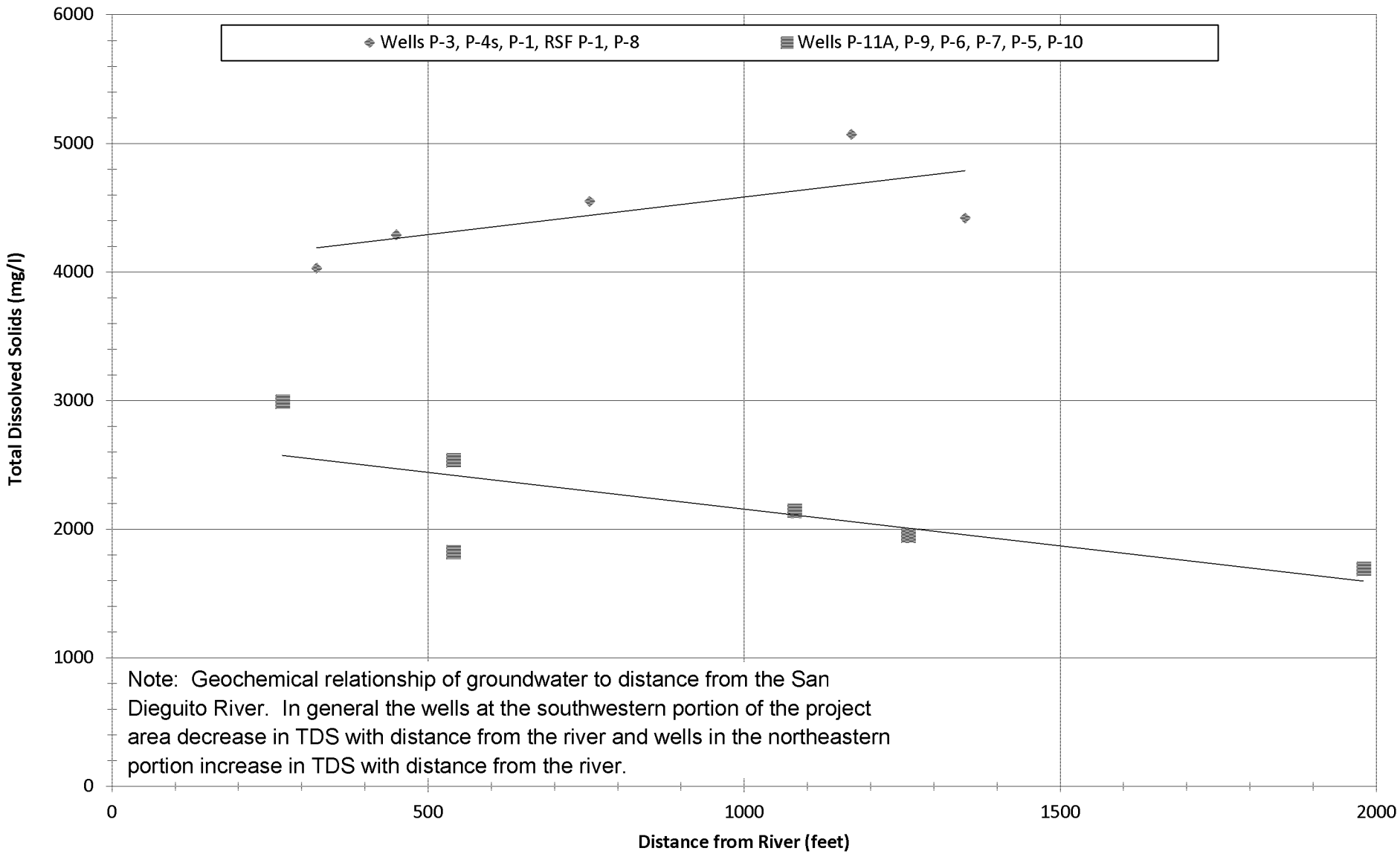
Average Daily Flow Balance for Year 9 H+A's Dry Weather Transient Simulation


N
W
E
S
0
0.275
0.55
1.1
Miles
Legend
Existing Production Wells
Approximate Northern Extent of CD-2 Confining Unit (H+A 2005)
San Dieguito Creek
Alternative Areas
Siting Area
Coast Sand Quarry
West El Apajo
East El Apajo
Forebay Area
Pressure Area
Rancho Paseana
Morgan Run Golf Course (E. of River)
North Polo Fields
Fairbanks Ranch Country Club
Note: Map of the San Dieguito Basin with dashed red line demarking the separation between the unconfined upper basin portion of the alluvial aquifer (i.e., forebay) and the confined portion of the lower basin (i.e., pressure area).
Alternative Areas for Additional Water Supply And Aquifer Recharge
Olivenhain Municipal Water District
Job No: 50021-03
Date: February 21, 2014
Figure No: 23
Copyright: © 2013 Esri, DeLorme, NAVTEQ, Tomtom, Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Note: Well hydraulics plot based on aquifer test by Hargis and Associates. Based on these data a single well extracting 1,000 GPM will result in a groundwater drawdown in the well of 32 feet.

SMC	**Specific Capacity and Well Efficiency Estimates for Test Well 1** Olivenhain Municipal Water District		
Job No: 50021-03	Date: February 28, 2014	Figure No: **24**	



Distance from River vs TDS

Olivenhain Municipal Water District

Job No:	Date:	Figure No:
50021-03	February 28, 2014	25

TABLE 1
INFORMATION FOR SAN ELIJO VALLEY WELLS
San Elijo Valley Project Update
SMC Project No. 50021-03

Well ID	Well No.	Depth Boring	Depth First Water	Depth Static Water	Well Elevation	Static Water Elv.	Screen Interval	Screen Length	Estimated Yield	Drawdown	Test Length
-	-	feet bgs	feet bgs	feet bgs	feet msl	feet msl	feet	feet	gpm	feet	hours
13S02W-18	157311	260	70	50	1900	1850	60-260	200	11	-	-
13S03W-32	1309	150	-	70	30	-40	89-94, 114-124, 137-143	10, 6	75	-	-
13S03W-15	1363	189	-	12	-	-	-	-	175	-	-
13S03W-02	1539	405	-	15.5	430	414.5	-	-	12.5	-	-
13S03W-11	4610	28.5	17.5	-	270	-	13-28	15	-	-	-
13S03W-11	4611	25.5	14	-	270	-	9-24	15	-	-	-
13S03W-11	4613	26.5	15	16	270	254	10-25	15	-	-	-
13S03W-11	4614	26	16	17	270	253	10-26	16	-	-	-
13S03W-36	6259	176	-	-	90	-	-	-	-	-	-
14S03W-11	6400	340	254	90	300	210	220-340	120	4	-	-
13S03W-34	9392	300	280	90	-	-	-	-	12	-	-
13S04W-15	12509	35	25	-	100	-	15-35	20	-	-	-
13S04W-15	12510	40	25	-	100	-	20-40	20	-	-	-
13S04W-15	12511	35	25	-	100	-	15-35	20	-	-	-
13S04W-15	12512	35	25	-	100	-	15-35	20	-	-	-
14S03W-18	15455	210	-	-	320	-	-	-	-	-	-
14S04W-02	21338	21	7	7	20	13	5-20	15	-	-	-
14S04W-02	21339	31	18.5	18.5	20	1.5	15-30	15	-	-	-
14S04W-02	21340	31	19	19	20	1	15-30	15	-	-	-
14S04W-02	21341	31	19	19	20	1	15-30	15	-	-	-
13S03W-08	33874	25	20	-	40	-	10-25	15	-	-	-
14S04W-13	34844	31	20	20	40	20	7-22	15	-	-	-
14S04W-13	34845	30	15	15	40	25	7-22	15	-	-	-
14S04W-13	34846	22	15	15	40	25	7-22	15	-	-	-
14S04W-13	34847	22	13	15	40	25	7-22	15	-	-	-
14S03W-06	35303	120	-	54	32	-22	72-108	36	600	-	-
13S04W-14	66186	25	21	20	300	280	-	-	-	-	-
13S04W-14	66188	35	21	-	300	-	-	-	30	-	-
13S04W-14	66189	25	18.5	20	300	280	-	-	20	-	-
13S04W-14	66190	35	30	-	300	-	-	-	-	-	-
13S04W-14	66191	26	20	-	300	-	-	-	-	-	-
13S04W-14	66194	28	23.5	25	300	275	-	-	25	-	-
13S03W-04	68426	510	450	-	560	-	-	-	12	-	-
13S03W-24	92833	92	20	18	20	2	89-92	3	60	-	-
13S03W-27	92835	300	-	160	60	-100	-	-	-	-	-
13S03W-25	93869	285	-	110	4200	4090	185-225, 245-285	40, 40	38	-	-
14S03W-05	100304	110	80	68	250	182	-	-	220	-	-
13S03W-33	100647	120	-	30	40	10	67-97	30	1000	-	-
13S03W-20	126465	400	-	154	240	86	360-400	40	100	-	-
14S03W-06	126630	117	-		10	-	-	-	-	-	-
14S03W-06	126635	180	-	-	10	-	-	-	-	-	-
14S03W-05	126966	125	-	-	-	-	-	-	600	38	8
13S03W-33	126968	123	-	-	-	-	83-123	40	1100	20	4
13S03W-33	126999	107	-	-	-	-	47-107	60	400	-	-
13S03W-18	127133	216	-	-	40	-	-	-	-	-	-
13S03W-30	127193	110	-	14	40	26	63-73, 83-93	10, 10	450	-	-
13S03W-32	127383	119	-	-	30	-	39-59, 93-118	20, 15	260	-	-
13S03W-33	158250	93	25	15	40	25	37-87	50	162	65	4
13S03W-33	158253	101	35	18	40	22	68-98	30	1100	17	8
13S03W-33	158275	124	60	42	30	-12	90-120	30	800	20	8
13S03W-05	158655	760	730	60	370	310	100-740	640	75	-	-
13S03W-04	159090	336	261	212	560	348	240-300	60	25	-	-
14S03W-07	159885	332	-	46	-	-	149-174, 195-214, 268-322	25, 19, 54	75	-	-
13S03W-17	171151	600	110	110	40	-70	-	-	10	0	1
13S03W-12	172683	953	118	-	-	-	-	-	-	-	-
13S04W-13	182935	180	-	-	60	-	-	-	-	-	-
13S04W-13	182936	205	-	-	240	-	-	-	-	-	-
13S04W-13	182937	210	-	-	220	-	-	-	-	-	-
13S04W-14	182939	190	-	-	350	-	-	-	-	-	-
13S04W-15	182940	185	-	-	200	-	-	-	-	-	-
14S04W-01	183007	30	15.5	15	50	35	13-28	15	-	-	-
14S04W-01	183008	30	16	14	30	16	13-28	15	-	-	-
14S04W-01	183009	30	15	14	30	16	13-28	15	-	-	-
14S04W-01	183010	30	15	15	30	15	13-28	15	-	-	-
13S03W-17	203796	75	-	-	260	-	-	-	-	-	-
13S03W-17	203797	97	50	20	260	240	-	-	-	-	-
13S03W-17	203798	53	38	5	40	35	-	-	-	-	-
13S03W-33	203818	105	40	27	40	13	65-105	40	80	53	8
13S03W-34	217389	100	25	17	30	13	60-100	40	450	63	12
13S03W-24	217394	250	-	-	460	-	-	-	-	-	-
13S03W-34	217400	130	18	13	30	17	83-128	45	1000	72	12
13S03W-25	217863	265	-	107	4000	3893	-	-	42.8	-	-
13S03W-19	218899	460	190	180	220	40	360-460	100	40	270	3
13S03W-33	221762	130	-	20	30	10	97-127	30	500	18	8
13S03W-33	221779	160	35	22	30	8	95-135	40	800	58	12
13S03W-33	222615	140	15	15	30	15	60-100	40	1000	-	-
14S03W-05	223233	138	9	9	-	-	60-120	60	800	-	-

TABLE 1
INFORMATION FOR SAN ELIJO VALLEY WELLS
San Elijo Valley Project Update
SMC Project No. 50021-03

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-	-	feet bgs	feet bgs	feet bgs	feet msl	feet msl	feet	feet	gpm	feet	hours
13S03W-27	223503	485	-	-	270	-	-	-	-	-	-
13S03W-15	229952	500	70	70	270	200	200-320	120	-	-	-
14S03W-07	240796	120	100	100	-	-	-	-	35	0	-
13S03W-28	262734	125	-	45	30	-15	60-122	62	-	-	-
13S03W-02	270208	40	-	-	350		10-40	30	-	-	-
13S03W-02	270208	45	-	-	350		10-45	35	-	-	-
13S03W-02	270208	35	-	-	350		15-35	20	-	-	-
14S04W-11	270537	15	-	5	10	5	-	-	-	-	-
13S03W-05	277278	375	71	-	270	-	335-375	40	-	-	-
13S03W-35	287976	445	120	95	740	645	-	-	5	-	-
13S03W-27	288011	500	-	-	100	-	180-200	20	-	-	-
13S03W-34	288099	134	-	70	25	-45	90-130	40	-	-	-
13S03W-10	288123	412	48	31	340	309	-	-	-	-	-
13S03W-27	288124	80	-	18	50	32	40-80	40	-	-	-
13S03W-33	288131	153	-	55	30	-25	73-133	60	-	-	-
13S03W-20	294351	1095	-	-	200	-	-	-	-	-	-
13S03W-20	294477	995	-	-	260	-	-	-	-	-	-
13S02W-31	322469	925	700	-	1600	-	-	-	2	400	8
13S04W-26	328078	60	-	38	70	32	-	-	-	-	-
13S03W-30	341129	100	48	6	-	-	-	-	37	-	-
13S03W-17	341130	600	282.6	100	250	150	435-535	100	25	-	-
14S03W-10	341149	600	72	-	-	-	-	-	-	-	-
13S03W-34	344552	400	195	60	220	160	-	-	2	-	-
13S03W-34	344553	250	118	80	220	140	90-130, 190-250	40, 60	6	-	-
13S02W-24	349188	880	240	100	690	590	-	-	37.5	50	2
13S02W-24	349189	500	120	20	650	630	-	-	50	16	2
13S02W-24	349198	560	47	-	660	-	0-560	560	80	-	-
13S03W-31	350214	284	90	90	120	30	-	-	-	155	-
13S03W-17	350451	905	-	235	270	35	-	-	160	-	-
13S03W-17	350452	610	-	85	270	185	-	-	200	-	-
13S03W-27	353063	1375	75	119	110	-9	-	-	-	-	-
13S03W-14	353068	663	423	159	450	291	-	-	12	-	-
13S03W-33	353077	150	50	42	30	-12	85-125	40	800	38	8
13S03W-23	353088	800	-	-	250	-	-	-	-	-	-
13S03W-03	353089	300	75	25	470	445	40-160	120	75	275	4
13S02W-30	353160	502	55	50	450	400	80-160	80	50	-	-
13S03W-09	353747	1000	200	-	340	-	-	-	2	-	-
13S03W-09	353748	700	60	50	340	290	-	-	2	650	8
13S03W-12	354663	575	-	-	850	-	-	-	65	-	-
13S03W-12	354665	720	-	-	850	-	-	-	45	-	-
13S03W-12	354669	580	-	-	850	-	-	-	22	-	-
13S03W-27	354795	1205	220	168	340	172	-	-	17.9	-	-
13S03W-27	354797	168	60	104	320	216	-	-	17.6	-	-
13S02W-24	355586	660	660	72	660	588	0-680	680	100	-	-
13S03W-28	365648	770	-	-	120	-	-	-	-	-	-
13S03W-33	370090	136	134	36	30	-6	124-134	10	1100	-	-
13S03W-05	394643	800	-	-	330	-	-	-	5.5	-	-
13S03W-05	394970	650	-	-	450	-	600-630	30	100	0	-
14S03W-01	396132	25	20	20	20	0	15-25	10	-	-	-
14S03W-01	396133	25	20	20	20	0	15-25	10	-	-	-
14S03W-01	396134	25	20	20	20	0	15-25	10	-	-	-
13S03W-33	401625	160	15	15	30	15	0-161	161	65	-	-
14S03W-06	401739	20	15	15	-	-	10-20	10	-	-	-
14S03W-06	401740	20	13	13	-	-	10-20	10	-	-	-
13S03W-18	401986	620	460	-	160	-	540-620	80	45	-	-
13S03W-18	402008	216	156	-	90	-	-	-	65	-	-
13S03W-28	402741	1141	147	147	270	123	-	-	31.4	1141	4
13S04W-12	429499	230	-	-	180	-	20-30	10	-	-	-
13S03W-17	439342	662	575	125	180	55	0-662	662	125	0	1
14S04W-14	439411	25	-	24	170	146	5-25	20	-	-	-
13S03W-29	439426	40	-	12.6	230	217.4	10-30	20	-	-	-
13S03W-29	439427	20	-	10.2	230	219.8	10-30	20	-	-	-
13S03W-29	439428	20	-	10.2	230	219.8	10-30	20	-	-	-
14S04W-14	439433	25	-	24	170	146	5-25	20	-	-	-
14S04W-14	439434	30	-	24	170	146	5-30	25	-	-	-
14S04W-14	439435	40	-	24	170	146	10-35	25	-	-	-
14S04W-14	439436	35	-	24	170	146	10-35	25	-	-	-
14S04W-14	439437	25	-	24	170	146	5-25	20	-	-	-
14S04W-14	439438	35	-	24	170	146	10-35	25	-	-	-
13S04W-27	439889	25	-	15	90	75	23-25	2	-	-	-
13S04W-27	439890	25	-	16	90	74	23-25	2	-	-	-
13S04W-27	439891	25	-	16	90	74	23-25	2	-	-	-
13S03W-17	440293	600	335	170	180	10	0-600	600	30	1	30
13S03W-17	440330	1020	590	175	320	145	0-1020	1020	25	0	2
14S04W-02	440911	16	12	12	90	78	13.5-15	1.5	-	-	-
14S04W-02	440912	13	11	11	90	79	13.5-15	1.5	-	-	-
14S04W-02	440913	16	12	12	90	78	13.5-15	1.5	-	-	-

TABLE 1
INFORMATION FOR SAN ELIJO VALLEY WELLS
San Elijo Valley Project Update
SMC Project No. 50021-03

Well ID	Well No.	Depth Boring	Depth First Water	Depth Static Water	Well Elevation	Static Water Elv.	Screen Interval	Screen Length	Estimated Yield	Drawdown	Test Length
-	-	feet bgs	feet bgs	feet bgs	feet msl	feet msl	feet	feet	gpm	feet	hours
14S04W-02	440914	16	10	10	90	80	13.5-15	1.5	-	-	-
14S04W-02	440915	16	11	11	90	79	13.5-15	1.5	-	-	-
14S04W-02	440916	16	10	10	90	80	13.5-15	1.5	-	-	-
14S04W-02	440917	16	10	10	90	80	13.5-15	1.5	-	-	-
13S03W-28	445625	610	30	25	40	15	-	-	100	500	3
13S03W-33	445758	90	50	43	30	-13	50-90	40	225	30	4
13S03W-33	445759	127	50	45	30	-15	65-123	58	250	30	4
14S04W-14	446195	25	-	24	170	146	5-25	20	-	-	-
14S04W-14	446196	25	-	24	170	146	5-25	20	-	-	-
14S04W-14	446197	25	-	24	170	146	5-25	20	-	-	-
13S03W-03	448429	295	50	6	470	464	20-295	275	25	-	-
13S03W-03	449169	710	460	200	1070	870	-	-	20	300	6
13S03W-16	455909	545	141	-	260	-	-	-	29.5	545	4
13S03W-32	456443	105	-	22	30	8	52-92	40	2500	17	8
13S03W-14	459414	300	92	50	220	170	-	-	27	-	-
13S03W-05	459418	700	-	90	470	380	-	-	85	0	-
13S03W-18	459498	230	-	-	80	-	-	-	-	-	-
13S03W-28	459837	120	60	45	30	-15	70-100	30	150	60	3
13S03W-19	462198	65	-	4	40	36	20-60	40	325	40	4
13S03W-22	463712	710	-	-	310	-	-	-	-	-	-
13S02W-31	463737	131	-	26	350	324	68-128	60	1000	65	8
13S04W-27	463750	150	-	-	80	-	-	-	-	-	-
14S03W-06	477604	30	15	14	-	-	19.5-30	10.5	-	-	-
14S04W-11	477924	15	-	6	10	4	-	-	-	-	-
13S03W-36	478038	111	111	7.75	90	82.25	20-111	91	68	-	-
13S04W-25	478631	207	94	20	30	10	59-95	36	115	-	-
13S03W-17	478635	80	22	18.75	190	171.25	-	-	12	-	-
13S03W-16	478836	580	-	35	290	255	380-480	100	40	0	1
13S03W-30	478842	580	-	148	150	2	-	-	40	-	-
13S03W-29	478848	87	12	12	20	8	53-73	20	-	-	-
13S03W-32	479051	167	-	90	100	10	0-167	167	20	-	-
13S03W-18	479131	425	60	-	80	-	1-30	29	25	-	-
13S03W-14	479228	805	505	35	300	265	-	-	9	-	-
13S03W-16	479575	505	185	-	260	-	-	-	45.1	-	-
13S03W-27	479576	505	-	85	210	125	-	-	5.7	-	-
13S03W-22	485444	1400	12	182	300	118	-	-	15	-	-
13S03W-30	485465	400	150	50	190	140	160-400	240	18	200	4
13S02W-31	487205	610	25	12	700	688	-	-	45	500	6
14S03W-03	487220	190	70	-	120	-	-	-	2	120	2
13S03W-22	487603	125	-	35	10	-25	-	-	-	500	
13S03W-13	487604	500	-	-	180	-	340-400	60	-	-	-
13S03W-27	487606	64	-	22	-	-	34-64	30	100	-	-
13S03W-23	487649	830	65	60	820	760	-	-	225	-	-
14S04W-11	490842	150	-	-	30	-	0-15	15	-	-	-
13S03W-03	491319	413	181	130	630	500	35-413	378	58	-	-
13S03W-17	491605	785	103	84.75	190	105.25	-	-	3.5	-	-
14S02W-06	491735	1000	-	-	680	-	-	-	10	-	-
14S03W-04	505668	600	384	70	90	20	-	-	40	500	6
13S03W-33	505708	95	-	43	30	-13	55-95	40	80	50	4
13S03W-17	505743	400	345	-	180	-	-	-	20	-	-
13S03W-33	518242	110	-	25	30	5	20-110	90	175	-	-
13S03W-31	521280	135	120	120	330	210	105-135	30	-	-	-
13S02W-31	521508	995	58	6	-	-	-	-	35	-	-
13S02W-31	521511	355	152	-	-	-	-	-	4	-	-
13S02W-30	521695	540	280	150	800	650	-	-	100	300	4
13S03W-17	521701	410	150	-	260	-	-	-	10	300	3
13S04W-11	529483	35	16	-	150	-	-	-	-	-	-
13S04W-11	529484	35	16	-	150	-	20-30	10	-	-	-
13S03W-17	534867	1033	273	100	200	100	-	-	50	-	-
13S03W-33	534874	118	-	15	30	15	20-118	98	78	-	-
13S03W-28	539698	30	-	-	230	-	10-30	20	-	-	-
13S03W-28	539698	30	-	-	230	-	10-30	20	-	-	-
13S03W-28	539698	30	-	-	230	-	10-30	20	-	-	-
13S04W-14	539708	60	40	40	220	180	28-58	30	-	-	-
13S04W-14	539709	60	40	40	220	180	28-58	30	-	-	-
13S04W-14	539710	60	37	37	220	183	29-59	30	-	-	-
13S04W-14	539711	46	37	37	220	183	22-46.5	24.5	-	-	-
13S03W-33	541074	115	26	8	30	22	80-105	25	-	-	-
13S03W-28	541858	30	-	25	200	175	10-30	20	-	-	-
13S03W-28	541859	30	-	-	200	-	10-30	20	-	-	-
13S03W-26	564425	1432	136	130	490	360	-	-	0.5	-	-
13S02W-31	564429	96	-	-	-	-	0-96	96	60	-	-
13S04W-13	574731	84	-	-	150	-	-	-	-	-	-
13S04W-13	574731	81	-	-	150	-	-	-	-	-	-
13S04W-13	574731	10	-	-	150	-	-	-	-	-	-
13S04W-13	574731	81	-	-	150	-	-	-	-	-	-
13S04W-13	574731	10	-	-	150	-	-	-	-	-	-

TABLE 1
INFORMATION FOR SAN ELIJO VALLEY WELLS
San Elijo Valley Project Update
SMC Project No. 50021-03

Well ID	Well No.	Depth Boring	Depth First Water	Depth Static Water	Well Elevation	Static Water Elv.	Screen Interval	Screen Length	Estimated Yield	Drawdown	Test Length
-	-	feet bgs	feet bgs	feet bgs	feet msl	feet msl	feet	feet	gpm	feet	hours
13S04W-36	575192	55	-	-	324	-	10-50	40	-	-	-
13S04W-24	576168	50	-	8	57	49	30-50	20	5	30	2
14S03W-06	578471	20	15	14	-	-	10-20	10	-	-	-
13S03W-14	580945	605	295	50	130	80	-	-	1	-	-
13S04W-13	584821	97	3	4	40	36	-	-	90	-	-
13S03W-23	584823	1098	27	30	-	-	-	-	100	-	-
13S03W-23	584826	1098	13	40	-	-	-	-	32	-	-
13S03W-23	584836	515	366	80	-	-	-	-	200	-	-
13S03W-23	584840	718	108	15	-	-	-	-	3	-	-
13S03W-23	584850	998	472	70	-	-	-	-	10	-	-
13S03W-08	702489	1010	333	-	200	-	-	-	-	-	-
13S04W-13	703180	150	-	-	280	-	50-150	100	-	-	-
13S03W-24	703277	200	-	-	-	-	50-200	150	-	-	-
13S03W-24	703278	170	-	-	-	-	50-170	120	-	-	-
13S03W-16	706742	436	-	160	270	110	197-494	297	30	-	-
13S02W-18	706749	994	504	200	100	-100	-	-	3	-	-
13S03W-31	706750	213	-	80	250	170	20-213	193	9	-	-
13S03W-31	706751	278	-	80	250	170	20-278	258	19	-	-
13S03W-28	707059	205	120	47	50	3	-	-	38	150	4
13S03W-24	710872	8	3.5	-	180	-	1-8	7	-	-	-
13S03W-24	710873	10	3.5	-	180	-	2-10	8	-	-	-
13S03W-20	710874	14.5	-	-	130	-	-	-	-	-	-
13S03W-20	710876	15.5	-	-	130	-	-	-	-	-	-
13S03W-15	720658	1000	330	200	260	60	-	-	20	-	-
13S03W-19	720665	980	225	-	240	-	-	-	30	-	-
14S03W-04	729037	600	35	-	60	-	115-175, 540-600	60, 60	60	280	4
13S04W-14	729389	30	-	-	220	-	10-30	20	-	-	-
13S04W-14	729390	30	-	-	220	-	10-30	20	-	-	-
13S04W-14	729391	30	-	-	220	-	10-30	20	-	-	-
13S03W-02	738653	260	100	23	430	407	140-180,220-260	40, 40	150	-	-
13S03W-06	739405	35.5	-	-	220	-	-	-	-	-	-
13S02W-31	741708	810	195	-	670	-	-	-	45	-	-
13S02W-30	741724	712	50	35	650	615	-	-	50	-	-
13S04W-23	742749	53	-	49	250	201	35-55	20	-	-	-
13S04W-23	742750	55	-	44	250	206	15-55	40	-	-	-
13S04W-23	742751	62	-	42	250	208	38-53	15	-	-	-
13S04W-23	742752	45	-	35	250	215	25-45	20	-	-	-
13S04W-23	742753	45	-	35	250	215	25-45	20	-	-	-
13S04W-23	742754	50	-	38	250	212	28-48	20	-	-	-
13S04W-23	742755	50	-	39	250	211	29-49	20	-	-	-
13S04W-23	742756	50	-	39	250	211	29-49	20	-	-	-
13S04W-36	745365	94	-	20	30	10	20-94	74	30	-	-
13S03W-28	745487	30	-	15	200	185	10-30	20	-	-	-
13S03W-04	748253	400	135	68	470	402	-	-	90	-	-
13S03W-16	748278	312	155	-	320	-	-	-	100	-	-
14S03W-04	752208	315	230	-	220	-	-	-	10	-	-
13S03W-18	752275	810	480	-	170	-	-	-	20	-	-
13S03W-05	767945	800	245	-	350	-	-	-	15	-	-
14S03W-05	775959	120	15	12	40	28	50-110	60	200	80	4
14S03W-05	775964	100	28	-	50	-	-	-	-	-	-
14S03W-03	776373	100	18	16	200	184	-	-	4	85	1
13S03W-03	776375	1210	60	77	630	553	600-660	60	11	900	8
14S03W-11	776388	800	425	405	330	-75	-	-	-	-	-
13S03W-28	776389	160	30	25	40	15	80-160	80	200	50	6
13S03W-34	776392	813	150	130	250	120	-	-	1	-	-
13S03W-22	796184	410	-	-	160	-	40-80	40	-	-	-
13S03W-30	796212	160	-	38	75	37	40-120, 140-160	80, 20	25	100	6
13S03W-05	902804	485	275	30	370	340	-	-	152	-	-
13S03W-18	903370	170	-	-	70	-	101-166	65	-	-	-
13S04W-27	903426	105	-	-	85	-	-	-	-	-	-
13S03W-04	903561	685	348	-	590	-	-	-	2	-	-
13S03W-20	909175	14.5	6	-	120	-	4.5-14.5	10		-	-
13S03W-20	909176	13	6	-	120	-	3-13	10		-	-
13S02W-31	909563	136	-	36	350	314	78-138	60	-	-	-
13S03W-10	1080849	150	-	-	140	-	-	-	-	-	-
13S03W-19	1085025	750	426	22	140	118	650-750	100	30	600	4
13S03W-30	1085047	90	24	20	20	0	30-70	40	600	6	8
13S03W-18	1085062	280	230	14	90	76	-	-	5	200	2
13S03W-32	1085066	144	29	19	30	11	37-97, 117-137	60, 20	70	-	-
14S04W-02	1085454	21	4.5	4	10	6	2.5-17.5	15	-	-	-
14S04W-02	1085455	21	3	4	10	6	2.5-17.5	15	-	-	-
14S04W-02	1085456	40	40	13	10	-3	19-34	15	-	-	-
14S03W-05	1085483	26	-	-	40	-	17-27, 40-45	10, 5	-	-	-
14S03W-05	1085484	26	-	-	30	-	10-25	15	-	-	-
14S03W-05	1085485	31	-	-	40	-	15-25	10	-	-	-
13S03W-29	1090946	41	-	-	210	-	25-41	16	-	-	-
14S03W-05	-	140	5	18	30	12	15-30	15	600	-	-

TABLE 10
LUSARDI FORMATION LAB RESULTS
San Elijo Valley and San Dieguito Creek Project Update
SMC Project No. 50021-03

Sample Name	Sleeve Height	Sleeve Diameter	Soil Height	Soil Volume	Dry Weight	Dry Weight	H2O Added	Wet Weight	Gravity Drain	Dry Density	Volume Soil	Volume Soil	Porosity	Specific Yield	Specific Retention	Permeability Average	Permeability
-	inches	inches	inches	feet^3	grams	pounds	ml	grams	ml	pcf	inch^3	ml	%	%	%	cm/sec	feet/day
LUSARDI-1; Bag sample-remolded to 103 pcf	6	2.5	6	0.02	-	1.765				103.00			25.9				
LUSARDI-2; Drive 1	6	2.5	3.25	0.01	572	1.261	68	639	16	135.97	15.95	261.48	26.0	23.5	76.5	0.00095	2.5
LUSARDI-3; Drive 1	6	2.5	1.5	0.00	418	0.922	72	453	2	215.40	7.36	120.68	59.7	2.8	97.2	0.022	59
LUSARDI-3; Drive 2	6	2.5	4.75	0.01	775	1.708	155	913	7	126.01	23.32	382.16	40.6	4.5	95.5	0.007	19.8

Notes:

1 feet^3 = cubic feet
2 ml=milliliters
3 pcf=pounds per cubic foot
4 inch^3 = cubic inches
5 Sample 2 stopped perking after 3 minutes.
6 Sample 3 was small and most likely had leakage around the soil - resulting in a faster rate.

TABLE 11

CH2M HILL NUMERCIAL FLOW BALANCE VS. ESTIMATES OF BASIN STORAGE

San Dieguito Creek Project Update

SMC Project No. 50021-03

Input From CH2M Hill (1995)														Calculated				Input From CH2M Hill (1995)		Calcualetd		
Time Step Information					Water Balance per Timestep				Basin Flows - Water Balance											Estimate Basin Storage		
Time Step	Start Date	Ending Date	Ending Time	Time Step Length	Recharge (Precipitation)	Ocean Boundary Balance	Pumping Discharge	River Balance	Recharge (Precipitation)	Ocean Boundary Balance	Pumping Discharge	River Balance	Net Change in Storage	Recharge (Precipitation)	Ocean Boundary Balance	Pumping Discharge	River Balance	Net Water Balance for Time Period	Cumulative Water Balance	Based on Izicki (1983)		
-	-	-	-	days	acre-feet				acre-feet per day					% of Net Water Balance				acre-feet	acre-feet	Period Type	acre-feet	% Basin Fill
0	1-Sep-44	1-Sep-44	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	2-Sep-44	1-Sep-46	730	730	0	-455	-2,672	-13	0	-0.62	-3.66	-0.02	-4.3	0%	14%	85%	0.4%	-3,140	-3,140	Dry	26,876	54%
2	2-Sep-46	31-Aug-48	1,460	730	0	-352	-2,672	0	0	-0.48	-3.66	0.00	-4.1	0%	12%	88%	0%	-3,024	-6,164	-	23,852	48%
3	1-Sep-48	31-Aug-49	1,825	365	0	-119	-1,336	0	0	-0.33	-3.66	0.00	-4.0	0%	8%	92%	0%	-1,455	-7,619	-	22,397	45%
4	1-Sep-49	31-Aug-51	2,555	730	0	-108	-2,672	0	0	-0.15	-3.66	0.00	-3.8	0%	4%	96%	0%	-2,780	-10,399	-	19,817	39%
5	1-Sep-51	1-Mar-52	2,738	183	5,579	-276	-670	0	30.49	-1.51	-3.66	0.00	25.3	120%	-6%	-14%	0%	4,633	-5,766	-	24,250	49%
6	2-Mar-52	4-Mar-52	2,741	3	91	-6	-11	1,163	30.33	-2.00	-3.67	387.67	412.3	7%	0%	-1%	94%	1,237	-4,529	-	25,487	51%
7	5-Mar-52	30-Aug-53	3,285	544	0	-313	-1,991	0	0	-0.58	-3.66	0.00	-4.2	0%	14%	86%	0%	-2,304	-6,833	-	23,183	46%
8	31-Aug-53	30-Aug-54	3,650	365	0	-96	-1,336	0	0	-0.26	-3.66	0.00	-3.9	0%	7%	93%	0%	-1,432	-8,265	-	21,751	44%
9	31-Aug-54	29-Aug-56	4,380	730	0	-73	-2,672	0	0	-0.10	-3.66	0.00	-3.8	0%	3%	97%	0%	-2,745	-11,010	-	19,006	38%
10	30-Aug-56	29-Aug-58	5,110	730	4,575	-274	-2,672	0	6.27	-0.38	-3.66	0.00	2.2	281%	-17%	-164%	0%	1,629	-9,381	-	20,635	41%
11	30-Aug-58	28-Aug-60	5,840	730	0	76	-2,672	0	0	0.10	-3.66	0.00	-3.6	0%	-3%	103%	0%	-2,596	-11,977	Seawater Intrusion	18,039	36%
12	29-Aug-60	28-Aug-62	6,570	730	0	257	-2,672	0	0	0.35	-3.66	0.00	-3.3	0%	-11%	111%	0%	-2,415	-14,392	-	15,624	31%
13	29-Aug-62	27-Aug-65	7,665	1,095	0	618	-4,008	0	0	0.56	-3.66	0.00	-3.1	0%	-18%	118%	0%	-3,390	-17,782	-	12,234	25%
14	28-Aug-65	27-Aug-66	8,030	365	5,979	-123	-1,336	0	16.38	-0.34	-3.66	0.00	12.4	132%	-3%	-30%	0%	4,520	-13,262	-	16,754	34%
15	28-Aug-66	26-Aug-68	8,760	730	0	363	-2,672	0	0	0.50	-3.66	0.00	-3.2	0%	-16%	116%	0%	-2,309	-15,571	-	14,445	29%
16	27-Aug-68	26-Aug-69	9,125	365	2,912	81	-1,336	0	7.98	0.22	-3.66	0.00	4.5	176%	5%	-81%	0%	1,657	-13,914	-	16,102	32%
17	27-Aug-69	26-Aug-71	9,855	730	0	507	-2,672	0	0	0.69	-3.66	0.00	-3.0	0%	-23%	123%	0%	-2,165	-16,079	-	13,937	28%
18	27-Aug-71	25-Aug-74	10,950	1,095	0	1,019	-4,008	0	0	0.93	-3.66	0.00	-2.7	0%	-34%	134%	0%	-2,989	-19,068	-	10,948	22%
19	26-Aug-74	24-Aug-77	12,045	1,095	0	1,209	-4,008	0	0	1.10	-3.66	0.00	-2.6	0%	-43%	143%	0%	-2,799	-21,867	-	8,149	16%
20	25-Aug-77	23-Feb-78	12,228	183	0	217	-670	0	0	1.19	-3.66	0.00	-2.5	0%	-48%	148%	0%	-453	-22,320	End Dry	7,696	15%
21	24-Feb-78	25-Apr-78	12,289	61	19,951	-753	-223	12,101	327.07	-12.34	-3.66	198.38	509.4	64%	-2%	-1%	39%	31,076	8,756	Start Wet	38,772	78%
22	26-Apr-78	25-Dec-78	12,533	244	0	-858	-893	-34	0	-3.52	-3.66	-0.14	-7.3	0%	48%	50%	2%	-1,785	6,971	-	36,987	74%
23	26-Dec-78	26-Apr-79	12,655	122	2,190	-883	-447	8,531	17.95	-7.24	-3.66	69.93	77.0	23%	-9%	-5%	91%	9,391	16,362	-	46,378	93%
24	27-Apr-79	26-Jan-80	12,930	275	0	-461	-1,007	-376	0	-1.68	-3.66	-1.37	-6.7	0%	25%	55%	20%	-1,844	14,518	-	44,534	89%
25	27-Jan-80	26-Apr-80	13,021	91	5,237	-299	-333	2,865	57.55	-3.29	-3.66	31.48	82.1	70%	-4%	-4%	38%	7,470	21,988	Basin Full	52,004	104%
26	27-Apr-80	26-Dec-80	13,265	244	0	-429	-893	-719	0	-1.76	-3.66	-2.95	-8.4	0%	21%	44%	35%	-2,041	19,947	-	49,963	100%
27	27-Dec-80	28-Mar-81	13,357	92	0	-112	-337	2,374	0	-1.22	-3.66	25.80	20.9	0%	-6%	-18%	123%	1,925	21,872	-	51,888	104%
28	29-Mar-81	27-Jan-82	13,662	305	0	-324	-1,116	-568	0	-1.06	-3.66	-1.86	-6.6	0%	16%	56%	28%	-2,008	19,864	-	49,880	100%
29	28-Jan-82	28-Apr-82	13,753	91	0	-97	-333	2,550	0	-1.07	-3.66	28.02	23.3	0%	-5%	-16%	120%	2,120	21,984	Basin Full	52,000	104%

Notes:

1 Postive values indicate recharge, negative values indicate discharge

TABLE 12
LAKE HODGES DISCHARGE VS. RIVER INFLOW
San Dieguito Creek Project Update
SMC Project No. 50021-03

Input							Calculated	
Lake Hodges Discharge			CH2M Hill 1995 Model Water Balance				Time Weighted Daily River Balance	Portion of Over Dam Spillage that is River Balance
Year	Yearly Total	Average Daily Discharge	Start Date	Ending Date	No. Days	Average Daily River Balance		
-	acre-feet	acre-feet per day	-	-	-	acre-feet per day	acre-feet per day	%
1921-22	89,903	246.31	-	-	-	-	-	-
1922-23	9,164	25.11	-	-	-	-	-	-
1925-26	13,831	37.89	-	-	-	-	-	-
1926-27	147,821	404.99	-	-	-	-	-	-
1931-32	49,153	134.67	-	-	-	-	-	-
1932-33	4,956	13.58	-	-	-	-	-	-
1936-37	129,907	355.91	-	-	-	-	-	-
1937-38	76,984	210.92	-	-	-	-	-	-
1938-39	27,671	75.81	-	-	-	-	-	-
1939-40	4,605	12.62	-	-	-	-	-	-
1940-41	156,843	429.71	-	-	-	-	-	-
1941-42	23,548	64.52	-	-	-	-	-	-
1942-43	32,481	88.99	-	-	-	-	-	-
1943-44	7,108	19.47	-	-	-	-	-	-
1944-45	4,372	11.98	1-Sep-44	1-Sep-44	0	-	-	-
1945-46	2,278	6.24	2-Sep-44	1-Sep-46	729	-0.02	0.0	-1%
-	-	-	2-Sep-46	31-Aug-48	729	0	-	-
-	-	-	1-Sep-48	31-Aug-49	364	0	-	-
-	-	-	1-Sep-49	31-Aug-51	729	0	-	-
-	-	-	1-Sep-51	1-Mar-52	182	0	-	-
1951-52	4,717	12.92	2-Mar-52	4-Mar-52	2	387.53	2.1	16%
-	-	-	5-Mar-52	30-Aug-53	543	0	-	-
-	-	-	31-Aug-53	30-Aug-54	364	0	-	-
-	-	-	31-Aug-54	29-Aug-56	729	0	-	-
-	-	-	30-Aug-56	29-Aug-58	729	0	-	-
-	-	-	30-Aug-58	28-Aug-60	729	0	-	-
-	-	-	29-Aug-60	28-Aug-62	729	0	-	-
-	-	-	29-Aug-62	27-Aug-65	1094	0	-	-
-	-	-	28-Aug-65	27-Aug-66	364	0	-	-
-	-	-	28-Aug-66	26-Aug-68	729	0	-	-
-	-	-	27-Aug-68	26-Aug-69	364	0	-	-
-	-	-	27-Aug-69	26-Aug-71	729	0	-	-
-	-	-	27-Aug-71	25-Aug-74	1094	0	-	-
-	-	-	26-Aug-74	24-Aug-77	1094	0	-	-
1977-78	46,709	127.97	25-Aug-77	23-Feb-78	182	0	-	-
1978-79	75,018	205.53	24-Feb-78	25-Apr-78	60	198.37	32.60	16%
			26-Apr-78	25-Dec-78	243	-0.14		
1979-80	248,624	681.16	26-Dec-78	26-Apr-79	121	69.92	22.2	3%
			27-Apr-79	26-Jan-80	274	-1.37		
1980-81	30,721	84.17	27-Jan-80	26-Apr-80	90	31.48	6.0	7%
			27-Apr-80	26-Dec-80	243	-2.95		
1981-82	37,881	103.78	27-Dec-80	28-Mar-81	91	25.8	4.9	5%
			29-Mar-81	27-Jan-82	304	-1.86		

1982-83	175,548	480.95	28-Jan-82	28-Apr-82	90	28.03	28.03	6%
							Average River Recharge from Spillage (1978 -1982):	**9%**

TABLE 13

COMPARISION OF ALTERNATIVE SITES FOR WATER SUPPLY WELL AND RECHARGE

San Dieguito Creek Project Update

SMC Project No. 50021-03

A) Comparison of Alternative Sites for Water Suupply Well

Area	Suitability Criteria								Totals
	Water Quality	Well Head Protection	Settlement Issues	Well Interference	Proximity to Natural Recharge	Saltwater Intrusion	Aquifer Thickness	High Transmissivity	
Criteria Weight	1	1	1	1	1	1	1	1	
Coast Sand Quarry	3	1	3	3	3	3	2	2	20
West El Apajo	3	1	3	2	3	3	2	2	19
East El Apajo	3	1	3	1	3	3	2	2	18
Morgan Run	2	3	1	2	2	2	3	3	18
Rancho Paseana	2	3	1	2	1	2	1	1	13
Fairbanks Ranch	1	3	1	1	1	1	1	2	11
North Polo Fields	1	3	1	1	1	1	1	2	11

b) Comparison of Alternative Sites for Recharge

Area	Suitability Criteria								Totals
	Impact on Groundwater Quality	Pressure Issues	Impact on Shallow Water Levels	Proximity to Natural Recharge	Recoverability	Ease of Injection	Storage Capacity	Well Head Protection	
Criteria Weight	1	1	1	1	1	1	1	1	
Coast Sand Quarry	3	3	2	3	3	3	3	1	21
West El Apajo	3	3	2	3	3	2	2	1	19
East El Apajo	3	3	2	3	3	2	2	1	19
Morgan Run	3	2	3	1	3	2	3	3	20
Rancho Paseana	3	2	3	1	1	1	1	3	15
Fairbanks Ranch	3	1	3	1	1	1	1	3	14
North Polo Fields	3	1	3	1	1	1	1	3	14

Notes:

1 Suitability rankings: 1 = low suitability and 3 = high suitability.

TABLE 14
PROJECT SUSTAINABILITY MATRIX
San Dieguito Creek Project Update
SMC Project No. 50021-03

	Option	Sustainability Criteria									Totals
		Well Field Cost	Number of Wells	Use JPA San Elijo Outfall	IPR Potential	Potential Environmental Concerns	Long Term Settlement	Water Quality	Well Head Protection	Potential Overdraft	
	Criteria Weight	1	1	1	1	1	1	1	1	1	
A	San Dieguito - Existing Wells	3	3	1	1	3	3	3	3	3	23
B	San Elijo - Deep Wells	1	1	3	1	3	3	3	3	2	20
C	San Dieguito - New Wells	2	3	1	2	2	2	2	2	2	18
D	San Elijo - Shallow Wells	2	2	3	1	1	2	2	1	3	17

Ranking Key	Notes on suitability ranking used for each criteria.								
1	>$2MM	>5 wells	No	No	Yes	Yes	>3000 ppm	No	Yes
2	$1-$2MM	3-5 wells	Maybe	Maybe	Maybe	Maybe	2000-3000 ppm	Maybe	Maybe
3	<$1MM	<2 well	Yes	Yes	No	No	<2000 ppm	Yes	No

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
13S02W-18	157311	0-6 Red Clay, 6-35 Decomposed Granite	35	Blue Granite
13S02W-18	706749	0-5 Metavolcanic in clay	5	Blue/Black Metavolcanic
13S02W-24	349188	0-60 Soft Sand, 60-100 Decompossed Granite	100	Granite
13S02W-24	349189	0-60 Decompossed Granite	60	Granite
13S02W-24	349198	0-40 Sand	40	Black/White Granite
13S02W-24	355586	0-20 Decomposed Granite, 20-25 Grey Granite, 25-100 Sand	100	Black/White Granite
13S02W-30	353160	0-8 Topsoil, 8-14 Brown Sand w/Decomposed Granite, 14-43 Decomposed Granite, 43-51 Green Shale/Clay	51	Black/White Granite
13S02W-30	521695	0-20 Red/Brown Decomposed Granite	20	Grey Granite
13S02W-30	741724	0-3 Artifical Fill, 3-43 Decomposed Granite	43	Black/White Granite
13S02W-31	909563	Silty Sand, 69-75 Coarse Sand w/Gravel, 75-90 Partly Cemented Sand, 90-136 Fine-Coarse Sand w/Boulders	40	Friar's Formation
13S02W-31	322469	0-8 Decomposed Granite, 8-140 Weathered Rock	140	Grey Granodiorite
13S02W-31	463737	75 Coarse Sand w/ Gravel, 75-90 Partly Cemented Sand, 90-131 Fine-Coarse Sand w/Boulders	-	Alluvium-Friar's Formation
13S02W-31	487205	0-7 Brown Artifical Fill, 7-28 Brown Decomposed Granite	28	Grey Granite
13S02W-31	521508	0-17 Brown Clay, 17-22 Brown Clay w/Cobble, 22-58 Tan-Brown Clay, 58-76 Grey Clay w/Green Rock, 76-115 Orange Clay, 115-135 Rust Rock	135	Grey/Green Metavolcanic
13S02W-31	521511	0-11 Brown Clay, 11-17 Brown Clay w/ Cobble, 17-62 Tan Clay, 62-78 Green-Grey Clay, 78-90 Grey Clay, 90-107 Decomposed Metavolcanic	107	Grey/Orange Metavolcanic
13S02W-31	564429	0-3 Brown Clay w/ Cobble, 3-5 Brown Sandy Clay, 5-13 Brown Clay, 13-28 Fine Sand, 28-46 Brown Marine Sediments, 46-96 Green Decomposed Metavolcanic	-	Grey/Green Metavolcanic
13S02W-31	741708	0-2 Clay, 2-20 Tan Decomposed Granite, 20-65 Grey Decomposed Granite	65	Black/White Granite
13S03W-02	1539	-	0	Grey Granite
13S03W-02	270208	0-13 Brown Sandy Clay, 13-40 Grey-Brown Decomposed Granite	-	Granite
13S03W-02	270208	0-7 Artifical Fill, 7-10 Brown Fine Silty Sand, 10-11 Brown Sandy Clay, 11-45 Grey-Brown Decomposed Granite	-	Granite
13S03W-02	270208	0-7 Artifical Fill, 7-12 Brown Fine Silty Clayey Sand, 12-45 Grey-Brown Decomposed Granite	-	Granite
13S03W-02	738653	0-3 Top Soil, 3-90 Decomposed Granite w/Clay	90	Black/White Rose Granite
13S03W-03	353089	0-35 Red/Brown Clayey Sand, 35-140 ReD/Brown Weathered Rock	140	Dark Grey Granite
13S03W-03	448429	0-5 Brown Topsoil, 5-12 Clay w/Metavolcanic Rock, 12-145 Brown Decomposed Metavolcanic Rock	145	Black-Green Metavolcanic
13S03W-03	449169	0-3 Brown Artifical Fill	3	Red/Blue/Green Metavolcanic
13S03W-03	491319	0-3 Brown Topsoil, 3-20 Decomposed Granite, 20-35 Clay w/Decomposed Granite	35	Blue-Grey Volcanic and Gneiss
13S03W-03	776375	0-50 Sandy Clay w/Rocks	50	Green/Grey Granite
13S03W-04	68426	-	0	Green Metavolcanic
13S03W-04	903561	0-10 Clay	10	Black/White Granite
13S03W-04	159090	0-286 Grey Decompossed Granite w/Brown Clay	311	Grey/Green Granite
13S03W-04	748253	0-50 Tan Clay & Decomposed Granite, 50-75 Grey Decomposed Granite	75	Black/White Granite
13S03W-05	902804	0-70 Decomposed Granite	70	Black/White Granite
13S03W-05	158655	0-25 Red Clay, 25-180 Clay, 180-194 Clay & Gravel	194	Granite
13S03W-05	277278	0-13 Grey-Tan Clay	13	Blue Grey Metavolcanic
13S03W-05	394643	0-4 Artifical Fill, 4-36 Clay & Boulders	36	Granite
13S03W-05	394970	0-8 Top Soil	8	Black Granite
13S03W-05	459418	0-10 Clay, 10-20 Sand Stone	20	Grey Green Granite
13S03W-05	767945	0-8 Clay & Rock. 8-15 Decomposed Granite	15	Black/Blue Granite
13S03W-06	739405	0-26 Artifical Fill, 26-35.5 Santiago Formation Grey Silty Claystone	-	Santiago Formation
13S03W-08	702489	0-7 Grey Clay, 7-33 White Clay w/Decomposed Granite, 33-120 Red Clay	120	Black/White Granite
13S03W-08	33874	0-10 Silty Sand, 10-25 Large Rock	-	Alluvium
13S03W-09	353747	0-14 Red/Brown Decomposed Granite	14	Grey Metavolcanic
13S03W-09	353748	0-10 Decomposed Granite	10	Grey Metavolcanic
13S03W-10	1080849	0-43 Brown Sandstone, 43-93 Clayey Sand, 93-150 Clay	-	Alluvium
13S03W-10	288123	0-6 Brown Clay, 7-30 Blue Clay	30	Gray Granite with Yellow Tint
13S03W-11	4610	Sand, 15-20 Grey-Brown Very Fine-Medium Sandy Silt, 20-28.5 Yellow-Brown Very Fine-Medium Silty Sand	-	Grey and Orange Metavolcanic

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
13S03W-11	4611	Sand, 15-20 Grey-Brown Very Fine-Medium Sandy Silt, 20-25.5 Yellow-Brown Very Fine-Medium Silty Sand	-	Grey and Orange Metavolcanic
13S03W-11	4613	Sand, 18-19 Yellow-Brown Very Fine-Medium Clayey Sand, 19-25 Yellow-Brown Very Fine-Medium Sand, 20-28.5 Yellow-Brown Very Fine-Medium Silty Sand	-	Grey and Orange Metavolcanic
13S03W-11	4614	18 Yellow-Brown Very Fine-Medium Sand, 18-20 Grey Very Fine-Fine Silty Sand, 20-23 Grey Very Fine-Fine Sand, 23-26 Grey Very Fine-Medium Silty Sand	-	Grey and Orange Metavolcanic
13S03W-12	172683	0-2 Brown Clay w/Decomposed Metavolcanic Rock, 3-59 Brown Clay, 59-68 Brown Clay w/Decomposed Metavolcanic Rock, 68-78 Grey Clay w/Decomposed Metavolcanic Rock	79	Grey and orange Metavolcanic
13S03W-12	354663	0-84 Topsoil, Clay, Boulders & Decomposed Granite	84	Granite
13S03W-12	354665	0-14 Topsoil & Cobble Stone w/Decomposed Granite	14	Grey Granite
13S03W-12	354669	0-21 Topsoil, Clay, Cobble & Decomposed Granite	21	Black Granite
13S03W-13	487604	0-75 Sand & Clay, 75-435 Red & Green Rock w/Clay	435	Grey Granite
13S03W-14	353068	0-103 Decomposed Granite	103	Grey Granite
13S03W-14	459414	0-10 Clay, 10-50 Sandstone, 50-118 Clay & Sandstone w/Granite	118	Black/White Granite
13S03W-14	479228	0-2 Topsoil	2	Grey Granite
13S03W-14	580945	0-5 TopSoil	5	Black/Green/Grey?Purple Granite
13S03W-15	1363	0-66 Clay	66	Metavolcanic
13S03W-15	229952	0-3 Topsoil, 3-34 Brown Clay	34	Green/Purple/Grey Volcanic Rock
13S03W-15	720658	Decomposed Granite & Clay, 20-45 Decomposed Granite, 45-60 Red Clay, 60-95 Decomposed Granite	95	Black Granite
13S03W-16	455909	0-1 Topsoil, 1-20 Silty Sand, 20-70.5 Grey-Green Silty Sand	70.5	Metavolcanic
13S03W-16	478836	-	0	Diabase (volcanic) and Granite
13S03W-16	479575	0-4 Brown Sandy Clay, 4-33 Buff Colored Silt Stone, 33-60 Light Green Silt stone, 60-90 Weathered Volcanic	90	Blue/Black Metavolcanic
13S03W-16	706742	0-19 Brown White Clay/Sand, 19-25 Grey Mudstone, 25-58 Orange Sandstone, 58-103 Brown Clay, 103-106 Rusty Sandstone, 106-197 Tan Clay	197	Blue/Green Metavolcanic
13S03W-16	748278	0-15 Clay with Rock	15	Black/White Granite
13S03W-17	171151	0-8 Fill,8-10 Soil, 10-45 Grey Shale, 45-155 Grey Shale and Clay, 155-173 Blue Clay/Shale, 173-222 Loose Clay/Shale, 222-600 Red Clay/Shale	-	Lusardi Formation
13S03W-17	203796	0-8 Clayey Sand, 8-30 Clayey Sand with rocks, 30-42 Clayey Sand and Silt, 42-63 Grey Sand and Siltstone	63	Grey Metavolcanic
13S03W-17	203797	0-50 Brown Clayey Sand and Siltstone, 50-75 Grey Siltstone	75	Grey Metavolcanic
13S03W-17	203798	0-40 Clayey Sand with Rocks	40	Grey Metavolcanic
13S03W-17	341130	0-23 Brown/Tan Clayey Sand, 23-45 Tan White Clay	45	Blue Grey Metavolcanic
13S03W-17	350451	0-3 Brown Clay w/ Cobble, 3-32 Yellow Brown to Green Brown Silty Sand, 32-63 Blue Grey Mud and Siltstone, 63-100 Black/Grey Sandstone	100	Blue Grey Metavolcanic
13S03W-17	350452	0-5 Brown Clay w/ Cobble, 5-57 Yellow Brown Silt and Sand, 57-125 Grey Sand with gravel	125	Black Metavolcanic
13S03W-17	439342	0-85 Soft Loose Rock	85	Green Black Rock
13S03W-17	440293	0-90 Soft Sand Rocks	90	Green Purple Bed Rock
13S03W-17	440330	0-155 Soft Loose Rock	155	Black Purple White Rock
13S03W-17	478635	0-3 Brown Clay w/ Cobble, 3- 19 Lemon Sand w/ Clay,19-22 Silty Sand, 22-44 Grey Siltstone, 44-78 Decomposed Metavolcanic	78	Metavolcanic
13S03W-17	491605	0-3 Brown Clay w/ Cobble, 3- 19 Lemon Sand w/ Clay,19-22 Silty Sand, 22-44 Grey Siltstone, 44-51 Decomposed Metavolcanic	51	Blue Gray Metavolcanic
13S03W-17	505743	0-81 Sandstone w/ Round Cobble, 81-157 Grey Shale	157	Metavolcanic
13S03W-17	521701	0-15 Brown/Grey Clayey Sand, 15-26 Grey Sandy Clay, 26-40 Pink Claystone	40	Grey/Green Metavolcanic
13S03W-17	534867	0-4 Brown Sandy Clay, 4-13 Brown/Red Clay, 13-48 Yellow-Orange Decomposed Metavolcanic	48	Blue-Green Metavolcanic
13S03W-18	903370	0-103 Redish Hard Rock	103	Granite
13S03W-18	1085062	0-12 Clayey Sand w/ Red/Brown Cobbles, 12-30 Sandy Clay w/ Cobbles, 30-45 Grey Clay	45	Grey/Blue Metavolcanic
13S03W-18	127133	Clayey Sand w/ Cobble Rock	216	Lusardi Formation
13S03W-18	401986	0-160 Alluvial	160	Black-White Granite
13S03W-18	402008	0-45 Grey Clay/Slate, 45-196 Grey Slate, 196-216 Grey Slate w/ Salt Water	0	Lusardi Formation
13S03W-18	459498	Grey Clay w/ Sandstone, 184-188 Sandstone, 188-223 Clay w/ Sandstone, 223-226 Sandstone, 226-230 Clay.	121	Lusardi Formation
13S03W-18	479131	0-40 Brown Clay; 40-425 black rock-diorite	40	Lusardi Formation
13S03W-18	752275	0-8 Clay w/ Cobble, 8-48 Brown Clay; 48-810 Black/White Greenish fractured granite	48	Metavolcanic
13S03W-19	1085025	0-25 Clayey Sand and Silt w/cobbles, 25-75 Brown Clayey Sand, 75-160 Grey Cemented Aggregate Brecca	160	Grey Metavolcanic
13S03W-19	218899	0-80 Clayey Sand w/ Cobble, 80-150 Weathered Metavolcanic	150	Metavolcanic
13S03W-19	462198	0-25 Fine Sand, 25-27 Clay, 27-53 Fine-Coarse Sand, 53-60 Partly Cemented Sand	60	Lusardi Formation

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
13S03W-19	720665	0-5 Brown Clay and Decomposed Granite, 5-15 White Clay, 15-25 Brown Clay, 25-56 Decomposed Granite & Brown Clay, 56-115 Gray Clay	115	Black/White Granite
13S03W-20	909175	0-10 Red-Brown Clayey Sand, 10-14 Brown Sandy Clay, 14-14.5 Decomposed Metavolcanic	-	Metavolcanic
13S03W-20	909176	0-10 Red-Brown Clayey Sand, 10-13 Decomposed Metavolcanic	-	Metavolcanic
13S03W-20	126465	0-95 Sandy Clay, 95-195 Decomposed Metavolcanic	195	Metavolcanic
13S03W-20	294351	0-75 Brown Sandy Clay, 75-165 Grey Sandy Clay, 165-445 Sand w/ Gravel	445	Purple/Green Metavolcanic
13S03W-20	294477	0-10 Brown Sand, Gravel & Clay, 10-19 Brown Clayey Sand, 19-995 Brown Sand, Gravel, Boulders	-	Lusardi Formation
13S03W-20	710874	0-14.5 Grey-Orange Fine-Medium Clayey Sand	-	Alluvium
13S03W-20	710876	0-8.5 Grey Fine-Medium Clayey Sand, 8.5-13.5 Yellow-Orange Fine-Coarse Clayey Sand, 13.5-15.5 Grey-Orange Fine-Coarse Silty Sand	-	Alluvium
13S03W-22	463712	0-10 Red/Brown Clayey Sand, 10-105 Tan Sandstone, 105-285 Green/Gray Shale, 285-570 Blue/Grey Shale w/ Pebbles, 570-710 Tan/Purple Shale	-	Lusardi Formation
13S03W-22	485444	0-18 Yellow Clayey Sand, 18-70 Brown/Yellow Sandstone	70	Grey Metavolcanic
13S03W-22	487603	80 Brown Coarse Sand w/ Clay, 80-102 Fine-Medium Sand w/ Clay, 102-122 Mud & Black Clay	122	Granite
13S03W-22	796184	0-5 Sandy Clay, 5-50 Yellow Clay-Mudstone, 50-75 Blue Clay, 75-410 Blue/Gray Shale	-	Friar's Formation
13S03W-23	353088	0-30 Grey Sandy Clay, 30-110 Clayey metavolcanic	110	Metavolcanic
13S03W-23	487649	0-5 Topsoil, 5-25 Decomposed Granite	25	Black/White Granite
13S03W-23	584823	0-6 Brown Clay, 6-27 Blue Santigo Peak Volcanic	27	Blue Metavolcanic
13S03W-23	584826	0-13 Red/Brown Clay, 13-19 Decompresed Metavolcanic	19	Blue/Grey Metavolcanic
13S03W-23	584836	0-9 Brown Clay, 9-19 Decompresed Metavolcanic	19	Blue/Grey Metavolcanic
13S03W-23	584840	0-4 Brown Clay, 4-32 Yellow Sandstone, 32-53 Grey Marine Sediment, 53-55 Purple Rock, 55-78 Grey Marine Sediment	78	Purple/Grey Metavolcanic
13S03W-23	584850	0-2 Brown Topsoil, 2-13 Grey-Blue Santiago Peaks	13	Blue/Grey Metavolcanic
13S03W-24	92833	0-70 Silt & Sand, 70-88 Silt & Blue Clay, 88-91 Gravel, 91-92 Clay	-	Alluvium
13S03W-24	217394	0-210 Clayey Sand w/ Cobble, 210-250 Soft Weathered Rock	-	Friar's Formation
13S03W-24	703277	0-10 Black Birt, 10-30 Brown Clay, 30-40 Boulders, 40-200 Brown Clay	-	-
13S03W-24	703278	0-3 Black Dirt, 3-40 Brown Clay, 40-55 Blue-Grey Shale, 70-100 Brown Clay, 100-150 Brown Sandstone	150	Granite
13S03W-24	710872	0-3.5 Brown Clayey Sand, 3.5-5 Yellow-Brown Silty Sand, 5-8 Brown Clayey Sand	-	Alluvium
13S03W-24	710873	0-5 Brown Clayey Sand, 5-10 Brown Clayey Sand	-	Alluvium
13S03W-25	93869	0-200 Decomposed Schist	200	Schist
13S03W-25	217863	0-6 Topsoil, 6-18 Decomposed Granite	18	Granite
13S03W-26	564425	0-4 Decomposed Metavolcanic, 4-7 Clay, 7-17 Decomposed Metavolcanic	17	Red/Blue/Green Metavolcanic
13S03W-27	92835	0-28 Decomposed Granite	28	Blue Granite
13S03W-27	223503	0-8 Clay, 8-10 Cobble, 1-65 Sediment w/ Cobble, 65-138 Cemented Gravels	138	Grey/Green Metavolcanic
13S03W-27	288011	0-11 Grey Fine Sand, 11-30 Brown Clay w/ Sand Cobble	31	Grey Granite
13S03W-27	288124	0-21 Fine Graind Sand/Clay,21-32 Medium Sand, 32-58 Fine Grey Sand, 58-80 Medium Grey Sand w/ Rocks	-	Alluvium
13S03W-27	353063	0-35 Brown/Red Clay, 35-275 Decomposed Granite, 275-320 Green/Black Layers	320	Grey Granite
13S03W-27	354795	0-2 Soil, 2-106 Medium Brown Sand, 106-117 Grey Siltstone,117-119 Hard Rock	119	Metavolcanic
13S03W-27	354797	0-3 Sandy Clay, 3-60 Fine-Medium Brown Sand,60-85 Decomposed Metavolcanic, 85-126 Decomposed to Medium Hard Metavolcanic	126	Metavolcanic
13S03W-27	479576	0-4 Brown Sandy Clay, 4-63 Brown Sandy Clay w/ Gravel, 63-98 Decomposed Metavolcanic	98	Blue-Grey Metavolcanic
13S03W-27	487606	0-4 Fine Sand, 4-35 Fine Sand w/ Clay, 35-41 Med Sand w/ Clay, 41-45 Medium Cemented Sand w/ Clay, 45-60 Medium Cemented Sand, 60-64 Hard Rock	-	Lusardi Formation
13S03W-28	262734	0-90 Fine Sand, 90-105 Medium Sand, 105-110 Broken Rock,110-125 Clay	-	Alluvium
13S03W-28	365648	80-318 Multicolored Rock w/ Fractures	318	Blue Granite
13S03W-28	402741	0-2 Clay w/Sand, 2-53.5 Yellow Sand w/ Clay, 53.5-215 Blue-Grey Siltstone	215	Blue/Grey Metavolcanic
13S03W-28	445625	0-15 Red/Brown Clayey Sand & Silt, 15-30 Decomposed Granite, 30-41 Clayey Sand & Boulders	41	Grey Metavolcanic
13S03W-28	459837	0-40 Brown Fine Sand,40-55 Grey Fine Sand, 55-70 Partly Cemented Sand, 70-83 Medium-Coarse Sand, 83-96 Grey Partly Cemented Sand & Boulders, 96-120 Blue Clay	-	Alluvium
13S03W-28	539698	0-2.5 Red Medium Clayey Sand, 2.5-13.5 Yellow Fine Silty Sand, 13.5-18.5 Pink-Grey Fine Sandy Silt, 18.5-28.5 Brown Silty Clay, 28.5-30 Grey Fine-Medium Clayey Sand	-	Friar's Formation
13S03W-28	539698	0-2 Red Medium Clayey Sand, 2-18.5 Yellow Fine Silty Sand, 18.5-24.5 Grey Clayey Silt, 24.5-30 Grey Clayey Fine-Medium Clayey Sand	-	Friar's Formation
13S03W-28	539698	23.5 Yellow Fine-Coarse Silty Sand, Grey Clayey Silt, 24.5-30 Grey Clayey Fine-Medium Clayey Sand	-	Friar's Formation
13S03W-28	541858	0-3.5 Red Medium Clayey Sand, 3.5-14 Yellow Fine Silty Sand, 14-16.5 Red-Yellow Fine Sandy Clay, 16.5-30 Yellow Fine-Medium Silty Sand	-	Friar's Formation

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
13S03W-28	541859	0-3.5 Red Medium Clayey Sand, 3.5-13 Yellow Fine Silty Sand, 13-23.5 Grey Silty Clay, 23.5-29 Grey Fine-Medium Silty Sand, 29-30 Grey Fine Clayey Sand	-	Friar's Formation
13S03W-28	707059	0-20 Red Brown Clayey Sand, 20-115 Grey Decomposed Metavolcanic	115	Grey-Brown/Black Metavolcanic
13S03W-28	745487	0-4 Yellow Medium Silty Sand, 4-19 Yellow-Grey Fine-Medium Clayey Sand, 19-30 Yellow-Grey Fine Silty Sand	-	Friar's Formation
13S03W-28	776389	0-90 Brown Fine Silty Sand, 90-115 Clayey Sand & Boulders, 115-160 Fine-Coarse Partly Cemented Sand	-	Friar's Formation
13S03W-29	1090946	Fine-Coarse Sand, 14-19 Grey Silt w/ Sand, 19-29 Grey Silt, 29-34 Brown Sand, 34-39 Brown Silty Sand, 39-40 Grey Silt w/ Sand	-	Friar's Formation
13S03W-29	439426	0-17.5 Sand, 17.5-40 Yellow/Orange Silty Sand	-	Friar's Formation
13S03W-29	439427	0-3 Yellow Sandy Clay, 3-6.5 Yellow/Orange Silty Sand, 6.5-20 Orange Silty Clay	-	Friar's Formation
13S03W-29	439428	0-3.5 Yellow Clayey Silt, 3.5-11 Yellow/Brown Silty Sand, 11-14 Orange Sand, 14-20 Yellow/Brown Silty Clay	-	Friar's Formation
13S03W-29	478848	0-10 Brown Silty Sand, 10-42 Brown Silty Sand w/Clay, 42-658 Coarse Silty Sand w/Cobble, 65-87 Coarse Sand	-	Friar's Formation
13S03W-30	1085047	0-26 Fine Clayey Sand, 26-34 Sand & Gravel, 34-90 Clayey Sand w/Cobble	-	Friar's Formation
13S03W-30	127193	0-50 Sandy Loam, 50-63 Clayey Sand, 63-73 Sand & Gravel, 73-83 Grey Clayey Sand, 83-110 Sand, Gravel, Clay	-	Friar's Formation
13S03W-30	341129	0-23 Tan Clay, 23-26 Brown-Red Sandy Clay, 26-47 Tan Clayey Sand, 47-74 Sandstone, 74-78 Blue-Grey Mudstone, 78-100 Blue-Grey Mudstone-Shale	-	-
13S03W-30	478842	0-72 Clay, 72-142 Blue Claystone, 142-230 Green Silty Sandstone, 230-245 Black Silt Stone, 245-510 Blue Claystone, 510-580 Grey-White Sand	-	Delmar Formation
13S03W-30	485465	180 Brown/Grey Clayey Sandstone, 180 -205 Black Clayey Sandstone w/ Cobble, 205-400 Grey Shale & Sandstone	-	Delmar Formation
13S03W-30	796212	0-14 Brown Fine Sand, 14-18 Small Boulders, 18-56 Fine-Coarse Sand, 56-160 Sandstone & Claystone	-	Delmar Formation
13S03W-31	350214	Shale, 54-59 Tan Sand, 59-62 Sand Clay, 62-66 Grey Shale, 66-77 Tan Sandstone, 77-80 Gravel, 80-88 Sandstone, 88-94 Grey Shale, 94-104 Sandstone & Gravel, 104-115 Green Shale, 115-125 Sand & Gravel, 125-149 Coarse Sand, 149-153 Gravel, 153-187	283	Granite
13S03W-31	521280	0-125 Yellow-Orange Fine-Coarse Sand, 125-130 Orange Silty Clay,130-135 Orange Sandy Silt	-	Torrey Sandstone
13S03W-31	706750	0-50 Sandstone, 50-121 Blue-Green Clay, 121-178 Blue-Green Marine Sediment, 178-213 Grey Shale	-	Delmar Formation
13S03W-31	706751	0-2 Topsoil, 2-32 Tan Sandstone, 32-56 Tan Clay, 56-59 Marine Sediment, 59-61 Cobble, 61-278 Blue-Green Marine Sediment	-	Delmar Formation
13S03W-32	1309	0-5 Red-Brown Clayey Sand, 5-143 Fine to Coarse Sand, 143-150 Blue-Green Clay	-	Alluvium
13S03W-32	1085066	0-4 Brown Silty Sand, 4-21 Fine-Coarse Sand, 21-29 Clayey Sand, 29-79 Fine-Coarse Sand, 79-92 Blue Clay, 92-101 Cemented Sand, 101-144 Blue Clay	-	Alluvium
13S03W-32	127383	w/Rocks, 77-92 Blue-Green Sandy Clay w/Rocks, 92-94 Sand, 94-109 Blue-Green Sandy Clay, 109-111 Blue-Green Clayey Sand, 111-116 Clayey Sand, 116-119 Blue-Green Sandy Clay	-	Friar's Formation
13S03W-32	456443	0-20 Grey Fine Sand, 20-30 Coarse Sand, 30-38 Red Clay w/Gravel, 38-50 Grey Sand, 51-60 Grey Coarse Sand, 60-75 Grey Medium Sand, 75-87 Grey Coarse Sand, 88-90 Grey Sand, 90-105 Grey Medium Sand	-	Delmar Formation
13S03W-32	479051	0-14 Brown Sandstone, 14-47 Sandstone w/ Shale, 47-65 Sandstone w/ Cobble, 65-167 Black/Brown Marine Sediment	-	Delmar Formation
13S03W-33	100647	0-65 Brown Fine Silty Sand, 65-75 Brown Fine-Coarse Sand, 75-100 Brown Fine-Coarse Sand w/Cobble, 100-110 Cemented Sand & Boulders	110	Granite
13S03W-33	126968	60-80 Clay, 80-86 Sand, 86-91 Rock, 91-97 Clay, 97-106 Coarse Sand, 106-111 Clay, 111-119 Sand, 119-123 Clay	-	-
13S03W-33	126999	0-16 Sand, 16-22 Clay, 22-26 Sand, 26-35 Clay, 35-40 Sand, 40-52 Clay, 52-60 Sand, 60-73 Clay, 73-98 Sand & Gravel, 98-107 Clay	-	-
13S03W-33	158250	0-20 Fine Silty Sand, 20-45 Brown Fine-Coarse Sand w/Cobble, 45-82 Green/Grey Clayey Sand & Cobble, 82-92 Green/Grey Clay & Cobble	-	-
13S03W-33	158253	0-22 Brown Fine Silty Sand, 22-65 Grey Fine Silty Sand, 65-98 Fine-Coarse Sand, 98-101 Boulder	-	-
13S03W-33	158275	0-20 Brown Fine Sand, Silt & Gravel, 20-75 Black Fine Sand, Silt & Gravel, 75-100 Grey Fine-Coarse Sand, 100-120 Grey Coarse Sand, 120-124 Boulder	-	-
13S03W-33	203818	0-60 Fine Sand & Silt, 60-95 Grey Fine-Coarse Sand w/Boulder	95	Black Granite
13S03W-33	221762	0-85 Black Fine Silty Sand, 85-100 Grey Fine-Coarse Sand, 100-130 Grey Fine-Coarse Sand w/Boulder	-	-
13S03W-33	221779	0-55 Fine Sand, 55-85 Black Fine Sand & Silt, 85-105 Grey Fine-Coarse Sand, 105-135 Partly Cemented Sand w/ Boulders, 135-160 Green/Gray Clay w/Cobble	-	-
13S03W-33	222615	46-65 Sand, 65-78 Clay & Cobble, 78-105 Coarse Sand, 105-110 Cobble, 110-114 Rock, 114-140 Blue Clay	-	-
13S03W-33	288131	0-20 Grey Silty Sand, 20-35 Grey Silty Sand & Clay, 35-133 Grey Medium Sand & Clay, 133-153 Grey Clay	-	Alluvium
13S03W-33	353077	0-55 Fine Sand, 55-85 Black Fine Sand & Silt, 85-105 Grey Fine-Coarse Sand, 105-135 Partly Cemented Sand w/ Boulders, 135-150 Green/Gray Clay w/Cobble	-	-
13S03W-33	370090	0-3 Silt & Sand, 3-90 Black Silt, 90-100 Sand & Gravel, 100-124 Black Silt, 124-134 Gravel, 134-136 Blue Clay	-	-
13S03W-33	401625	0-14 Silty Topsoil, 14-102 Coarse Sand & Gravel, 102-141 Blue Clay, 141-155 Coarse Sand & Gravel	155	Grey Granite
13S03W-33	445758	0-30 Brown/Grey Fine-Coarse Sand, 30-80 Fine-Coarse Partly Cemented Sand, 80-90 Cemented Boulders	-	-
13S03W-33	445759	93 Grey Fine-Coarse Sand, 93-117 Grey Fine-Coarse Partly Cemented Sand & Boulders, 117-127 Cemented Cobble Rock	-	-
13S03W-33	505708	0-50 Brown Fine Sand and Silt, 50- 90 Grey Fine-Coarse Sand, 90-95 Grey Cemented Conglomerate	-	Alluvium
13S03W-33	518242	0-3 Sand, 3-4 Artifical Fill, 4-38 Fine Sand, 38-57 Sand w/Cobble, 57-95 Marine Sediment w/White Clay, 95-100 Marine Sediment w/Green Clay	-	Alluvium
13S03W-33	534874	0-19 Fine Sand, 19-28 Cobbles, 28-37 Medium Sand, 37-48 Coarse Sand, 48-61 Cobbles,61-66 Coarse Sand, 66-90 Grey Marine Sediment, 90-118 Coarse Sand	-	Alluvium
13S03W-33	541074	0-60 Tan Silty Sand, 60-115 Tan Silty Sand	-	Alluvium

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
13S03W-34	9392	0-11 Decomposed Granite	11	Blue Granite
13S03W-34	217389	0-20 Fine-Coarse Sand, 20-60 Fine Sand, 60-100 Fine-Coarse Sand w/ Boulders	-	-
13S03W-34	217400	0-80 Fine Sand, 80-90 Fine-Coarse Sand, 90-130 Sand, Gravel & Boulders	-	-
13S03W-34	288099	74-89 Sand, Clay, & Boulders, 90-104 Grey Medium Sand & Boulders, 104-130 Med Sand & Boulders	130	Granodiorite
13S03W-34	344552	0-5 Topsoil, 5-28 Brown Clay,28-40 Grey Clay & Rocks, 40-120 Grey Clay, 120-160 Yellow Clay, 160-195 Grey Clay, 195-198 Gravel	198	Black Metavolcanic
13S03W-34	344553	0-10 Topsoil, 10-40 Grey/Yellow Clay, 40-180 Grey Clay, 180-200 Red/Yellow/Grey Clay	200	Metavolcanic
13S03W-34	776392	Sandstone, 46-57 Grey Clay, 57-65 Blue-Green Marine Sediments, 65-73 Brown-Orange Clay, 73-93 Blue-Green Marine Sediments, 93-95 Grey/Orange/Brown Clay, 95-	103	Blue-Green Metavolcanic
13S03W-35	287976	0-60 Red Clay	60	Granite
13S03W-36	6259	0-72 Yellow/Brown Clayey Sandstone, 72-88 Grey Clayey Sandstone, 88-92 Black Silt, 92-128 Cobble, 130-176 Blue/Green Clayey Sandstone	-	-
13S03W-36	478038	Sand, 20-49.6 Medium Silty Sand, 85-110 Blue-Grey Silty Sand, 110-111 Blue Grey Mudstone	-	-
13S04W-11	529483	0-3 Clay w/Gravel, 3-25 Medium Sand w/Silt, 25-35 Sand	-	Alluvium
13S04W-11	529484	0-3 Clay w/Gravel, 3-25 Medium Sand w/Silt, 25-35 Sand	-	Alluvium
13S04W-12	429499	Sandy Clay, 64-115 Green Marine Sediment, 115-149 Green Clay, 149-154 Red Clay, 154-223 Grey Siltstone, 223-226 Sandstone, 226-260 Grey Siltstone	-	Delmar Formation
13S04W-13	182935	0-128 Sandy Clay, 128-165 Rock, 165-172 Clay & Cemented Sand, 172-180 Rock	-	Delmar Formation
13S04W-13	182936	0-12 Sandy Clay, 12-14 Sandstone, 14-108 Cemented Sand, 108-205 Cemented Sand & Blue Clay	-	Delmar Formation
13S04W-13	182937	0-10 Sand, 10-15 Cemented Sand, 15-17 Rock, 17-125 Cemented Sand & Blue Clay, 125-126 Rock, 126-210 Cemented Sand & Clay	-	Delmar Formation
13S04W-13	574731	Fine Silty Sand, 55-60 Grey Fine Silty Sand, 60-73 Tan Fine Silty Sand, 73-84 Tan Fine Silty Sand w/Cobbles	-	Delmar Formation
13S04W-13	574731	0-14 Yellow Fine-Medium Sand, 14-31 Tan Fine Sand, 31-77 Grey-Tan Fine Silty Sand, 77-81 Grey Silty Sand	-	Delmar Formation
13S04W-13	574731	0-10 Tan Fine Sand	-	Delmar Formation
13S04W-13	574731	0-25 Grey-Yellow Artifical Fill, 25-34 Grey Fine Silty Sand, 34-60 Yellow/Tan/Grey Fine Silty Sand w/Gravel, 60-78 Light Grey Fine Silty Sand, 78-81 Yellow Fine Sand	-	Delmar Formation
13S04W-13	574731	0-10 Grey-Tan Fine Silty Sand	-	Delmar Formation
13S04W-13	584821	Medium-Very Coarse Sand, 78-90 Medium-Very Coarse Sand w/Cobbles, 90-94 Silty Sand w/Green Clay, 94-95 Gravel, 95-97 Fine Cemented Sand	-	Dawson Formation
13S04W-13	703180	0-150 Clay	-	-
13S04W-14	182939	0-23 Sand Loam, 23-28 Cobble, 28-60 Cemented Sandstone, 60-190 Cemented Sand & Clay	-	Delmar Formation
13S04W-14	539708	0-18 Torrey Sandstone Brown Sandy Silt, 18-45 Brown Fine Sand, 45-60 Delmar Formation Grey Clayey Silt	-	Alluvium
13S04W-14	539709	0-14 Torrey Sandstone Brown Sandy Silt, 14-46 Brown Fine Sand, 46-60 Delmar Formation Grey Clayey Silt	-	Alluvium
13S04W-14	539710	0-9 Torrey Sandstone Brown Sandy Silt, 9-40 Tan-Orange Fine Sand, 40-60 Delmar Formation Grey Clayey Silt	-	Alluvium
13S04W-14	539711	0-14 Torrey Sandstone Brown Sandy Silt, 14-40 Brown Fine Sand, 40-46 Delmar Formation Grey Clayey Silt	-	Alluvium
13S04W-14	729389	0-30 Silty Sand w/Cobbles	-	Alluvium
13S04W-14	729390	0-30 Silty Sand w/Cobbles	-	Alluvium
13S04W-14	729391	0-30 Silty Sand w/Cobbles	-	Alluvium
13S04W-14	66186	13-23 Yellow-Brown Fine-Medium Clayey Sand, 23-25 Yellow-Brown Fine-Medium Silty Sand	-	Alluvium
13S04W-14	66188	Medium Silty Sand, 18-23 Yellow-Brown Fine-Medium Sand w/Clay, 23-28 Yellow-Brown Fine-Medium Sand. 28-35 Yellow-Brown Fine Silty Sand	-	Alluvium
13S04W-14	66189	0-5 Cement, 5-22 Brown Medium-Coarse Graine Clayey Sand, 22-25 Yellow-Brown Medium-Coarse Sand w/ Clay	-	Alluvium
13S04W-14	66190	0-5 Cement, 5-18 Brown Fine-Medium Sand, 18-28 Brown Fine-Medium Clayey Sand, 28-33 Yellow-Brown Fine Silty Sand, 33-35 Brown Sand w/ Silt	-	Alluvium
13S04W-14	66191	0-5 Cement, 5-26 Brown Fine-Medium Clayey Sand	-	Alluvium
13S04W-14	66194	0-5 Cement, 5-8 Brown Fine-Medium Clayey Sand, 8-22 Grey Fine Silty Sand, 22-27 Brown Sandy Clayey, 27-28 Brown Fine Silty Sand	-	Alluvium
13S04W-15	182940	0-37 Cemented Sand, 37-40 Rock, 40-52 Cemented Sand & Clay, 52-55 Rock, 55-140 Cemented Sand & Clay, 140-153 Sandstone, 153-157 Cemented Sand & Clay, 157-163 Sandstone, 163-178 Cemented Sand & Clay, 178-182 Sandstone, 182-185 Cemented Sand & Clay	-	Delmar Formation
13S04W-15	12509	0-15 Brown Medium-Coarse Sand, 15-35 Brown Fine Sand	-	Delmar Formation
13S04W-15	12510	0-20 Brown Fine Sand, 20-25 Brown Clay, 25-38 Yellow Fine Sand, 38-40 Yellow Clay	-	Delmar Formation
13S04W-15	12511	0-15 Brown Fine Sand, 15-20 Yellow Fine Sand, 20-25 Yellow Fine-Medium Sand, 25-30 Yellow Medium Sand, 30-35 Brown Fine Sand	-	Delmar Formation
13S04W-15	12512	0-15 Brown Fine Sand, 15-25 Grey Fine Sand, 25-30 Brown Fine Sand, 30-34 Grey Clay, 34-35 Brown-Grey Clay	-	Delmar Formation
13S04W-23	742749	0-53 Tan-Orange Fine-Coarse Sand	-	Delmar Formation
13S04W-23	742750	0-55 Tan-Orange Medium-Coarse Sand	-	Delmar Formation
13S04W-23	742751	0-55 Tan-Orange Medium-Coarse Sand	-	Delmar Formation

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
13S04W-23	742752	0-28 Brown Fine-Medium Sand, 28-33 Brown Fine Clayey Sand, 33-37 Fine Sand, 37-45 Grey Fine Sand	-	Delmar Formation
13S04W-23	742753	0-28 Brown Fine-Medium Sand, 28-44 Brown Fine Clayey Sand, 44-45 Grey Fine Sand	-	Delmar Formation
13S04W-23	742754	0-32 Brown Fine-Medium Sand, 32-39 Brown Fine Clayey Sand, 39-43 Fine Sand, 43-50 Brown Fine Sand	-	Delmar Formation
13S04W-23	742755	0-26 Brown Fine-Medium Sand, 26-37 Brown Fine Clayey Sand, 37-49 Brown Fine-Medium Sand, 49-50 Sandstone	-	Delmar Formation
13S04W-23	742756	0-43 Brown Fine-Medium Sand, 43-49 Brown Fine Clayey Sand, 49-50 Sandstone	-	Delmar Formation
13S04W-24	576168	0-7 Clayey Sand, 7-19 Sandy Clay, 19-37 Clay w/Sand, 37-50 Brown Clay w/Sand	-	Metavolcanic
13S04W-25	478631	38-41 Silty Sand, 41-71 Sandy Clay, 71-82 Clay w/Rocks, 82-87 Clay, 87-91 Decomposed Rock, 91-93 Decomposed Metavolcanic	93	Metavolcanic
13S04W-26	328078	0-35 Fone Sand, 35-47 Fine-Medium Sand, 47-52 Brown-Tan Clayey Sand, 52-56 Green Clay, 56-60 Brown-Tan Sandy Clay	-	Metavolcanic
13S04W-27	903426	0-12 Sandy Clay, 12-53 White Clay, 53-105 Blue Clay	-	Alluvium
13S04W-27	439889	Sand, 9-11 Brown Clay, 11-15 Brown Coarse Sandy Clay, 15-16 Fine-Medium Sand, 16-25 Fine-Medium Sand	-	Alluvium
13S04W-27	439890	0-5 Brown Coarse Clayey Sand, 5-7 Brown Sandy Clay, 7-10 Grey Sandy Clay, 10-13 Grey Sandy Clay, 13-25 Brown Coarse Silty Sand	-	Alluvium
13S04W-27	439891	0-7, Brown Sandy Clay, 7-10 Brown Coarse Clayey Sand, 10-14 Brown Sandy Clay, 14-25 Brown Silty Sand	-	Alluvium
13S04W-27	463750	0-20 Fine-Coarse Sand, 20-150 Clay	-	-
13S04W-36	575192	0-13 Tan-Brown Fine-Coarse Sand, 13-39 Brown Medium Sand, 40-55 Grey-Tan Fine-Medium Sand	-	Delmar Formation
13S04W-36	745365	0-13 Browny Silty Sand & Clay, 13-20 Fine Sand & Grey Clay, 20-37 Brown Medium Sand, 37-47 Tan Fine Sand, 47-50 Cobbles, 50-82 Grey Clay, 82-94 Decomposed Metavolcanic	-	Delmar Formation
14S02W-06	491735	0-24 Decomposed Granite, 24-120 Soft Formation	120	Black/White Granite
14S03W-01	396132	0-19 Brown Fine Silty Sand, 19-24 Black Clayey Silt, 24-25 Black Fine Sand	-	Alluvium
14S03W-01	396133	0-19 Yellow-Brown Fine Silty Sand, 19-24 Black Clayey Silt, 24-25 Black Fine Sand	-	Alluvium
14S03W-01	396134	0-19 Brown Fine-Medium Silty Sand, 19-25 Black Clayey Silt	-	Alluvium
14S03W-03	487220	0-33 Yellow-Brown Sandy Clay, 33-70 Grey Clay, 70-165 Blue-Grey Clayey Sandstone, 165-190 Red-Brown Clayey Sandstone	-	-
14S03W-03	776373	0-12 Sandy Clay, 12-24 Clayey Sand, 24-27 Yellow Sandy Clay, 27-50 Grey Clay, 50-65 Black Shale,65-100 Grey Shale	-	Friar's Formation
14S03W-04	505668	0-150 Sandy Clay, 150-200 Grey Shale	200	Blue/Green Metavolcanic
14S03W-04	729037	Boulder, 72-85 Red-Pink Cemented Cobbles, 85-95 Purple Clay, 95-135 Grey Sandy Clay, 135-165 Grey Cemented Cobbles	165	Black Metavolcanic
14S03W-04	752208	0-48 Brown Clay & Decomposed Clay, 48-210 Grey Shale & Clay	210	Black/White Granite
14S03W-05	-	Grey Fine Silty Sand, 50-83 Grey Medium Silty Sand, 83-95 Medium Sand, 95-132 Fine-Coarse Sand, 132-137 Sand, 137-140 Cemented Boulders	-	Delmar Formation
14S03W-05	100304	0-25 Grey Sand, 25-35 Black Silt, 35-60 Brown Clay, 60-76 Brown Sandy Clay, 76-84 Brown Sand, 84-90 Black Clay, 90-110 Sand & Gravel	-	-
14S03W-05	1085483	0-20 Brown Fine-Medium Silty Sand, 20-26 Brown Sandy Silt	-	Alluvium
14S03W-05	1085484	0-26 Brown Fine-Coarse Silty Sand	-	Alluvium
14S03W-05	1085485	0-6 Yellow-Brown Silt, 6-30 Olive fine-Coarse Silty Sand, 30-31 Delmar Formation	-	Delmar Formation
14S03W-05	126966	Sand, 74-86 Clay, 86-93 Coarse Sand, 93-100 Clay, 100-106 Sand, 106-108 Clay, 108-125 Coarse Sand	-	-
14S03W-05	223233	0-30 Silt, 30-38 Silty Clay, 38-40 Sand, 40-70 Silty Clay, 70-120 Sand, 120- 135 Clay & Cobbles, 135-138 Blue Clay	-	-
14S03W-05	775959	Black Fine-Coarse Sand, 85-100 Black Fine-Coarse Clayey Sand, 100-110 Black Coarse Sand, 110-120 Grey Clay	-	-
14S03W-05	775964	0-7 Yellow/Brown Clayey Sand, 7-36 Brown-Black Very Fine Silty Sand, 36-76 Siltstone, 76-100 Blue/Green Shale	-	Metavolcanic
14S03W-06	126630	0-4 Very Fine Silty Sand, 4-28 Very Fine Sand w/Clay, 28-102 Black/Brown Silty Mudstone, 102-111 Cemented Sand & Cobble, 111-117 White Clay	-	-
14S03W-06	126635	0-3 Silty Sand, 3-22 Very Fine Sand w/Clay, 22-95 Black/Brown Mudstone, 95-180 Fine-Coarse Sand	-	-
14S03W-06	35303	0-20 Silt, 20-60 Clay, 60-96 Sand, 96-108 Gravel & Sand, 108-120 Rock	-	-

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
14S03W-06	401739	0-3 Topsoil, 3-20 Brown Medium Clayey Sand	-	Torrey Sandstone
14S03W-06	401740	0-20 Brown Medium Clayey Sand	-	Torrey Sandstone
14S03W-06	477604	0-10 Brown Medium Sandy Clay, 10-12 Green Sandy Clay, 12-30 Red/Green/Grey Clay	-	Torrey Sandstone
14S03W-06	578471	0-20 Brown Medium Clayey Sand	-	Torrey Sandstone
14S03W-07	159885	0-19 Red Marine Sediment, 19-21 Sand, 21-45 Yellow Marine Sediment, 45-85 Green Marine Sediment, 85-87 Sandstone, 87-148 Green Marine Sediment, 148-167 Tan Sandstone, 167-169 Sand, 169-235 Green Marine Sediment, 235-269 Green-Grey Clay, 269-274 Clay W/Sand, 274-277 Coarse Sand, 277-291 Green Marine Sediment, 291-305 Clayey Sand, 305-332 Marine Sediment	-	Torrey Sandstone
14S03W-07	240796	0-72 Silt, 72-105 Gravel	105	Bedrock
14S03W-10	341149	Sandstone, 25-30 Orange Sandstone, 30-70 Grey Sandstone, 70-72 Sandstone, 72-97 Green Sandstone & Clay, 97-110 Pink Sandstone, 110-132 Brown Sandstone	132	Grey-Blue Metavolcanic
14S03W-11	6400	0-29 Decomposed Granite, 29-340 Sandstone w/Clay & Gravel,	-	-
14S03W-11	776388	Clayey Sandstone & Siltstone, 95-315 Grey Clay, 315-395 Green Clay, 395-675 Clay w/Yellow-Brown Rocks, 675-800 Grey Shale	-	-
14S03W-18	15455	0-12 Artifical Fill, 12-20 Cobble, 20-210 Clay	-	Alluvium
14S04W-01	183007	0-30 Brown/Grey Fine-Coarse Sand	-	Alluvium
14S04W-01	183008	0-6 Grey Fine Silty Sand, 6-9 Grey/Brown Fine Silty Sand, 9-16 Grey Fine Clayey Sand, 16-30 Brown/Grey Fine Silty Sand	-	Alluvium
14S04W-01	183009	0-5 Tan Fine Sand, 5-11Grey/Brown Silt, 11-14 Brown/Orane/Grey Silt, 14-30 Brown/Grey Fine-Medium Silty Sand	-	Alluvium
14S04W-01	183010	0-30 Brown/Grey Fine-Medium Sand	-	Alluvium
14S04W-02	1085454	0-2 Green-Yellow Fine Clayey Silty Sand, 2-4 Brown Sandy Clay, 4-5 Black Very Fine-Fine Silty Sand, 5-10 Black Clay, 10-21 Grey Very Fine-Fine Silty Sand	-	Alluvium
14S04W-02	1085455	0-1 Black Clay, 1-2 Grey Very Fine-Fine Silty Sand, 2-5 Black Clay, 10-21 Black Very Fine-Fine Silty Sand	-	Alluvium
14S04W-02	1085456	0-25 Yellow Very Fine-Fine Silty Sand, 25-35 Torrey Sandstone Green-Grey Sandy Siltstone, 35-40 Yellow-Red Very Fine-Fine Silty Sandstone	-	Torrey Sandstone
14S04W-02	440911	0-15 Grey Fine-Medium Sand	-	Alluvium
14S04W-02	440912	0-15 Grey Fine-Medium Sand	-	Alluvium
14S04W-02	440913	0-15 Grey Fine-Medium Sand	-	Alluvium
14S04W-02	440914	0-6 Grey-Brown Fine-Coarse Sand, 6-9 Red-Brown Fine-Coarse Silty Sand, 9-14 Yellow-Brown Sandy Silt, 14-16 Grey Fine-Medium Sand	-	Alluvium
14S04W-02	440915	0-15 Yellow-Brown Fine-Medium Sand	-	Alluvium
14S04W-02	440916	0-15 Yellow-Brown Fine-Medium Sand	-	Alluvium
14S04W-02	440917	0-5 Yellow-Brown Fine-Medium Sand, 5-6 Cobble, 6-16 Yellow-Brown Fine-Medium Sand	-	Alluvium
14S04W-02	21338	0-4 Brown Fine-Medium Sand, 4-8 Grey-Brown Silt, 8-21 Grey-Brown Clay	-	Alluvium
14S04W-02	21339	0-18 Yellow-Brown Fine-Medium Sand, 18-23 Grey Fine Silty Sand, 23-27 Grey Fine-Coarse Gravely Sand, 27-31 Grey Fine-Coarse Sand	-	Alluvium
14S04W-02	21340	0-23 Yellow-Brown Fine-Medium Sand, 23-31 Grey Clay w/Fine Sand	-	Alluvium
14S04W-02	21341	0-23 Yellow-Brown Fine-Medium Sand, 23-31 Grey Clay w/Fine Sand	-	Alluvium
14S04W-11	270537	0-9 Artifical Fill, 9-11 Brown Silty Sand, 11-15 Brown Sandy Clay	-	Alluvium
14S04W-11	477924	0-1 Artifical Fill, 1-15 Brown Silty Sand	-	Alluvium
14S04W-11	490842	0-90 Grey Fine-Coarse Sand, 90-150 Grey Clay	-	-
14S04W-13	34844	0-7 Air-knifed, 7-16 Grey-Brown Fine Sand w/Silt, 16-23 Grey-Brown Clay w/Sand, 23-31 Grey Fine Sand	-	Alluvium
14S04W-13	34845	0-7 Air-knifed, 7-30 Brown Fine-Medium Sand	-	Alluvium
14S04W-13	34846	0-7 Air-knifed, 7-9 Brown Medium Sand, 9-12 Olive Clay w/Medium Sand, 12-17 Brown Fine-Medium Sand, 17-22 Brown Fine-Medium Sand w/Gravel	-	Alluvium
14S04W-13	34847	0-7 Air-knifed, 7-17 Yellow Medium Sand, 17-22 Grey Fine-Medium Sand	-	Alluvium
14S04W-14	439411	0-25 Grey Fine Silty Sand	-	Alluvium
14S04W-14	439433	0-25 Grey Fine Silty Sand	-	Alluvium
14S04W-14	439434	0-30 Brown-Grey Fine Silty Sand	-	Alluvium
14S04W-14	439435	Yellow-Brown Fine Sand, 21-23 Grey Clay, 23-24 Grey Silt, 24-29 Grey Fine Sand, 29-40 Grey Silty Sand	-	Alluvium
14S04W-14	439436	0-25 Red Fine Silty Sand, 25-26 Olive Silt w/Fine Sand, 26-35 Grey Fine Sand	-	Alluvium
14S04W-14	439437	0-17 Grey Fine Silty Sand, 17-22 Grey Clay, 22-25 Yellow Fine Sand	-	Alluvium
14S04W-14	439438	0-23 Yellow Fine Silty Sand, 23-31 Brown Clay, 31-35 Grey Fine Silty Sand	-	Alluvium
14S04W-14	446195	0-17 Brown Fine-Medium Silty Sand, 17-21 Grey Silt, 21-25 Yellow-Brown Fine Sand	-	Alluvium
14S04W-14	446196	0-11 Brown Fine-Medium Silty Sand, 11-17 Yellow-Brown Fine Sand w/Silt, 17-25 Brown Fine-Medium Silty Sand	-	Alluvium

TABLE 2

GEOLOGY OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basement Rock Geology
-	-	-	feet	-
14S04W-14	446197	0-11 Brown Fine-Medium Silty Sand, 11-18 Yellow-Brown Fine Sand w/Silt, 18-25 Brown Fine-Medium Silty Sand	-	Alluvium

TABLE 3
LCOATION OF SAN ELIJO VALLEY WELLS IN WGS 1984 UTM ZONE 11S

Well Section	Well Log	Acre Parcel	Easting Location	Northing Location	Street Address	City
13S02W-18	157311	-	516935	13655326	P.O. Box 1422	-
13S02W-18	706749	678-020-12	483592	13652622	4501 Artesian Road	-
13S02W-24	349188	273-901-09	496138	13655306	17934 Vista Lomas Drive	Poway
13S02W-24	349189	273-911-26	495454	13654543	13016 Lomas Verdes Drive	Poway
13S02W-24	349198	273-900-32	495950	13654546	13246 Lomas Verdes Drive	Poway
13S02W-24	355586	273-911-27	495488	13654566	13038 Lomas Verdes Drive	Poway
13S02W-30	353160	-	487258	13653744	9350 Artesian Road	-
13S02W-30	521695	278-424-21	498129	13652260	14352 Blue Sage	Poway
13S02W-30	741724	277-181-25	497052	13653385	13675 Ash Hollow Crossing Road	Poway
13S02W-31	909563	241-100-31	498467	13660822	15023 Old San Pasqual Road	Escondido
13S02W-31	322469	-	516634	13650940	23427 Calistoga Place	-
13S02W-31	463737	241-100-31	498644	13660616	15023 Old San Pasqual Road	Escondido
13S02W-31	487205	234-440-05	496352	13662852	2260 San Pasqual Valley Road	Escondido
13S02W-31	521508	312-141-01	-	-	Artesian Road	-
13S02W-31	521511	312-141-01	-	-	Artesian Road	-
13S02W-31	564429	312-141-01	-	-	Artesian Road	-
13S02W-31	741708	321-410-16	497311	13649316	14884 Huntington Gate Drive	Poway
13S03W-02	1539	-	484567	13659405	19660 Elfin Forest Road	Escondido
13S03W-02	270208	-	494476	13659100	3332 Bear Valley Parkway	Escondido
13S03W-02	270208	-	494484	13659948	3333 Bear Valley Parkway	Escondido
13S03W-02	270208	-	494528	13659913	3334 Bear Valley Parkway	Escondido
13S03W-02	738653	264-052-19	484699	13659862	Questhaven & Faraway	Escondido
13S03W-03	353089	-	482676	13659889	6808 Los Vientos Serenos	Escondido
13S03W-03	448429	264-042-56	482648	13659830	6809 Los Vientos Serenos	Escondido
13S03W-03	449169	264-041-22	483407	13658840	19218 Fortuna Del Este	Escondido
13S03W-03	491319	264-042-31	483902	13659664	20059 Elfin Forest Lane	Escondido
13S03W-03	776375	264-042-28	483758	13659589	20084 Elfin Forest Lane	Escondido
13S03W-04	68426	-	482497	13660489	Elfin Forest Rd & Fortuna Del Sur	Escondido
13S03W-04	903561	264-031-17	482066	13659414	1912 Seaquest Trail	Encinitas
13S03W-04	159090	-	482551	13660722	Elfin Forest Rd & Seaquest Trail	Encinitas
13S03W-04	748253	264-450-03	481360	13659219	1732 Rancho Summit Drive	Encinitas
13S03W-05	902804	264-020-11	479934	13659370	3485 Lone Jack Road	Encinitas
13S03W-05	158655	264-220-58	479559	13659370	3137 Dusty Trail	Encinitas
13S03W-05	277278	-	480003	13659122	3256 Lone Hill Lane	Encinitas
13S03W-05	394643	264-223-02	479139	13659184	2909 Wishbone Way	Encinitas
13S03W-05	394970	264-232-12	480891	13658835	3660 Dove Hollow Road	Encinitas
13S03W-05	459418	264-232-10	480754	13658979	3534 Dove Hollow Road	Encinitas
13S03W-05	767945	264-222-09	479305	13659562	3805 Dusty Trail	Encinitas
13S03W-06	739405	-	477763	13659439	3368 Avenida Nieve	Carlsbad
13S03W-08	702489	264-240-37	479588	13658485	1099 Double Ll Ranch Road	Encinitas
13S03W-08	33874		479515	13629838	2804 Garnet Avenue	San Diego
13S03W-09	353747	-	482037	13656788	6950 Calle Reina	Rancho Santa Fe
13S03W-09	353748	-	481970	13656781	6950 Calle Reina	Rancho Santa Fe
13S03W-10	1080849	258-130-81	473830	13656549	550 Encinitas Boulevard	Encinitas
13S03W-10	288123	-	482307	13656760	6675 Las Arboledas	Rancho Santa Fe
13S03W-11	4610	259-121-18	475747	13656139	236 Camino Real North	Encinitas
13S03W-11	4611	259-121-18	475747	13656139	236 Camino Real North	Encinitas
13S03W-11	4613	259-121-18	475747	13656139	236 Camino Real North	Encinitas
13S03W-11	4614	259-121-18	475747	13656139	236 Camino Real North	Encinitas
13S03W-12	172683	-			Seaquest Trail	Encinitas
13S03W-12	354663	-	486966	13658046	Detwiler rd and Mt israel	Encinitas
13S03W-12	354665	-	486692	13657943	8881 Detwiler Road	Encinitas
13S03W-12	354669	-	486727	13658053	8810 Detwiler Road	Encinitas
13S03W-13	487604	-	480994	13655626	6080 El Montevideo	Rancho Santa Fe
13S03W-14	353068	-	484284	13655527	7722 Del Dios Highway	Rancho Santa Fe
13S03W-14	459414	267-131-42	484485	13655095	17514 Rancho Del Rio	Rancho Santa Fe
13S03W-14	479228	-	485619	13656268	18143 Camino De Estrellas	Rancho Santa Fe
13S03W-14	580945	265-291-08	485673	13655946	Del Dios Hwy in San Diego Fldwy	Rancho Santa Fe
13S03W-15	1363	-			Aliso Canyon Rd	Rancho Santa Fe
13S03W-15	229952	-	482508	13656090	18085 Aliso Canyon Road	Rancho Santa Fe
13S03W-15	720658	265-231-06	482634	13655317	7099 El Camino Del Norte	Rancho Santa Fe
13S03W-16	455909	265-230-03	482349	13655904	6715 Lago Lindo	Rancho Santa Fe
13S03W-16	478836	465-432-02	481933	13656229	6515 Primero Izquierdo	Rancho Santa Fe
13S03W-16	479575	-	482465	13655991	6759 Lago Lindo	Rancho Santa Fe
13S03W-16	706742	265-220-17	482139	13655421	6565 Lago Lindo	Rancho Santa Fe
13S03W-16	748278	265-433-05	482440	13656922	6676 Las Arboledas	Rancho Santa Fe
13S03W-17	171151	265-421-06	478761	13656368	544 Flores De Oro	Rancho Santa Fe
13S03W-17	203796	-	480286	13655663	Via De Fortuna & El Montevideo	Rancho Santa Fe
13S03W-17	203797	-	479558	13655079	Via De Fortuna & El Mirlo	Rancho Santa Fe
13S03W-17	203798	-	478085	13655038	S Rancho Santa Fe rd & El Mirlo	Rancho Santa Fe
13S03W-17	341130	-	480928	13654979	5956 San Elijo Avenue	Rancho Santa Fe
13S03W-17	350451	-	480708	13656060	El Camino Del Norte & Via De Fortuna	Rancho Santa Fe
13S03W-17	350452	-	480541	13656207	El Camino Del Norte & Via De Fortuna	Rancho Santa Fe

TABLE 3
LCOATION OF SAN ELIJO VALLEY WELLS IN WGS 1984 UTM ZONE 11S

Well Section	Well Log	Acre Parcel	Easting Location	Northing Location	Street Address	City
13S03W-17	439342	264-250-13	479536	13656722	3211 Circa De Tierra	Rancho Santa Fe
13S03W-17	440293	264-250-14	479498	13656612	3205 Circa De Tierra	Rancho Santa Fe
13S03W-17	440330	265-080-20	481313	13656240	5422 El Camino Del Norte	Rancho Santa Fe
13S03W-17	478635	-	480055	13656181	Via De Sueno & El Camino Del Norte	Rancho Santa Fe
13S03W-17	491605	-	480134	13656160	18278 Via De Sueno	Rancho Santa Fe
13S03W-17	505743	265-061-16	479324	13655694	5305 La Crescenta Road	Rancho Santa Fe
13S03W-17	521701	265-220-31	482351	13655442	6611 Lago Lindo	Rancho Santa Fe
13S03W-17	534867	265-080-22	479794	13656770	18044 Loma Alegre	Rancho Santa Fe
13S03W-18	903370	264-171-76	478640	13656737	El Camino Del Norte & Windmill Ranch Road	Encinitas
13S03W-18	1085062	265-412-13	478942	13656246	459 Flores De Oro	Rancho Santa Fe
13S03W-18	127133	-	477665	13655201	Encinitas Boulevard & Manchester Avenue	Encinitas
13S03W-18	401986	265-411-01	479217	13656106	3214 Cerros Redondos	Rancho Santa Fe
13S03W-18	402008	265-412-10	479036	13656226	3139 Cerros Redondos Ranch Road	Rancho Santa Fe
13S03W-18	459498	225-122-53	478369	13657031	770 Cole Ranch Road	Encinitas
13S03W-18	479131	265-412-04	479024	13656324	3112 Cerros Redondos	Rancho Santa Fe
13S03W-18	752275	265-411-04	479537	13656141	3346 Cerros Redondos	Rancho Santa Fe
13S03W-19	1085025	266-041-13	477976	13654573	17585 Ranchito Del Rio	Rancho Santa Fe
13S03W-19	218899	-	479528	13654547	17549 Via De Fortuna	Rancho Santa Fe
13S03W-19	462198	265-422-15	478467	13656196	2595 Triple C Ranch Road	Encinitas
13S03W-19	720665	266-010-48	478625	13654706	17490 Los Morros	Rancho Santa Fe
13S03W-20	909175	266-130-06	479935	13654104	5539 Via De La Cumbre	Rancho Santa Fe
13S03W-20	909176	266-130-07	479930	13654091	5540 Via De La Cumbre	Rancho Santa Fe
13S03W-20	126465	-	479468	13654759	Via De Fortuna & Los Morros	Rancho Santa Fe
13S03W-20	294351	-	481326	13654211	5827 Via De La Cunbre	Rancho Santa Fe
13S03W-20	294477	-	481865	13654507	5827 Via De La Cunbre	Rancho Santa Fe
13S03W-20	710874	266-130-06	479964	13654051	5539 Via De La Cumbre	Rancho Santa Fe
13S03W-20	710876	266-130-06	479965	13654062	5539 Via De La Cumbre	Rancho Santa Fe
13S03W-22	463712	267-020-04	482728	13654468	17484 El Vuelo	Rancho Santa Fe
13S03W-22	485444	266-320-50	482212	13653891	6605 La Valle Plateada	Rancho Santa Fe
13S03W-22	487603	-	480676	13651323	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-22	796184	267-120-19	483355	13654296	7090 Via Guadalupe	Rancho Santa Fe
13S03W-23	353088	-	484501	13655227	La Brisa & Rancho Del Rio	Rancho Santa Fe
13S03W-23	487649	-	496926	13664085	2170 Skyline Drive	Escondido
13S03W-23	584823	267-050-31	-	-	Del Dios Highway	Rancho Santa Fe
13S03W-23	584826	267-060-25	-	-	Del Dios Highway	Rancho Santa Fe
13S03W-23	584836	267-050-31	-	-	Del Dios Highway	Rancho Santa Fe
13S03W-23	584840	267-051-26	-	-	Del Dios Highway	Rancho Santa Fe
13S03W-23	584850	267-051-23	-	-	Del Dios Highway	Rancho Santa Fe
13S03W-24	92833	-	478292	13649246	Vie De La Valle & Via Del Canon	Del Mar
13S03W-24	217394	-	485712	13653618	8402 Artesian Road	-
13S03W-24	703277	267-060-27	-	-	Artesian Road & Bing Crosby Road	-
13S03W-24	703278	267-060-24	-	-	Artesian Road & Old Course Road	-
13S03W-24	710872	266-130-24	480498	13654025	5827 Via De La Cunbre	Rancho Santa Fe
13S03W-24	710873	266-130-25	480503	13654015	5828 Via De La Cunbre	Rancho Santa Fe
13S03W-25	93869	-	538336	13659768	1420 Hollow Glen Road	Julian
13S03W-25	217863	-	535416	13652559	6635 Engineers Road	Julian
13S03W-26	564425	267-144-24	485728	13653126	16636 Artesian Trail	San Diego
13S03W-27	92835	-	483586	13652509	ZamaQue Street & San Dieguito River	Rancho Santa Fe
13S03W-27	223503	-	481870	13653362	Las Colinas & El Zorro Vista	Rancho Santa Fe
13S03W-27	288011	-	483510	13653578	17109 El Vuelo	Rancho Santa Fe
13S03W-27	288124	-	482137	13652278	17040 Circa Del Norte	Rancho Santa Fe
13S03W-27	353063	265-072-14	479621	13656497	3015 El Camino Del Norte	Encinitas
13S03W-27	354795	267-100-15	482806	13653548	17048 El Mirador	Rancho Santa Fe
13S03W-27	354797	267-100-15	482841	13653522	17048 El Mirador	Rancho Santa Fe
13S03W-27	479576	267-070	482587	13653044	16720 Las Cuestas	Rancho Santa Fe
13S03W-27	487606	-			Calle Camposeco	Rancho Santa Fe
13S03W-28	262734	-	481318	13651033	15719 Via De Santa Fe	Rancho Santa Fe
13S03W-28	365648	-	482668	13652513	5990 Calle Camposeco	Rancho Santa Fe
13S03W-28	402741	266-321-16	481807	13653515	6576 Las Colinas	Rancho Santa Fe
13S03W-28	445625	269-040-11	481855	13652278	6451 El Sicomoro	Rancho Santa Fe
13S03W-28	459837	269-080-21	481245	13651196	15743 Via De Santa Fe	Rancho Santa Fe
13S03W-28	539698	266-272-16	481099	13653485	6089 La Flecha	Rancho Santa Fe
13S03W-28	539698	266-272-16	481138	13653441	6089 La Flecha	Rancho Santa Fe
13S03W-28	539698	266-272-16	481124	13653394	6089 La Flecha	Rancho Santa Fe
13S03W-28	541858	266-272-16	481072	13653427	6089 La Flecha	Rancho Santa Fe
13S03W-28	541859	266-272-16	481109	13653391	6089 La Flecha	Rancho Santa Fe
13S03W-28	707059	269-040-17	481713	13652337	16484 Calle Feliz	Rancho Santa Fe
13S03W-28	745487	266-272-16	481086	13653393	6089 La Flecha	Rancho Santa Fe
13S03W-28	776389	268-180-045	481010	13652131	16168 Valle De Oro	Rancho Santa Fe
13S03W-29	1090946	-	480854	13653625	6051 El Tordo	Rancho Santa Fe
13S03W-29	439426	266-181-17	480651	13653523	16936 El Fuego	Rancho Santa Fe
13S03W-29	439427	266-181-17	480655	13653508	16936 El Fuego	Rancho Santa Fe
13S03W-29	439428	266-181-17	480662	13653482	16936 El Fuego	Rancho Santa Fe

TABLE 3
LCOATION OF SAN ELIJO VALLEY WELLS IN WGS 1984 UTM ZONE 11S
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Well Section	Well Log	Acre Parcel	Easting Location	Northing Location	Street Address	City
13S03W-29	478848	268-172-11	481127	13652445	16275 Via De La Valle	Rancho Santa Fe
13S03W-30	1085047	296-040-20	481607	13652295	16422 Calle Feliz	Rancho Santa Fe
13S03W-30	127193	-	481724	13650906	6461 El Apajo	Rancho Santa Fe
13S03W-30	341129	268-031-02	-	-	La Orilla	Rancho Santa Fe
13S03W-30	478842	268-070-18	478985	13652765	5000 El Acebo	Rancho Santa Fe
13S03W-30	485465	268-340-08	478147	13651866	4712 El Nido	Rancho Santa Fe
13S03W-30	796212	268-020-35	478541	13652695	16540 Rambla De Las Flores	Rancho Santa Fe
13S03W-31	350214	-	478041	13652116	Via Gaviota	Rancho Santa Fe
13S03W-31	521280	263-293-50	477545	13650771	1505 Lomas Santa Fe Drive	Solana Beach
13S03W-31	706750	268-220-23	478464	13651336	15880 El Camino Real	Rancho Santa Fe
13S03W-31	706751	268-220-23	478511	13651214	15880 El Camino Real	Rancho Santa Fe
13S03W-32	1309	-	480575	13651558	16039 Via Del Alba	Rancho Santa Fe
13S03W-32	1085066	268-310-06	481039	13651118	15616 Via De Santa Fe	Rancho Santa Fe
13S03W-32	127383	302-080-14	480438	13648880	15150 San Dieguito Road	Rancho Santa Fe
13S03W-32	456443	-	480810	13650640	5690 Cancha De Golf	Del Mar
13S03W-32	479051	268-280-20	480231	13651692	16025 Via Del Alba	Rancho Santa Fe
13S03W-33	100647	-	481391	13651834	Via De Santa Fe & Calzada Del Bosque	Rancho Santa Fe
13S03W-33	126968	302-080-10	-	-	-	Del Mar
13S03W-33	126999	269-080-05	-	-	-	Del Mar
13S03W-33	158250	-	481394	13651089	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	158253	-	481386	13651816	Via De Santa Fe & Calzada Del Bosque	Rancho Santa Fe
13S03W-33	158275	-	481259	13651182	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	203818	-	481467	13651900	Via De Santa Fe & Calzada Del Bosque	Rancho Santa Fe
13S03W-33	221762	-	481236	13651267	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	221779	-	481264	13651282	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	222615	302-080-014	480738	13651198	County Highway S6& El Apajo Road	Del Mar
13S03W-33	288131	-	481450	13651109	6233 El Apajo Road	Del Mar
13S03W-33	353077	-	481269	13651313	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	370090	-	481313	13651153	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	401625	268-310-06	481079	13651112	15616 Via De Santa Fe	Del Mar
13S03W-33	445758	269-080-15	481323	13651083	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	445759	269-080-19	481341	13651079	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-33	505708	269-080-22	481321	13651166	15747 Via De Santa Fe	Del Mar
13S03W-33	518242	268-310-17	481060	13651147	6045 El Apajo	Del Mar
13S03W-33	534874	268-310-07	480971	13650949	15648 Via De Santa Fe	Del Mar
13S03W-33	541074	268-310-18	481127	13651186	15754 Via De Santa Fe	Del Mar
13S03W-34	9392	-	-	-	Mina De Oro Rd	Poway
13S03W-34	217389	-	481579	13651139	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-34	217400	-	481525	13651180	Via De Santa Fe & El Apajo Road	Del Mar
13S03W-34	288099	-	480918	13649684	5690 Cancha De Golf	Del Mar
13S03W-34	344552	-	483720	13651345	Circa Oriente & Camino De Montecillo	Rancho Santa Fe
13S03W-34	344553	-	483668	13651320	Circa Oriente & Camino De Montecillo	Rancho Santa Fe
13S03W-34	776392	269-193-05	484024	13650765	17373 Calle Serena	Rancho Santa Fe
13S03W-35	287976	-	484531	13661725	20845 Questhaven Road	San Marcos
13S03W-36	6259	-	475557	13658730	El Camino Real & Olivenhain Road	Encinitas
13S03W-36	478038	-	475773	13658559	El Camino Real & Olivenhain Road	Encinitas
13S04W-11	529483	259-121-20	475546	13657210	276D El Camino Real	Encinitas
13S04W-11	529484	259-121-20	475557	13657176	276D El Camino Real	Encinitas
13S04W-12	429499	255-122-53	477503	13658064	2065 Avenida La Posta	Encinitas
13S04W-13	182935	-	477843	13655630	199 Rancho Santa Fe Road	Encinitas
13S04W-13	182936	-	477112	13656020	1860 Encinitas Boulevard	Encinitas
13S04W-13	182937	-	476103	13656372	1499 Encinitas Boulevard	Encinitas
13S04W-13	574731	259-222-37	477373	13655625	2099 Encinitas Boulevard	Encinitas
13S04W-13	574731	259-222-37	477384	13655566	2099 Encinitas Boulevard	Encinitas
13S04W-13	574731	259-222-37	477369	13655527	2099 Encinitas Boulevard	Encinitas
13S04W-13	574731	259-222-37	477360	13655517	2099 Encinitas Boulevard	Encinitas
13S04W-13	574731	259-222-37	477351	13655529	2099 Encinitas Boulevard	Encinitas
13S04W-13	584821	259-221-12	478028	13655400	2423 5th Street	Encinitas
13S04W-13	703180		474529	13655443	Bonita Drive & Santa Fe Drive	Encinitas
13S04W-14	182939	-	474951	13656111	600 Balour Drive	Encinitas
13S04W-14	539708	259-121-24	475946	13656653	127 North El Camino Real	Encinitas
13S04W-14	539709	259-121-24	475928	13656656	127 North El Camino Real	Encinitas
13S04W-14	539710	259-121-24	475925	13656671	127 North El Camino Real	Encinitas
13S04W-14	539711	259-121-24	475943	13656672	127 North El Camino Real	Encinitas
13S04W-14	729389	-	475810	13656188	236 El Camino Real	Encinitas
13S04W-14	729390	-	475805	13656188	236 El Camino Real	Encinitas
13S04W-14	729391	-	475820	13656198	236 El Camino Real	Encinitas
13S04W-14	66186	-	475810	13656191	236 El Camino Real	Encinitas
13S04W-14	66188	-	475802	13656199	236 El Camino Real	Encinitas
13S04W-14	66189	-	475821	13656202	236 El Camino Real	Encinitas
13S04W-14	66190	-	475821	13653192	236 El Camino Real	Encinitas
13S04W-14	66191	-	475820	13656185	236 El Camino Real	Encinitas
13S04W-14	66194	-	475807	13656185	236 El Camino Real	Encinitas

TABLE 3
LCOATION OF SAN ELIJO VALLEY WELLS IN WGS 1984 UTM ZONE 11S
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Well Section	Well Log	Acre Parcel	Easting Location	Northing Location	Street Address	City
13S04W-15	182940	-	473768	13656127	501 Requeza Street	Encinitas
13S04W-15	12509	258-112-22	473330	13656607	325 Encinitas Boulevard	Encinitas
13S04W-15	12510	258-112-22	473346	13656645	325 Encinitas Boulevard	Encinitas
13S04W-15	12511	258-112-22	473390	13656652	325 Encinitas Boulevard	Encinitas
13S04W-15	12512	258-112-22	473367	13656623	325 Encinitas Boulevard	Encinitas
13S04W-23	742749	260-324-12	474462	13654236	805 Birmingham Drive	Encinitas
13S04W-23	742750	260-324-12	474468	13654219	805 Birmingham Drive	Encinitas
13S04W-23	742751	260-324-12	474483	13654223	805 Birmingham Drive	Encinitas
13S04W-23	742752	260-324-12	474470	13654244	805 Birmingham Drive	Encinitas
13S04W-23	742753	260-324-12	474500	13654232	805 Birmingham Drive	Encinitas
13S04W-23	742754	260-324-12	474468	13654196	805 Birmingham Drive	Encinitas
13S04W-23	742755	260-324-12	474445	13654217	805 Birmingham Drive	Encinitas
13S04W-23	742756	260-324-12	474450	13654228	805 Birmingham Drive	Encinitas
13S04W-24	576168	262-061-74	477056	13654147	3942 Manchester Avenue	Encinitas
13S04W-25	478631	266-003-12	477628	13654155	17514 Rancho La Noria	Rancho Santa Fe
13S04W-26	328078	-	476023	13653554	3535 Manchester Avenue	Encinitas
13S04W-27	903426	260-275-26	473358	13654200	1809 Montgomery Avenue	Encinitas
13S04W-27	439889	260-370-04	473634	13653883	2009 Newcastle Avenue	Encinitas
13S04W-27	439890	260-370-04	473643	13653879	2009 Newcastle Avenue	Encinitas
13S04W-27	439891	260-370-04	473635	13653876	2009 Newcastle Avenue	Encinitas
13S04W-27	463750	260-370-26	473629	13653855	Birmingham Drive & Newcastle Avenue	Encinitas
13S04W-36	575192	-	477557	13650730	1505 Lomas Santa Fe Drive	Solana Beach
13S04W-36	745365	268-021-19	477356	13652626	16414 El Camino Real	Del Mar
14S02W-06	491735	273-911-44	495351	13654106	12979 Solera Way	Poway
14S03W-01	396132	299-300-08	476149	13649026	2205 Via De La Valle	Del Mar
14S03W-01	396133	299-300-08	476127	13649004	2205 Via De La Valle	Del Mar
14S03W-01	396134	299-300-08	476160	13648996	2205 Via De La Valle	Del Mar
14S03W-03	487220	-	483278	13648877	Lago Corte & Rancho Santa Fe Farms Road	Rancho Santa Fe
14S03W-03	776373	-	483087	13649037	14725 Rancho Santa Fe Farms Road	Rancho Santa Fe
14S03W-04	505668	302-303-17	481864	13650027	6827 Alydar Court	Del Mar
14S03W-04	729037	302-303-15	481931	13650316	6857 Rancho Valencia Road	Del Mar
14S03W-04	752208	302-303-21	482114	13649675	5974 Rancho Diegueno Road	Del Mar
14S03W-05	-	302-120-36	480891	13651115	5690 Cancha De Golf	Rancho Santa Fe
14S03W-05	100304	-	481410	13653806	Paseo Delicias & Via De La Valle	Rancho Santa Fe
14S03W-05	1085483	302-120-36	480169	13650595	15169 Via De La Valle	Rancho Santa Fe
14S03W-05	1085484	302-120-36	480667	13650912	15169 Via De La Valle	Rancho Santa Fe
14S03W-05	1085485	302-120-36	480327	13650698	15169 Via De La Valle	Rancho Santa Fe
14S03W-05	126966	302-080-12	-	-	-	Rancho Santa Fe
14S03W-05	223233	268-031-15	-	-	-	Rancho Santa Fe
14S03W-05	775959	260-146-07	479700	13649558	El Camino Real & Via De La Valle	Del Mar
14S03W-05	775964	302-090-27	478931	13649489	14750 El Camino Real	Del Mar
14S03W-06	126630	-	478611	13648907	El Camino Real & Via De La Valle	Del Mar
14S03W-06	126635	-	478537	13649242	El Camino Real & Via De La Valle	Del Mar
14S03W-06	35303	-	480548	13651837	Via De La Valle & Calzada Del Bosque	Del Mar
14S03W-06	401739	302-210-30	-	-	3702 Via De La Valle	Del Mar
14S03W-06	401740	302-210-30	-	-	3703 Via De La Valle	Del Mar
14S03W-06	477604	302-210-30	-	-	3704 Via De La Valle	Del Mar
14S03W-06	578471	302-210-30	-	-	3705 Via De La Valle	Del Mar
14S03W-07	159885	-	-	-	14333 San Dieguito Road	Del Mar
14S03W-07	240796	293-220-28	-	-	-	-
14S03W-10	341149	305-020-01	-	-	-	-
14S03W-11	6400	-	483935	13648013	Clarkview Lane & Carmel Valley Road	-
14S03W-11	776388	306-051-08	485137	13646632	Sierra Mesa Court	-
14S03W-18	15455	305-010-22	482656	13647326	Carmel Valley Road	-
14S04W-01	183007	-	477091	13649189	2750 Via De La Valle	Del Mar
14S04W-01	183008	-	476825	13649171	2750 Via De La Valle	Del Mar
14S04W-01	183009	-	476845	13649153	2750 Via De La Valle	Del Mar
14S04W-01	183010	-	476858	13649161	2750 Via De La Valle	Del Mar
14S04W-02	1085454	298-271-03	475957	13648994	2260 Jimmy Durante Boulevard	Solana Beach
14S04W-02	1085455	298-271-03	475986	13648962	2260 Jimmy Durante Boulevard	Solana Beach
14S04W-02	1085456	297-270-25	475921	13648958	674 Via De La Valle	Solana Beach
14S04W-02	440911	298-270-24	476035	13649054	660 Vie De La Valle	Solana Beach
14S04W-02	440912	298-270-24	476035	13649060	660 Vie De La Valle	Solana Beach
14S04W-02	440913	298-270-24	476049	13649057	660 Vie De La Valle	Solana Beach
14S04W-02	440914	298-270-24	476026	13649055	660 Vie De La Valle	Solana Beach
14S04W-02	440915	298-270-24	476026	13649072	660 Vie De La Valle	Solana Beach
14S04W-02	440916	298-270-24	476005	13649065	660 Vie De La Valle	Solana Beach
14S04W-02	440917	298-270-24	476016	13649080	660 Vie De La Valle	Solana Beach
14S04W-02	21338	299-300-03	476132	13649007	2205 Via De La Valle	Solana Beach
14S04W-02	21339	299-300-03	476154	13649019	2205 Via De La Valle	Solana Beach
14S04W-02	21340	299-300-03	476156	13649018	2205 Via De La Valle	Solana Beach
14S04W-02	21341	299-300-03	476167	13649009	2205 Via De La Valle	Solana Beach

TABLE 3

LCOATION OF SAN ELIJO VALLEY WELLS IN WGS 1984 UTM ZONE 11S

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Well Section	Well Log	Acre Parcel	Easting Location	Northing Location	Street Address	City
14S04W-11	270537	299-100-28	475417	13648035	2126 Jimmy Durante Boulevard	Solana Beach
14S04W-11	477924	299-100-28	475420	13648026	2126 Jimmy Durante Boulevard	Solana Beach
14S04W-11	490842	25A-191-09	474997	13647967	25th Street & Ocean Front	Solana Beach
14S04W-13	34844	307-340-07	477530	13643942	3060 Carmel Valley Road	-
14S04W-13	34845	307-340-07	477583	13643948	3060 Carmel Valley Road	-
14S04W-13	34846	307-340-07	477566	13643955	3060 Carmel Valley Road	-
14S04W-13	34847	307-340-07	477555	13643931	3060 Carmel Valley Road	-
14S04W-14	439411	300-221-33	475417	13646246	941 Camino Del Mar	Del Mar
14S04W-14	439433	300-221-33	475426	13646244	941 Camino Del Mar	Del Mar
14S04W-14	439434	300-221-33	475408	13646244	941 Camino Del Mar	Del Mar
14S04W-14	439435	300-221-33	475429	13646250	941 Camino Del Mar	Del Mar
14S04W-14	439436	300-221-33	475435	13646261	941 Camino Del Mar	Del Mar
14S04W-14	439437	300-221-33	475432	13646256	941 Camino Del Mar	Del Mar
14S04W-14	439438	300-221-33	475452	13646234	941 Camino Del Mar	Del Mar
14S04W-14	446195	300-221-33	475417	13646222	941 Camino Del Mar	Del Mar
14S04W-14	446196	300-221-33	475410	13646258	941 Camino Del Mar	Del Mar
14S04W-14	446197	300-221-33	475430	13646229	941 Camino Del Mar	Del Mar

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S02W-18	157311	San Diego	San Vicente	Gower	-
13S02W-18	706749	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S02W-24	349188	San Dieguito	Hodges	Green	-
13S02W-24	349189	San Dieguito	Hodges	Green	-
13S02W-24	349198	San Dieguito	Hodges	Green	-
13S02W-24	355586	San Dieguito	Hodges	Green	-
13S02W-30	353160	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S02W-30	521695	San Dieguito	Hodges	Green	-
13S02W-30	741724	San Dieguito	Hodges	Green	-
13S02W-31	909563	San Dieguito	San Pasqual	Las Lomas Muertas	-
13S02W-31	322469	San Diego	San Vicente	Gower	-
13S02W-31	463737	San Diegutio	San Pasqual	Las Lomas Muertas	-
13S02W-31	487205	San Diegutio	Hodges	Green	-
13S02W-31	521508	-	-	-	-
13S02W-31	521511	-	-	-	-
13S02W-31	564429	-	-	-	-
13S02W-31	741708	Penasquitos	Poway	Poway	-
13S03W-02	1539	Carlsbad	Escondido Creek	San Elijo	-
13S03W-02	270208	San Diegutio	Hodges	Green	-
13S03W-02	270208	San Diegutio	Hodges	Green	-
13S03W-02	270208	San Diegutio	Hodges	Green	-
13S03W-02	738653	Carlsbad	Escondido Creek	San Elijo	-
13S03W-03	353089	Carlsbad	Escondido Creek	San Elijo	-
13S03W-03	448429	Carlsbad	Escondido Creek	San Elijo	-
13S03W-03	449169	Carlsbad	Escondido Creek	San Elijo	-
13S03W-03	491319	Carlsbad	Escondido Creek	San Elijo	-
13S03W-03	776375	Carlsbad	Escondido Creek	San Elijo	-
13S03W-04	68426	Carlsbad	Escondido Creek	San Elijo	-
13S03W-04	903561	Carlsbad	Escondido Creek	San Elijo	-
13S03W-04	159090	Carlsbad	Escondido Creek	San Elijo	-
13S03W-04	748253	Carlsbad	Escondido Creek	San Elijo	-
13S03W-05	902804	Carlsbad	Escondido Creek	San Elijo	-
13S03W-05	158655	Carlsbad	Escondido Creek	San Elijo	-
13S03W-05	277278	Carlsbad	Escondido Creek	San Elijo	-
13S03W-05	394643	Carlsbad	San Marcos	Batiquitos	-
13S03W-05	394970	Carlsbad	Escondido Creek	San Elijo	-
13S03W-05	459418	Carlsbad	Escondido Creek	San Elijo	-
13S03W-05	767945	Carlsbad	San Marcos	Batiquitos	-
13S03W-06	739405	Carlsbad	San Marcos	Batiquitos	-
13S03W-08	702489	Carlsbad	Escondido Creek	San Elijo	-
13S03W-08	33874	Penasquitos	Miramar	Miramar	-
13S03W-09	353747	Carlsbad	Escondido Creek	San Elijo	-
13S03W-09	353748	Carlsbad	Escondido Creek	San Elijo	-

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S03W-10	1080849	Carlsbad	San Marcos	Batiquitos	-
13S03W-10	288123	Carlsbad	Escondido Creek	San Elijo	-
13S03W-11	4610	Carlsbad	San Marcos	Batiquitos	-
13S03W-11	4611	Carlsbad	San Marcos	Batiquitos	-
13S03W-11	4613	Carlsbad	San Marcos	Batiquitos	-
13S03W-11	4614	Carlsbad	San Marcos	Batiquitos	-
13S03W-12	172683	-	-	-	-
13S03W-12	354663	Carlsbad	Escondido Creek	San Elijo	-
13S03W-12	354665	Carlsbad	Escondido Creek	San Elijo	-
13S03W-12	354669	Carlsbad	Escondido Creek	San Elijo	-
13S03W-13	487604	Carlsbad	Escondido Creek	San Elijo	-
13S03W-14	353068	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-14	459414	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-14	479228	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-14	580945	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-15	1363	-	-	-	-
13S03W-15	229952	Carlsbad	Escondido Creek	San Elijo	-
13S03W-15	720658	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-16	455909	Carlsbad	Escondido Creek	San Elijo	-
13S03W-16	478836	Carlsbad	Escondido Creek	San Elijo	-
13S03W-16	479575	Carlsbad	Escondido Creek	San Elijo	-
13S03W-16	706742	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-16	748278	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	171151	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	203796	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	203797	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	203798	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	341130	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	350451	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	350452	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	439342	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	440293	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	440330	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	478635	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	491605	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	505743	Carlsbad	Escondido Creek	San Elijo	-
13S03W-17	521701	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-17	534867	Carlsbad	Escondido Creek	San Elijo	-
13S03W-18	903370	Carlsbad	Escondido Creek	San Elijo	9-23
13S03W-18	1085062	Carlsbad	Escondido Creek	San Elijo	-
13S03W-18	127133	Carlsbad	Escondido Creek	San Elijo	9-23
13S03W-18	401986	Carlsbad	Escondido Creek	San Elijo	-
13S03W-18	402008	Carlsbad	Escondido Creek	San Elijo	-

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S03W-18	459498	Carlsbad	Escondido Creek	San Elijo	9-23
13S03W-18	479131	Carlsbad	Escondido Creek	San Elijo	-
13S03W-18	752275	Carlsbad	Escondido Creek	San Elijo	-
13S03W-19	1085025	Carlsbad	Escondido Creek	San Elijo	-
13S03W-19	218899	Carlsbad	Escondido Creek	San Elijo	-
13S03W-19	462198	Carlsbad	Escondido Creek	San Elijo	9-23
13S03W-19	720665	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	909175	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	909176	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	126465	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	294351	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	294477	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	710874	Carlsbad	Escondido Creek	San Elijo	-
13S03W-20	710876	Carlsbad	Escondido Creek	San Elijo	-
13S03W-22	463712	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-22	485444	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-22	487603	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-22	796184	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-23	353088	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-23	487649	San Dieguito	Hodges	Green	-
13S03W-23	584823	-	-	-	-
13S03W-23	584826	-	-	-	-
13S03W-23	584836	-	-	-	-
13S03W-23	584840	-	-	-	-
13S03W-23	584850	-	-	-	-
13S03W-24	92833	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-24	217394	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-24	703277	-	-	-	-
13S03W-24	703278	-	-	-	-
13S03W-24	710872	Carlsbad	Escondido Creek	SanElijo	-
13S03W-24	710873	Carlsbad	Escondido Creek	SanElijo	-
13S03W-25	93869	Anza Borrego	San Felipe	San Felipe	-
13S03W-25	217863	San Diego	Boulder Creek	Inaja	-
13S03W-26	564425	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-27	92835	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-27	223503	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-27	288011	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-27	288124	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-27	353063	Carlsbad	Escondido Creek	SanElijo	-
13S03W-27	354795	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-27	354797	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-27	479576	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-27	487606	-	-	-	-

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S03W-28	262734	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-28	365648	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	402741	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	445625	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-28	459837	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-28	539698	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	539698	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	539698	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	541858	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	541859	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	707059	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-28	745487	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-28	776389	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-29	1090946	Carlsbad	Escondido Creek	San Elijo	-
13S03W-29	439426	Carlsbad	Escondido Creek	San Elijo	-
13S03W-29	439427	Carlsbad	Escondido Creek	San Elijo	-
13S03W-29	439428	Carlsbad	Escondido Creek	San Elijo	-
13S03W-29	478848	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-30	1085047	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-30	127193	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-30	341129	-	-	-	-
13S03W-30	478842	Carlsbad	Escondido Creek	San Elijo	-
13S03W-30	485465	Carlsbad	Escondido Creek	San Elijo	-
13S03W-30	796212	Carlsbad	Escondido Creek	San Elijo	-
13S03W-31	350214	Carlsbad	Escondido Creek	San Elijo	-
13S03W-31	521280	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-31	706750	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-31	706751	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-32	1309	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-32	1085066	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-32	127383	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-32	456443	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-32	479051	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-33	100647	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	126968	-	-	-	-
13S03W-33	126999	-	-	-	-
13S03W-33	158250	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	158253	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	158275	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	203818	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	221762	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	221779	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	222615	San Dieguito	Solona Beach	Rancho Santa Fe	9-12

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S03W-33	288131	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	353077	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	370090	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	401625	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	445758	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	445759	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	505708	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	518242	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	534874	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33	541074	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-34	9392	-	-	Rancho Santa Fe	9-12
13S03W-34	217389	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-34	217400	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-34	288099	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-34	344552	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-34	344553	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-34	776392	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-35	287976	Carlsbad	Escondido Creek	San Elijo	-
13S03W-36	6259	Carlsbad	San Marcos	Batiquitos	-
13S03W-36	478038	Carlsbad	San Marcos	Batiquitos	-
13S04W-11	529483	Carlsbad	San Marcos	Batiquitos	-
13S04W-11	529484	Carlsbad	San Marcos	Batiquitos	-
13S04W-12	429499	Carlsbad	San Marcos	Batiquitos	-
13S04W-13	182935	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	182936	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	182937	Carlsbad	San Marcos	Batiquitos	-
13S04W-13	574731	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	574731	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	574731	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	574731	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	574731	Carlsbad	Escondido Creek	San Elijo	-
13S04W-13	584821	Carlsbad	Escondido Creek	San Elijo	9-23
13S04W-13	703180	Carlsbad	Escondido Creek	San Elijo	-
13S04W-14	182939	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	539708	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	539709	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	539710	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	539711	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	729389	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	729390	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	729391	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	66186	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	66188	Carlsbad	San Marcos	Batiquitos	-

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S04W-14	66189	Carlsbad	San Marcos	Batiquitos	-
13S04W-14	66190	Carlsbad	Escondido Creek	San Elijo	-
13S04W-14	66191	Carlsbad	San Marcos	Batiquitos	-
13S04W-15	182940	Carlsbad	San Marcos	Batiquitos	-
13S04W-15	12509	Carlsbad	San Marcos	Batiquitos	-
13S04W-15	12510	Carlsbad	San Marcos	Batiquitos	-
13S04W-15	12511	Carlsbad	San Marcos	Batiquitos	-
13S04W-15	12512	Carlsbad	San Marcos	Batiquitos	-
13S04W-23	742749	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742750	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742751	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742752	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742753	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742754	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742755	Carlsbad	Escondido Creek	San Elijo	-
13S04W-23	742756	Carlsbad	Escondido Creek	San Elijo	-
13S04W-24	576168	Carlsbad	Escondido Creek	San Elijo	9-23
13S04W-25	478631	Carlsbad	Escondido Creek	San Elijo	-
13S04W-26	328078	Carlsbad	Escondido Creek	San Elijo	-
13S04W-27	903426	Carlsbad	Escondido Creek	San Elijo	-
13S04W-27	439889	Carlsbad	Escondido Creek	San Elijo	-
13S04W-27	439890	Carlsbad	Escondido Creek	San Elijo	-
13S04W-27	439891	Carlsbad	Escondido Creek	San Elijo	-
13S04W-27	463750	Carlsbad	Escondido Creek	San Elijo	-
13S04W-36	575192	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S04W-36	745365	Carlsbad	Escondido Creek	San Elijo	9-23
14S02W-06	491735	San Dieguito	Hodges	Green	-
14S03W-01	396132	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-01	396133	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S03W-01	396134	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S03W-03	487220	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-03	776373	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-04	505668	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-04	729037	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-04	752208	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-05	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S03W-05	100304	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-05	1085483	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-05	1085484	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-05	1085485	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-05	126966	-	-	-	-
14S03W-05	223233	-	-	-	-
14S03W-05	775959	San Dieguito	Solona Beach	Rancho Santa Fe	-

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
14S03W-05	775964	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-06	126630	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S03W-06	126635	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-06	35303	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S03W-06	401739	-	-	-	-
14S03W-06	401740	-	-	-	-
14S03W-06	477604	-	-	-	-
14S03W-06	578471	-	-	-	-
14S03W-07	159885	-	-	-	-
14S03W-07	240796	-	-	-	-
14S03W-10	341149	-	-	-	-
14S03W-11	6400	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S03W-11	776388	Penasquitos	Miramar Reservoir	Miramar Reservoir	-
14S03W-18	15455	Penasquitos	Miramar Reservoir	Miramar Reservoir	-
14S04W-01	183007	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-01	183008	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-01	183009	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-01	183010	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	1085454	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	1085455	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S04W-02	1085456	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440911	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440912	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440913	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440914	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440915	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440916	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	440917	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	21338	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S04W-02	21339	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	21340	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-02	21341	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-11	270537	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S04W-11	477924	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S04W-11	490842	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S04W-13	34844	Penasquitos	Miramar Reservoir	Miramar Reservoir	-
14S04W-13	34845	Penasquitos	Miramar Reservoir	Miramar Reservoir	-
14S04W-13	34846	Penasquitos	Miramar Reservoir	Miramar Reservoir	-
14S04W-13	34847	Penasquitos	Miramar Reservoir	Miramar Reservoir	-
14S04W-14	439411	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	439433	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	439434	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	439435	San Dieguito	Solona Beach	Rancho Santa Fe	-

TABLE 4

HYDROLOGIC AREAS OF SAN ELIJO VALLEY WELLS

San Elijo Valley Project Update

SMC Project No. 50021-03

Well Section / ID	Well Log No.	Hydrologic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
14S04W-14	439436	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	439437	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	439438	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	446195	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	446196	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S04W-14	446197	San Dieguito	Solona Beach	Rancho Santa Fe	-

TABLE 5
INFORMATION OF SAN DIEGUITO VALLEY WELL
San Dieguito Creek Project Update
SMC Project No. 50021-03

Well ID	Well No.	Depth Boring	Depth First Water	Depth Static Water	Well Elevation	Static Water Elv.	Screen Interval	Screen Length	Estimated Yield	Drawdown	Test Length
-	-	feet bgs	feet bgs	feet bgs	feet msl	feet msl	feet	feet	gpm	feet	hours
13S03W-21G	158219	1200	53	150	120	-30	994-1200	206	300	-	-
13S03W-22	130153	620	80	80	250	170	360-560	200	43	-	-
13S03W-25J1	104583	173	86	-	4600	-	-	-	15	-	-
13S03W-27J1	92832	300	-	160	60	-100	-	-	-	-	-
13S03W-28D	100301	88	49	44	40	-4	49	1	150	80	36
13S03W-28N	100277	125	89	89	60	-29	92-122	30	-	-	-
13S03W-28N	288124	80	-	18	60	42	40-80	40	-	-	-
13S03W-30K	180422	1210	370	90	100	10	800-1200	400	50	-	-
13S03W-31L	943790	460	188	126	260	134	-	-	20	-	-
13S03W-32GA	479051	167	-	90	90	0	0-167	167	20	-	-
13S03W-32H1	1309	150	-	70	40	-30	89-94, 114-124, 137-143	5, 10, 6	75	-	-
13S03W-32H1	487603	125	-	35	50	15	40-80	40	250	-	-
13S03W-32JA	60184	138	9	9	30	21	60-120	60	800	-	-
13S03W-32JB	277290	110	29	29	30	1	68-108	40	-	-	-
13S03W-32JC	351500	1205	65	5	70	65	-	-	1000	-	-
13S03W-32R3	100306	110	80	68	250	182	76-84, 90-110	8, 20	600	-	-
13S03W-33BA	192758	86	-	-	50	-	45-85	40	-	-	-
13S03W-33CA	158253	101	35	18	40	22	68-98	30	1100	17	8
13S03W-33CB	203818	105	40	27	40	13	65-105	40	80	53	8
13S03W-33C5	-	130	-	-	40	-	40-130	90	-	-	-
13S03W-33C5	-	130	-	-	40	-	-	-	-	-	-
13S03W-33C7	100647	120	-	30	40	10	67-97	30	1000	-	-
13S03W-33EA	221762	130	-	20	40	20	97-127	30	500	18	8
13S03W-33FA	221779	160	35	22	50	28	95-135	40	800	58	12
13S03W-33FB	353077	150	50	42	50	8	85-125	40	800	38	8
13S03W-33G3	217370	110	22	18	30	12	60-100	40	300	62	6
13S03W-33A1	-	136	13	36	30	-6	-	-	1100	-	-
13S03W-33L6	126968	123	-	-	-	-	85-123	38	1100	20	4
13S03W-33L7	217389	100	25	17	40	23	60-100	40	450	63	12
13S03W-33L8	217400	130	18	13	40	27	83-120	37	1000	72	12
13S03W-33LC	262734	125		45	30	-15	60-122	62	-	-	-
13S03W-33LD	445758	90	50	43	30	-13	50-90	40	225	30	4
13S03W-33LE	505708	95	-	43	30	-13	55-95	40	80	50	4
13S03W-33M2	127383	119	-	-	50	-	39-59, 93-118	20, 25	250	-	-
13S03W-33MB	259917	160	15	15	30	15	20-100, 140-160	80, 20	65	-	-
13S03W-33MC	459837	120	60	45	30	-15	70-100	30	150	60	3
13S03W-33MD	518242	110	-	25	30	5	20-110	90	175	-	-
13S03W-33N	153675	120	33	16	40	24	40-120	80	200	-	-
13S03W-33NB	158250	92	25	15	30	15	37-87	50	162	65	4
13S03W-33NC	288099	134	-	70	30	-40	90-130	40	-	-	-
13S03W-33ND	445759	127	50	45	30	-15	65-123	58	250	30	4
13S03W-33PA	158275	124	60	42	40	-2	90-120	30	800	20	8
13S03W-33PB	61332	153	-	55	40	-15	73-133	60	-	-	-
13S03W-33RA	222615	140	15	15	30	15	60-100	40	1000	-	-
13S03W-33RA	456443	105	-	22	30	8	52-92	40	2500	-	-
14S03W-5CD	775959	120	15	12	30	18	50-110	60	200	30	4
14S03W-5H2	126966	125	-	-	-	-	85-125	40	600	38	8
14S03W-6LA	126635	180	-	-	20	-	-	-	-	-	-
14S03W-6PA	126630	117	-	-	10	-	-	-	-	-	-
14S03W-6Q2	35303	120	-	54	40	-14	-	-	600	-	-
14S03W-7BA	159885	332	-	46	30	-16	149-174, 195-214, 268-322	25, 19, 54	75	-	-
14S03W-7C2	-	140	-	-	10	-	-	-	-	-	-
14S03W-7C3	-	158	-	-	10	-	92-106, 138-150	14, 12	-	-	-
14S03W-7C4	-	186	-	-	10	-	-	-	-	-	-

14S03W-7E2	223541	72	-	6	10	4	52-72	20	60	-	-
14S03W-7K3	230408	112	-	33	230	197	52-112	60	120	-	-
14S03W-7LA	223526	120	-	14	20	6	60-120	60	75	-	-
14S03W-7LC	4588	365	302	215	200	-15	270-365	95	12	0	-
14S03W-8C1	-	153	-	-	340	-	-	-	-	-	-
14S04W-11	943692	400	60	-	10	-	-	-	25	-	-
-	487606	64	-	22	130	108	24-64	40	100	-	-
-	395649	770	-	-	130	-	-	-	145	-	-
-	350214	284	90	90	140	50	-	-	-	155	-

TABLE 6
GEOLOGY OF SAN DIEGUITO VALLEY WELLS

Well Section	Well Log	Wellhole Geology	Depth to Basment	Basment Rock Geology
-	-	-	feet	-
13S03W-21G	158219	0-52 White/Grey Clay, 52-76 Whtie Clay, 76-154 Grey Clay, 154-172 Clay w/Cobbles, 172-217 Grey Shale	217	Black/Purple Volcanic Rock
13S03W-22	130153	0-18 Grey-Brown Silty Fine-Medium Sand w/Gravel, 18-160 Green-Brown Claey Silty Fine Sand w/Gravel, 16-620 Grey-Brwon Fine-Medium Sand	-	-
13S03W-25J1	104583	0-4 Soil, 4-18 Decomposed Gneiss	18	Gneiss
13S03W-27J1	92832	0-28 Decomposed Granite	28	Granite
13S03W-28D	100301	0-49 Dark Soil, 49-58 Coarse Sand, 58-88 Fine Sand & Silt	-	-
13S03W-28N	100277	0-70 Clay, 70-122 Sand & Gravel, 122-125 Blue Clay	-	-
13S03W-28N	288124	0-21 Grey fine Sand w/ Clay, 21-32 Medium Sand, 32-58 Grey Fine sand w/Clay, 58-80 Grey Medium Sand w/Rocks	-	-
13S03W-30K	180422	0-12 Brown Sandy Clay, 12-46 Brown Clay, 46-64 Brown Sandy Clay, 64-77 Brown Clay, 77-149 Blue Clay w/Sand, 149-175 Blue Clay	175	Black Igneous Rock
13S03W-31L	943790	0-14 Sand & Clay, 14-96 Clay & Sandstone, 96-98 Sandstone, 98-290 Clay & Brown Sandstone	290	Brown Granite
13S03W-32GA	479051	0-3 Brown Sandstone, 3-14 Tan Sandstone, 14-47 Interbedded Sandstone & Shale, 47-65 Brown Sandstone w/Pebbles, 65-85 Black/Brown Marine Sediment, 85-88 Black/Brown Marine Sediment w/Pebbles, 88-150 Black/Brown Marine Sediment, 150-154 Pebbles	154	Black Volcanic Rock
13S03W-32H1	1309	0-5 Red-Brown Clayey Sand, 5-110 Fine-Coarse Sand, 110-143 Grey Fine-Coarse Sand, 143-150 Blue/Green Clay	-	-
13S03W-32H1	487603	0-15 Top Soil, 15-50 Fine Sand w/Brown Clay, 50-60 Medium-Coarse Sand w/Clay, 60-80 Coarse Sand w/Clay, 80-102 Fine-Medium Sand w/Clay, 102-122 Mud & Black Clay	122	Granite
13S03W-32JA	60184	0-30 Silt, 30-38 Silty Clay, 38-40 Sand, 40-70 Silty Clay, 70-120 Sand, 120-135 Clay & Cobbles, 135-138 Blue Clay	-	-
13S03W-32JB	277290	0-7 Top Soil, 7-13 Sand & Boulders, 13-35 Brown Medium Sand w/ Clay, 35-46 Brown Medium Sand, 46-48 Clay, 49-65 Grey Medium Sand, 65-78 Cobble, Medium Sand & Clay, 78-105 Coarse Sand, 105-110 Sand & Boulders	-	-
13S03W-32JC	351500	0-300 Alluvial	300	Metavolcanics
13S03W-32R3	100306	0-25 Grey Sand, 25-35 Black Silt, 35-60 Brown Clay, 60-76 Brown Sandy Clay, 76-84 Brown Sand, 84-90 Black Silt, 90-110 Sand & Gravel	-	-
13S03W-33A1	-	0-3 Silt & Sand, 3-90 Black Silt, 90-100 Sand & Gravel, 100-118 Black Silt, 118-119 Rock, 119-124 Black Silt, 124-134 Gravel, 134-136 Blue Clay	-	-
13S3W-33BA	192758	0-3 Top Soil, 4-13 Brown Fine Sand, 13-31 Brown Medium Sand, 31-35 Clay & Brown Fine Sand, 35-44 Brown Medium Sand w/Clay, 44-49 Grey Medium Gravel, 50-69 Grey Medium Sand w/Rocks, 69-77 Medium Gravel & Boulders, 77-85 Boulders	86	Black Granite
13S03W-33C5	-	0-20 Silt and Sand, 20-80 Sand, Boulders w/Clay, 80-82 Grey Rock, 82-130 Sand & Boulders	-	-
13S03W-33C5	-	0-20 Silt and Sand, 20-80 Sand, Boulders w/Clay, 80-82 Grey Rock, 82-130 Sand & Boulders	-	-
13S03W-33C7	100647	0-65 Brown Fine Silty Sand, 65-75 Brown Fine-Coarse Sand, 75-100 Brown Fine-Coarse Sand & Gravel, 100-110 Brown Cemented Sand & Boulders	110	Granetic Rock
13S03W-33CA	158253	0-22 Brown Fine Silty Sand, 22-65 Grey Fine Silty Sand, 65-98 Grey Fine-Coarse Sand w/Rocks. 98-101 Boulders	-	-
13S03W-33CB	203818	0-60 Fine Sand & Silt, 60-95 Grey Partly Cemented Fine-Coarse Sand w/Boulders	95	Black Granite
13S03W-33EA	221762	0-55 Black Fine Sand, 55-85 Black Fine Silty Sand, 85-100 Grey Fine-Coarse Sand, 100-130 Grey Fine-Coarse Sand w/Boulders	-	-
13S03W-33FA	221779	0-55 Fine Grained Sand, 55-85 Black Fine Silt & Sand, 85-105 Grey Fine-Coarse Sand w/Rocks, 105-135 Partly Cemented Sand & Boulders, 135-160 Green/Grey Clay w/Cobble	-	-
13S03W-33FB	353077	0-55 Fine Grained Sand, 55-85 Black Fine Silt & Sand, 85-105 Grey Fine-Coarse Sand w/Rocks, 105-130 Partly Cemented Sand & Boulders, 130-150 Green/Grey Clay w/Cobble	-	-
13S3W-33G3	217370	0-30 Fine-Coarse Sand w/Gravel, 30-60 Silty Sand, 60-110 Fine-Coarse Sand w/Gravel	-	-
13S03W-33L6	126968	0-18 Sand, 18-22 Clay, 22-30 Sand, 30-36 Clay, 36-47 Sand, 47-49 Clay, 49-60 Sand, 60-80 Clay, 80-86 Sand, 86-91 Rock, 91-97 Clay, 97-106 Coarse Sand, 106-111 Clay, 111-119 Sand, 119-123 Clay	-	-
13S03W-33L7	217389	0-20 Fine-Coarse Sand, 20-60 Fine Sand w/Rocks, 60-100 Fine-Coarse Sand	-	-
13S03W-33L8	217400	0-80 Fine Sand, 80-90 Fine-Coarse Sand, 90-130 Sand, Gravel & Boulders	-	-
13S03W-33LC	262734	0-90 Fine Sand, 90-105 Medium Sand, 105-110 Weathered Rock, 110-125 Clay	-	-
13S03W-33LD	445758	0-30 Brown-Grey Fine-Coarse Sand, 30-80 Fine-Coarse Partly Cemented Sand, 80-90 Cemented Boulders	-	-

TABLE 6
GEOLOGY OF SAN DIEGUITO VALLEY WELLS
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Well Section	Well Log	Wellhole Geology	Depth to Basment	Basment Rock Geology
-	-	-	feet	-
13S03W-33LE	505708	0-50 Brown Fine Grained Silt & Sand, 50-90 Grey Fine-Coarse Partly Cemented Sand, 90-95 Grey Cemented Conglomerate	-	-
13S03W-33M2	127383	61-69 Sandy Clay & Rocks, 69-76 Blue-Green Sandy Clay, 76-77 Blue-Green Clay w/Rocks, 77-92 Blue-Green Sandy Clay w/Rocks, 92-94 Sand, 94-109 Blue-Green Sandy Clay, 109-119 Blue-Green Clayey Sand	-	-
13S03W-33MB	259917	0-14 Top Soil, 14-102 Coarse Sand & Gravel, 102-141 Blue Clay, 141-155 Coarse Sand & Gravel, 155-160 Grey Granite	-	-
13S03W-33MC	459837	0-40 Brown Fine-Coarse Sand, 40-55 Grey Fine Sand, 55-70 Partly Cemented Sand, 70-83 Medium-Coarse Sand, 83-96 Grey Partly Cemented Sand & Boulders, 96-120 Blue/Grey Clay	-	-
13S03W-33MD	518242	0-3 Sand, 3-4 Artifical Fill, 4-38 Fine Sand, 38-57 Sand w/Cobbles, 57-75 Marine Sediment, 75-95 Marine Sediment w/White Clay, 95-110 Marine Sediment w/Green Clay	-	-
13S03W-33N	153675	0-27 Brown Fine Sand, 27-33 Cobble Rock, 33-55 Brown Meidum Sand, 55-57 Cobble, 57-64 Brown Clay w/Rocks, 64-74 Blue Clay, 74-80 Medium-Coarse Gravel w/Brown Sand, 80-97 Blue Clay, 97-105 Fine-Medium Sand, 105-111 Blue Clay	111	Bedrock
13S03W-33NB	158250	0-20 Brown Fine Silty Sand, 20-45 Brown Fine-Coarse Sand w/Cobble, 45-82 Green/Grey Clayey Sand & Cobble, 82-92 Green/Grey Clay & Cobble	-	-
13S03W-33NC	288099	0-44 Clay & Fine Sand, 44-59 Silty Sand, 59-74 Silty Sand & Clay, 74-89 Sand, Clay & Boulders, 89-104 Grey Medium Sand & Boulders, 104-130 Medium Sand & Boulders	130	Granodiorite
13S03W-33ND	445759	0-40 Brown-Grey Fine-Coarse Sand, 40-67 Grey Fine-Coarse Partly Cemented Sand, 67-93 Grey Fine-Coarse Sand, 93-117 Grey Partly Cemented Sand & Boulders, 117-127 Cemented Cobble	-	-
13S03W-33PA	158275	0-20 Brown Fine Sand, Gravel & Silt, 20-75 Black Fine Sand, Gravel & Silt, 75-79 Grey Fine-Coarse Sand, 79-100 Grey Fine-Coarse Sand w/Clay, 100-120 Grey Coarse Sand, 120-124 Boulders	-	-
13S03W-33PB	61332	0-20 Grey Silty Sand, 20-35 Grey Silty Sand & Clay, 35-50 Grey Medium Sand, Clay & Boulders, 50-70 Grey Medium Sand & Clay, 71-133 Grey Medium Sand & Boulders, 133-153 Grey Clay	-	-
13S03W-33RA	456443	0-20 Grey Fine Sand, 20-30 Coarse Sand, 30-38 Red Clay & Gravel, 38-50 Grey Soft Sand, 50-60 Grey Coarse Sand, 60-75 Grey Medium Sand, 75-87 Grey Coarse Sand, 87-90 Grey Sand, 90-105 Grey Medium Sand	-	-
13S03W-33RA	222615	0-7 Sand, 7-13 Boulders & Sand, 13-35 Gravel & Brown Clay, 35-45 Sand, 45-46 Clay, 46-65 Sand, 65-78 Clay & Cobble, 78-105 Coarse Sand, 105-110 Cobble and Rock, 110-114 Rock, 114-140 Blue Clay	-	-
14S03W-5CD	775959	0-15 Brown Fine Sand & Silt, 15-30 Brown Fine Sand, 30-70 Black Silty Sand, 70-85 Black Fine-Coarse Sand, 85-100 Black Fine-Coarse Clayey Sand, 100-110 Black Coarse Sand, 110-120 Grey Clay	-	-
14S03W-5H2	126966	0-14 Sand, 14-22 Clay, 22-34 Sand, 34-41 Clay, 41-60 Sand, 60-68 Clay, 68-74 Coarse Sand, 74-86 Clay, 86-93 Coarse Sand, 93-100 Clay, 100-106 Sand, 106-108 Clay, 108-125 Coarse Sand	-	-
14S03W-6LA	126635	0-3 Silty Sand, 3-22 Very Fine Sand w/ Clay and Silt, 22-95 Black-Brown Mud, 95-180 Fine-Coarse Sand	-	-
14S03W-6PA	126630	0-4 Very Fine Silty Sand, 4-28 Very Fine Sand w/Clay, 28-102 Black-Brown Silty Mudstone, 102-111 Cemented Sand and Cobble w/Clay & Silt, 111-117 White Clay	-	-
14S03W-6Q2	35303	0-20 Silt, 20-60 Clay, 60-96 Sand, 96-108 Gravel & Sand, 108-120 Rock	-	-
14S03W-7BA	159885	0-19 Red Marine Sediments, 19-21 Sand, 21-45 Yellow-Green Marine Sediment, 45-85 Green Marine Sediment, 85-87 Sandstone, 87-148 Green Marine Sediment, 148-167 Tan Sandstone, 167-169 Sand, 169-245 Green-Grey/Purple Clay, 245-269 Green-Grey Clay, 269-274 Clay w/Sand, 274-277 Coarse Sand, 277-291 Green Marine Sediment, 291-305 Clayey Sand, 305-332 Marine Sedment	-	-
14S03W-7C2	-	0-4 Sandy Soil, 4-22 Blue Sand, 22-56 Blue Mud, 56-106 Blue Sandy Clay, 106-112 Coarse Gravel, 112-120 Grey Clay, 120-122 Boulders, 122-138 Sandy Clay, 138-140 Blue Shale	-	-
14S03W-7C3	-	0-3 Sandy Soil, 3-20 Blue Sandy Clay, 20-62 Blue Mud, 62-88 Brown Sandy Clay, 88-106 Coarse Sand & Gravel, 106-116 Blue Sandy Clay, 116-120 Brown Fine Sand, 120-138 Brown Coarse Sand, 138-150 Yellow Coarse Sand & Gravel, 150-152 Black Sandy Clay, 152-158 Blue Sandstone	-	-
14S03W-7C4	-	0-2 Soil, 2-12 Sandy Clay, 12-68 Blue Sandy Clay, 68-82 Blue Clay, 82-92 Brown Clay, 92-109 Grey Sandstone, 109-110 Grey Shale, 110-115 Blue Sand, 115-118 Blue Clay, 118-129 Black Fine Sand, 129-130 Blue Clay, 130-143 Blue Coarse Sand, 143-156 Blue Clay, 156-180 Blue Fine Sand, 180-186 Blue Sandstone& Shale	-	-
14S03W-7E2	223541	0-2 Artifical Fill, 2-7 Sand, 7-15 Silt, 15-27 Sand/Silt, 27-43 Silt, 43-52 Silty Sand, 52-72 Sand	-	-
14S03W-7K3	230408	0-2 Silty Sand, 2-48 Med-Coarse Sand w/Silt & Clay, 48-104 Med-Coarse Sand w/Gravel & Cobble	104	Black Volcanic Rock
14S03W-7LA	223526	0-19 Fine-Coarse Sand, 19-33 Silty Sand, 33-73 Sand & Gravel, 73-118 Sand & Gravel w/Grey Silt, 118-120 Blue, Green Mudstone & Clay	-	-
14S03W-7LC	4588	0-185 Yellow/Brown Sandstone, 185-365 Blue-Green/Grey Shale	-	-
14S03W-8C1	-	0-33 Top Soil, 33-63 Silt & Shale, 63-153 Sand	-	-
14S04W-11	943692	0-2 Top Soil, 2-20 Sand, 20-40 Sandstone & White Clay, 40-120 Clay & Sand, 120-220 Blue Clay	220	Black/White Granite
-	487606	0-4 Fine Sand, 4-35 Fine Sand w/Clay, 35-41 Medium Sand w/Clay, 41-45 Medium Cemented Sand w/Red Clay, 45-60 Medium Cemented Sand, 60-64 Rock	-	-
-	395649	UNKNOWN, 1st page is missing	64-479	-

TABLE 6
GEOLOGY OF SAN DIEGUITO VALLEY WELLS
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Well Section	Well Log	Wellhole Geology	Depth to Basment	Basment Rock Geology
-	-	-	feet	-
-	350214	0-5 Tan Shale, 5-7 Tan Sandy Shale, 7-10 Tan Sand, 10-22 Red Clay w/Green Clay, 22-25 Clay, 25-45 Tan Sandstone w/Green Clay, 45-48 Tan Sandstone w/Shale, 48-53 Green Shale, 53-54 Red-Tan Shale, 54-59 Tan Sand, 59-62 Sand w/Grey Clay, 62-66 Grey Shale, 66-77 Tan Sandstone, 77-80 Gravel, 80-88 Pink Sandstone, 88-91 Grey Shale, 91-94 Grey Sandy Shale, 94-101 Sandstone w/Gravel, 101-104 Green Sandy Clay, 104-115 Green Sandy Shale, 115-125 Green-Grey Sand w/Gravel, 125-130 Coarse Sand, 130-149 Grey Coarse Sand, 149-153 Gravel, 153-167 Grey Shale, 167-187 Grey Shale, 187-246 Black Shale, 246-283 Sand	283	Quartz Diorite

TABLE 7

LOCATION OF SAN DIEGUITO ALLEY WELLS IN WGS 1984 UTM ZONE 11S

[illegible]

[illegible]

Well Section	Well Log	Acre Parcel	Easting Location	Northing Location	Street Address	City
13S03W-21G	158219	-	479981	13654087	5539 Via De La Cumbre	Rancho Santa Fe
13S03W-22	130153	-	482910	13654633	7008 El Vuelo Del Este	Rancho Santa Fe
13S03W-25J1	104583	-	539204	13649729	Lake Cuyamaca	Julian
13S03W-27J1	92832	-	483703	13652842	Zumaque Street	Rancho Santa Fe
13S03W-28D	100301	269-030-25	482134	13652633	Via A La Casa & El Sicomoro	Rancho Santa Fe
13S03W-28N	100277	269-171-18	482330	13652121	17040 Circa Del Norte	Rancho Santa Fe
13S03W-28N	288124	269-171-18	482313	13652131	17040 Circa Del Norte	Rancho Santa Fe
13S03W-30K	180422	-	478664	13652680	El Acebo & Rambla Da Las Flores	Rancho Santa Fe
13S03W-31L	943790	268-220-33	478769	13651407	15880 El Camino Real	Rancho Santa Fe
13S03W-32GA	479051	268-280-20	480207	13651591	16025 Via Del Alba	Rancho Santa Fe
13S03W-32H1	1309	-	480568	13651570	16039 Via Del Alba	Rancho Santa Fe
13S03W-32H1	487603	268-280-06	480488	13651787	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-32JA	60184	-	480740	13651168	El Apajo & Via De La Valle	Rancho Santa Fe
13S03W-32JB	277290	-	480732	13651113	El Apajo & Via De La Valle	Rancho Santa Fe
13S03W-32JC	351500	-	480370	13651958	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-32R3	100306	-	481395	13653863	Paseo Delicias & Via De La Valle	Rancho Santa Fe
13S03W-33A1	-	-	481475	13651007	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33BA	192758	-	482000	13651842	16003 Via De Santa Fe	Rancho Santa Fe
13S03W-33C5	-	-	481397	13651813	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-33C5	-	-	481382	13651815	Calzada Del Bosque & Via De Santa Fe Road	Del Mar
13S03W-33C7	100647	268-320-01	481349	13651842	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-33CA	158253	268-320-02	481389	13651817	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-33CB	203818	268-320-02	481455	13651875	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
13S03W-33EA	221762	268-320-03	481223	13651268	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33FA	221779	-	481367	13651505	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33FB	353077	-	481367	13651505	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33G3	217370	-	481684	13651728	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33L6	126968	302-080-10	-	-	-	-
13S03W-33L7	217389	269-071-07	481664	13651187	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33L8	217400	269-080-01	481520	13650838	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33LC	262734	269-080-24	481275	13651084	15719 Via De Santa Fe	Rancho Santa Fe
13S03W-33LD	445758	269-080-15	481257	13650990	15663 Via De Santa Fe	Rancho Santa Fe
13S03W-33LE	505708	269-080-22	481327	13651170	15747 Via De Santa Fe	Rancho Santa Fe
13S03W-33M2	127383	302-080-14	480728	13649478	San Dieguito Road	Del Mar
13S03W-33MB	259917	268-310-06	481040	13651121	15616 Via De Santa Fe	Del Mar
13S03W-33MC	459837	269-080-21	481244	13651205	15743 Via De Santa Fe	Rancho Santa Fe
13S03W-33MD	518242	268-310-17	481072	13651145	6045 El Apajo	Rancho Santa Fe
13S03W-33N	153675	-	481520	13650322	15530 Via De Santa Fe	Rancho Santa Fe
13S03W-33RA	222615	302-080-014	480732	13651154	El Apajo & Via De La Valle	Rancho Santa Fe
13S03W-33RA	456443	-	480634	13650740	Via Valle Verde	Rancho Santa Fe
13S03W-33NB	158250	268-310-09	481177	13650761	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33NC	288099	268-31-15	481017	13650613	Via De Santa Fe	Rancho Santa Fe
13S03W-33ND	445759	269-080-19	481128	13650817	15557 Via De Santa Fe	Rancho Santa Fe
13S03W-33PA	158275	-	481524	13650733	El Apajo & Via De Santa Fe	Rancho Santa Fe
13S03W-33PB	61332	269-080-12	481381	13650985	6233 El Apajo	Del Mar
14S03W-5CD	775959	730-146-07	479755	13649579	Via De La Valle & El Camino Real	Rancho Santa Fe
14S03W-5H2	126966	302-080-12	-	-	-	-
14S03W-6LA	126635	-	478725	13649330	Via De La Valle & El Camino Real	Del Mar
14S03W-6PA	126630	-	478452	13648886	Via De La Valle & El Camino Real	Del Mar
14S03W-6Q2	35303	-	480526	13651859	Calzada Del Bosque & Via De La Valle	Rancho Santa Fe
14S03W-7BA	159885	-	480671	13648954	14333 San Dieguito Road	-
14S03W-7C2	-	-	478746	13648962	San Dieguito Road & El Camino Real	-
14S03W-7C3	-	-	478518	13648861	San Dieguito Road & El Camino Real	-
14S03W-7C4	-	-	478488	13648883	San Dieguito Road & El Camino Real	-
14S03W-7E2	223541	-	478350	13648954	El Camino Real	Rancho Santa Fe
14S03W-7K3	230408	-	478226	13646088	13985 El Camino Real	-
14S03W-7LA	223526	-	478516	13648639	San Dieguito Road & El Camino Real	Del Mar
14S03W-7LC	4588	-	478151	13646235	El Camino Real	Del Mar
14S03W-8C1	-	-	485049	13649521	Camino Del Sur	-
14S04W-11	943692	299-200-64	475823	13647551	1854 San Dieguito Road	Del Mar

-	487606	269-171-21	482705	13652513	5990 Calle Camposeco	Rancho Santa Fe
-	395649	269-171-21	482671	13652511	5990 Calle Camposeco	Rancho Santa Fe
-	350214	-	477923	13652200	4538 Via Gaviota	Rancho Santa Fe

TABLE 8

HYDROLOGIC AREAS OF SAN DIEGUITO VALLEY

[illegible]

[illegible]

Well Section / ID	Well Log No.	Hydrlogic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
13S03W-21G	158219	Carlsbad	Escondido Creek	San Elijo	-
13S03W-22	130153	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-25J1	104583	San Diego	Boulder Creek	Cuyamaca	-
13S03W-27J1	92832	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-28D	100301	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-28N	100277	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-28N	288124	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S03W-30K	180422	Carlsbad	Escondido Creek	San Elijo	-
13S3W-31L	943790	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-32GA	479051	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-32H1	1309	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-32H1	487603	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-32JA	60184	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-32JB	277290	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-32JC	351500	San Dieguito	Solona Beach	Rancho Santa Fe	-
13S3W-32R3	100306	Carlsbad	Escondido Creek	San Elijo	-
13S3W-33A1	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33BA	192758	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33C5	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33C5	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33C7	100647	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33CA	158253	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33CB	203818	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33EA	221762	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33FA	221779	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33FB	353077	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33G3	217370	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33L6	126968	-	-	-	-
13S3W-33L7	217389	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33L8	217400	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33LC	262734	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33LD	445758	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33LE	505708	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33M2	127383	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33MB	259917	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33MC	459837	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33MD	518242	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S03W-33N	153675	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33NB	158250	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33NC	288099	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33ND	445759	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33PA	158275	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33PB	61332	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33RA	222615	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
13S3W-33RA	456443	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S3W-5CD	775959	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S3W-5H2	126966	-	-	-	-
14S3W-6LA	126635	San Dieguito	Solona Beach	Rancho Santa Fe	-

TABLE 8

HYDROLOGIC AREAS OF SAN DIEGUITO VALLEY

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Well Section / ID	Well Log No.	Hydrlogic Unit	Hydrologic Area	Hydrologic Subarea	Groundwater Basin
14S3W-6PA	126630	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-6Q2	35303	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S3W-7BA	159885	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-7C2	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-7C3	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-7C4	-	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-7E2	223541	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-7K3	230408	Carlsbad	Escondido Creek	San Elijo	-
14S3W-7LA	223526	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
14S3W-7LC	4588	Carlsbad	Escondido Creek	Rancho Santa Fe	-
14S3W-8C1	-	San Dieguito	Solona Beach	Rancho Santa Fe	-
14S4W-11	943692	San Dieguito	Solona Beach	Rancho Santa Fe	9-12
-	487606	San Dieguito	Solona Beach	Rancho Santa Fe	-
-	395649	San Dieguito	Solona Beach	Rancho Santa Fe	-
-	350214	Carlsbad	Escondido Creek	San Elijo	-

TABLE 9

SUMMARY OF HYDRAULIC PROPERTIES OF AQUIFERS

San Elijo Valley and San Dieguito Creek Project Update

SMC Project No. 50021-03

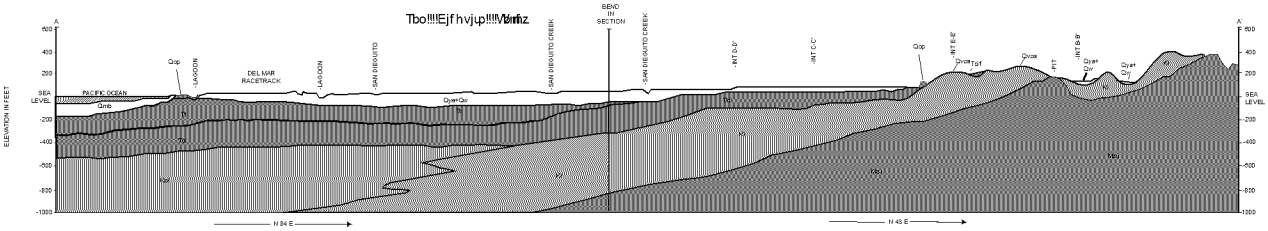
Aquifer	State Well Number	Well Id	Estimated Yield	Test Length	Drawdown	Specific Capacity	Transmissivity	Aquifer Thickness Required for 1.44MM GPD	Estimated Number of Extraction Wells Needed	TDS
-		-	gpm	hours	feet	gpm per foot	gpd per foot	feet	-	ppm
Escondido Creek	13S03W-24K1	576168	5	2	30	0.17	250.00	5760	116	
	13S03W-18F1	462198	325	4	40	8.13	12187.50	118	3	
	Averages		**165.00**	**3.00**	**35.00**	**4.15**	**6218.75**	**232**	**6**	
San Dieguito Creek	13S03-28D1	100301	150	36	80	1.88	3750.00	384	5	
	13S03W-33G3	217370	300	6	62	4.84	9677.42	149	2	
	13S03W-33C4	203818	80	8	53	1.51	3018.87	477	2	
	13S03W-33D1	776389	200	6	50	4.00	8000.00	180	1	
	14S03W-05	126966	600	8	38	15.79	31578.95	46	1	
	13S03W-28P1	1085047	600	8	6	100.00	200000.00	7	1	
	13S03W-33M2	221762	500	8	18	27.78	55555.56	26	1	
	13S03W-33M11	158275	800	8	20	40.00	80000.00	18	1	
	13S03W-33M3	221779	800	12	58	13.79	27586.21	52	2	
	13S03W-33M4	353077	800	8	38	21.05	42105.26	34	1	
	13S03W-33L4	217400	1000	12	72	13.89	27777.78	52	2	
	12S01W-31J1	463737	1000	8	65	15.38	30769.23	47	1	
	13S03W-33	126968	1100	4	20	55.00	110000.00	13	1	
	13S03W-33C3	158253	1100	8	17	64.71	129411.76	11	1	
	13S03W-32R1	456443	2500	8	17	147.06	294117.65	5	1	
	13S03W-33L1	158250	162	4	65	2.49	4984.62	289	2	
	13S03W-33L3	217389	450	12	63	7.14	14285.71	101	1	
	13S03W-33M5	505708	80	4	50	1.60	3200.00	450	2	
	13S03W-33M7	459837	150	3	60	2.50	5000.00	288	2	
	13S03W-33M13	445758	225	4	30	7.50	15000.00	96	1	
	13S03W-33M14	445759	250	4	30	8.33	16666.67	86	1	
	14S03W-05L1	775959	200	4	80	2.50	5000.00	288	4	
	Averages		**593.05**	**8.32**	**45.09**	**25.40**	**50794.80**	**28**	**1**	
Lusardi Formation	13S03W-30K2	796212	25	6	100	0.25	500.00	2880	7	
	13S03W-31C1	485465	18	4	200	0.09	180.00	8000	17	1350
	13S03W-17D2	440293	30	30	1	30.00	45000.00	32	2	
	14S03W-04B1	729037	60	4	280	0.21	428.57	3360	8	
	13S04W-26P1	SDSE	47	24	310	0.15	303.23	4749	10	
	Averages w/o hi / lo		**30.00**	**11.33**	**193.33**	**0.21**	**410.60**	**3507**	**8**	
Santiago Peak Metavolcanic Fractured Rock Aquifer	12S03W-34M1	159090	50	1	99	0.51	1010.10	1426	3	
	13S02W-30Q1	521695	100	4	300	0.33	666.67	2160	5	
	13S03W-16B1	353748	2	8	650	0.00	4.62	312000	6241	
	13S03W-28B2	402741	31.4	4	1141	0.03	55.04	26163	53	
	13S03W-28Q1	445625	100	3	500	0.20	400.00	3600	8	
	13S03W-28Q2	707059	38	4	150	0.25	506.67	2842	7	
	12S02W-25G1	487205	45	6	500	0.09	180.00	8000	81	
	13S03W-03Q1	449169	20	6	300	0.07	100.00	14400	289	
	13S03W-03H2	776375	11	8	900	0.01	18.33	78545	1572	
	13S03W-03D1	353089	75	4	275	0.27	545.45	2640	6	
	13S02W-24C1	349188	37.5	2	50	0.75	1500.00	960	11	
	13S02W-24E1	349189	50	2	16	3.13	6250.00	230	3	
	14S03W-04G1	505668	40	6	500	0.08	160.00	9000	16	
	13S03W-16J2	455909	29.5	4	545	0.05	108.26	13302	23	
	13S03W-17R2	521701	10	3	300	0.03	66.67	21600	37	
	13S03W-18H1	1085062	5	2	200	0.03	50.00	28800	49	
	13S03W-19E1	1085025	30	4	600	0.05	100.00	14400	25	5000
	13S03W-20M1	218899	40	3	270	0.15	296.30	4860	9	
	Averages w/o hi and lo		**41.40**	**4.00**	**414.38**	**0.18**	**360.22**	**3998**	**8**	

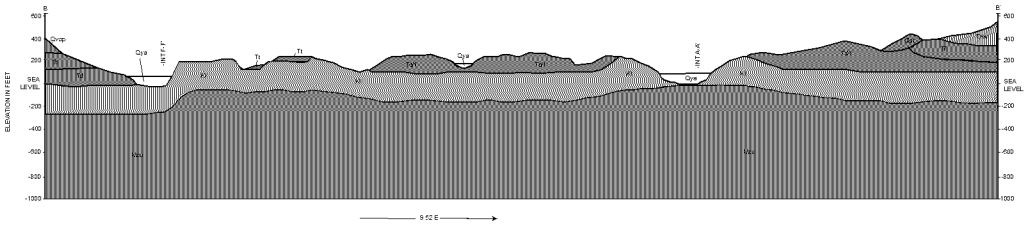
Notes:

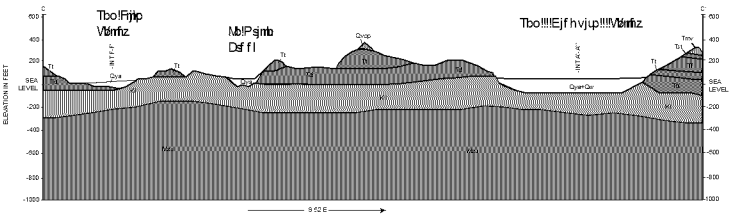
1 gpm denotes gallons per minute

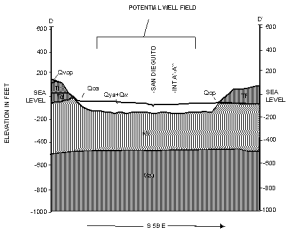
2 gpd denotes gallons per day

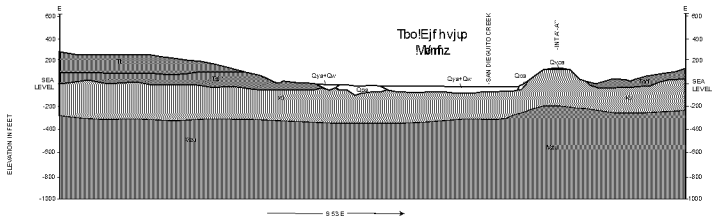
3 ppm denotes parts per million

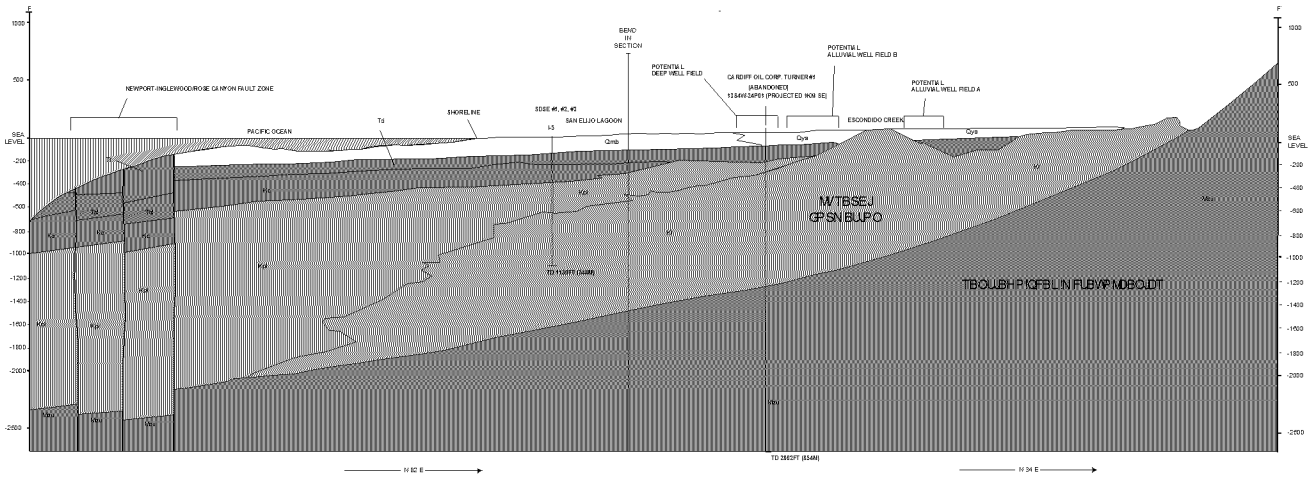


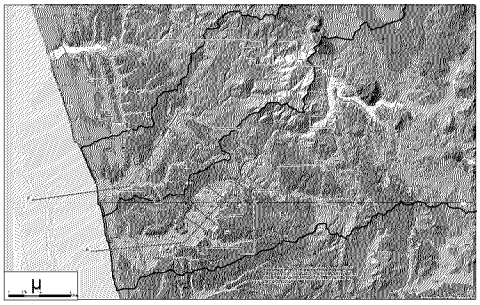












Generalized Geologic Units

Qw	Recent stream channel deposits
Qya, Qpe	Recent alluvium
Qoa, Qop	Older alluvium
Qvop, Qvoa	Older marine terrace deposits
Tmv	Eocene Mission Valley Formation
Tf	Eocene Friars Formation
Tt	Eocene Torrey Sandstone
Td	Eocene Delmar Formation
Kpl	Point Loma Formation
Kl	Lusardi Formation
Kd, Klh etc.	Cretaceous granitic rocks
Mzu	Santiago Peak Metavolcanic Rock

Cross Section Line

Olivenhain Municipal Water District

Watershed

6Y/Mfsujdbnfyybhhf sbujpo

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0 5000 10000

Geologic Cross Section

Olivenhain Water District

Job Title: 5001-05 | Date: February 21, 2014 | Plate: 1

LEGGETTE, BRASHEARS & GRAHAM, INC.

PROFESSIONAL GROUNDWATER AND ENVIRONMENTAL ENGINEERING SERVICES

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651-490-1405
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www.lbgweb.com

February 14, 2014

Mr. John Foster
Stoney-Miller Consultants, Inc.
14 Hughes, Suite B-101
Irvine, CA 92618

RE: Geophysical Surveys Results and Recommendations
San Elijo Lagoon Area
Olivenhain Municipal Water District

Dear John,

Leggette, Brashears & Graham (LBG) is pleased to present you with the results of the recently completed geophysical investigations conducted in the vicinity of the San Elijo Lagoon, located in north San Diego County, between Solana Beach to the south and Encinitas to the north, and extending inland to Rancho Santa Fe, CA. This survey was conducted to augment the results of a geophysical survey conducted in February of 2013 in the San Elijo Lagoon. As part of the geophysical investigation, three geophysical methods (high resolution resistivity, time-domain electromagnetic induction, and gravity) were completed. The surveys were conducted for Stoney-Miller Consultants, Inc. (Stoney-Miller) in support of their on-going water supply investigations being conducted on for the Olivenhain Municipal Water District (OMWD). The proposed scope of work for the geophysical investigations was prepared by LBG and presented to Stoney-Miller, on behalf of the OMWD, in the Geophysics Work Plan, dated January 2, 2014.

The objectives of the geophysical investigations were to assist in defining the subsurface geo-electrical characteristics of the unsaturated and saturated materials located above the basement rock in the study area, which is the Jurassic-age Santiago Peak Formation, and to map the upper surface of the basement rock. More specifically, the high resolution electrical resistivity survey (resistivity survey) was conducted to map the lateral and vertical grain size distribution of the upper 300 to 400 feet of the material above the basement rock, and the TEM survey was utilized to determine the grain size distribution to depths of up to approximately 1,200 feet. The gravity survey was conducted to map the upper surface of the basement rock. Combining the results of these three methods have enabled us to map the relative thickness and location of the inferred permeable zones of the Lusardi Formation and/or areas of fractured and weathered rock, or areas of sand or sandstone units above the Lusardi, if present. The geophysical survey locations are shown on **Figure 1**.

The geophysical methods used in this investigation measure the subsurface properties in different ways. Each electrical method has a different optimal range of depth and resistivity values and loses accuracy when working out of the optimal range. The accuracy of the gravity method depends on the density values of the various subsurface units that are put in the model and the ability

to ground truth the modeled depths with stratigraphic data from reliable well or boring logs. As a result, the measurements made by each method in a given area will show similar trends but will not match exactly in terms of layer depth and resistivity. The use of several complimentary geophysical methods increases the reliability of the interpretation by measuring the same geologic trend using different methods and physical properties.

This letter report summarizes the methodology employed to collect, process and model the data for each of the geophysical methods and presents the results of the surveys, including recommendations for further activities.

BACKGROUND

OMWD has been actively investigating the possibility of constructing a production well or wells and brackish water desalination facility in the vicinity of the San Elijo Lagoon (the Lagoon) as a means to supplement their source of water supply. OWMD currently receives all of its potable water from the San Diego County Water Authority (SDCWA). SDCWA in turn purchases its water from the Metropolitan Water District of Southern California (MWD).

An exploratory test well was completed in the Lagoon by USGS in 2012. The test well was drilled to depth of 1,850 feet. Review of the USGS drilling and lithologic log for this well indicates that thick sequences of silty clay and clayey silt were penetrated in the majority of the upper section of the boring. Two significant sandy zones were penetrated in lower section of the boring, the first from 610 to 740 and the second from 820 to 1,185 feet. Based on the drilling results and review of down-hole geophysical logs that were conducted in the test well, screens were installed in the two lower sections and short-term test pumping was conducted. The well was pumped at 50 gpm for approximately 6 hours with approximately 300 feet of drawdown, yielding an estimated specific capacity of approximately 0.2 gpm per foot of drawdown.

To further evaluate the potential for siting a well in or adjacent to the Lagoon, Stoney-Miller retained Cardno Entrix to conduct a gravity survey at the Lagoon in February 2013. The results of this survey indicated a substantial amount of relief exists on the basement rock surface in the study area. The modeled gravity data indicate elevations for the Santiago Peak Formation range from approximately 1,150 feet below mean sea level (ft bl msl) to the northeast and north-central portions of the site, to between 2,300 to 2,500 ft bl msl in the southeast, south-central, and southwest portions of the site.

Based on the results of the 2013 gravity survey Stoney-Miller retained LBG to conduct additional geophysical surveys in the vicinity of the Lagoon to further characterize the extent of subsurface material potentially favorable for siting a new production well. Details of the investigation activities including results and recommendations follow.

Electrical Properties of Soils and Rock

The resistivity and TEM methods are classified as electrical methods because they measure the electrical properties of the subsurface. The specific electrical property measured by these methods is electrical resistivity, which is the mathematical inverse of electrical conductivity. Electrical resistivity is measured in units of ohm-meters (ohm-m).

Resistivity is a material property that can be used to determine the characteristics of the subsurface. The resistivity of a soil or rock horizon is determined by the moisture content, formation water quality, and by the particular mineralogical composition and grain size of the material. Porous

earth materials saturated with fresh water generally have lower resistivity values than unsaturated materials. Materials saturated with brackish water have lower resistivity than materials that contain fresh water. Materials saturated with salt water and clay rich materials, such as lacustrine clays, generally exhibit very low resistivity (less than 10 ohm-m). Porous materials saturated with brackish water generally exhibit resistivity values of between less than 10 to 30 ohm-meters. Materials containing little clay, such as unweathered granite or competent carbonate formations and clean sand and gravel, generally exhibit very high resistivity values (greater than several hundred ohm-m). Porous materials, such as various sand and gravel mixtures saturated with fresh water, have intermediate resistivity values (between approximately 100 and 300 ohm-m). The higher the percentage of fine grain materials present in a formation, the lower the electrical resistivity of the formation. Very silty sand and sand/silt/ clay mixtures will exhibit resistivity values of between 30 to about 100 ohm-meters. Local conditions affect the resistivity value of a given formation and these typical ranges need to be adjusted to fit the site. However, by using these general relationships, resistivity measurements can be used to distinguish subsurface soil types and the relative quality of the formation water.

RESISTIVITY SURVEY

Description of the Resistivity Method

The method of electrical resistivity uses a pair of electrodes (current electrodes) to pass an electrical current through the ground while measuring the resultant voltage field in the ground at an offset pair of electrodes (potential electrodes). Resistivity surveys are utilized to delineate lateral and vertical variations of resistivity with depth. The subsurface penetration of the electrical current is a function of the electrode separation. The position of the measurement is a function of the midpoint of the current and potential electrode pairs. The change in electrical properties with depth and laterally is determined by taking measurements at increased electrode spacing and at different locations and modeling the change in apparent resistivity with electrode spacing.

High resolution multi-node resistivity systems use a cable system with multiple conductors to connect many electrodes to a switching box. The switching box selects pairs of current and potential electrodes to make resistivity measurements. The spacing between current and potential electrodes, the spacing between the electrode pairs, and the position of the center of the electrode arrays are changed from one measurement to the next in a systematic way to provide resistivity measurements to different depths and different positions along a profile line. These systems can make hundreds of measurements in a matter of a few minutes or hours. The data can be interpreted to produce a relatively high resolution two dimensional section that shows the lateral and vertical changes in resistivity along the profile line.

The resistivity values recorded in the field are called measured apparent resistivity values because they are a composite measure of the resistivity of all layers that the current traveled through. The field data must be modeled to distinguish the effects of each electrical layer penetrated in order to determine the thickness and resistivity of each layer. Multi-node resistivity data is typically modeled to produce a two dimensional resistivity section that shows the modeled resistivity of the subsurface beneath the profile line.

Description of Resistivity Field Procedures

A geophysical survey consisting of two high-resolution resistivity profiles (R1 and R2) was conducted adjacent to the Lagoon on January 9, 2014. **Figure 2** shows the location of the two

profiles. The resistivity data were collected using a SuperSting™ model R8 IP, with a Swift™, multi-node resistivity imaging system, manufactured by Advanced Geosciences, Inc., (AGI) of Austin, Texas. Survey profile locations were chosen on the basis of site availability, adequate open area free of cultural interference, and position relative to the Lagoon and Escondido Creek. Limited sites that were suitable for resistivity surveys which reduced the length and number of resistivity lines conducted.

The Sting system consisted of a transmitter/receiver, switch box, four 900-foot long electrode cables, each with 14-takeouts spaced 10 meters (approximately 32.8 feet) apart, 56 metal stakes (electrodes), and a 12-volt deep cycle marine battery to power the transmitter. Due to site limitations, only two 2 cables were utilized on each profile, resulting in a maximum line length of 900 feet. The system was laid out with the transmitter/receiver, switch box, and battery located at the end of cable two (normally the middle of the line if four cables are utilized). For each sounding electrodes were pounded into the ground and attached to the cable at each 10-meter takeout. The electrode spacing was controlled by the transmitter's internal switching system. The switching system selects various electrodes to form dipole pairs of current electrodes and potential electrodes with different dipole spacing, dipole offsets, and array centers. Hundreds of measurements were made along each profile line to measure the lateral and vertical changes in subsurface resistivity.

The depth of penetration depends on the spacing between the dipole pair of electrodes. The longer the distance between the electrodes, the deeper the penetration of the electrical current and hence the resulting modeled section. Resistivity sounding R1was conducted using 28 takeouts and resistivity sounding R2 was conducted using 25 takeouts. Sounding R1 was conducted using a pole-dipole array (a specific configuration of potential and current electrodes). Sounding R2 was conducted using a pole-dipole array and a Wenner array. The pole-dipole array is used to obtain a deeper depth of penetration than the Wenner array, but suffers from a lower signal to noise ratio to obtain a deeper "picture" of the subsurface materials. The Wenner array is used to provide a higher signal to noise ratio which reduces the amount of interference observed in the data at the expense of the depth of penetration.

The modeling package Earth Imager was used to model the field data. This program models the field data to image the lateral and vertical changes in subsurface resistivity. Available subsurface geologic data was used to provide estimates of the depth to bedrock and soil types in order to improve the accuracy of the interpretation of the resistivity models.

Resistivity Survey Results and Discussion

Review of the modeled resistivity data indicates that generally good quality data was obtained at each sounding location. The data at sounding R1 had very low noise or interference. Profile R2 happened to cross a buried electrical cable, which is a source of interference when conducting resistivity soundings. However, even though R2 crossed the buried cable it took minimal data processing to filter out the impacted data and create a relatively clear picture of the subsurface geo-electrical profile. Each of the modeled profile lines are plotted without any correction to the resistivity color scale. The lower limit of the modeled resistivity was approximately 2 ohm-m at both R1 and R2. The upper limit of the modeled resistivity was 93 ohm-m at R1 and 72 ohm-m at R2. The depths of penetration of the modeled resistivity profiles R1 and R2 were 310 and 178 feet, respectively. Both of the modeled resistivity profiles are considered to have provided a good representation of the geo-electrical properties of the subsurface materials below the soundings.

Resistivity Line R1

Resistivity Line R1 (**Figure 2**) is located approximately 700 feet northeast of the Manchester Preserve, 100 feet east of Manchester Avenue and approximately 700 feet west of Escondido Creek. The modeled profile for R1 **(Figure 3)** shows a continuous unit of very low resistivity material across the entire profile from ground surface to a depth of approximately 35 feet on the south end to 50 feet on the north end. This uppermost unit appears characteristic of unconsolidated sands and clays saturated with brackish water. Immediately below this brackish unit there appears to be a relatively thin (15 to 25 feet thick) zone of low resistivity material, which appears to be acting as a confining unit that separates the upper brackish water zone from an apparent fresh water zone below. The confining unit grades into a more brackish zone on the north end of the line and it can't be differentiated from the material above or below it. Beneath the inferred confining unit a substantial zone of medium resistivity material characteristic of fresh water in sand or sandstone is present in the south half of the profile. This zone ranges from about 100 to 130 feet thick and is truncated at about 500 feet from the south end of the line and is surrounded by low resistivity material that is characteristic of low permeability fine-grain material, or brackish water.

Resistivity Line R2

Resistivity Line R2 (**Figure 2**) is located on the east of Escondido Creek, with the south end (electrode number 1) located approximately 50 feet from the north side of South Rancho Santa Fe and the north end (electrode number 25) located approximately 3 feet from Escondido Creek. Resistivity Line R2 shows a similar sequence to R1, but there is a zone of interference caused by crossing a buried utility line from about stations 200 to 260 feet. The inferred sandstone/fresh water unit as seen on **Figure 4** is likely continuous across the anomaly. This sandstone/fresh water zone appears to thicken and increase in depth at about 500 to 700 feet from the south end of the line. Note that this profile does not extend as deep as the profile for R1 because of the shorter line and data filtering required to remove the bad data points.

TEM SURVEY

Description of TEM Method

The TEM method uses a heavy gauge wire laid out as a square or rectangle to form a transmitter loop. A current of several amps is passed through the transmitter loop. The current is cut off with a steep ramp function creating a broad band EM pulse as the electric field of the transmitter loop collapses. The EM pulse propagates vertically into the subsurface and induces eddy currents in horizontal conductors. The intensity of the magnetic field created by the eddy currents is measured as a function of time by a magnetic receiver coil positioned in the center of the transmitter loop. The field data is then modeled to produce a horizontally layered resistivity model of the subsurface. Current modeling technology does not account for three-dimensional structures so significant errors can occur near abrupt lateral resistivity contrasts such as faults. These 3-D disruptions can be used as indicators of faults or fractures zones near a sounding.

Description of TEM Field Procedures

A geophysical survey consisting of ten Time-domain Electromagnetic Induction (TEM) soundings was conducted at eight separate field sites in the vicinity of the Lagoon between January 10 and January 11, 2014. The locations of the TEM soundings are shown on **Figure 2**.

The TEM data were collected using a Geonics TEM 57 transmitter and a PROTEM 58D receiver. A Honda EU2000i portable generator was used to provide power to the transmitter. Survey sounding locations were chosen on the basis of site availability, adequate open area free of cultural interference, and position relative to the Lagoon and Escondido Creek basin. Most sites were too small for large single turn loops that generally provide the deepest data. A 20 meter by 20 meter square transmitter loop with four turns of 10 gauge insulated copper wire was utilized to carry the electrical energy source. This field geometry provides adequate penetration on smaller sites and is less susceptible to interference than larger single turn loops. The transmitter loop size was chosen based on the results obtained in previous studies completed at similar sites and due to site physical constraints that limited the use of a larger transmitter loop.

The electrical data generated during the field procedures was mathematically modeled using IX1D TEM, a one and two-dimensional modeling software distributed by Interpex Ltd. The modeled data provides an estimate of the geo-electrical section beneath a sounding location. The resistivity values and modeled unit thickness are bulk average values that are the result of recording measurements over a large surface area and depth section. The actual geology at a particular sounding location may contain thinner inter-layered units of variable composition and permeability that represent an average bulk resistivity value obtained through the modeling.

TEM Survey Results and Discussion

The majority of the soundings produced good interference-free data and provided good depth of penetration. However, the soundings at TEM- 8, TEM-8SW (8W) and TEM-8NE (8E), appeared to be impacted by noise (interference), which may be associated with the high tension power lines located to the west, or from 3-D effects from potentially faulted structure beneath the survey area, or from a combination of either of these. In most soundings, the full 20 gates of the high frequency data set were useable for the interpretation process. In some soundings, the data from about the last three or four time gates was unusable due to a low signal to noise ratio. The TEM sounding locations conducted as part of this investigation are shown on **Figure 2**. The modeled TEM data are included in **Attachment A**.

To assist in the visual interpretation of the subsurface geology at the site a geo-electrical cross section was constructed using the modeled TEM sounding data. The geo-electrical cross section is shown on **Figure 5**. The TEM cross section trends in a southwest to northeast direction, adjacent to Escondido Creek. Review of the modeled geo-electrical resistivity data along the interpolated TEM profile indicates that generally four distinct units were identified in the modeled data. The resistivity contrast of these units may be more indicative of groundwater quality than lithology. A description of the four geo-electric units follows:

The first unit, which is the uppermost unit and was identified in all of the TEM soundings, was present from ground surface to depths ranging between approximately 20 feet at TEM-4 to 575 feet at TEM-2. The modeled resistivity values in unit one ranged from approximately 0.1 ohm-m to approximately 10 ohm-m. The geo-electric signature of unit one is characteristic of unconsolidated material containing salty or brackish water and fractured and broken weathered rock that likely contains clay and or brackish water in the fractures. The unconsolidated material could consist of various mixtures of sand, silt and clay. This unit does not appear to be an acceptable aquifer unit, as the water from this unit will likely be brackish. It should be noted that unit 1 is present in TEM-3 in the assumed brackish water or fine grained portion of resistivity line R1 (northern end of the profile). The assumed fresh water zone of resistivity line R1 is located in the southern end of the profile.

Several well logs in the study area noted brackish water or salt water production from the upper bedrock, though it is not known how ubiquitous the brackish water zone is.

Unit two consists of modeled resistivity values between approximately 10 to 50 ohm-m. This unit was detected at TEM-2, TEM-4 and TEM-7 and was encountered at depths of approximately 20 feet at TEM-4, 50 feet at TEM-2, and 410 feet at TEM-7. The total thickness of unit two ranged from approximately 75 feet at TEM-4 to 275 feet at TEM-2. The geo-electric signature of unit two is characteristic of unconsolidated material and fractured and broken weathered rock that may contain somewhat brackish groundwater grading to fresher groundwater. This unit may produce acceptable water quality if the permeability is sufficient to transmit water. Based on the interpreted TEM cross section and resistivity data, it is not clear if this unit has a source of fresh water recharge. The production capacity and long term water quality of this zone cannot be predicted without test drilling and pumping tests.

Unit three consists of modeled resistivity values between approximately 50 to 500 ohm-m. This unit was identified in TEM-1, TEM-5, TEM-6, TEM-8E and TEM-8W at a depth of between approximately 30 feet at TEM-5 to 360 feet at TEM-8W. The interpreted thickness of unit 3 ranged from approximately 140 feet at TEM-5 to 170 feet at TEM-6. Unit three in TEM-1 appears to correlate to the assumed fresh water zone in resistivity line R2. As mentioned previously, the data obtained at soundings TEM-8E and TEM-8W may have been impacted by cultural interference or by 3-D effects from potentially faulted structure beneath the sounding locations; as such the modeled results are not as reliable as the soundings that did not appear to be influenced by cultural interference or effects of the underlying structure. If the modeled data more or less reflects the actual subsurface geo-electric properties at this location, the interval may contain isolated zones of fresh water or more competent crystalline rock.

Unit four consists of modeled resistivity values greater than approximately 500 ohm-m. Unit four was the deepest layer detected on all of the soundings, except TEM 8W, with the top of the unit being detected at depths of between approximately 350 feet at TEM-8 to greater than 600 feet at TEM-7. The geo-electric signature of unit four is characteristic of competent crystalline bedrock. This unit is not considered as a potential aquifer source.

GRAVITY SURVEY

Description of the Gravity Method

A gravity survey is a geophysical remote sensing technique that allows for the measurement of relative changes in the earth's gravitational field at specific locations. The difference in the measured, or observed, gravity at various locations is due to several factors, including the elevation of the surface and the fact that the earth is not a perfect sphere and the radius changes with latitude. Changes in observed gravity can be corrected for elevation changes and latitude changes to provide processed readings that reflect changes in the density of the subsurface. The subsurface is not uniform and lateral and vertical variations in density of the subsurface materials are created by such factors as depth to basement rock, depth to bedrock, the type of lithologic materials present, and the degree of saturation of the subsurface.

Gravity data is readily collected in the field using a portable gravity meter (gravimeter). Following data collection, mathematical corrections (slight adjustments that approximately compensate for known variations in the gravity field that are not geologically significant) are applied to the data thereby enabling gravity anomalies to be detected, and subsequently processed and

modeled using computer software. The data corrections include adjustments for gravimeter drift, differences in altitude and latitude between gravity measurement locations (stations), tidal variations with time, and for the variable surface topography adjacent to the survey area. Additionally, a final correction called the Bouguer Correction is applied to the data to account for the mass of material between a gravity station and a base station. Variations across the site in the processed data indicate changes in density of the subsurface that can be used to interpret various geologic conditions.

Description of Gravity Survey Field Procedures

Gravity data were collected along one profile line (gravity Line 7) along the northwest side of the Lagoon and Escondido Creek. The data were collected using a LaCoste & Romberg (L&R), Model G (meter number G-400) gravimeter equipped with an Aliod 100 electrostatic nulling beam and digital display. 20 gravity stations (including the base station) were occupied along the profile. At each station one gravity measurement was obtained after allowing the digital output of the meter to stabilize for approximately two minutes. Multiple readings were obtained at stations that exhibited substantial meter drift (the meter response was fluctuating). This drift was typically associated with areas in which the soil was sandy, which made planting the meter base firmly on the ground difficult, or areas with heavy traffic which caused the surface to vibrate slightly. The gravity stations were spaced at intervals of between approximately 900 to 3,000 feet along the profile. Gravity measurements were obtained periodically throughout the day at the base station.

The latitude, longitude, and elevation at each gravity station were surveyed prior to obtaining a gravity measurement. The stations were surveyed by an LBG Geographic Information Systems Professional (GISP) using a Trimble® GeoExplorer® 6000 series GeoXH™ handheld global positioning system (gps) instrument, which provided an accuracy of approximately 3 to 8 inches positioning (latitude, longitude, and elevation). The fieldwork was conducted on January 12, 2014. The locations of the gravity line, including station location, are shown on **Figure 6**. The survey station coordinates, and gravimeter readings are included in **Attachment B, Table 1B.**

Corrections to the field data (processing) were performed using Excel spreadsheets and GravMaster™, a Geotools Corporation gravity data processing software. The following corrections to the gravity data were performed: Drift Correction; Latitude Correction; Free Air Correction; Terrain Correction; and, Bouguer Correction. A discussion of each of the data corrections was presented in the March 2013 Gravity Survey Report prepared by CardnoEntrix and is not repeated in this report. Additional information can also be obtained from numerous geophysical methods text books.

Subsequent to processing the raw gravity data, the corrected gravity data were input to the Geotools Corporation software, GravModeler™, a 2-1/2-dimension gravity-modeling program. This software permitted the Bouguer anomalies to be modeled so that an estimate of the depth to bedrock under each gravity line could be made. The program utilizes a homogenous bedrock background (consistent with the 2013 survey, a modeled Bouguer density of 2.75 gm/cc was utilized). Bodies of various densities representing different rock or soil density are inserted into the model background. Changes in the bedrock surface (higher or lower) in conjunction with density contrasts that represent the density of the strata below the gravity profile result in a best fit modeled gravity response and corresponding depths to bedrock.

Gravity Survey Results and Discussion

The corrected gravity data beneath gravity Line 7 were modeled using GravModeler™. Line 7 profile was modeled until a best-fit model response was obtained. The modeled profile for Gravity Line 7 is shown on **Figure 7**. The corrected gravity data for Line 7 was modeled using a background crystalline bedrock density of 2.75 gm/cc. The Delmar and Lusardi sandstone formations in the survey area were inserted into the model profile above the bedrock surface as appropriate (where known or assumed to be present and considered thick enough to warrant inclusion in the model). Densities for the unconsolidated material, meta-volcanic bedrock rubble/gravel, Delmar, and Lusardi sandstone were 2.0, 2.3, and 2.6 gm/cc, respectively. On each of the lines, an additional crystalline bedrock density of 2.85 gm/cc was required to be inserted in the Santiago bedrock unit in order to create a sufficient model of the data. The two densities for the Santiago are deemed geologically appropriate and represent an upper and more weathered and fractured less dense unit lying on top of a denser plutonitic crystalline material. The densities utilized in the models are consistent with published values for the earth materials and/or rock types that are known or expected to exist beneath the Lagoon.

Review of the modeled gravity profile for Line 7 indicates that the basement rock (inferred as Santiago Peak) rises dramatically to the northeast, beginning at approximately gravity station LN7-2, the southern-most gravity station in Line 7. Review of the available well logs confirm that the depth to bedrock northeast of the Lagoon is dramatically higher than at the main Lagoon area, where gravity lines 1 through 6 were completed in 2013. The modeled depth to the upper surface of the Santiago Peak bedrock, which is assumed to represent the more weathered and fractured (less dense) portion of the bedrock ranged from approximately the ground surface at gravity stations LN7-18 and LN7-19 (furthest northeast) to approximately 970 feet at gravity station LN7-2. The modeled elevations of the upper bedrock surface range from approximately 950 feet below mean sea level (msl) at gravity station LN7-2 to 440 feet above msl at gravity station LN7-19.

Based on the corrected gravity values obtained at each gravity station, the modeled data indicated that the bedrock surface is not uniform and several anomalous areas are present where the depth to bedrock appears to be deeper beneath the gravity lows. The general locations of the anomalous areas are between stations LN7-6 and LN7-8, LN7-11 and LN7-15, and LN7-16 and LN7-18. To account for the less dense material beneath the anomalous stations, the depth to bedrock was increased under the anomalies. The density of the material is affected by numerous factors including type of material, mineralogical structure, degree of alteration of the material due to physical change such as weathering and fracturing, and water content. Typically weathering and variances in type of material or state of saturation will be more variable closer to ground surface. Therefore to reflect these differences in the gravity model of Line 7, the depth to bedrock in the areas beneath the gravity anomalies have been pushed down to assist with the modeling and reflect the potential for either the presence of greater depth to bedrock and/or a more highly fractured bedrock environment from fracture zones or faulting.

The elevation of the bedrock (generally the assumed top of the upper weathered and fractured zone of the Santiago Peak Formation) and depth to bedrock beneath each gravity station along each of the modeled gravity lines was input to the Golden Software, Inc. program, Surfer®, and a bedrock elevation map (**Figure 8**) and a depth to bedrock map (**Figure 9**) were constructed. These maps include the depths and elevations obtained on gravity lines 1 through 6 in 2013, gravity line 7, and the data obtained from available well logs in the vicinity of gravity line 7. Review of both these maps indicates a substantial amount of relief on the bedrock surface in the study area. Modeled elevations range from approximately 440 feet above msl at the northeast end of gravity line 7, to

between 2,300 to 2,500 feet below msl in the southeast, south-central, and southwest portions of the Lagoon area.

Recommendations

The geophysical data collected during this investigation indicates that the depth to bedrock comes up much faster and is much higher in elevation to the northeast of the Lagoon than anticipated. The unexpected high bedrock over most of the area covered by this phase of the investigation indicates that siting a new well in the deeper Delmar or Lusardi Formations to the east of the main Lagoon area may be difficult to accomplish. However, it does not necessarily suggest that a siting a production well east of the Lagoon is not possible. Based on the modeled data, it appears that several general areas may be favorable for encountering thicker sections of sandstone or Lusardi Formation or fractured and weathered rock that may be more permeable than the surrounding bedrock and therefore, more capable of supporting a production well. Areas of fractured and weathered rock are commonly associated with fracture zones and faults. It appears that the location of Escondido Creek and its tributaries are structurally controlled (i.e. follow faults). Faults and fractured areas are frequently characterized by increased permeability that can support higher pumping rates and receive recharge from a larger area that may provide a greater long-term sustainable yield than adjacent non fractured portions of the host rock. The higher permeability and additional potential recharge in a fracture zone may result in a much higher well yield in tight formations such as much of the Lusardi sandstone and the underlying Santiago Peak Formation. Based on the a review of the data collected in the February 2013 and January 2014 geophysical investigations, the following areas are considered potentially favorable for conducting additional investigations including completing test boring activities for the purpose of siting a new well for OMWD:

- The areas near TEM-4, TEM-1, TEM-5 and TEM-6 and resistivity line R-2.
  This area is near a resistivity and TEM unit that may represent fresh water saturated sandstone or sand.

- The areas near the south half of resistivity line R-1.
  This area is near a resistivity unit that may represent fresh water saturated sandstone or sand.

- The areas near TEM-2 and TEM-7 and gravity stations LN7-16 and LN7-13.
  This area is near a gravity low that suggests the bedrock in that area may be more fractured than in adjacent areas. Additionally the sounding at TEM-2 and TEM-7 detected zones between the depths of approximately 50 to 275 feet and 350 to 600 feet, respectively that may contain brackish water, which will be cheaper to treat than more saline water,

- The areas near gravity stations LN7-17.
  This area is near a gravity low that suggests the bedrock in that area may be more fractured than in adjacent areas.

- The general locations of the anomalous areas are between gravity stations LN7-14 to LN7-12, and LN7-15.

These areas are near gravity lows that suggest the bedrock in that area may be more fractured than in adjacent areas. The area near the three TEM-8 soundings and gravity stations LN7-6, LN7-7 and LN7-8.

- The general locations of TEM-8E or 8W or gravity stations LN-7 and LN-8. Although the three TEM-8 soundings did exhibit some interference, whether the interference was from cultural or geologic origin is uncertain. The variation in TEM data may represent a fault or fracture zone that may have higher permeability and better recharge than the surrounding material. Zones of fairly high resistivity material characteristic of porous formation saturated with fresh water were present in TEM 8E and 8W. These TEM soundings are located in a linear trending canyon in the Manchester Preserve that may suggest structural control in the bedrock. Gravity stations LN-7 and LN-8 indicate a localized gravity anomaly that may support the interpretation of a fault or fracture zone. The TEM soundings are located across Escondido Creek from resistivity sounding R1, which exhibited a resistivity signature characteristic of freshwater sandstone on the southern portion of the profile at a depth of approximately 70 to 150 feet. These zones may correlate with each other and if so, the apparent fresh water zone may be more prolific in the vicinity of the TEM soundings and more closely tied to fresh water recharge than the units at resistivity profile R1 and especially closer to the creek.

- Based on the survey results obtained along gravity lines 1 through 6 collected in February 2013, it appears that that wells drilled in the southeast or southwest portions of the survey area may encounter about an additional 1,000 feet of Lusardi Sandstone which may significantly increase the production capacity of the well.

The geophysical surveys conducted to date at the site have illustrated that the subsurface geology along Escondido Creek is complex. The interpretation of the geophysical data was tied to subsurface control from well data, where available. However, the interpretation is based on several inferences and assumptions. The interpretation provided several drilling targets but the reliability of our interpretation cannot be guaranteed due to the complexity of the site. We recommend that one or more locations be selected for test drilling and that the interpretation of the geophysical data be revisited after additional subsurface information is available.

We trust this information meets your needs. Please do not hesitate to call if you have any questions or comments.

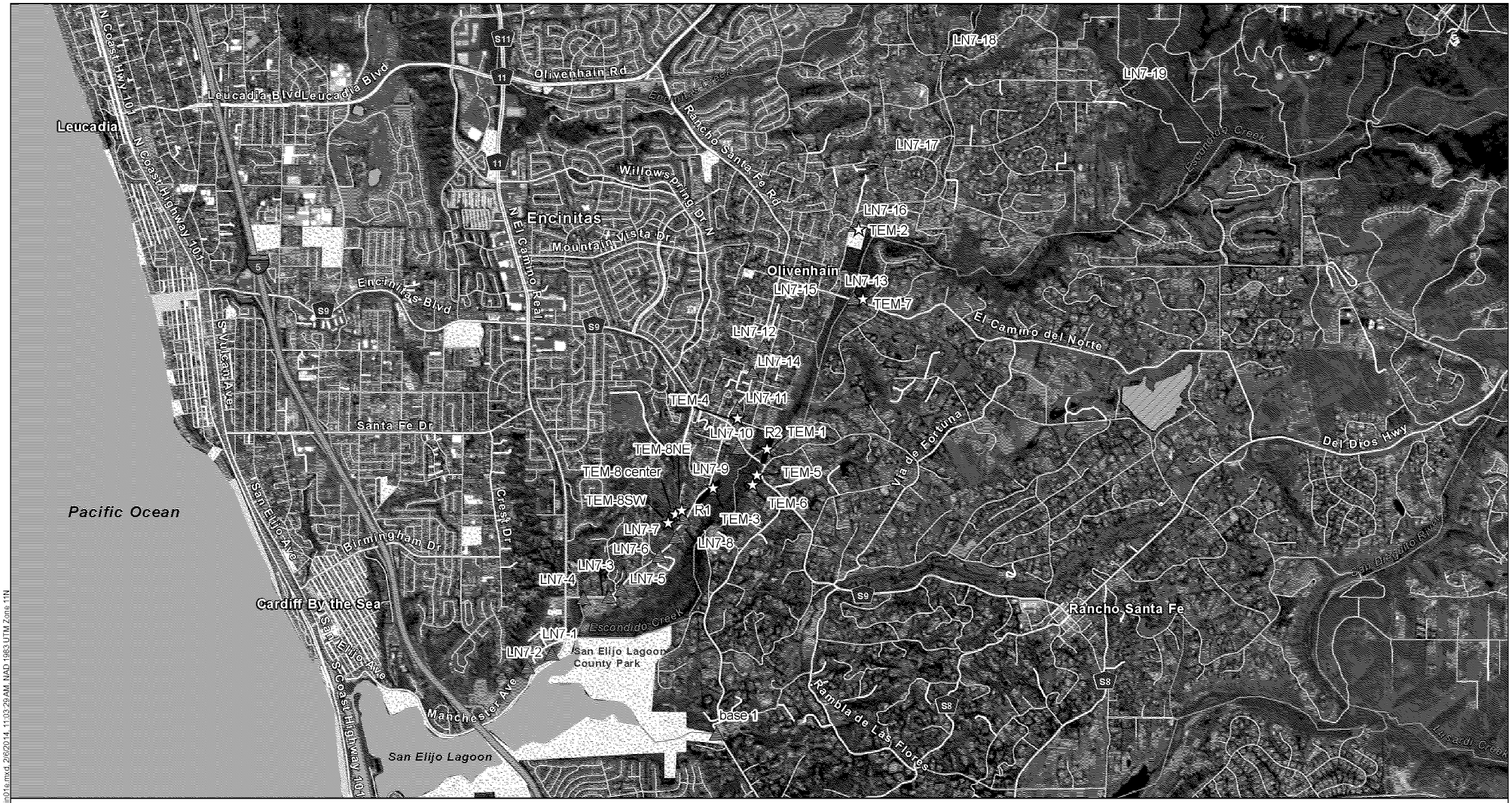
Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.

John R. Jansen, P.G., P.GP., Ph.D.
Senior Associate

Enclosures
cc: File
Reviewed by: J. Kevin Powers, Principal

FIGURES



LN7-1 GRAVITY SURVEY LOCATIONS

TEM-1 TIME DOMAIN ELECTROMAGNETIC INDUCTION (TEM) LOCATIONS

R1 RESISTIVITY LINES

0 1,500 3,000 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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GRAVITY, TEM, AND RESISTIVITY SURVEY LOCATIONS

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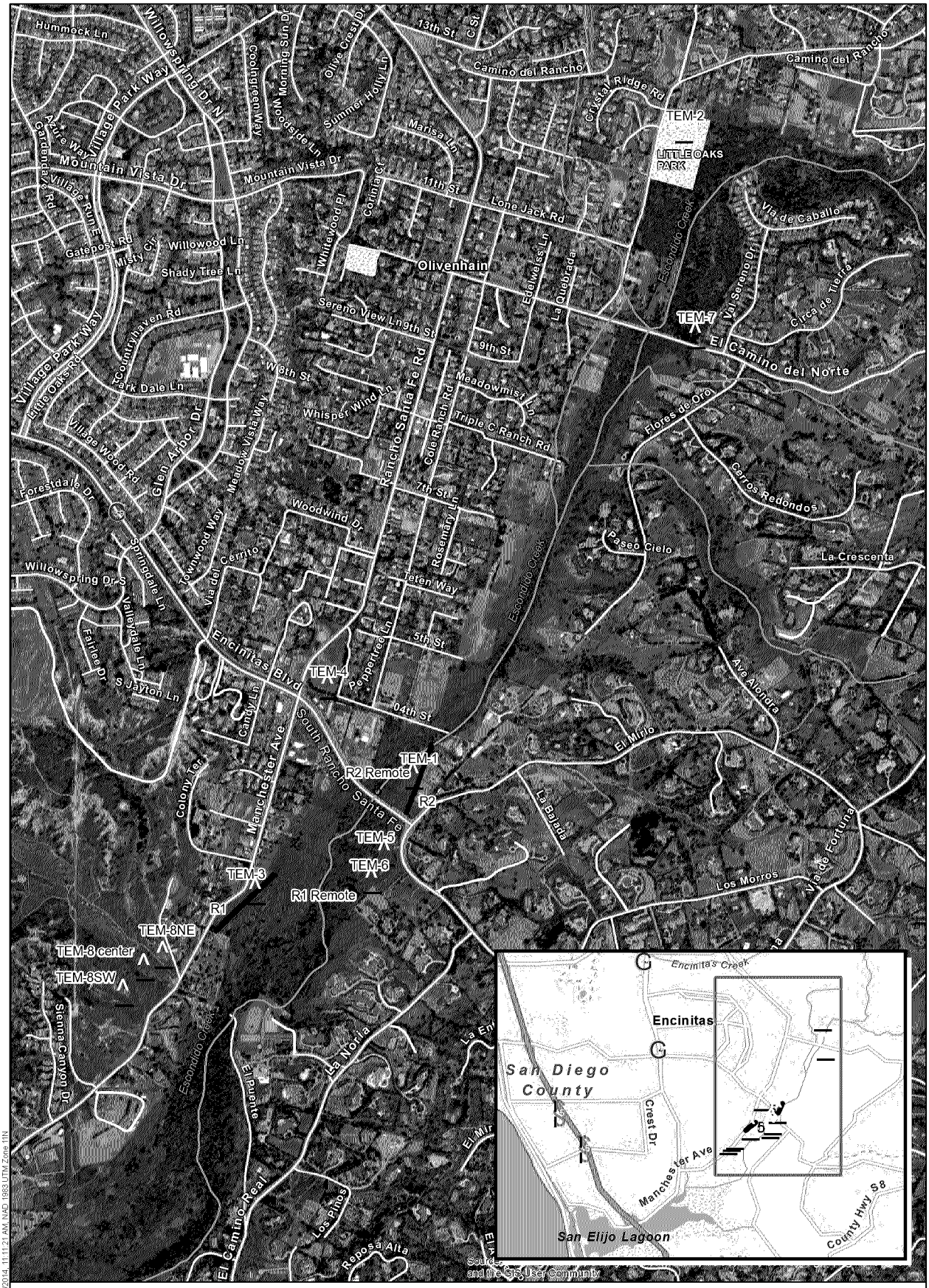

TEM-1 TIME DOMAIN ELECTROMAGNETIC INDUCTION (TEM) LOCATIONS

R1 RESISTIVITY LINES

5 RESISTIVITY LINE REMOTE ELECTRODE

0 500 1,000 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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TEM AND RESISTIVITY SURVEY LOCATIONS

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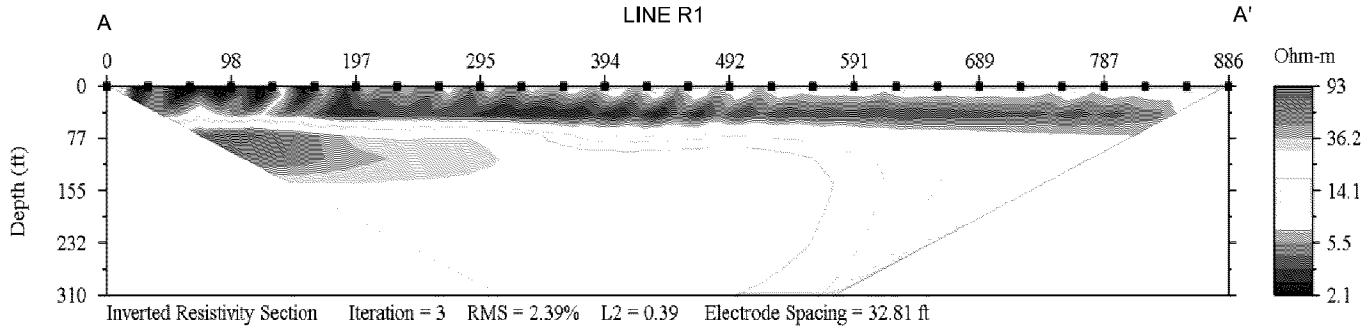
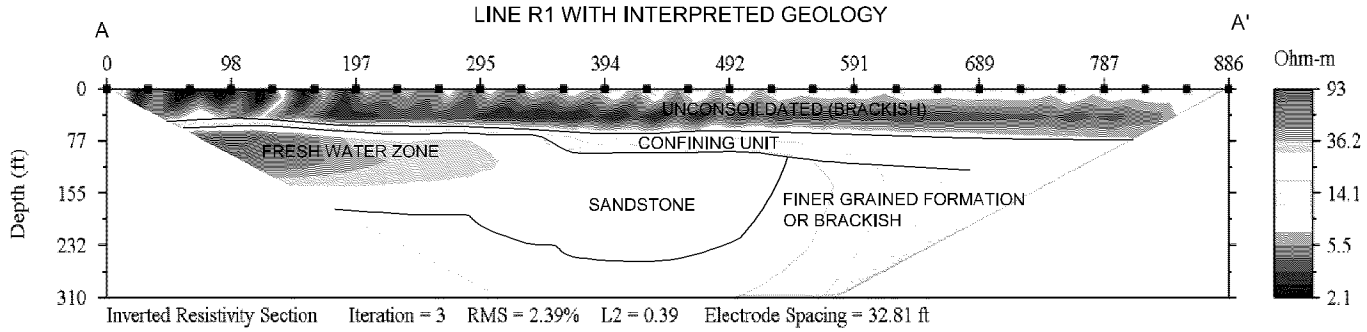
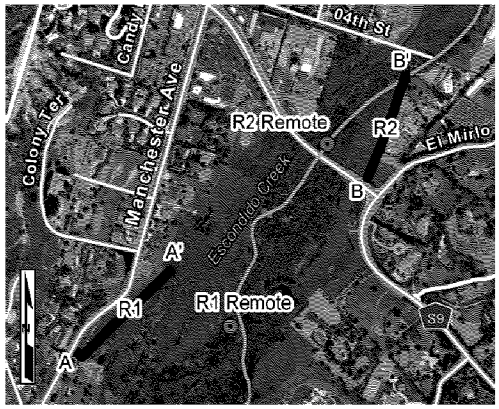




Section Location Map



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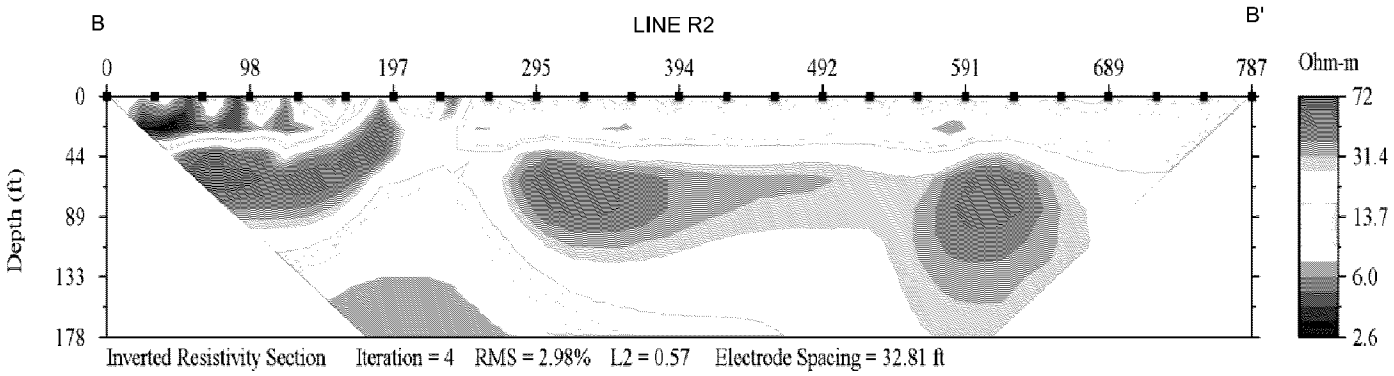
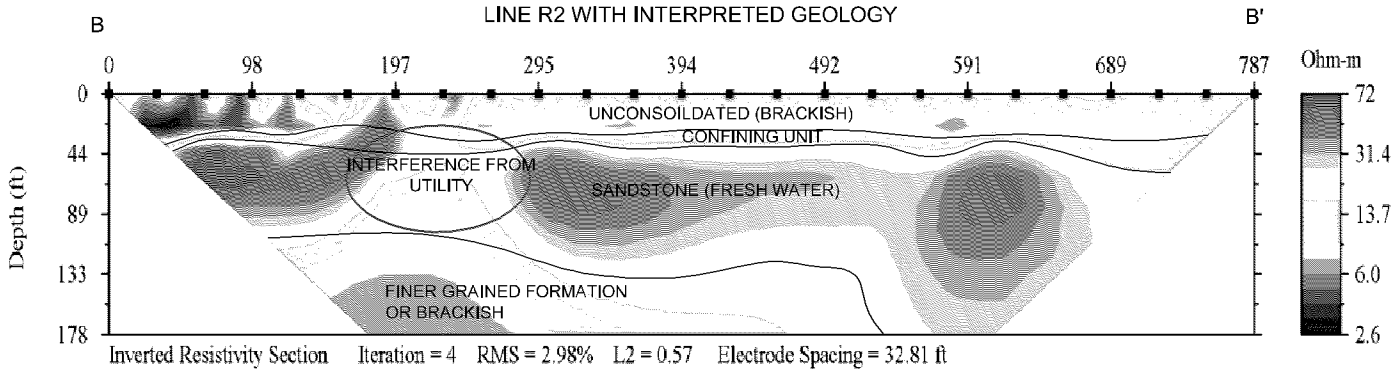
RESISTIVITY LINE R1 MODELED PROFILE

FILE:	3MPOMW01C.DWG	DATE:	February 2014	FIGURE:	3





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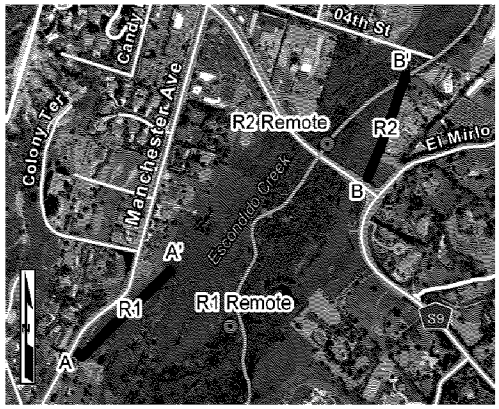

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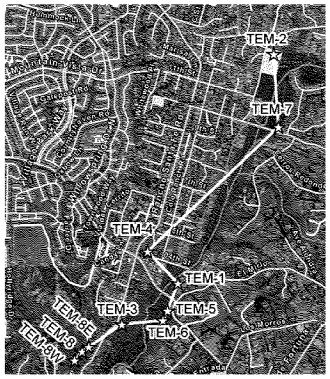
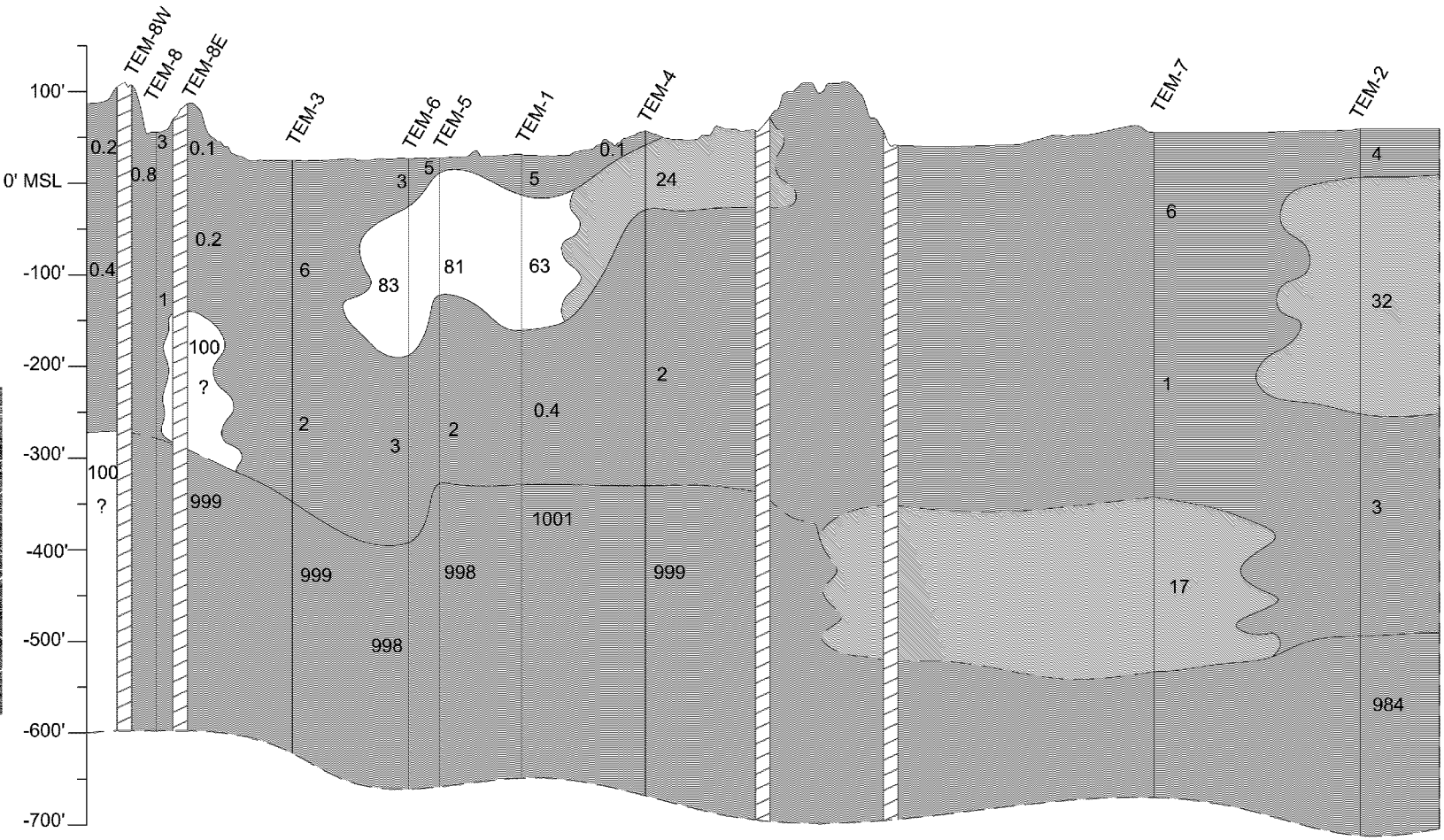
RESISTIVITY LINE R2 MODELED PROFILE

FILE:	3MPOMW01C.DWG	DATE:	February 2014	FIGURE:	4





LEGEND

LAYER	RESISTIVITY (OHM-M)
1	0.1-10
2	10-50
3	50-500
4	>500

? POTENTIAL INTERFERENCE

INFERRED FRACTURE ZONE

999 RESISTIVITY IN OHM-M

0 1000
SCALE IN FEET

VERTICAL EXAGGERATION = 10X

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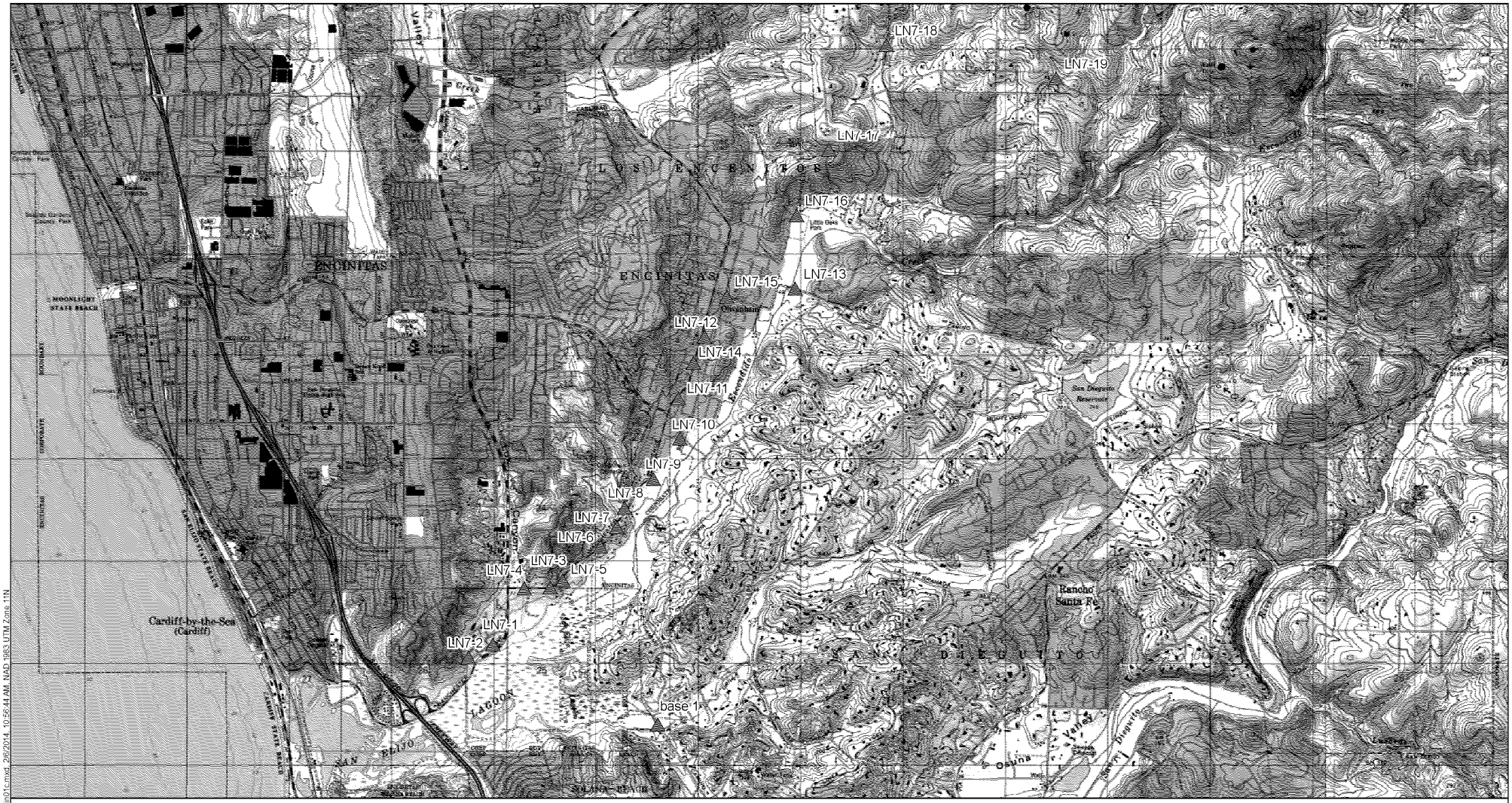
OLIVENHAIN MUNICIPAL WATER DISTRICT
OLIVENHAIN, CALIFORNIA

TEM GEO-ELECTRICAL CROSS SECTION

FILE:	3MPOMW01A.DWG	DATE:	February 2014	FIGURE:	5



▲ GRAVITY SURVEY LOCATIONS

Service Layer Credits: Copyright:© 2011 National Geographic Society, i-cubed

N

0 1,500 3,000 Feet

Prepared By:
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OLIVENHAIN MUNICIPAL WATER DISTRICT

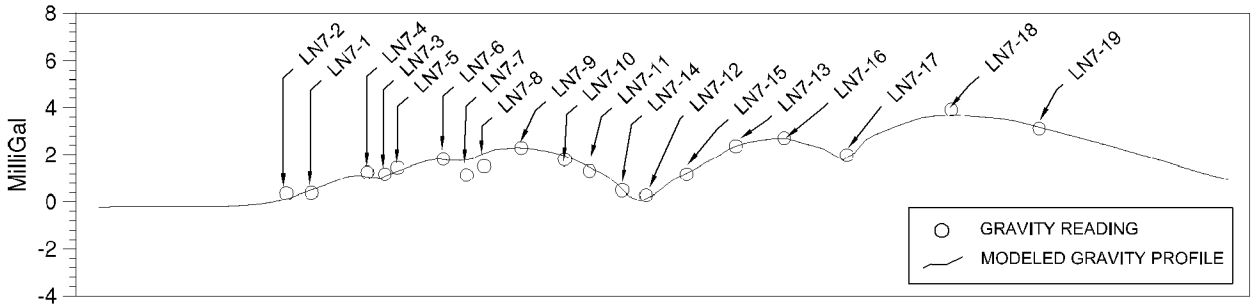
OLIVENHAIN, CA

GRAVITY SURVEY LOCATIONS
JANUARY 12, 2014

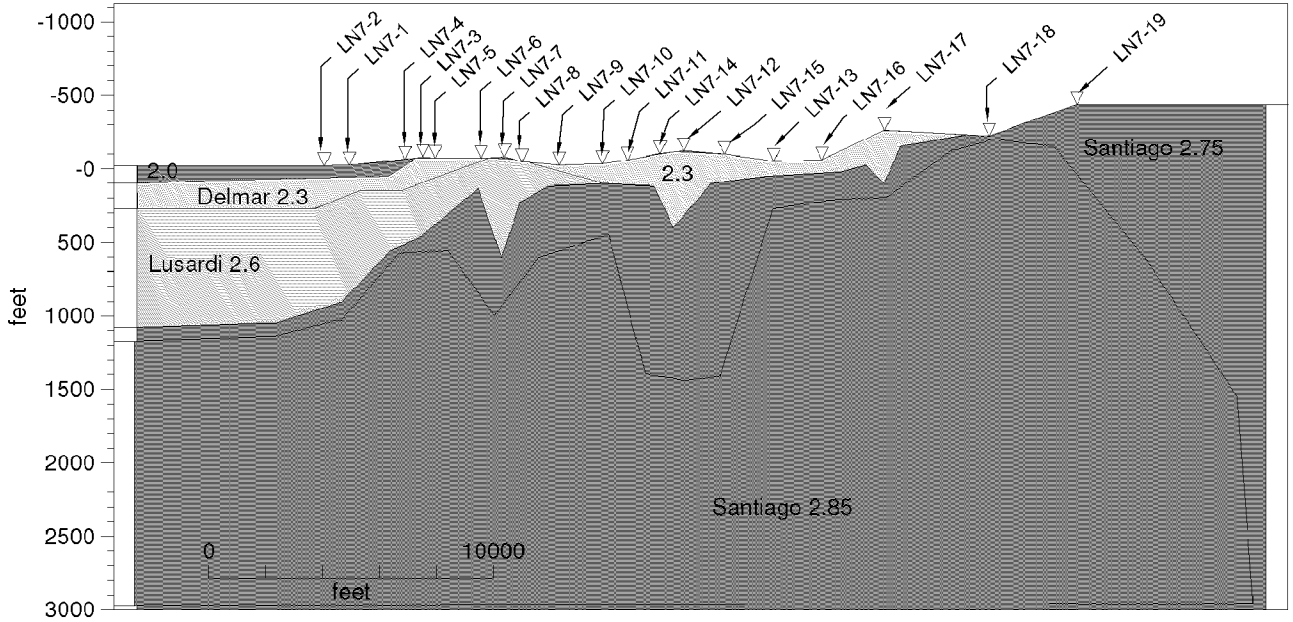
FILE:	g3olivenhain01c.MXD	DATE:	2/6/2014	FIGURE:	6

G:\GIS\Olivenhain CA\maps\g3olivenhain01c.mxd 2/6/2014 10:56:44 AM NAD 1983 UTM Zone 11N

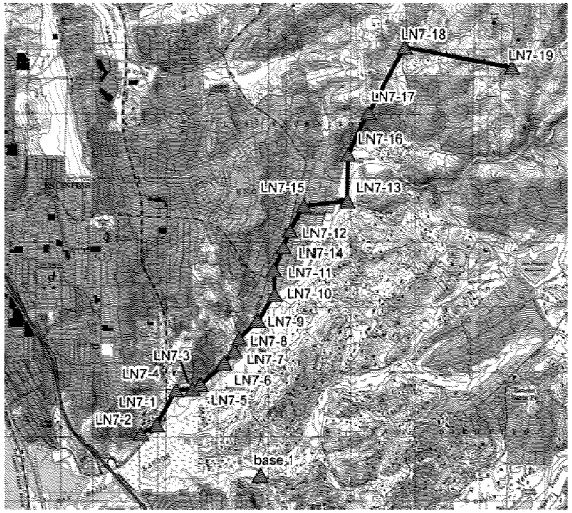
GRAVITY DATA



GRAVITY MODEL



Section Location Map



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OLIVENHAIN MUNICIPAL WATER DISTRICT

OLIVENHAIN, CALIFORNIA

GRAVITY LINE 7 MODELED PROFILE

FILE:	3MPOMW01B.DWG	DATE:	February 2014	FIGURE:	7

LN7-1 GRAVITY SURVEY LOCATIONS

WELL LOCATIONS

GRAVITY LOCATIONS LINE 1-6 (FEBRUARY 2013)

0 1,750 3,500 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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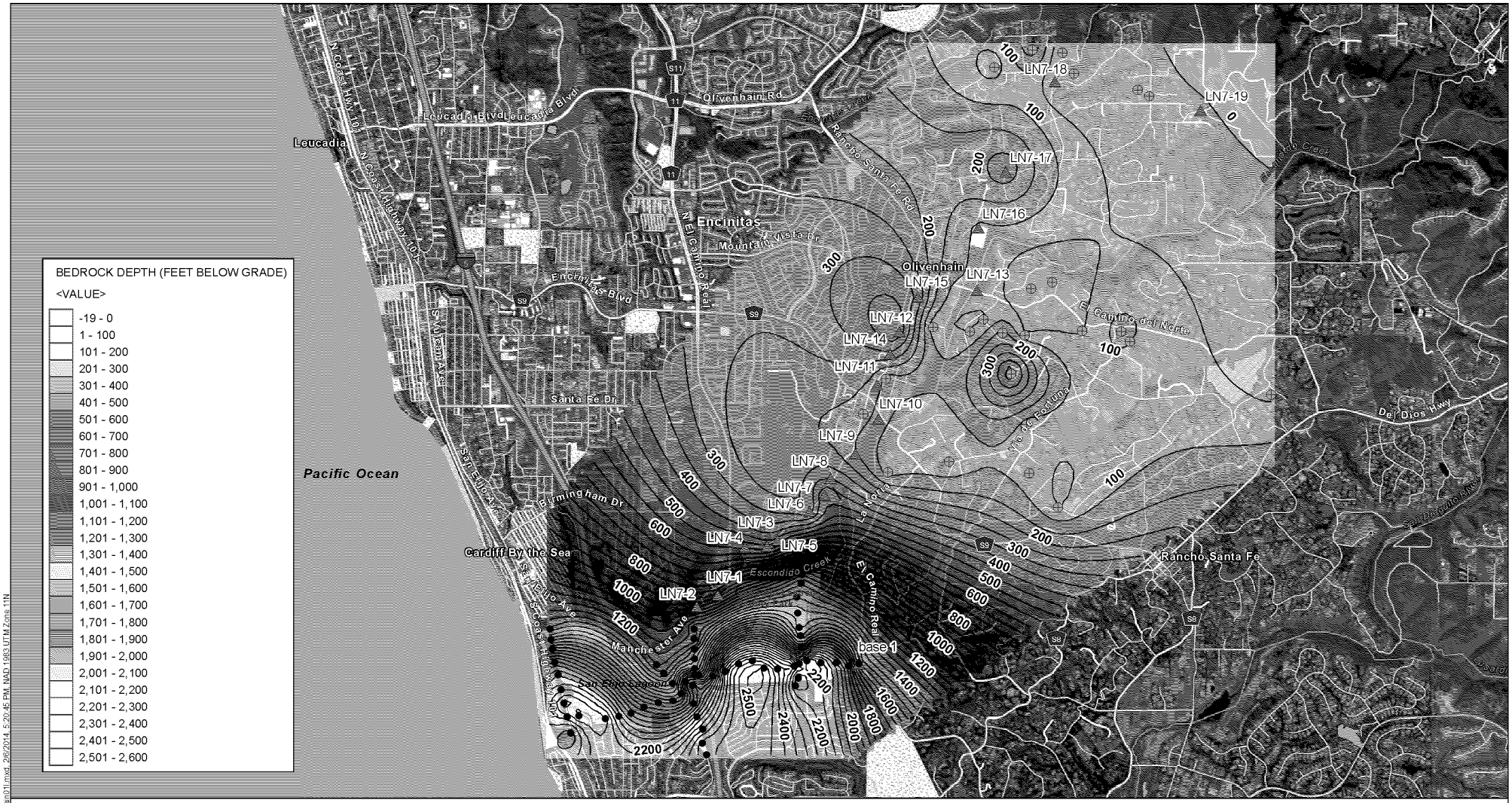
OLIVENHAIN MUNICIPAL WATER DISTRICT

OLIVENHAIN, CA

MODELED ELEVATION OF SANTIAGO PEAK FORMATION
SAN ELIJO LAGOON - SAN DIEGO COUNTY, CA

FILE: g3olivenhain01k.MXD	DATE: 2/6/2014	FIGURE: 8

G:\GIS\Olivenhain CA\maps\g3olivenhain01k.mxd 2/6/2014 3:57:35 PM NAD 1983 UTM Zone 11N



LN7-1 GRAVITY SURVEY LOCATIONS

WELL LOCATIONS

GRAVITY LOCATIONS LINE 1-6 (FEBRUARY 2013)

0 1,750 3,500 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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OLIVENHAIN MUNICIPAL WATER DISTRICT

OLIVENHAIN, CA

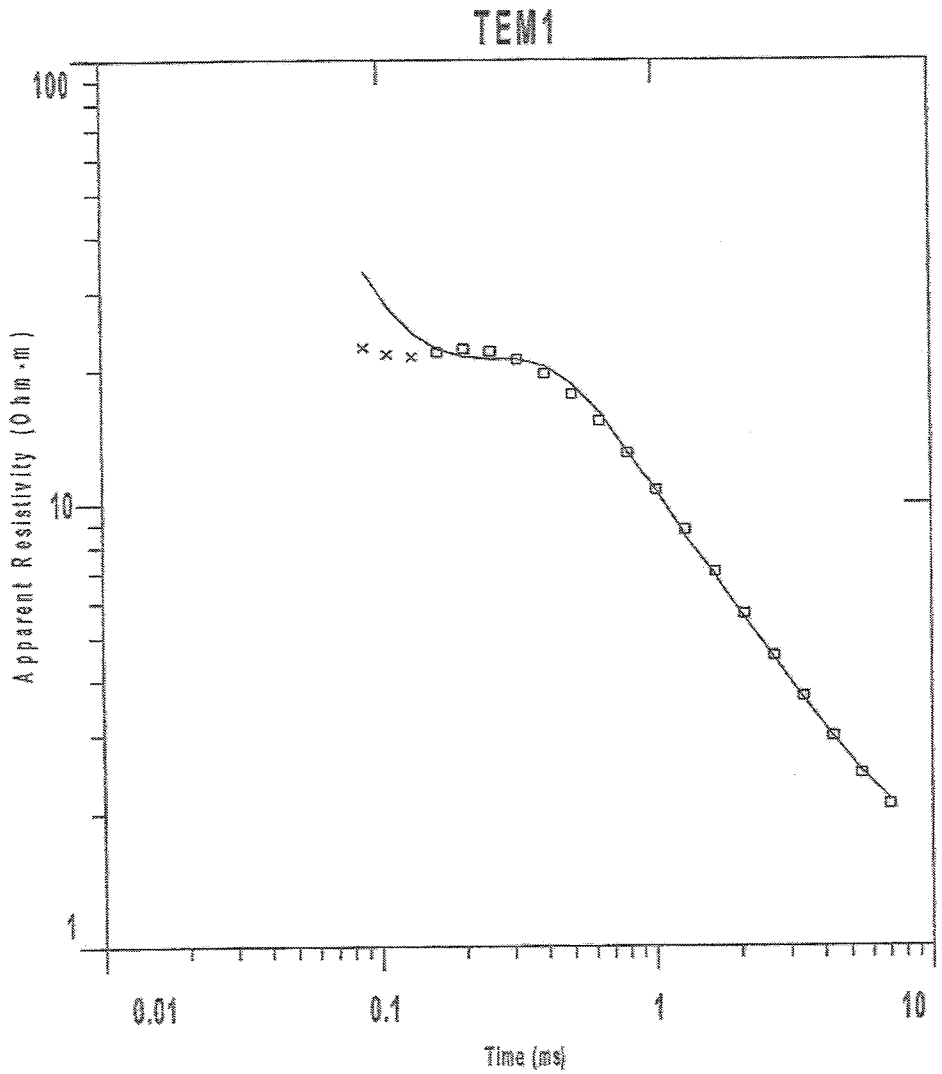
MODELED DEPTH TO SANTIAGO PEAK FORMATION
SAN ELIJO LAGOON - SAN DIEGO COUNTY, CA

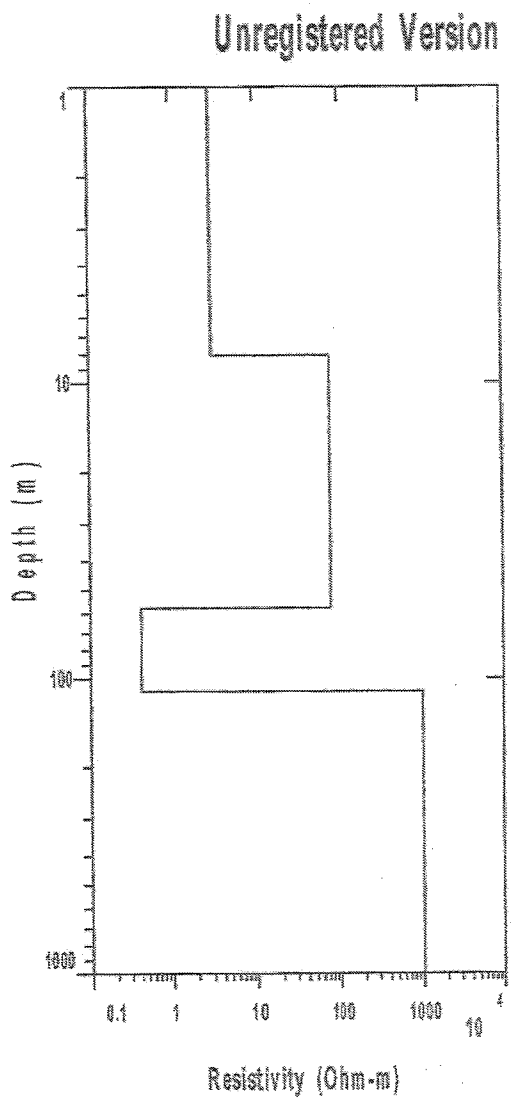
FILE:	g3olivenhain01l.MXD	DATE:	2/6/2014	FIGURE:	9

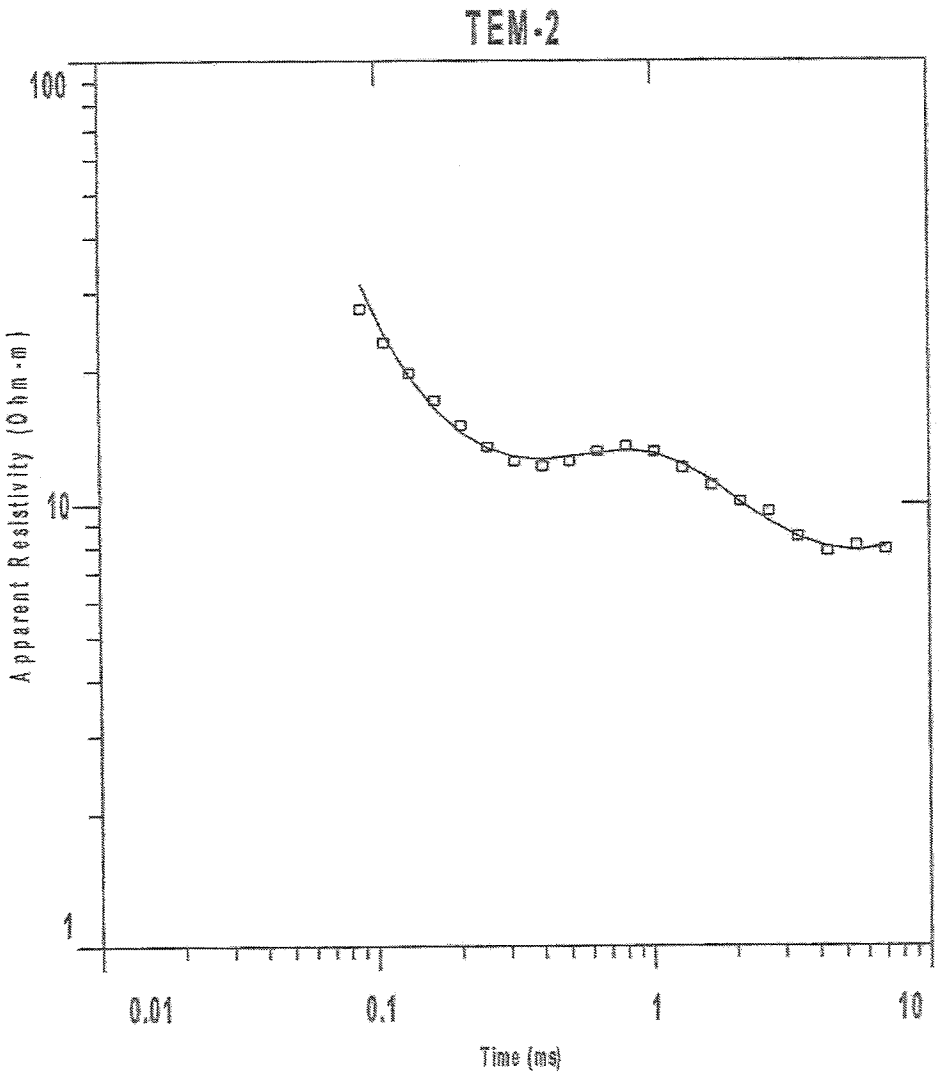
G:\GIS\Olivenhain_CA\maps\g3olivenhain01l.mxd, 2/6/2014, 5:20:45 PM, NAD 1983 UTM Zone 11N

Attachment A

Modeled TEM Data


TEM1
Apparent Resistivity (Ohm-m)
100
10
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
1
10
100
1000
0.1
1
10
100
1000
10
Resistivity (Ohm-m)


TEM-2
Apparent Resistivity (Ohm-m)
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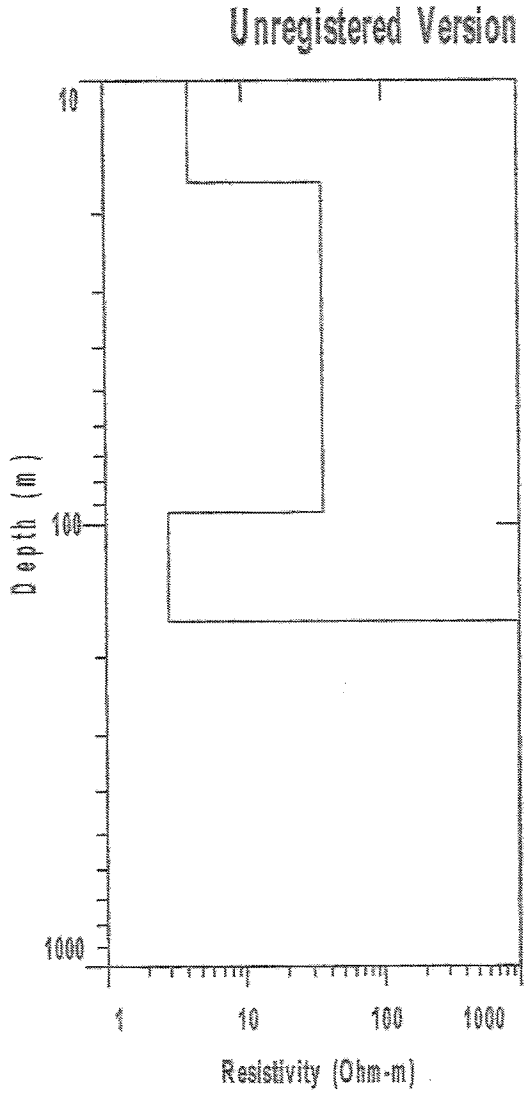
10
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
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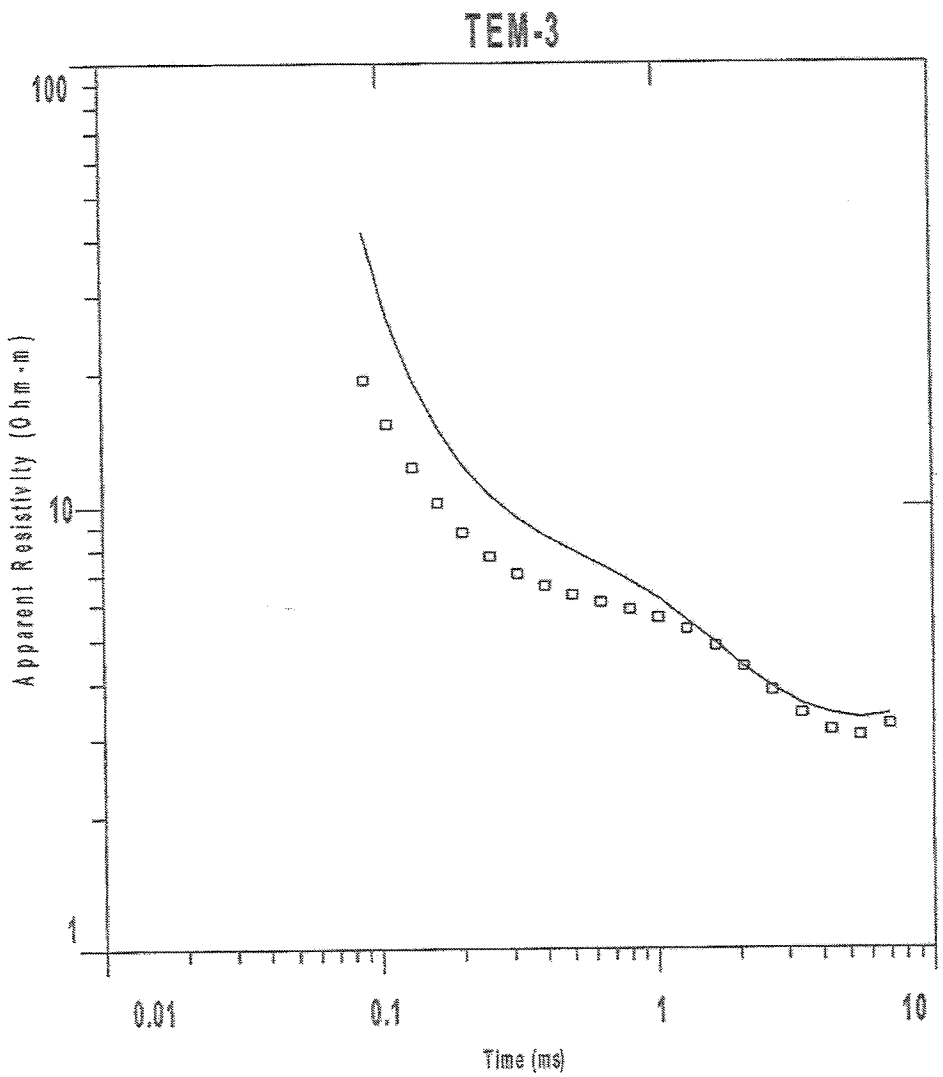
100
1000
1
10
100
1000
Resistivity (Ohm-m)


TEM-3
Apparent Resistivity (Ohm-m)
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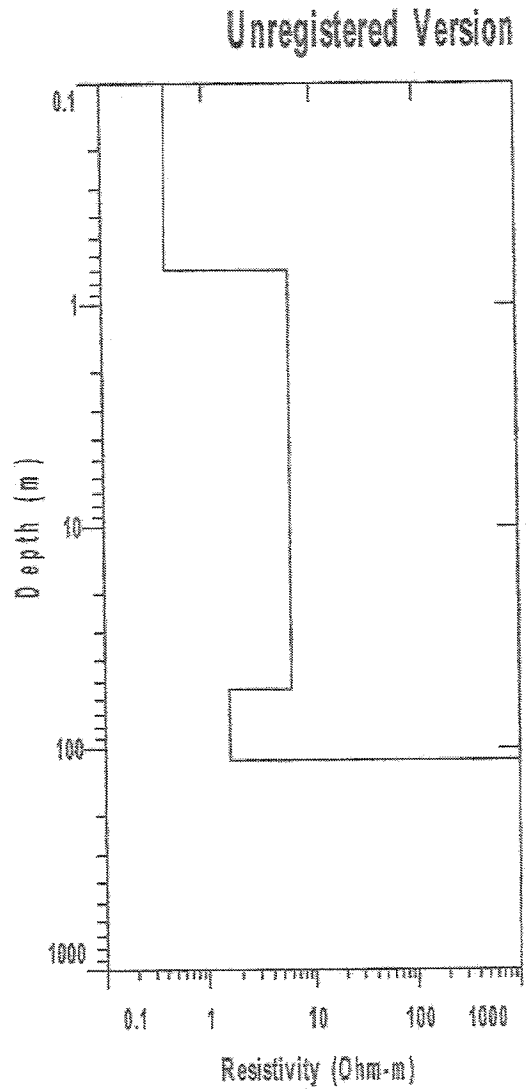
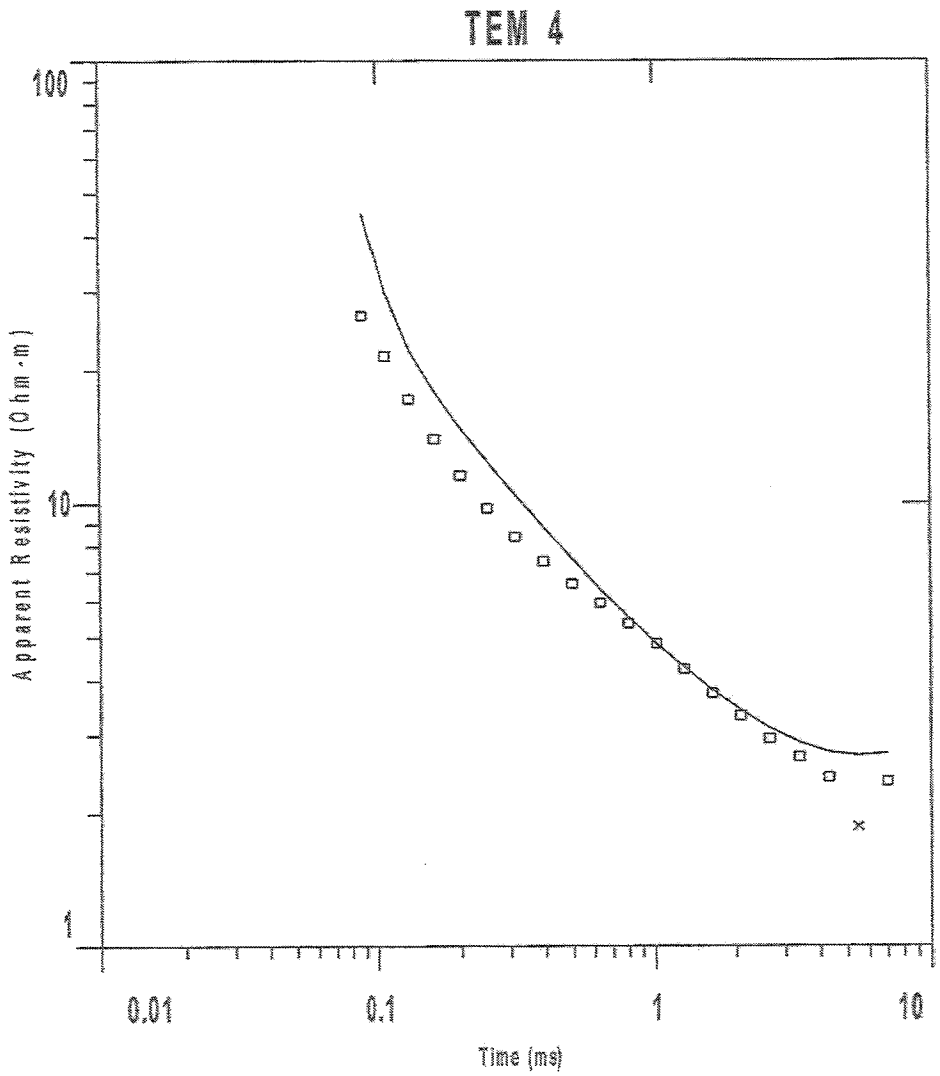
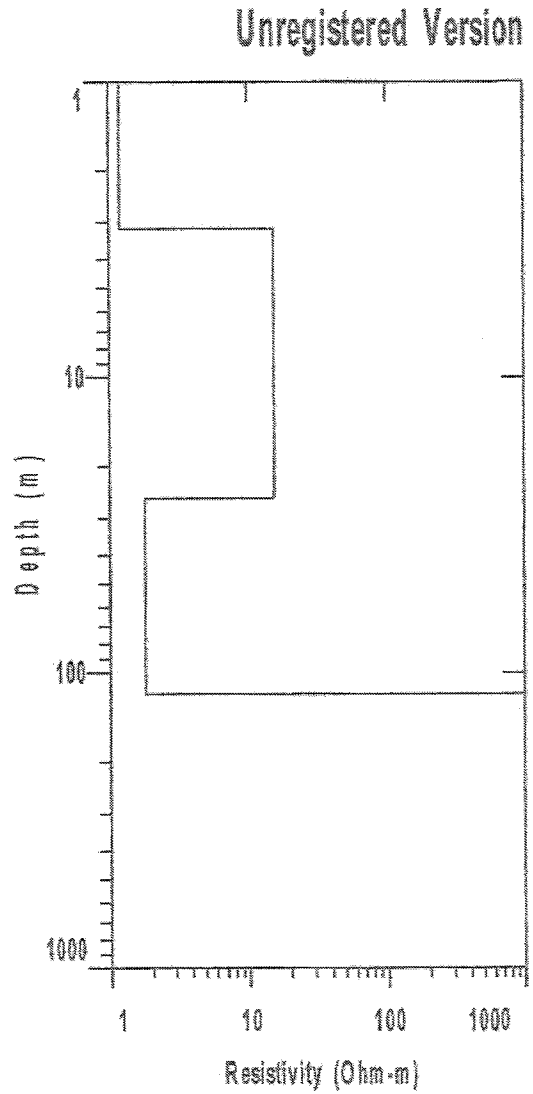
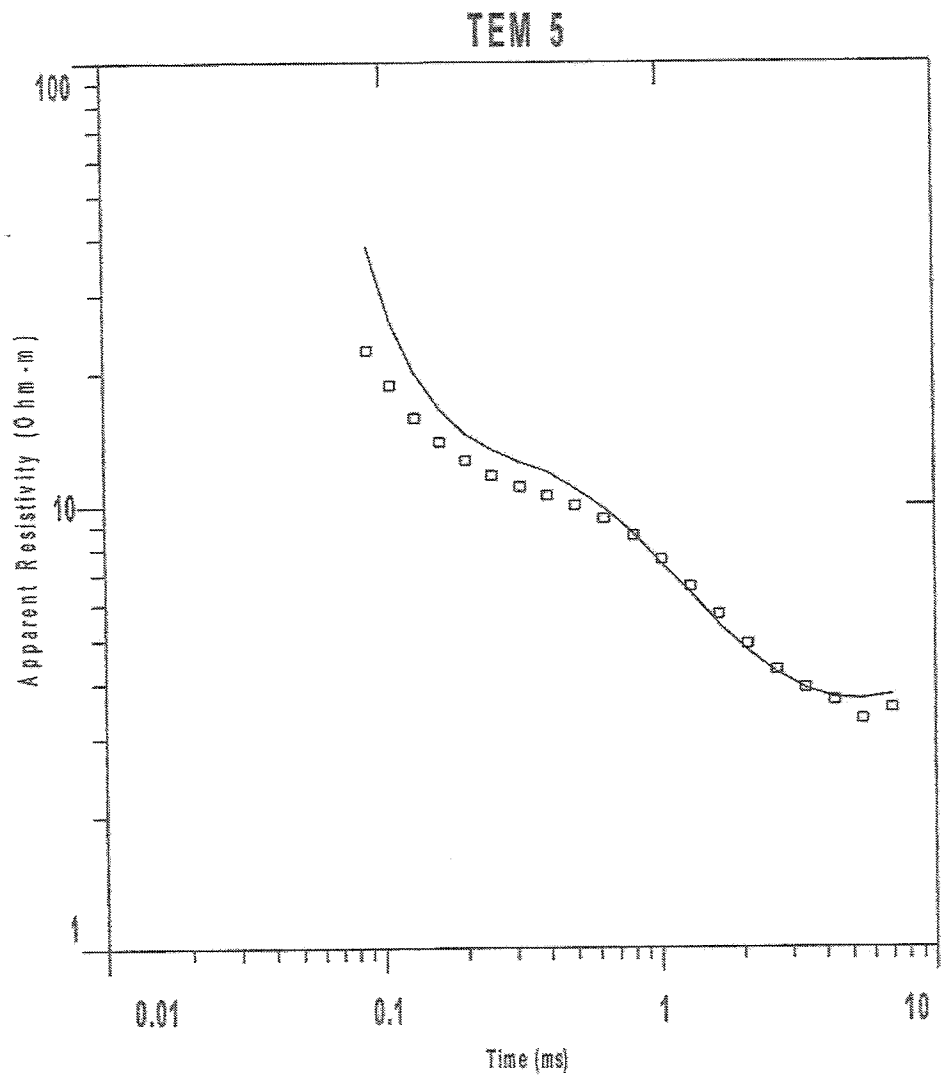
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
0.1
1
10
100
1000
0.1
1
10
100
1000
Resistivity (Ohm-m)


TEM 4
Apparent Resistivity (Ohm-m)
100
10
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
1
10
100
1000
1
10
100
1000
Resistivity (Ohm-m)


TEM 5
Apparent Resistivity (Ohm-m)
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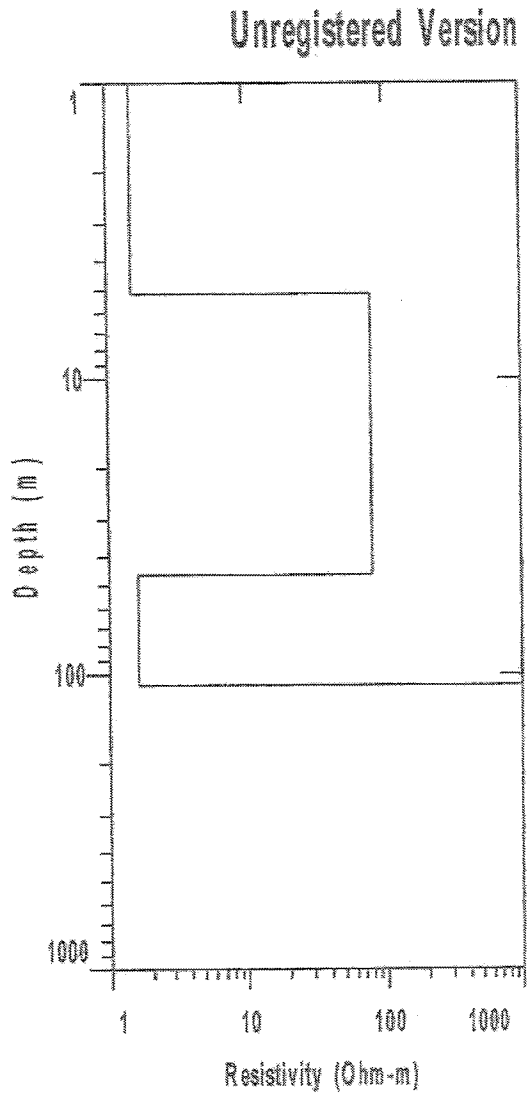
10
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
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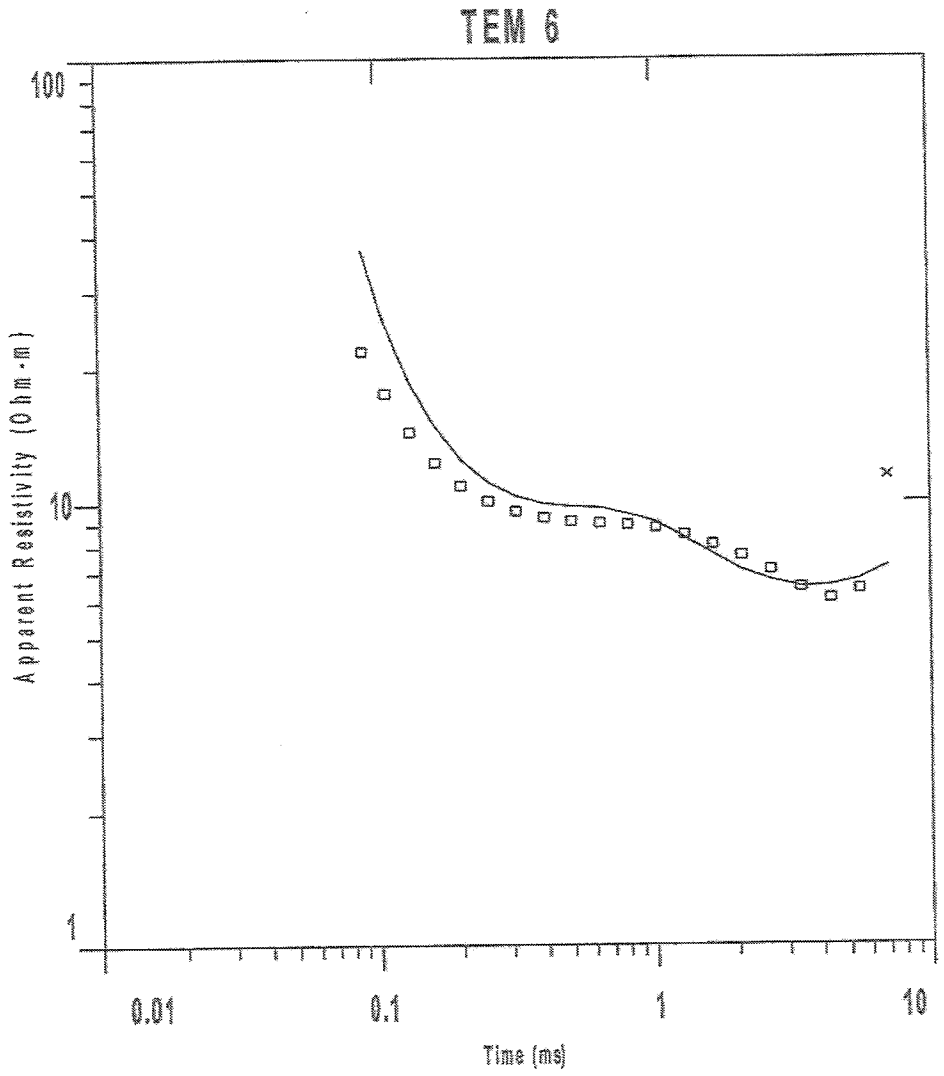
10
100
1000
1
10
100
1000
Resistivity (Ohm-m)


TEM 6
Apparent Resistivity (Ohm-m)
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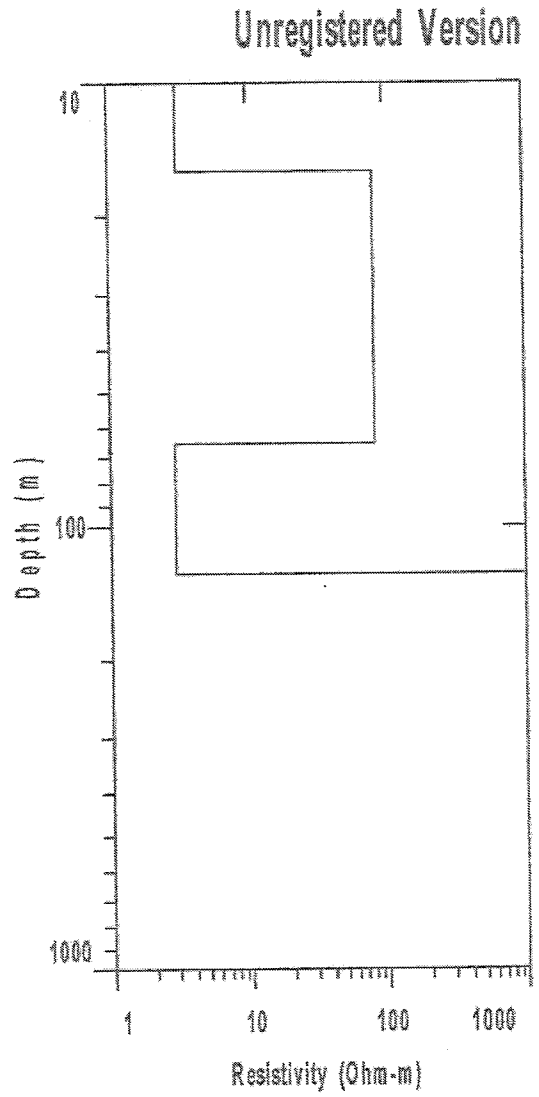
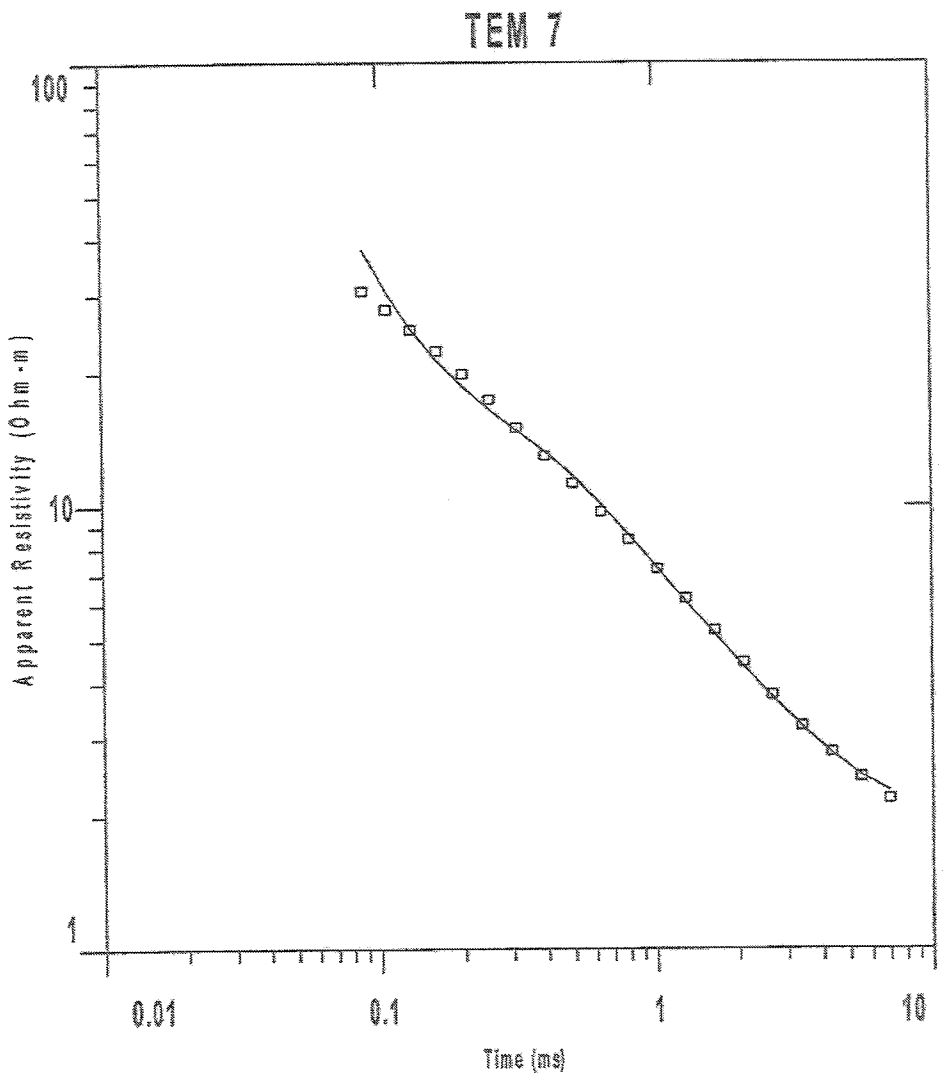
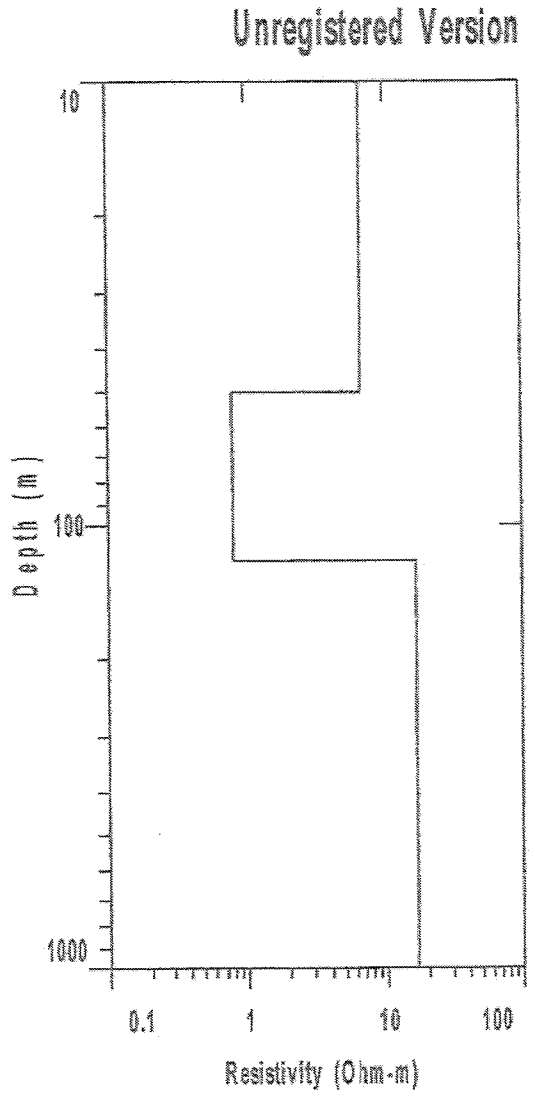
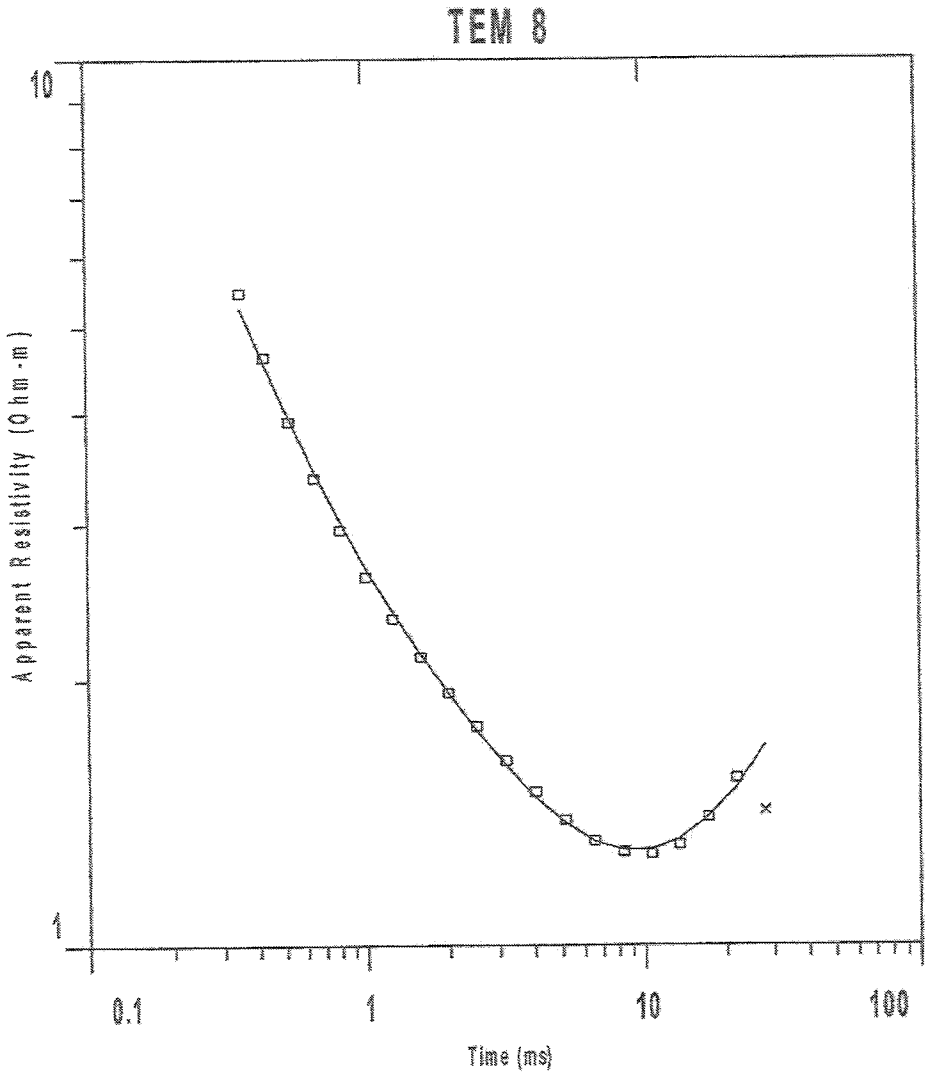
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
10
100
1000
1
10
100
1000
Resistivity (Ohm-m)


TEM 7
Apparent Resistivity (Ohm-m)
100
10
1
0.01
0.1
1
10
Time (ms)


Unregistered Version
Depth (m)
10
100
1000
0.1
1
10
100
Resistivity (Ohm-m)


TEM 8
Apparent Resistivity (Ohm-m)
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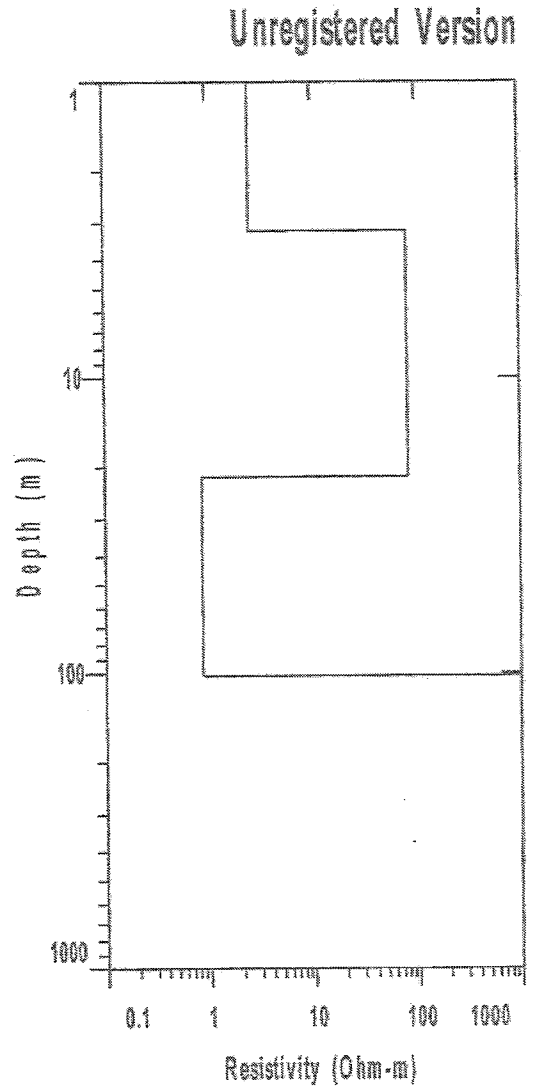
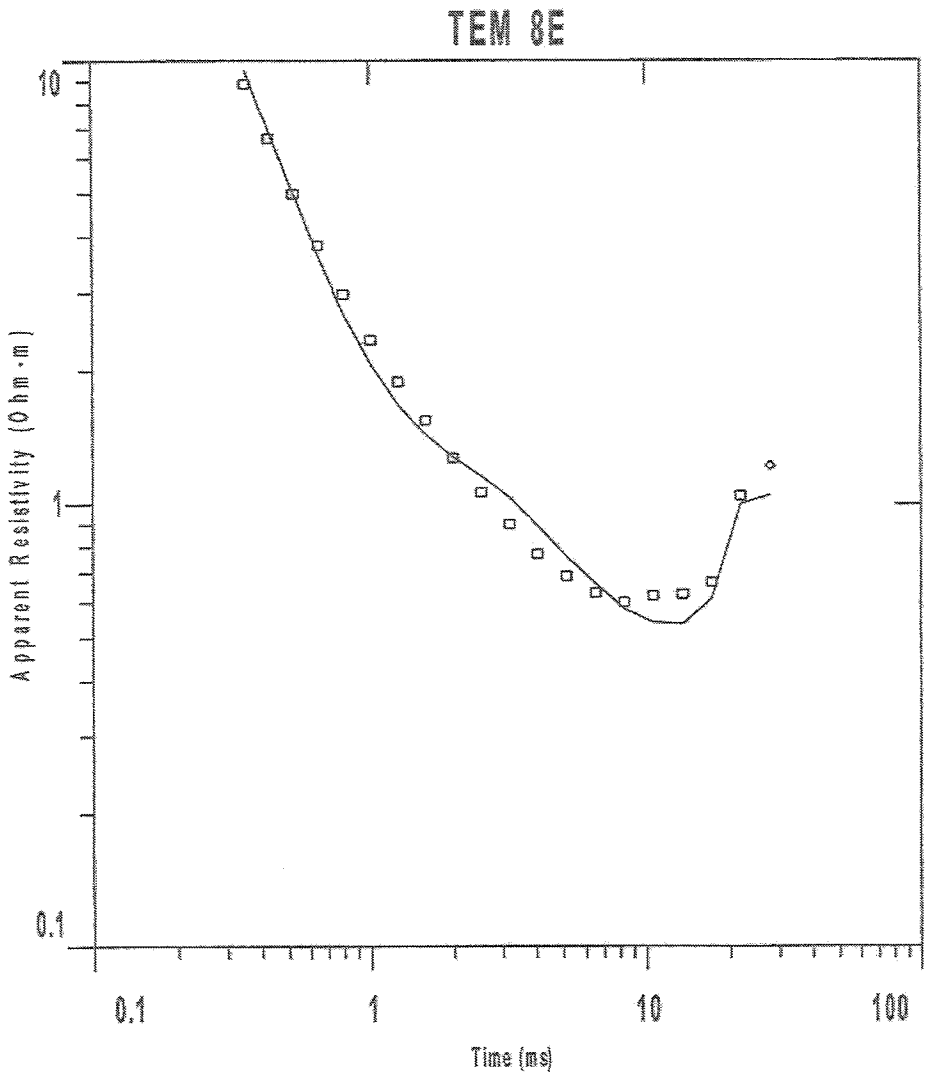
0.1
1
10
100
Time (ms)


Unregistered Version
Depth (m)
1
10
100
1000
0.1
1
10
100
1000
Resistivity (Ohm-m)


TEM 8E
Apparent Resistivity (Ohm-m)
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0.1
0.1
1
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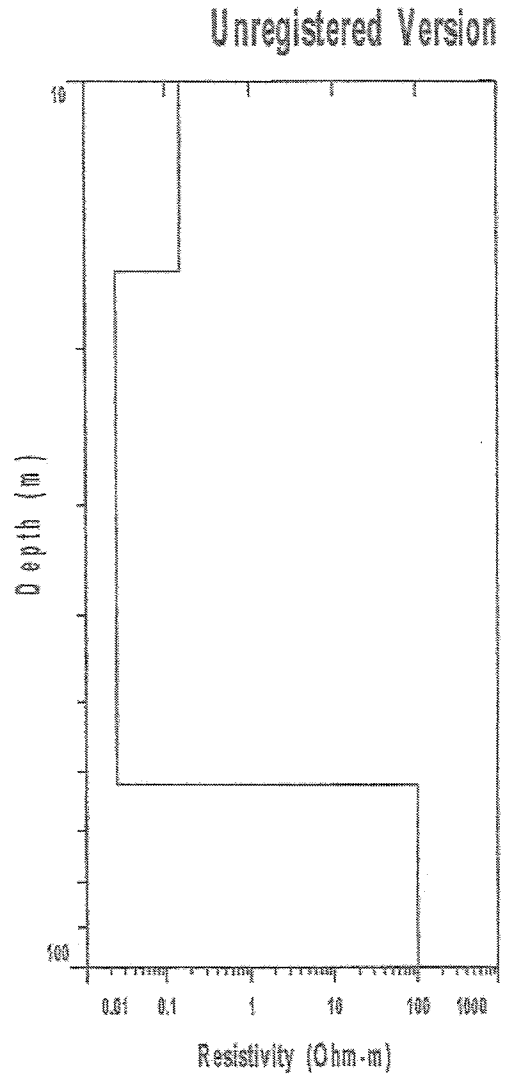
100
Time (ms)


Unregistered Version
Depth (m)
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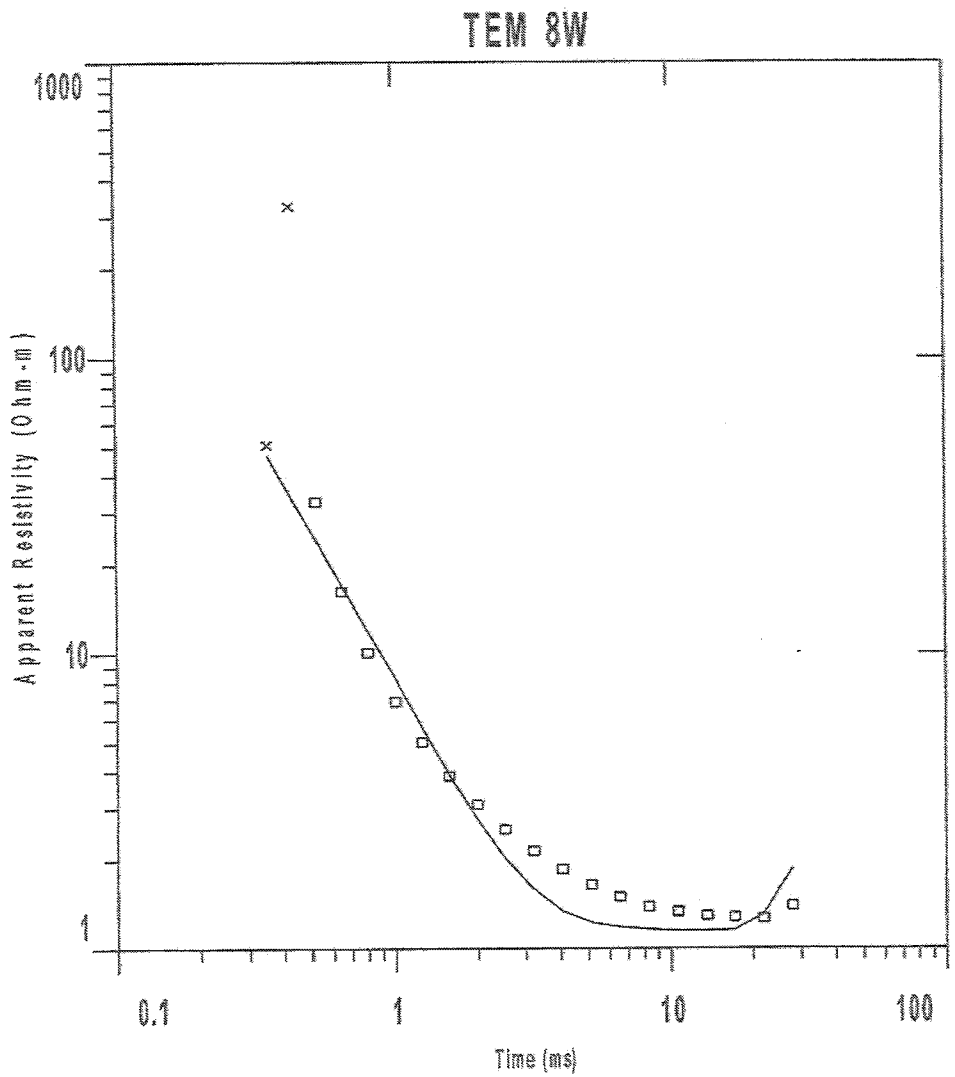
100
0.01
0.1
1
10
100
1000
Resistivity (Ohm-m)


TEM 8W
Apparent Resistivity (Ohm-m)
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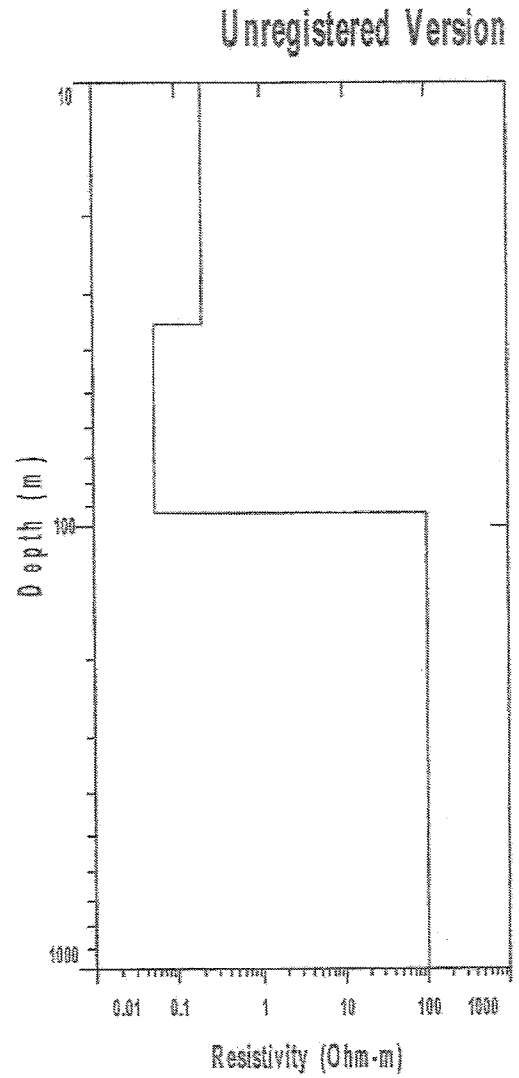
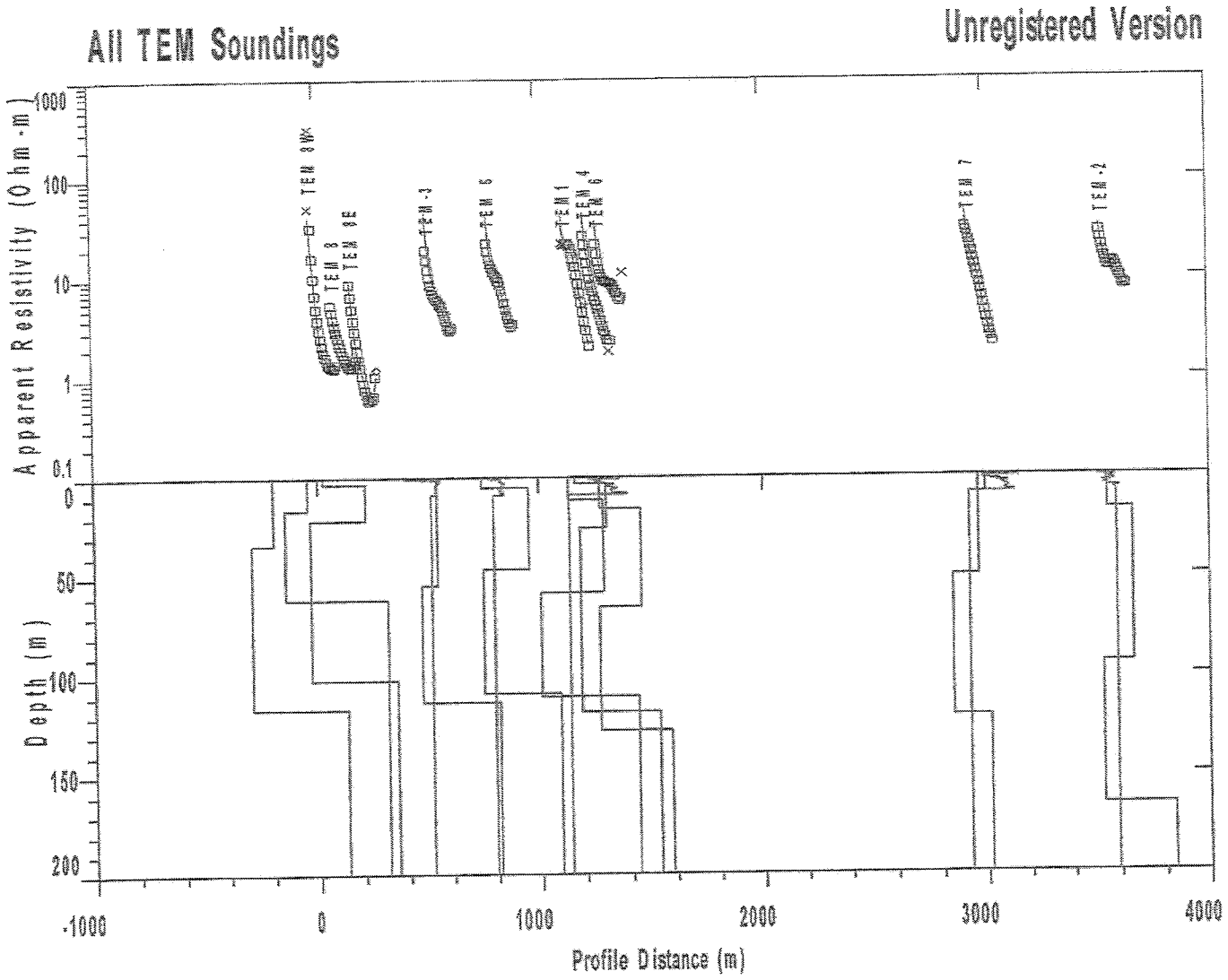
10
1
0.1
1
10
100
Time (ms)


Unregistered Version
Depth (m)
10
100
1000
0.01
0.1
1
10
100
1000
Resistivity (Ohm-m)


All TEM Soundings
Unregistered Version
Apparent Resistivity (Ohm-m)
1000
100
10
1
0.1
TEM 8W
TEM 3
TEM 9E
TEM-3
TEM 5
TEM 1
TEM 4
TEM 6
TEM 7
TEM-2
Depth (m)
0
50
100
150
200
-1000
0
1000
2000
3000
4000
Profile Distance (m)

Attachment B

Gravity Station Data and Survey Coordinates

Table 1B
Olivenhain Water District
January 2014 Gravity Survey
Raw Gravity Values

Point_ID	Time	Date	Longitude	Latitude	Elev (meter)	Inst Reading	Raw Gravity (mgal)	Comment
2	9:00	1/12/2014	-117.2397801	33.00978176	6.321	10.588	3432.109	BASE 1
3	9:35	1/12/2014	-117.257009	33.01683138	8.121	9.936	3431.457	LN7-1
4	9:48	1/12/2014	-117.2595757	33.01562346	6.776	9.674	3431.195	LN7-2
5	10:06	1/12/2014	-117.2537419	33.02171354	19.926	9.043	3430.564	LN7-3
6	10:21	1/12/2014	-117.2510341	33.02183477	24.275	8.208	3429.729	LN7-4
7	10:32	1/12/2014	-117.2497295	33.02247625	22.214	8.548	3430.069	LN7-5
8	10:46	1/12/2014	-117.2458276	33.02546546	21.562	9.211	3430.732	LN7-6
9	10:58	1/12/2014	-117.2440674	33.02713963	24.746	8.699	3430.22	LN7-7
2	11:30	1/12/2014	-117.2397801	33.00978176	6.321	10.61	3432.131	BASE 1
10	11:45	1/12/2014	-117.243278	33.02884763	15.150	10.667	3432.188	LN7-8
11	11:58	1/12/2014	-117.2402936	33.03141088	8.303	12.269	3433.79	LN7-9
12	12:11	1/12/2014	-117.237493	33.03498515	11.197	11.845	3433.366	LN7-10
13	12:21	1/12/2014	-117.2376481	33.03851245	18.118	10.494	3432.015	LN7-11
14	12:44	1/12/2014	-117.2349661	33.04394737	37.737	6.73	3428.251	LN7-12
15	13:01	1/12/2014	-117.2254683	33.04820197	16.141	12.973	3434.494	LN7-13
2	13:23	1/12/2014	-117.2397801	33.00978176	6.321	10.703	3432.224	BASE 1
16	13:42	1/12/2014	-117.2360878	33.04163714	31.539	7.797	3429.318	LN7-14
17	13:58	1/12/2014	-117.232651	33.04750671	30.255	9.255	3430.776	LN7-15
18	14:23	1/12/2014	-117.2253236	33.05467232	18.793	12.989	3434.51	LN7-16
19	14:38	1/12/2014	-117.2219835	33.06043912	80.297	1.204	3422.725	LN7-17
20	15:12	1/12/2014	-117.2159877	33.06968046	67.784	5.978	3427.499	LN7-18
21	15:39	1/12/2014	-117.198204	33.06676933	133.451	-7.598	3413.923	LN7-19
2	16:03	1/12/2014	-117.2397801	33.00978176	6.321	10.849	3432.37	BASE 1

APPENDIX B
HISTROICAL GROUNDWATER ELEVATION DATA
San Dieguito Valley

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
Albert Court	33BA	44.77	12/14/1997	NM	NM
	33BA	44.77	5/14/1998	17.88	26.89
	33BA	44.77	11/10/1998	19.9	24.87
	33BA	44.77	4/15/1999	18.52	26.25
	33BA	44.77	10/14/1999	20.42	24.35
	33BA	44.77	6/6/2001	19.6	25.17
	33BA	44.77	12/20/2001	18.7	26.07
	33BA	44.77	6/6/2002	19.68	25.09
	33BA	44.77	3/13/2003	18.24	26.53
	33BA	44.77	10/23/2003	19.4	25.37
	33BA	44.77	3/12/2003	18.65	26.12
Chino Farms	33C7	43.16	12/15/1997	NM	NM
	33C7	43.16	4/22/1998	19.88	23.28
	33C7	43.16	11/10/1998	24.42	18.74
	33C7	43.16	4/15/1999	21.6	21.56
	33C7	43.16	10/14/1999	25.11	18.05
	33C7	43.16	6/7/2001	22.85	20.31
	33C7	43.16	12/20/2001	22.34	20.82
	33C7	43.16	6/6/2002	23.29	19.87
	33C7	43.16	3/14/2003	21.43	21.73
	33C7	43.16	10/23/2003	22.73	20.43
	33C7	43.16	3/12/2004	21.13	22.03
FBR Homeowners No 1 (East)	33L7	34.43	12/16/1997	29.74	4.69
	33L7	34.43	4/23/1998	17.65	16.78
	33L7	34.43	11/10/1998	30.66	3.77
	33L7	34.43	4/15/1999	17.95	16.48
	33L7	34.43	10/14/1999	Dry	Dry
	33L7	34.43	6/5/2001	29.95	4.48
	33L7	34.43	12/20/2001	19.25	15.18
	33L7	34.43	6/6/2002	> 90	Dry
	33L7	34.43	10/23/2003	35.07	-0.64
	33L7	34.43	3/17/2004	NM	NM
FBR Homeowners No 2 (west)	33LA	34.94	12/16/1997	29.7	5.24
	33LA	34.94	4/22/1998	NM	NM
	33LA	34.94	11/10/1998	30.15	4.79
	33LA	34.94	4/15/1999	17.05	17.89
	33LA	34.94	10/14/1999	44.41	-9.47
	33LA	34.94	6/5/2001	30.9	4.04
	33LA	34.94	12/20/2001	19.83	15.11
	33LA	34.94	6/6/2002	39.6	-4.66
	33LA	34.94	3/20/2003	18.01	16.93
	33LA	34.94	10/23/2003	35.44	-0.5

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	33LA	34.94	3/17/2004	19.18	15.76
Helen Woodward Animal Center (north)	33K8	31.84	12/15/1997	NM	NM
	33K8	31.84	5/14/1998	NM	NM
	33K8	31.84	11/10/1998	27.46	4.38
	33K8	31.84	4/15/1999	15.34	16.5
	33K8	31.84	10/14/1999	40.45	-8.61
	33K8	31.84	6/5/2001	27.46	4.38
	33K8	31.84	12/20/2001	16.67	15.17
	33K8	31.84	6/6/2002	36.75	-4.91
	33K8	31.84	3/14/2003	17.35	14.49
	33K8	31.84	10/23/2003	31.74	0.1
	33K8	31.84	3/11/2004	19.75	12.09
International Farms Deep Well	28RC	46.05	12/17/1997	20.5	25.55
	28RC	46.05	5/15/1998	14.45	31.6
	28RC	46.05	11/10/1998	16.94	29.11
	28RC	46.05	4/15/1999	15.81	30.24
	28RC	46.05	10/14/1999	17.35	28.7
	28RC	46.05	6/5/2001	16.1	29.95
	28RC	46.05	12/20/2001	16.05	30
	28RC	46.05	6/6/2002	15.95	30.1
	28RC	46.05	3/13/2003	15.23	30.82
	28RC	46.05	10/23/2003	15.81	30.24
	28RC	46.05	3/12/2004	15.01	31.04
International Farms Shallow Well	28RB	52.62	12/17/1997	23.54	29.08
	28RB	52.62	5/15/1998	20.57	32.05
	28RB	52.62	11/10/1998	24.3	28.32
	28RB	52.62	4/15/1999	22.7	29.92
	28RB	52.62	10/14/1999	25.35	27.27
	28RB	52.62	6/5/2001	22.98	29.64
	28RB	52.62	12/20/2001	22.75	29.87
	28RB	52.62	6/6/2002	23.2	29.42
	28RB	52.62	3/13/2003	22.22	30.4
	28RB	52.62	10/23/2003	22.58	30.04
	28RB	52.62	3/12/2004	21.89	30.73
Me Farlane North	33EA	36.62	11/10/1998	29.45	7.17
	33EA	36.62	4/15/1999	19.3	17.32
	33EA	36.62	10/14/1999	45.21	-8.59
	33EA	36.62	6/5/2001	30	6.62
	33EA	36.62	8/23/2001	45.2	-8.58
	33EA	36.62	12/20/2001	20.68	15.94
	33EA	36.62	2/27/2002	21.94	14.68

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	33EA	36.62	3/21/2002	20.31	16.31
	33EA	36.62	4/18/2002	33.6	3.02
	33EA	36.62	6/6/2002	41.96	-0.39
	33EA	36.62	10/4/2002	40.98	0.59
	33EA	36.62	3/13/2003	26.01	15.56
	33EA	36.62	5/20/2003	28.58	12.99
	33EA	36.62	5/20/2003	28.63	12.94
	33EA	36.62	5/20/2003	25.58	15.99
	33EA	36.62	5/29/2003	34.08	7.49
	33EA	36.62	10/22/2003	42.56	-0.99
	33EA	36.62	3/11/2004	33	8.67
	33EA	36.62	3/12/2004	34.33	7.34
	33EA	36.62	3/12/2004	34.34	7.33
Me Farlane South	33E2	36.46	11/10/1998	19.03	17.43
	33E2	36.46	4/15/1999	16.88	19.58
	33E2	36.46	10/14/1999	20	16.46
	33E2	36.46	6/5/2001	16.9	19.56
	33E2	36.46	12/20/2001	18.78	17.68
	33E2	36.46	6/6/2002	17.14	19.32
Morgan Run East Well	33NC	31.18	12/16/1997	28.98	2.2
	33NC	31.18	2/19/1998	16.2	14.98
	33NC	31.18	2/24/1998	14.84	16.34
	33NC	31.18	4/22/1998	14.57	16.61
	33NC	31.18	5/14/1998	23.5	7.68
	33NC	31.18	11/10/1998	26.64	4.54
	33NC	31.18	4/15/1999	14.85	16.33
	33NC	31.18	10/14/1999	35.45	-4.27
	33NC	31.18	6/5/2001	26.24	4.94
	33NC	31.18	8/23/2001	38.33	-7.15
	33NC	31.18	12/20/2001	16.22	14.96
	33NC	31.18	2/19/2002	17.73	13.45
	33NC	31.18	2/27/2002	17.63	13.55
	33NC	31.18	3/21/2002	15.94	15.24
	33NC	31.18	4/18/2002	22.16	9.02
	33NC	31.18	6/6/2002	32.59	-1.41
	33NC	31.18	10/4/2002	32	-0.82
	33NC	31.18	3/13/2003	16.52	14.66
	33NC	31.18	5/20/2003	20.15	11.03
	33NC	31.18	9/30/2003	28.41	2.77
	33NC	31.18	9/30/2003	27.5	3.68
	33NC	31.18	10/20/2003	22.95	8.23
	33NC	31.18	10/8/2003	21.74	9.44
	33NC	31.18	10/10/2003	21.25	9.93

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	33NC	31.18	10/15/2003	24.3	6.88
	33NC	31.18	10/22/2003	28.3	2.88
	33NC	31.18	3/11/2004	15.88	15.3
	33NC	31.18	3/22/2004	16.17	15.01
	33NC	31.18	3/23/2004	17.8	13.38
	33NC	31.18	3/24/2004	18.25	12.93
	33NC	31.18	3/25/2004	16.74	14.44
	33NC	31.18	3/26/2004	14.8	16.38
	33NC	31.18	3/27/2004	13.15	18.03
	33NC	31.18	3/28/2004	12.14	19.04
	33NC	31.18	3/29/2004	11.4	19.78
	33NC	31.18	3/30/2004	10.85	20.33
	33NC	31.18	3/31/2004	10.7	20.48
	33NC	31.18	4/20/2004	12.06	19.12
	33NC	31.18	4/9/2004	18.18	13
Morgan Run Fairway 2	5H2	21.18	12/15/1997	NM	NM
	5H2	21.18	4/15/1998	3.6	17.58
	5H2	21.18	5/18/1998	6.42	14.76
	5H2	21.18	11/10/1998	10.98	10.2
	5H2	21.18	4/15/1999	3.6	17.58
	5H2	21.18	10/14/1999	15.63	5.55
	5H2	21.18	6/5/2001	8.88	12.3
	5H2	21.03	8/23/2001	16.17	4.86
	5H2	21.03	12/20/2001	4.32	16.71
	5H2	21.03	2/19/2002	4.73	16.3
	5H2	21.03	3/21/2002	4.1	16.93
	5H2	21.03	4/20/2002	9.75	11.28
	5H2	21.03	4/20/2002	10.8	10.23
	5H2	21.03	4/18/2002	7.92	13.11
	5H2	21.03	6/6/2002	13.74	7.29
	5H2	21.03	10/4/2002	14.41	6.62
	5H2	21.03	3/13/2003	4.07	16.96
	5H2	21.03	9/30/2003	11.31	9.72
	5H2	21.03	10/20/2003	5.08	15.95
	5H2	21.03	10/8/2003	3.42	17.61
	5H2	21.03	10/10/2003	3	18.03
	5H2	21.03	10/16/2003	8.51	12.52
	5H2	21.03	10/22/2003	9.64	11.39
	5H2	21.03	3/11/2004	3.37	17.66
	5H2	26.05	3/23/2004	9.11	16.94
	5H2	26.05	3/24/2004	9.27	16.78
	5H2	26.05	3/25/2004	7.51	18.54
	5H2	26.05	3/26/2004	6.06	19.99
	5H2	26.05	3/27/2004	4.65	21.4

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	5H2	26.05	3/28/2004	3.96	22.09
	5H2	26.05	3/29/2004	3.53	22.52
	5H2	26.05	3/30/2004	3.03	23.02
	5H2	26.05	3/31/2004	2.85	23.2
	5H2	26.05	4/20/2004	2.89	23.16
	5H2	26.05	4/9/2004	10	16.05
Morgan Run Gun	32JB	29.1	12/16/1997	28.04	1.06
	32JB	29.1	2/19/1998	13.7	15.4
	32JB	29.1	2/24/1998	12.08	17.02
	32JB	29.1	4/23/1998	16.17	12.93
	32JB	29.1	5/14/1998	13.37	15.73
	32JB	29.1	11/10/1998	21.65	7.45
	32JB	29.1	11/10/1998	21.65	7.45
	32JB	29.1	4/15/1999	12.14	16.96
	32JB	29.1	4/15/1999	12.14	16.96
	32JB	29.05	10/14/1999	25.35	3.7
	32JB	29.05	6/5/2001	15.34	13.71
	32JB	29.05	12/20/2001	13.7	15.35
	32JB	29.05	2/15/2002	14.77	14.28
	32JB	29.05	2/27/2002	12.55	16.5
	32JB	29.05	3/4/2002	12.31	16.74
	32JB	29.05	3/21/2002	12.85	16.2
	32JB	29.05	4/18/2002	16.77	12.28
	32JB	29.05	6/6/2002	23.55	5.5
	32JB	29.05	3/13/2003	12.29	16.76
	32JB	29.05	10/22/2003	15.86	13.19
	32JB	28.05	3/12/2004	13.75	14.3
Morgan Run GunR	32JD	30.78	6/5/2001	17.85	12.93
	32JD	30.78	12/20/2001	15.58	15.2
	32JD	30.78	2/15/2002	34.62	-3.84
	32JD	30.78	2/19/2002	35.47	-4.69
	32JD	30.78	2/27/2002	14.51	16.27
	32JD	30.78	3/4/2002	14.24	16.54
	32JD	30.78	3/5/2002	18.2	12.58
	32JD	30.78	3/21/2002	16.05	14.73
	32JD	30.78	4/18/2002	20.7	10.08
	32JD	30.78	6/6/2002	46.53	-15.75
	32JD	30.78	10/4/2002	55.38	-24.6
	32JD	30.78	3/13/2003	14.28	16.5
	32JD	30.78	10/22/2003	18.29	12.49
	32JD	30.78	3/12/2004	28	2.78
	32JD	30.78	5/24/2004	17.85	12.93

APPENDIX B
HISTROICAL GROUNDWATER ELEVATION DATA
San Dieguito Valley

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
Morgan Run NO.3 Green North	32RB	38.82	12/16/1997	38.5	0.32
	32RB	38.82	5/14/1998	24.24	14.58
	32RB	38.82	11/10/1998	32.41	6.41
	32RB	38.82	4/15/1999	22.75	16.07
	32RB	38.82	10/14/1999	36.15	2.67
	32RB	38.82	6/5/2001	27.31	11.51
	32RB	38.82	12/20/2001	24.72	14.1
	32RB	38.82	6/6/2002	45.55	-6.73
	32RB	38.82	3/13/2003	23.41	15.41
	32RB	38.82	10/22/2003	27.89	10.93
	32RB	38.82	3/12/2004	30.85	7.97
Morgan Run NO.3 Green North Old 2	32RA	37.32	8/23/2001	42.28	-4.96
	32RA	37.32	12/20/2001	22.4	14.92
	32RA	37.32	3/4/2002	20.92	16.4
	32RA	37.32	3/21/2002	25.26	12.06
	32RA	37.32	4/18/2002	31.11	6.21
	32RA	37.32	6/6/2002	37.57	-0.25
	32RA	37.24	10/4/2002	36.97	0.27
	32RA	37.24	3/13/2003	21.04	16.2
	32RA	37.24	10/22/2003	25.44	11.8
	32RA	37.24	3/12/2004	24.94	12.3
	32RA	37.24	3/12/2004	24.97	12.27
Shallow Piezometer P-1	P-1	24.84	3/12/2002	5.4	19.44
	P-1	24.84	3/13/2002	5.31	19.53
	P-1	24.84	3/21/2002	5.17	19.67
	P-1	24.84	4/18/2002	5.1	19.74
	P-1	24.84	6/6/2002	5.13	19.71
	P-1	24.84	10/4/2002	4.96	19.88
	P-1	24.84	3/13/2003	5	19.84
	P-1	24.84	4/21/2003	4.62	20.22
	P-1	24.84	5/20/2003	4.72	20.12
	P-1	24.84	07/30103	5.06	19.78
	P-1	24.84	9/28/2003	5.01	19.83
	P-1	24.84	09/30103	5.05	19.79
	P-1	24.84	10/3/2003	4.97	19.87
	P-1	24.84	10/8/2003	4.84	20
	P-1	24.84	10/10/2003	4.88	19.96
	P-1	24.84	10/15/2003	5.12	19.72
	P-1	24.84	10/22/2003	4.98	19.86
	P-1	24.84	3/12/2004	4.86	19.98
	P-1	24.84	3/23/2004	5.01	19.83
	P-1	24.84	3/24/2004	4.97	19.87
	P-1	24.84	3/25/2004	4.94	19.9

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-1	24.84	3/26/2004	4.94	19.9
	P-1	24.84	3/27/2004	4.89	19.95
	P-1	24.84	3/28/2004	7.86	16.98
	P-1	24.84	03/30104	4.89	19.95
	P-1	24.84	4/20/2004	4.89	19.95
	P-1	24.84	4/9/2004	5.06	19.78
	P-1	24.84	5/6/2004	5.35	19.49
	P-1	24.84	6/11/2004	5.39	19.45
Shallow Piezometer P-2	P-2	24.55	3/12/2002	5.1	19.45
	P-2	24.55	3/13/2002	5.1	19.45
	P-2	24.55	3/21/2002	4.95	19.6
	P-2	24.55	6/6/2002	4.94	19.61
	P-2	24.55	10/4/2002	4.78	19.77
	P-2	24.55	3/13/2003	4.31	20.24
	P-2	24.55	4/21/2003	4.43	20.12
	P-2	24.55	10/22/2003	4.62	19.93
	P-2	24.55	3/12/2004	4.57	19.98
	P-2	24.55	3/23/2004	4.77	19.78
	P-2	24.55	3/24/2004	4.78	19.77
	P-2	24.55	3/25/2004	4.74	19.81
	P-2	24.55	3/26/2004	4.74	19.81
	P-2	24.55	3/27/2004	4.7	19.85
	P-2	24.55	3/28/2004	4.86	19.69
	P-2	24.55	03/30104	4.7	19.85
	P-2	24.55	4/20/2004	4.74	19.81
	P-2	24.55	4/9/2004	4.88	19.67
	P-2	24.55	5/6/2004	5.16	19.39
	P-2	24.55	6/11/2004	5.33	19.22
Shallow Piezometer P-3	P-3	25.39	11/5/2002	19.06	6.33
	P-3	25.39	11/8/2002	18.93	6.46
	P-3	25.39	11/8/2002	18.85	6.54
	P-3	25.39	3/13/2003	7.41	17.98
	P-3	25.39	4/21/2003	7.09	18.3
	P-3	25.39	10/22/2003	9.48	15.91
	P-3	25.39	12/23/2003	7.82	17.57
	P-3	25.39	3/11/2004	5.56	19.83
	P-3	25.39	3/22/2004	7.09	18.3
	P-3	25.39	3/23/2004	7.27	18.12
	P-3	25.39	3/24/2004	7.39	18
	P-3	25.39	3/25/2004	7.31	18.08
	P-3	25.39	3/26/2004	7.33	18.06
	P-3	25.39	3/28/2004	7.26	18.13
	P-3	25.39	3/30/2004	7.28	18.11

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-3	25.39	4/20/2004	7.5	17.89
	P-3	25.39	4/9/2004	7.31	18.08
	P-3	25.39	5/6/2004	8.35	17.04
	P-3	25.39	6/11/2004	9.44	15.95
	P-3	**25.39**	**12/12/2013**	**6.3**	**19.09**
Shallow Piezometer P-4S	P-4S	32.21	11/5/2002	16.47	15.74
	P-4S	32.21	11/8/2002	16.49	15.72
	P-4S	32.21	11/8/2002	16.48	15.73
	P-4S	32.21	3/13/2003	14.71	17.5
	P-4S	32.21	4/21/2003	14.19	18.02
	P-4S	32.21	9/29/2003	15.12	17.09
	P-4S	32.21	10/3/2003	15.17	17.04
	P-4S	32.21	10/8/2003	15.18	17.03
	P-4S	32.21	10/10/2003	15.12	17.09
	P-4S	32.21	10/15/2003	15.21	17
	P-4S	32.21	10/22/2003	15.18	17.03
	P-4S	32.21	12/5/2003	14.96	17.25
	P-4S	32.21	12/23/2003	14.83	17.38
	P-4S	32.21	3/12/2004	14.11	18.1
	P-4S	32.21	3/22/2004	14.06	18.15
	P-4S	32.21	3/23/2004	14.07	18.14
	P-4S	32.21	3/24/2004	14.06	18.15
	P-4S	32.21	3/25/2004	14.05	18.16
	P-4S	32.21	3/26/2004	14.05	18.16
	P-4S	32.21	3/28/2004	14.04	18.17
	P-4S	32.21	3/30/2004	14.04	18.17
	P-4S	32.21	4/20/2004	14.04	18.17
	P-4S	32.21	4/9/2004	14.03	18.18
	P-4S	32.21	5/6/2004	14.22	17.99
	P-4S	32.21	6/11/2004	14.52	17.69
	P-4S	32.21	6/11/2004	14.52	17.69
	P-4S	**32.21**	**12/12/2013**	**14.2**	**18.01**
Deep Piezometer P-4D	P-4D	31.77	11/5/2002	28.18	3.59
	P-4D	31.77	11/8/2002	27.84	3.93
	P-4D	31.77	11/8/2002	27.89	3.88
	P-4D	31.77	3/13/2003	16.2	15.57
	P-4D	31.77	9/29/2003	23.43	8.34
	P-4D	31.77	10/3/2003	19.93	11.84
	P-4D	31.77	10/8/2003	18.9	12.87
	P-4D	31.77	10/10/2003	19.27	12.5
	P-4D	31.77	10/15/2003	20.33	11.44
	P-4D	31.77	10/22/2003	22.59	9.18
	P-4D	31.77	12/5/2003	17.77	14

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-4D	31.77	12/23/2003	16.55	15.22
	P-4D	31.77	3/12/2004	16.7	15.07
	P-4D	31.77	3/22/2004	14.06	17.71
	P-4D	31.77	3/23/2004	14.07	17.7
	P-4D	31.77	3/24/2004	14.06	17.71
	P-4D	31.77	3/25/2004	14.05	17.72
	P-4D	31.77	3/26/2004	14.05	17.72
	P-4D	31.77	3/28/2004	14.04	17.73
	P-4D	31.77	3/30/2004	14.04	17.73
	P-4D	31.77	4/20/2004	14.04	17.73
	P-4D	31.77	4/9/2004	14.03	17.74
	P-4D	31.77	5/6/2004	22.4	9.37
	P-4D	**31.77**	**12/12/2013**	**14.63**	**17.14**
Shallow Piezometer P-5	P-5	28.79	4/21/2003	10.77	18.02
	P-5	28.79	10/23/2003	10.86	17.93
	P-5	28.79	12/23/2003	10.87	17.92
	P-5	28.79	3/11/2004	10.61	18.18
	P-5	28.79	3/22/2004	10.57	18.22
	P-5	28.79	3/23/2004	10.59	18.2
	P-5	28.79	3/24/2004	10.56	18.23
	P-5	28.79	3/25/2004	10.56	18.23
	P-5	28.79	3/26/2004	10.55	18.24
	P-5	28.79	3/28/2004	10.53	18.26
	P-5	28.79	3/30/2004	10.53	18.26
	P-5	28.79	4/20/2004	10.52	18.27
	P-5	28.79	4/20/2004	10.52	18.27
	P-5	28.79	4/5/2004	10.52	18.27
	P-5	28,79	4/8/2004	10.48	18.31
	P-5	28.79	5/6/2004	10.4	18.39
	P-5	28.79	6/11/2004	10.44	18.35
	P-5	**28.79**	**12/12/2013**	**10.71**	**18.08**
Shallow Piezometer P-6	P-6	28.94	4/21/2003	11.11	17.83
	P-6	28.94	7/30/2003	11.11	17.83
	P-6	28.94	9/26/2003	11.29	17.65
	P-6	28.94	9/28/2003	11.25	17.69
	P-6	28.94	9/29/2003	11.29	17.65
	P-6	28.94	10/3/2003	11.3	17.64
	P-6	28.94	10/8/2003	11.32	17.62
	P-6	28.94	10/10/2003	11.25	17.69
	P-6	28.94	10/15/2003	11.36	17.58
	P-6	28.94	10/22/2003	11.34	17.S0
	P-6	28.94	12/5/2003	11.41	17.53
	P-6	28.94	12/23/2003	11.44	17.5

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-6	28.94	3/11/2004	11.21	17.73
	P-6	28.94	3/12/2004	11.21	17.73
	P-6	28.94	3/22/2004	11.17	17.77
	P-6	28.94	3/23/2004	11.23	17.71
	P-6	28.94	3/24/2004	11.19	17.75
	P-6	28.94	3/25/2004	11.2	17.74
	P-6	28.94	3/26/2004	11.2	17.74
	P-6	28.94	3/28/2004	11.13	17.81
	P-6	28.94	3/30/2004	11.15	17.79
	P-6	28.94	4/1/2004	11.13	17.81
	P-6	28.94	4/2/2004	11.18	17.7S
	P-6	28.94	4/5/2004	11.15	17.79
	P-6	28.94	4/8/2004	11.11	17.83
	P-6	28.94	4/9/2004	11.1	17.84
	P-6	28.94	5/6/2004	11.05	17.89
	P-6	28.94	6/11/2004	11.14	17.8
	P-6	**28.94**	**12/12/2013**	**11.44**	**17.5**
Shallow Piezometer P-7	P-7	28.81	4/21/2003	10.92	17.89
	P-7	28.81	10/23/2003	11.37	17.44
	P-7	28.81	12/5/2003	11.35	17.4S
	P-7	28.81	12/23/2003	11.45	17.36
	P-7	28.81	3/11/2004	11.07	17.74
	P-7	28.81	3/22/2004	11.04	17.77
	P-7	28.81	3/23/2004	11.13	17.68
	P-7	28.81	3/24/2004	11.11	17.7
	P-7	28.81	3/25/2004	11.11	17.7
	P-7	28.81	3/26/2004	11.11	17.7
	P-7	28.81	3/28/2004	11.03	17.78
	P-7	28.81	3/30/2004	11.06	17.75
	P-7	28.81	4/1/2004	11.06	17.75
	P-7	28.81	4/2/2004	11.1	17.71
	P-7	28.81	4/8/2004	11.05	17.76
	P-7	28.81	5/6/2004	11	17.81
	P-7	28.81	6/11/2004	11.15	17.66
	P-7	**28.81**	**12/12/2013**	**11.76**	**17.05**
Shallow Piezometer P-8	P-8	28.16	4/21/2003	11.06	17.1
	P-8	28.16	10/23/2003	12.17	15.99
	P-8	28.16	12/23/2003	11.49	16.67
	P-8	28.16	3/11/2004	10.4	17.76
	P-8	28.16	3/22/2004	10.46	17.7
	P-8	28.16	3/23/2004	10.51	17.65
	P-8	28.16	3/24/2004	10.53	17.63
	P-8	28.16	3/25/2004	10.52	17.64

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-8	28.16	3/26/2004	10.51	17.65
	P-8	28.16	3/28/2004	10.41	17.75
	P-8	28.16	3/30/2004	10.38	17.78
	P-8	28.16	4/20/2004	10.38	17.78
	P-8	28.16	4/22/2004	10.35	17.81
	P-8	28.16	4/5/2004	10.36	17.8
	P-8	28.16	4/8/2004	10.35	17.81
	P-8	28.16	5/6/2004	10.95	17.21
	P-8	28.16	6/11/2004	11.43	16.73
	P-8	**28.16**	**12/12/2013**	**10.82**	**17.34**
Shallow Piezometer P-9	P-9	33.89	4/21/2003	17.67	16.22
	P-9	33.89	6/11/2003	19.08	14.81
	P-9	33.89	7/8/2003	19.85	14.04
	P-9	33.89	7/21/2003	20.37	13.52
	P-9	33.89	10/23/2003	20.69	13.2
	P-9	33.89	12/23/2003	18.1	15.79
	P-9	33.89	3/11/2004	16.01	17.88
	P-9	33.89	3/22/2004	16.82	17.07
	P-9	33.89	3/23/2004	16.89	17
	P-9	33.89	3/24/2004	16.99	16.9
	P-9	33.89	3/25/2004	17.02	16.87
	P-9	33.89	3/26/2004	17.05	16.84
	P-9	33.89	3/28/2004	17.08	16.81
	P-9	33.89	3/30/2004	17.03	16.86
	P-9	33.89	4/21/2004	17.2	16.69
	P-9	33.89	4/22/2004	17.19	16.7
	P-9	33.89	4/5/2004	16.98	16.91
	P-9	33.89	4/8/2004	16.95	16.94
	P-9	33.89	5/6/2004	18.95	14.94
	P-9	33.89	6/11/2004	20.19	13.7
	P-9	**33.89**	**12/12/2013**	**17.14**	**16.75**
Shallow Piezometer P-10	P-10	30.19	4/21/2003	11.46	18.73
	P-10	30.19	10/23/2003	12.1	18.09
	P-10	30.19	12/23/2003	12.15	18.04
	P-10	30.19	3/11/2004	11.73	18.46
	P-10	30.19	3/22/2004	11.79	18.4
	P-10	30.19	3/23/2004	11.8	18.39
	P-10	30.19	3/24/2004	11.79	18.4
	P-10	30.19	3/26/2004	11.8	18.39
	P-10	30.19	3/28/2004	11.75	18.44
	P-11	30.19	3/30/2004	11.78	18.41
	P-12	30.19	4/1/2004	11.76	18.43
	P-13	30.19	4/2/2004	11.75	18.44

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-14	30.19	4/5/2004	11.72	18.47
	P-15	30.19	5/6/2004	11.77	18.42
	P-16	30.19	6/11/2004	11.8	18.39
	P-16	**30.19**	**12/12/2013**	**10.82**	**19.37**
Shallow Piezometer P-11A	P-11A	22.13	6/11/2003	4.64	17.49
	P-11A	22.13	7/8/2003	4.66	17.47
	P-11A	22.13	7/16/2003	4.74	17.39
	P-11A	22.13	7/22/2003	4.73	17.4
	P-11A	22.13	7/23/2003	4.74	17.39
	P-11A	22.13	7/23/2003	4.77	17.36
	P-11A	22.13	7/27/2003	4.82	17.31
	P-11A	22.13	9/28/2003	4.8	17.33
	P-11A	22.13	9/30/2003	4.83	17.3
	P-11A	22.13	10/20/2003	5.05	17.08
	P-11A	22.13	11/14/2003	4.49	17.64
	P-11A	22.13	12/5/2003	4.56	17.57
	P-11A	22.13	12/23/2003	4.49	17.64
	P-11A	22.13	3/12/2004	4.27	17.86
	P-11A	22.13	3/22/2004	4.37	17.76
	P-11A	22.13	3/22/2004	4.41	17.72
	P-11A	22.13	3/23/2004	4.43	17.7
	P-11A	22.13	3/24/2004	4.43	17.7
	P-11A	22.13	3/24/2004	4.4	17.73
	P-11A	22.13	3/25/2004	4.4	17.73
	P-11A	22.13	3/25/2004	4.4	17.73
	P-11A	22.13	3/26/2004	4.39	17.74
	P-11A	22.13	3/27/2004	4.39	17.74
	P-11A	22.13	3/28/2004	4.4	17.73
	P-11A	22.13	3/29/2004	4.42	17.71
	P-11A	22.13	3/30/2004	4.44	17.69
	P-11A	22.13	3/31/2004	4.45	17.68
	P-11A	22.13	4/1/2004	4.46	17.67
	P-11A	22.13	4/9/2004	4.46	17.67
	P-11A	22.13	5/6/2004	4.76	17.37
	P-11A	22.13	6/11/2004	4.9	17.23
Intermediate Piezometer P-11B	P-11B	22.1	3/12/2003	5.37	16.73
	P-11B	22.1	6/11/2003	8.47	13.63
	P-11B	22.1	7/8/2003	8.47	13.63
	P-11B	22.1	7/16/2003	8.92	13.18
	P-11B	22.1	7/22/2003	9.41	12.69
	P-11B	22.1	7/22/2003	9.73	12.37
	P-11B	22.1	7/23/2003	9.88	12.22
	P-11B	22.1	7/23/2003	10.02	12.08

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-11B	22.1	7/27/2003	9.96	12.14
	P-11B	22.1	9/28/2003	9.83	12.27
	P-11B	22.1	9/30/2003	9.84	12.26
	P-11B	22.1	10/20/2003	8.65	13.45
	P-11B	22.1	11/14/2003	10.27	11.83
	P-11B	22.1	12/5/2003	7.78	14.32
	P-11B	22.36	12/23/2003	6.68	15.68
	P-11B	22.1	3/12/2004	5.37	16.73
	P-11B	22.1	3/22/2004	5.66	16.44
	P-11B	22.1	3/22/2004	5.73	16.37
	P-11B	22.1	3/23/2004	5.81	16.29
	P-11B	22.1	3/24/2004	5.96	16.14
	P-11B	22.1	3/24/2004	5.95	16.15
	P-11B	22.1	3/25/2004	5.75	16.35
	P-11B	22.1	3/25/2004	5.73	16.37
	P-11B	22.1	3/26/2004	5.07	17.03
	P-11B	22.1	3/27/2004	4.62	17.48
	P-11B	22.1	3/28/2004	4.22	17.88
	P-11B	22.1	3/29/2004	4.02	18.08
	P-11B	22.1	03/30104	3.75	18.35
	P-11B	22.1	3/31/2004	3.55	18.55
	P-11B	22.1	4/21/2004	3.44	18.66
	P-11B	22.1	4/9/2004	5.9	16.2
	P-11B	22.1	5/6/2004	9.08	13.02
	P-11B	22.1	6/11/2004	10.91	11.19
Deep Piezometer P-11D	P-11D	22.13	6/11/2003	14.3	7.83
	P-11D	22.13	7/8/2003	13.53	8.6
	P-11D	22.13	7/16/2003	15.51	6.62
	P-11D	22.13	7/22/2003	22.61	-0.48
	P-11D	22.13	7/22/2003	18.96	3.17
	P-11D	22.13	7/23/2003	18.81	3.32
	P-11D	22.13	7/23/2003	20.98	1.15
	P-11D	22.13	7/23/2003	18.96	3.17
	P-11D	22.13	7/27/2003	17.11	5.02
	P-11D	22.13	9/28/2003	16.42	5.71
	P-11D	22.13	9/30/2003	16.18	5.95
	P-11D	22.13	9/30/2003	16.16	5.97
	P-11D	22.13	10/20/2003	13.58	8.55
	P-11D	22.44	11/14/2003	21.14	1.3
	P-11D	22.44	12/5/2003	10.18	12.26
	P-11D	22.13	3/22/2004	4.43	17.7
	P-11D	22.13	3/12/2004	6.06	16.07
	P-11D	22.13	3/18/2004	6.1	16.03
	P-11D	22.13	3/22/2004	6.86	15.27

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	P-11D	22.13	3/22/2004	6.44	15.69
	P-11D	22.13	3/23/2004	6.73	15.4
	P-11D	22.13	3/24/2004	7.41	14.72
	P-11D	22.13	3/24/2004	7.49	14.64
	P-11D	22.13	3/24/2004	4.68	17.45
	P-11D	22.13	3/24/2004	4.25	17.88
	P-11D	22.13	3/25/2004	1.07	21.06
	P-11D	22.13	3/25/2004	0.73	21.4
	P-11D	22.13	3/26/2004	-1.02	23.15
	P-11D	22.13	3/27/2004	-2.24	24.37
	P-11D	22.13	3/28/2004	-3.3	25.43
	P-11D	22.13	3/29/2004	-4.1	26.23
	P-11D	22.13	3/30/2004	-4.61	26.74
	P-11D	22.13	3/31/2004	-4.84	26.97
	P-11D	22.13	4/21/2004	-4.64	26.77
	P-11D	22.13	4/21/2004	-4.64	26.77
	P-11D	22.13	4/9/2004	7.95	14.18
	P-11D	22.13	5/6/2004	15.87	6.26
	P-11D	22.13	6/11/2004	19.1	3.03
Morgan Run Test Well	Test Well	25.93	7/22/2003	21.32	4.61
	Test Well	25.93	7/23/2003	20.95	4.98
	Test Well	25.93	7/23/2003	21.32	4.61
	Test Well	25.93	7/23/2003	20.97	4.96
	Test Well	25.93	7/23/2003	38.29	-12.36
	Test Well	25.42	9/30/2003	19.34	6.08
Rancho El Camino	7LA	50	12/15/1997	NM	NM
	7LA	50	11/11/1998	15.67	34.33
	7LA	50	4/15/1999	15.24	34.76
	7LA	50	10/14/1999	17.55	32.45
	7LA	50	6/5/2001	15.85	34.15
	7LA	50	12/20/2001	16.18	33.82
	7LA	50	6/6/2002	17.1	32.9
	7LA	50	3/14/2003	15.28	34.72
	7LA	50	10/23/2003	15.91	34.09
	7LA	50	3/17/2004	15.65	34.35
Rancho Paseana, South (east)	33PA	36	11/10/1998	32.21	3.79
	33PA	36	4/15/1999	19.65	16.35
	33PA	36	10/14/1999	42.48	-6.48
	33PA	36	6/5/2001	31.95	4.05
	33PA	36	12/20/2001	20.98	15.02
	33PA	36	6/6/2002	39.64	-3.64
	33PA	36	3/13/2003	21.88	14.12

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	33PA	36	10/22/2003	35.49	0.51
	33PA	36	3/12/2004	23.43	12.57
Rancho Paseana, South (west)	33N2	35.81	11/10/1998	32	3.81
	33N2	35.81	4/15/1999	19.45	16.36
	33N2	35.81	10/14/1999	42.2	-6.39
	33N2	35.81	6/5/2001	31.72	4.09
	33N2	35.81	12/20/2001	20.8	15.01
	33N2	35.81	2/15/2002	26.67	9.14
	33N2	35.81	2/15/2002	26.41	9.4
	33N2	35.81	2/19/2002	22.65	13.16
	33N2	35.81	2/22/2002	38.8	-2.99
	33N2	35.81	2/27/2002	22.8	13.01
	33N2	35.81	3/21/2002	20.57	15.24
	33N2	35.81	4/18/2002	28.3	7.51
	33N2	35.81	6/6/2002	39.45	-3.64
	33N2	35.81	10/4/2002	37.75	-1.94
	33N2	35.81	3/13/2003	21.62	14.19
	33N2	35.81	10/22/2003	35.27	0.54
	33N2	35.81	3/12/2004	23.08	12.73
	33N2	35.81	3/24/2004	24.5	11.31
	33N2	35.81	3/25/2004	22.78	13.03
	33N2	35.81	3/26/2004	20.7	15.11
	33N2	35.81	3/27/2004	19.03	16.78
	33N2	35.81	3/28/2004	17.81	18
	33N2	35.81	3/29/2004	17.16	18.65
	33N2	35.81	3/30/2004	16.6	19.21
	33N2	35.81	3/31/2004	16.19	19.62
	33N2	35.81	4/21/2004	18.4	17.41
	33N2	35.81	4/9/2004	24.1	11.71
	33N2	35.81	5/24/2004	45.82	-10.01
	33N2	35.81	5/24/2004	46	-10.19
RSF Polo Club No.2 Replacement (2R)	5FC	24.27	6/5/2001	65	-40.73
	5FC	24.27	12/20/2001	9.65	14.62
	5FC	24.3	6/6/2002	56.98	-32.68
	5FC	24.3	3/13/2003	8.81	15.49
	5FC	24.3	3/11/2004	7.81	16.49
RSF Polo Club No 1	SFA	24.32	6/6/2002	6.72	17.6
RSF Polo Club No 2	SFB	22.79	12/15/1997	13.22	9.57
	SFB	22.79	5/14/1998	12.07	10.72
	SFB	22.79	11/10/1998	14.32	8.47
	SFB	22.79	4/15/1999	7.66	15.13

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	SFB	22.79	10/14/1999	72.2	-49.41
	SFB	24.04	6/6/2001	43.85	·19.81
	SFB	22.73	7/10/2001	45.22	-22.49
	SFB	22.73	10/30/2001	37.23	-14.5
	SFB	22.73	12/20/2001	8.28	14.45
	SFB	22.73	3/21/2002	36.9	-14.17
	SFB	22.73	4/18/2002	35.13	-12.4
	SFB	22.73	6/6/2002	39.58	-16.85
	SFB	22.73	10/4/2002	37.49	-14.76
	SFB	22.73	3/13/2003	7.25	15.48
	SFB	22.73	9/29/2003	13.9	8.83
	SFB	22.73	9/29/2003	13.92	8.81
	SFB	22.73	10/3/2003	35.98	-13.25
	5FB	22.73	10/4/2003	37.49	-14.76
	SFB	22.73	10/10/2003	12.58	10.15
	5FB	22.73	10/22/2003	11.57	11.16
	SFB	22.73	3/11/2004	6.42	16.31
	5FB	22.73	3/12/2004	6.64	16.09
	5FB	22.73	3/23/2004	7.2S	15.48
	5FB	22.73	3/24/2004	7.43	15.3
	5FB	22.73	3/24/2004	7.43	15.3
	5FB	22.73	3/25/2004	7.06	15.67
	5FB	22.73	3/26/2004	6.18	16.S5
	5FB	22.73	3/27/2004	5.53	17.2
	5FB	22.73	3/28/2004	4.85	17.88
	5FB	22.73	3/29/2004	4.S2	18.21
	SFB	22.73	03/30104	4.04	18.69
	5FB	22.73	3/31/2004	3.75	18.98
	5FB	22.73	04/2001/2004	25.07	-2.34
	5FB	22.73	04/2001/2004	25.07	-2.34
	SFB	22.73	4/9/2004	33.42	-10.69
RSF Polo Club 5F1	SF1	25.25	12/15/1997	9.3	15.95
	SF1	2S.25	5/14/1998	8.78	16.47
	SF1	25.25	11/10/1998	9.45	15.8
	SF1	25.25	4/15/1999	7.5	17.75
	SF1	25.25	10/14/1999	34.44	-9.19
	SF1	25.25	6/5/2001	31.87	-6.62
	5F1	25.25	12/20/2001	7.78	17.47
	5F1	25.25	6/6/2002	7.64	17.61
	5F1	25.25	3/13/2003	6.9	18.35
	5F1	25.25	10/22/2003	8.61	16.64
	5F1	25.25	3/11/2004	7.04	18.21
RSF Polo Shallow Piezometer P-1	RSF P-1	31.52	4/8/2002	8.46	23.06

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
	RSF P-1	31.52	4/18/2002	8.55	22.97
	RSF P-1	31.52	6/6/2002	8.62	22.9
	RSF P-1	31.52	10/4/2002	9.79	21.73
	RSF P-1	31.52	3/13/2003	7.99	23.53
	RSF P-1	31.52	4/18/2003	8.55	22.97
	RSF P-1	31.52	9/28/2003	9.98	21.54
	RSF P-1	31.52	10/3/2003	10	21.52
	RSF P-1	31.52	10/8/2003	10.19	21.33
	RSF P-1	31.52	10/10/2003	10.05	21.47
	RSF P-1	31.52	10/15/2003	9.84	21.68
	RSF P-1	31.52	10/22/2003	9.6	21.92
	RSF P-1	31.52	3/11/2004	8.28	23.24
	RSF P-1	31.52	3/23/2004	8.35	23.17
	RSF P-1	31.52	3/24/2004	8.36	23.16
	RSF P-1	31.52	3/25/2004	8.4	23.12
	RSF P-1	31.52	3/26/2004	8.4	23.12
	RSF P-1	31.52	3/28/2004	8.39	23.13
	RSF P-1	31.52	3/30/2004	8.4	23.12
	RSF P-1	31.52	3/31/2004	8.41	23.11
	RSF P-1	31.52	04/2001/2004	8.4	23.12
	RSF P-1	31.52	4/5/2004	8.4	23.12
	RSF P-1	31.52	4/8/2004	8.44	23.08
	RSF P-1	31.52	5/6/2004	8.74	22.78
	RSF P-1	31.52	6/11/2004	9.68	21.84
RSF Polo Test Well	5GA	NA	11/11/1998	17.85	NM
	5GA	26.98	4/15/1999	11.31	15.67
	5GA	26.98	10/14/1999	23.33	3.65
	5GA	26.98	6/5/2001	18.66	8.32
	5GA	26.98	12/20/2001	12.41	14.57
	5GA	26.98	6/6/2002	21.11	5.87
Schoenfelder No 1 (north)	33FA	36.42	12/15/1997	30.48	5.94
	33FA	36.42	4/22/1998	18.32	18.1
	33FA	36.42	11/10/1998	26.75	9.67
	33FA	36.42	4/15/1999	19.15	17.27
	33FA	36.42	10/14/1999	46.1	-9.68
	33FA	36.42	6/5/2001	33.13	3.29
	33FA	36.42	12/20/2001	20.28	16.14
	33FA	36.42	6/6/2002	42.28	-5.86
	33FA	36.42	3/13/2003	20.66	15.76
	33FA	36.42	3/12/2004	25.95	10.47

APPENDIX B
HISTROICAL GROUNDWATER ELEVATION DATA
San Dieguito Valley

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
Via De Santa Fe Bridge		49.09	5/14/1998	25	24.09
		49.09	11/11/1998	29	19.49
		49.09	4/15/1998	26.72	22.37
		49.09	10/14/1999	30.28	18.81
		49.09	6/5/2001	26.9	22.19
		49.09	6/6/2002	27.1	21.99
		49.09	3/14/2003	26.71	22.38
		49.09	10/23/2003	27	22.09
		49.09	3/11/2004	26.56	22.53
El Camino Real Bridge		27.96	5/15/1998	18.55	9.41
		27.96	6/6/2002	22.27	5.69
		27.96	3/14/2003	21.8	6.16
		27.96	10/23/2003	21.97	5.99
		27.96	3/11/2004	21.57	6.39
Morgan Run North Bridge		29.23	4/1/2004	11.32	17.91
		29.23	4/9/2004	11.26	17.97
		29.23	5/7/2004	11.8	17.43
Morgan Run South Bridge		26.39	5/14/1998	8.73	17.66
		26.39	11/11/1998	11.61	14.78
		26.39	10/14/1999	11.7	14.69
		26.39	6/5/2001	11.6	14.79
		26.39	5/21/2002	11.75	14.64
		26.39	6/6/2002	11.65	14.74
		26.39	3/13/2003	10.86	15.53
		26.39	10/23/2003	11.71	14.68
		26.39	12/31/2003	11	15.39
		26.39	3/12/2004	10.72	15.67
		26.39	3/22/2004	10.83	15.56
		26.39	3/23/2004	10.87	15.52
		26.39	3/24/2004	10.93	15.46
		26.39	3/25/2004	10.93	15.46
		26.39	3/26/2004	10.94	15.45
		26.39	3/28/2004	11	15.39
		26.39	3/30/2004	11.02	15.37
		26.39	4/1/2004	11.1	15.29
		26.39	4/9/2004	11.01	15.38
		26.39	5/7/2004	11.62	14.77
		26.39	6/11/2004	11.72	14.67
		26.86	9/28/2003	11.62	15.24
		26.86	09/30103	11.59	15.27
		26.86	10/1/2003	11.61	15.25
		26.86	10/2/2003	11.62	15.24

APPENDIX B
HISTROICAL GROUNDWATER ELEVATION DATA
San Dieguito Valley

Well	Well No.	Reference Point Elevation	Date	Depth To Water	Water Level Elevation
		feet msl		feet	feet msl
		26.86	10/3/2003	11.6	15.26
		26.86	10/4/2003	11.6	15.26
		26.86	10/5/2003	11.6	15.26
		26.86	10/6/2003	11.6	15.26
		26.86	10/7/2003	11.6	15.26
		26.86	10/8/2003	11.61	15.25
		26.86	10/9/2003	11.58	15.28
		26.86	10/10/2003	11.58	15.28
		26.86	10/15/2003	11.64	15.22
		26.86	10/20/2003	11.63	15.23
		26.86	10/23/2003	11.59	15.27
		26.86	11/4/2003	11.47	15.39
		26.86	11/4/2003	11.44	15.42
		26.86	11/5/2003	11.54	15.32
		26.86	11/6/2003	11.52	15.34
		26.86	11/7/2003	11.53	15.33
		26.86	11/8/2003	11.36	15.5
		26.86	11/9/2003	11.39	15.47
		26.86	11/10103	11.35	15.51
		26.86	11/11/2003	10.74	16.12
		26.86	11/12/2003	10.81	16.05
		26.86	11/13/2003	10.82	16.04
		26.86	11/14/2003	10.46	16.4
		26.86	12/5/2003	11.1	15.76
		26.86	12/23/2003	10.94	15.92
		26.86	12/26/2003	10.84	16.02
		26.86	3/12/2004	10.62	16.24
		26.86	3/22/2004	10.83	16.03
		26.86	3/23/2004	10.87	15.99
		26.86	3/24/2004	10.93	15.93
		26.86	3/25/2004	10.93	15.93
		26.86	3/26/2004	10.94	15.92
		26.86	3/28/2004	11	15.86
		26.86	3/30/2004	11.02	15.84
		26.86	04/2001/2004	11.1	15.76
		26.86	4/9/2004	11.01	15.85
		26.86	5/6/2004	11.68	15.18
		26.86	6/11/2004	11.62	15.24
		26.86	11/2004/2004	11.44	15.42
		26.86	11/6/2004	11.52	15.34

Date	Avg. Daily Discharge
	feet^3 per second
11/4/2004	0.43
11/5/2004	0.63
11/6/2004	0.49
11/7/2004	0.61
11/8/2004	10.77
11/9/2004	15.02
11/10/2004	0.92
11/11/2004	0.39
11/12/2004	1.39
11/13/2004	0.36
11/14/2004	0.30
11/15/2004	0.23
11/16/2004	0.36
11/17/2004	0.23
11/18/2004	0.20
11/19/2004	0.23
11/20/2004	0.21
11/21/2004	70.84
11/22/2004	12.34
11/23/2004	1.07
11/24/2004	0.35
11/25/2004	0.29
11/26/2004	0.27
11/27/2004	0.40
11/28/2004	25.32
11/29/2004	2.20
11/30/2004	0.40
12/1/2004	0.32
12/2/2004	0.30
12/3/2004	0.27
12/4/2004	0.26
12/5/2004	53.29
12/6/2004	52.48
12/7/2004	2.84
12/8/2004	0.70
12/9/2004	0.53
12/10/2004	0.36
12/11/2004	0.34
12/12/2004	0.31
12/13/2004	0.29
12/14/2004	0.28
12/15/2004	0.28
12/16/2004	0.26
12/17/2004	0.21
12/18/2004	0.23
12/19/2004	0.26
12/20/2004	0.20
12/21/2004	0.30
12/22/2004	0.27
12/23/2004	0.27
12/24/2004	0.25
12/25/2004	0.25
12/26/2004	0.27
12/27/2004	0.28
12/28/2004	135.40
12/29/2004	493.84
12/30/2004	144.08
12/31/2004	101.36
1/1/2005	98.89
1/2/2005	17.54
1/3/2005	409.54
1/4/2005	322.66
1/5/2005	135.60
1/6/2005	56.19
1/7/2005	242.93
1/8/2005	274.28
1/9/2005	1208.94
1/10/2005	854.31
1/11/2005	1224.86
1/12/2005	300.22
1/13/2005	168.11
1/14/2005	124.93
1/15/2005	96.52
1/16/2005	80.07
1/17/2005	69.73
1/18/2005	61.32
1/19/2005	55.61
1/20/2005	51.17
1/21/2005	47.61
1/22/2005	43.16
1/23/2005	40.70
1/24/2005	38.75
1/25/2005	36.93
1/26/2005	40.45
1/27/2005	54.11
1/28/2005	58.71
1/29/2005	70.76
1/30/2005	36.63
1/31/2005	32.89
2/1/2005	30.65
2/2/2005	28.91
2/3/2005	28.23
2/4/2005	27.37
2/5/2005	26.14
2/6/2005	25.78
2/7/2005	30.73
2/8/2005	27.93
2/9/2005	25.68
2/10/2005	24.20
2/11/2005	160.76
2/12/2005	356.45
2/13/2005	152.68
2/14/2005	78.13
2/15/2005	62.35
2/16/2005	53.26
2/17/2005	48.82
2/18/2005	193.41
2/19/2005	221.28
2/20/2005	172.27
2/21/2005	945.80
2/22/2005	506.84
2/23/2005	736.27
2/24/2005	255.52
2/25/2005	167.55
2/26/2005	124.66
2/27/2005	102.20

Date	Avg. Daily Discharge
	feet^3 per second
5/1/2006	5.93
5/2/2006	6.63
5/3/2006	5.09
5/4/2006	5.22
5/5/2006	4.84
5/6/2006	5.27
5/7/2006	4.66
5/8/2006	4.37
5/9/2006	4.25
5/10/2006	4.51
5/11/2006	4.28
5/12/2006	3.91
5/13/2006	3.65
5/14/2006	3.48
5/15/2006	3.84
5/16/2006	4.42
5/17/2006	5.17
5/18/2006	4.85
5/19/2006	4.77
5/20/2006	4.73
5/21/2006	4.18
5/22/2006	4.34
5/23/2006	4.28
5/24/2006	4.44
5/25/2006	4.70
5/26/2006	4.71
5/27/2006	4.50
5/28/2006	4.70
5/29/2006	4.51
5/30/2006	4.22
7/1/2006	4.74
7/2/2006	4.89
7/3/2006	3.88
7/4/2006	2.04
7/5/2006	1.91
7/6/2006	2.11
7/7/2006	2.80
7/8/2006	2.27
7/9/2006	2.11
7/10/2006	1.88
7/11/2006	1.87
7/12/2006	1.65
7/13/2006	1.54
7/14/2006	1.74
7/15/2006	2.16
7/16/2006	2.12
7/17/2006	2.05
7/18/2006	2.25
7/19/2006	2.17
7/20/2006	2.37
7/21/2006	2.27
7/22/2006	2.96
7/23/2006	2.92
7/24/2006	2.36
7/25/2006	2.72
7/26/2006	2.34
7/27/2006	2.51
7/28/2006	2.59
7/29/2006	6.21
7/30/2006	4.55
7/31/2006	5.02
8/1/2006	3.10
8/2/2006	2.33
8/3/2006	1.57
8/4/2006	1.87
8/5/2006	0.98
8/6/2006	0.99
8/7/2006	0.98
8/8/2006	0.92
8/9/2006	0.89
8/10/2006	1.04
8/11/2006	1.89
8/12/2006	1.07
8/13/2006	0.64
8/14/2006	0.52
8/15/2006	0.56
8/16/2006	0.59
8/17/2006	0.52
8/18/2006	0.53
8/19/2006	0.61
8/20/2006	0.75
8/21/2006	0.61
8/22/2006	1.06
8/23/2006	1.17
8/24/2006	0.91
8/25/2006	1.19
8/26/2006	0.75
8/27/2006	0.55
8/28/2006	0.39
8/29/2006	0.56
8/30/2006	0.89
8/31/2006	0.70
9/1/2006	0.81
9/2/2006	0.95
9/3/2006	0.75
9/4/2006	1.00
9/5/2006	1.30
9/6/2006	1.26
9/7/2006	0.63
9/8/2006	0.45
9/9/2006	0.37
9/10/2006	0.21
9/11/2006	0.33
9/12/2006	0.56
9/13/2006	0.59
9/14/2006	0.39
9/15/2006	0.27
9/16/2006	0.20
9/17/2006	0.17
9/18/2006	0.10
9/19/2006	0.13
9/20/2006	0.18
9/21/2006	0.17
9/22/2006	0.17
9/23/2006	0.25
9/24/2006	0.18

Date	Avg. Daily Discharge
	feet^3 per second
1/1/2008	7.69
1/2/2008	7.72
1/3/2008	7.70
1/4/2008	7.63
1/5/2008	367.60
1/6/2008	277.98
1/7/2008	419.58
1/8/2008	98.26
1/9/2008	45.61
1/10/2008	29.94
1/11/2008	22.43
1/12/2008	18.09
1/13/2008	15.51
1/14/2008	13.91
1/15/2008	12.35
1/16/2008	11.61
1/17/2008	10.93
1/18/2008	10.57
1/19/2008	10.15
1/20/2008	9.49
1/21/2008	18.39
1/22/2008	15.26
1/23/2008	14.52
1/24/2008	153.97
1/25/2008	20.60
1/26/2008	12.26
1/27/2008	176.69
1/28/2008	144.80
1/29/2008	49.77
1/30/2008	22.75
1/31/2008	18.94
2/1/2008	16.45
2/2/2008	16.54
2/3/2008	282.69
2/4/2008	227.71
2/5/2008	74.73
2/6/2008	41.70
2/7/2008	31.74
2/8/2008	26.57
2/9/2008	22.39
2/10/2008	19.17
2/11/2008	17.50
2/12/2008	16.10
2/13/2008	15.00
2/14/2008	220.48
2/15/2008	100.46
2/16/2008	29.86
2/17/2008	21.71
2/18/2008	23.66
2/19/2008	19.07
2/20/2008	57.20
2/21/2008	34.73
2/22/2008	343.56
2/23/2008	132.47
2/24/2008	133.66
2/25/2008	79.79
2/26/2008	46.65
2/27/2008	35.39
2/28/2008	29.55
2/29/2008	25.56
3/1/2008	22.94
3/2/2008	21.89
3/3/2008	19.57
3/4/2008	17.71
3/5/2008	17.40
3/6/2008	16.26
3/7/2008	14.99
3/8/2008	14.95
3/9/2008	15.31
3/10/2008	14.40
3/11/2008	13.80
3/12/2008	12.79
3/13/2008	12.60
3/14/2008	12.34
3/15/2008	12.23
3/16/2008	15.20
3/17/2008	12.36
3/18/2008	11.36
3/19/2008	11.18
3/20/2008	11.10
3/21/2008	10.95
3/22/2008	10.70
3/23/2008	10.27
3/24/2008	9.89
3/25/2008	9.88
3/26/2008	9.80
3/27/2008	9.80
3/28/2008	9.92
3/29/2008	10.03
3/30/2008	10.14
3/31/2008	10.46
4/1/2008	9.66
4/2/2008	9.74
4/3/2008	10.26
4/4/2008	9.69
4/5/2008	9.47
4/6/2008	9.37
4/7/2008	9.21
4/8/2008	9.40
4/9/2008	9.66
4/10/2008	9.21
4/11/2008	8.70
4/12/2008	8.27
4/13/2008	8.01
4/14/2008	7.83
4/15/2008	7.77
4/16/2008	7.82
4/17/2008	7.86
4/18/2008	7.48
4/19/2008	7.65
4/20/2008	7.96
4/21/2008	8.12
4/22/2008	7.89
4/23/2008	7.82
4/24/2008	7.65
4/25/2008	7.70

Date	Avg. Daily Discharge
	feet^3 per second
7/28/2009	3.82
7/29/2009	3.81
7/30/2009	3.80
7/31/2009	3.80
8/1/2009	3.81
8/2/2009	3.79
8/3/2009	3.79
8/4/2009	3.80
8/5/2009	3.79
8/6/2009	3.80
8/7/2009	3.78
8/8/2009	3.76
8/9/2009	3.74
8/10/2009	3.69
8/11/2009	3.67
8/12/2009	3.68
8/13/2009	3.70
8/14/2009	3.70
8/15/2009	3.71
8/16/2009	3.84
8/17/2009	3.78
8/18/2009	3.76
8/19/2009	3.79
8/20/2009	3.77
8/21/2009	3.87
8/22/2009	4.14
8/23/2009	4.16
8/24/2009	3.85
8/25/2009	3.79
8/26/2009	3.67
8/27/2009	3.66
8/28/2009	3.60
8/29/2009	3.61
8/30/2009	3.66
8/31/2009	3.60
9/1/2009	3.60
9/2/2009	3.59
9/3/2009	3.58
9/4/2009	3.59
9/5/2009	3.60
9/6/2009	3.60
9/7/2009	3.56
9/8/2009	3.56
9/9/2009	3.56
9/10/2009	3.57
9/11/2009	3.56
9/12/2009	3.56
9/13/2009	3.54
9/14/2009	3.53
9/15/2009	3.53
9/16/2009	3.52
9/17/2009	3.74
9/18/2009	3.48
9/19/2009	3.49
9/20/2009	3.49
9/21/2009	3.47
9/22/2009	3.49
9/23/2009	3.52
9/24/2009	3.55
9/25/2009	3.53
9/26/2009	3.49
9/27/2009	3.48
9/28/2009	3.50
9/29/2009	3.53
9/30/2009	3.59
10/1/2009	3.43
10/2/2009	3.28
10/3/2009	3.24
10/4/2009	3.20
10/5/2009	3.16
10/6/2009	3.21
10/7/2009	3.29
10/8/2009	3.29
10/9/2009	3.33
10/10/2009	3.51
10/11/2009	3.68
10/12/2009	3.49
10/13/2009	4.61
10/14/2009	5.96
10/15/2009	4.01
10/16/2009	3.66
10/17/2009	3.39
10/18/2009	3.33
10/19/2009	3.35
10/20/2009	3.66
10/21/2009	3.80
10/22/2009	3.54
10/23/2009	3.47
10/24/2009	3.48
10/25/2009	3.52
10/26/2009	3.37
10/27/2009	3.40
10/28/2009	3.51
10/29/2009	3.49
10/30/2009	3.66
10/31/2009	3.78
11/1/2009	3.88
11/2/2009	5.36
11/3/2009	5.06
11/4/2009	4.31
11/5/2009	4.30
11/6/2009	4.28
11/7/2009	4.45
11/8/2009	4.52
11/9/2009	4.39
11/10/2009	4.57
11/11/2009	4.73
11/12/2009	4.44
11/13/2009	4.60
11/14/2009	4.81
11/15/2009	4.54
11/16/2009	4.44
11/17/2009	4.24
11/18/2009	4.26
11/19/2009	4.55
11/20/2009	4.65

Date	Avg. Daily Discharge
	feet^3 per second
2/28/2005	88.07
3/1/2005	78.62
3/2/2005	70.20
3/3/2005	64.07
3/4/2005	65.01
3/5/2005	143.36
3/6/2005	62.70
3/7/2005	55.63
3/8/2005	51.28
3/9/2005	50.47
3/10/2005	47.37
3/11/2005	44.50
3/12/2005	41.87
3/13/2005	40.72
3/14/2005	39.71
3/15/2005	37.88
3/16/2005	35.08
3/17/2005	34.07
3/18/2005	34.04
3/19/2005	54.57
3/20/2005	45.99
3/21/2005	33.50
3/22/2005	36.38
3/23/2005	184.94
3/24/2005	43.09
3/25/2005	38.65
3/26/2005	32.54
3/27/2005	29.94
3/28/2005	28.58
3/29/2005	28.08
3/30/2005	26.45
3/31/2005	25.40
4/1/2005	23.87
4/2/2005	23.54
4/3/2005	22.89
4/4/2005	22.81
4/5/2005	22.70
4/6/2005	21.73
4/7/2005	20.88
4/8/2005	20.67
4/9/2005	21.26
4/10/2005	20.87
4/11/2005	19.99
4/12/2005	20.12
4/13/2005	19.43
4/14/2005	19.32
4/15/2005	18.80
4/16/2005	19.16
4/17/2005	18.59
4/18/2005	18.35
4/19/2005	18.57
4/20/2005	18.32
4/21/2005	18.11
4/22/2005	18.99
4/23/2005	20.83
4/24/2005	20.16
4/25/2005	19.31
4/26/2005	18.40
4/27/2005	18.54
4/28/2005	165.88
4/29/2005	59.10
4/30/2005	22.71
5/1/2005	19.15
5/2/2005	17.87
5/3/2005	16.90
5/4/2005	15.67
5/5/2005	15.28
5/6/2005	22.55
5/7/2005	17.65
5/8/2005	14.63
5/9/2005	14.15
5/10/2005	13.79
5/11/2005	13.49
5/12/2005	13.21
5/13/2005	12.68
5/14/2005	12.41
5/15/2005	12.01
5/16/2005	11.87
5/17/2005	12.45
5/18/2005	12.42
5/19/2005	12.15
5/20/2005	11.81
5/21/2005	11.69
5/22/2005	11.15
5/23/2005	11.02
5/24/2005	10.85
5/25/2005	10.37
5/26/2005	10.25
5/27/2005	10.28
5/28/2005	10.23
5/29/2005	9.71
5/30/2005	9.63
5/31/2005	9.68
6/1/2005	9.56
6/2/2005	9.79
6/3/2005	10.39
6/4/2005	9.63
6/5/2005	9.70
6/6/2005	10.52
6/7/2005	9.99
6/8/2005	9.60
6/9/2005	9.48
6/10/2005	10.00
6/11/2005	10.28
6/12/2005	10.43
6/13/2005	9.93
6/14/2005	9.72
6/15/2005	9.79
6/16/2005	9.71
6/17/2005	9.43
6/18/2005	8.90
6/19/2005	8.65
6/20/2005	8.43
6/21/2005	8.30
6/22/2005	8.18
6/23/2005	7.97
6/24/2005	8.00
6/25/2005	7.89
6/26/2005	7.78
6/27/2005	7.88

Date	Avg. Daily Discharge
	feet^3 per second
9/25/2006	0.26
9/26/2006	0.25
9/27/2006	0.36
9/28/2006	0.32
9/29/2006	0.24
9/30/2006	0.27
10/1/2006	0.79
10/2/2006	0.79
10/3/2006	0.44
10/4/2006	0.14
10/5/2006	0.58
10/6/2006	0.22
10/7/2006	0.10
10/8/2006	0.10
10/9/2006	0.11
10/10/2006	1.88
10/11/2006	0.56
10/12/2006	0.10
10/13/2006	1.48
10/14/2006	37.98
10/15/2006	20.22
10/16/2006	7.16
10/17/2006	5.85
10/18/2006	3.72
10/19/2006	2.33
10/20/2006	1.80
10/21/2006	1.94
10/22/2006	3.39
10/23/2006	2.80
10/24/2006	3.75
10/25/2006	3.86
10/26/2006	2.55
10/27/2006	0.94
10/28/2006	0.55
10/29/2006	0.74
10/30/2006	1.52
10/31/2006	2.65
11/1/2006	3.23
11/2/2006	3.96
11/3/2006	4.86
11/4/2006	6.33
11/5/2006	3.51
11/6/2006	2.20
11/7/2006	2.41
11/8/2006	1.71
11/9/2006	3.63
11/10/2006	2.74
11/11/2006	2.61
11/12/2006	3.66
11/13/2006	1.64
11/14/2006	1.30
11/15/2006	1.81
11/16/2006	0.62
11/17/2006	1.32
11/18/2006	2.93
11/19/2006	3.00
11/20/2006	2.35
11/21/2006	2.75
11/22/2006	3.26
11/23/2006	4.34
11/24/2006	5.14
11/25/2006	5.19
11/26/2006	3.71
11/27/2006	14.04
11/28/2006	23.99
11/29/2006	2.63
11/30/2006	0.14
12/1/2006	0.09
12/2/2006	0.09
12/3/2006	0.10
12/4/2006	0.08
12/5/2006	0.91
12/6/2006	1.40
12/7/2006	2.17
12/8/2006	3.50
12/9/2006	6.29
12/10/2006	144.85
12/11/2006	33.46
12/12/2006	16.29
12/13/2006	12.50
12/14/2006	11.31
12/15/2006	11.56
12/16/2006	18.64
12/17/2006	73.32
12/18/2006	13.47
12/19/2006	4.49
12/20/2006	2.67
12/21/2006	2.60
12/22/2006	4.81
12/23/2006	4.94
12/24/2006	3.63
12/25/2006	3.90
12/26/2006	4.31
12/27/2006	29.43
12/28/2006	21.16
12/29/2006	6.73
12/30/2006	3.24
12/31/2006	3.23
1/1/2007	5.65
1/2/2007	4.51
1/3/2007	4.66
1/4/2007	9.12
1/5/2007	13.69
1/6/2007	4.27
1/7/2007	3.53
1/8/2007	5.91
1/9/2007	6.41
1/10/2007	6.01
1/11/2007	7.34
1/12/2007	7.25
1/13/2007	2.11
1/14/2007	0.39
1/15/2007	0.46
1/16/2007	0.29
1/17/2007	0.57
1/18/2007	0.95
1/19/2007	3.89
1/20/2007	3.58
1/21/2007	5.60
1/22/2007	2.43

Date	Avg. Daily Discharge
	feet^3 per second
4/26/2008	7.40
4/27/2008	7.00
4/28/2008	6.61
4/29/2008	6.54
4/30/2008	6.98
5/1/2008	7.28
5/2/2008	8.57
5/3/2008	7.42
5/4/2008	6.36
5/5/2008	6.52
5/6/2008	7.06
5/7/2008	8.04
5/8/2008	7.47
5/9/2008	7.19
5/10/2008	6.85
5/11/2008	7.08
5/12/2008	9.80
5/13/2008	7.27
5/14/2008	6.27
5/15/2008	6.17
5/16/2008	6.52
5/17/2008	6.04
5/18/2008	5.89
5/19/2008	5.73
5/20/2008	5.58
5/21/2008	5.97
5/22/2008	12.99
5/23/2008	40.06
5/24/2008	59.40
5/25/2008	8.98
5/26/2008	6.58
5/27/2008	6.23
5/28/2008	6.01
5/29/2008	5.93
5/30/2008	6.18
5/31/2008	5.83
6/1/2008	5.81
6/2/2008	6.43
6/3/2008	6.81
6/4/2008	5.65
6/5/2008	5.95
6/6/2008	5.78
6/7/2008	5.69
6/8/2008	5.73
6/9/2008	5.62
6/10/2008	5.60
6/11/2008	5.61
6/12/2008	4.94
6/13/2008	4.54
6/14/2008	4.69
6/15/2008	4.66
6/16/2008	4.50
6/17/2008	4.35
6/18/2008	4.37
6/19/2008	4.12
6/20/2008	5.15
6/21/2008	4.40
6/22/2008	3.85
6/23/2008	3.79
6/24/2008	3.99
6/25/2008	4.22
6/26/2008	4.35
6/27/2008	4.30
6/28/2008	4.40
6/29/2008	4.21
6/30/2008	4.10
7/1/2008	4.27
7/2/2008	4.37
7/3/2008	5.37
7/4/2008	4.44
7/5/2008	4.31
7/6/2008	4.39
7/7/2008	4.46
7/8/2008	4.54
7/9/2008	4.54
7/10/2008	4.71
7/11/2008	4.74
7/12/2008	4.73
7/13/2008	4.53
7/14/2008	4.48
7/15/2008	4.35
7/16/2008	4.33
7/17/2008	4.26
7/18/2008	4.30
7/19/2008	4.55
7/20/2008	4.41
7/21/2008	4.31
7/22/2008	4.35
7/23/2008	4.55
7/24/2008	4.14
7/25/2008	4.20
7/26/2008	4.19
7/27/2008	3.97
7/28/2008	4.18
7/29/2008	4.38
7/30/2008	4.70
7/31/2008	4.18
8/1/2008	4.17
8/2/2008	4.06
8/3/2008	4.14
8/4/2008	3.88
8/5/2008	3.82
8/6/2008	3.79
8/7/2008	4.04
8/8/2008	3.68
8/9/2008	3.79
8/10/2008	4.01
8/11/2008	3.66
8/12/2008	3.77
8/13/2008	3.91
8/14/2008	4.27
8/15/2008	4.31
8/16/2008	4.06
8/17/2008	3.82
8/18/2008	3.68
8/19/2008	3.96
8/20/2008	4.03
8/21/2008	4.46
8/22/2008	4.10
8/23/2008	4.15

Date	Avg. Daily Discharge
	feet^3 per second
11/21/2009	4.83
11/22/2009	4.78
11/23/2009	4.65
11/24/2009	4.72
11/25/2009	4.81
11/26/2009	4.43
11/27/2009	4.32
11/28/2009	102.54
11/29/2009	125.09
11/30/2009	10.07
12/1/2009	6.19
12/2/2009	5.35
12/3/2009	4.85
12/4/2009	4.58
12/5/2009	4.43
12/6/2009	4.48
12/7/2009	470.49
12/8/2009	145.74
12/9/2009	17.37
12/10/2009	10.00
12/11/2009	7.97
12/12/2009	46.10
12/13/2009	423.66
12/14/2009	34.81
12/15/2009	14.46
12/16/2009	10.10
12/17/2009	8.54
12/18/2009	7.65
12/19/2009	7.09
12/20/2009	6.65
12/21/2009	6.43
12/22/2009	9.36
12/23/2009	13.49
12/24/2009	6.92
12/25/2009	6.39
12/26/2009	6.17
12/27/2009	6.16
12/28/2009	6.06
12/29/2009	5.99
12/30/2009	5.89
12/31/2009	8.34
1/1/2010	6.73
1/2/2010	5.99
1/3/2010	5.94
1/4/2010	5.80
1/5/2010	6.30
1/6/2010	6.71
1/7/2010	6.23
1/8/2010	6.17
1/9/2010	5.84
1/10/2010	5.73
1/11/2010	5.65
1/12/2010	5.71
1/13/2010	6.12
1/14/2010	6.02
1/15/2010	5.97
1/16/2010	5.90
1/17/2010	5.90
1/18/2010	423.89
1/19/2010	285.80
1/20/2010	405.13
1/21/2010	1202.24
1/22/2010	515.11
1/23/2010	167.87
1/24/2010	77.49
1/25/2010	49.07
1/26/2010	37.83
1/27/2010	55.70
1/28/2010	28.81
1/29/2010	24.13
1/30/2010	21.17
1/31/2010	19.45
2/1/2010	18.20
2/2/2010	17.41
2/3/2010	16.32
2/4/2010	15.33
2/5/2010	15.57
2/6/2010	201.31
2/7/2010	139.60
2/8/2010	38.86
2/9/2010	102.27
2/10/2010	201.72
2/11/2010	41.15
2/12/2010	30.67
2/13/2010	26.47
2/14/2010	27.16
2/15/2010	22.05
2/16/2010	20.22
2/17/2010	18.52
2/18/2010	17.45
2/19/2010	17.21
2/20/2010	131.41
2/21/2010	39.09
2/22/2010	64.82
2/23/2010	31.73
2/24/2010	20.95
2/25/2010	20.55
2/26/2010	18.70
2/27/2010	213.07
2/28/2010	201.61
3/1/2010	57.86
3/2/2010	41.16
3/3/2010	34.20
3/4/2010	36.86
3/5/2010	29.63
3/6/2010	30.73
3/7/2010	117.92
3/8/2010	61.53
3/9/2010	36.76
3/10/2010	27.50
3/11/2010	24.28
3/12/2010	22.45
3/13/2010	21.20
3/14/2010	20.60
3/15/2010	18.92
3/16/2010	17.45
3/17/2010	17.11
3/18/2010	16.66
3/19/2010	16.12
3/20/2010	15.67

Date	Avg. Daily Discharge
	feet^3 per second
6/28/2005	7.92
6/29/2005	7.75
6/30/2005	7.51
7/1/2005	7.40
7/2/2005	7.24
7/3/2005	7.09
7/4/2005	7.06
7/5/2005	7.00
7/6/2005	6.97
7/7/2005	6.97
7/8/2005	6.88
7/9/2005	6.99
7/10/2005	7.08
7/11/2005	6.99
7/12/2005	7.00
7/13/2005	6.96
7/14/2005	7.03
7/15/2005	6.75
7/16/2005	6.39
7/17/2005	6.09
7/18/2005	5.87
7/19/2005	6.19
7/20/2005	5.88
7/21/2005	5.61
7/22/2005	5.88
7/23/2005	7.40
7/24/2005	6.26
7/25/2005	5.61
7/26/2005	5.70
7/27/2005	5.64
7/28/2005	5.59
7/29/2005	5.44
7/30/2005	5.98
7/31/2005	5.39
8/1/2005	5.33
8/2/2005	5.58
8/3/2005	5.53
8/4/2005	5.42
8/5/2005	5.47
8/6/2005	5.43
8/7/2005	5.41
8/8/2005	5.47
8/9/2005	5.52
8/10/2005	5.68
8/11/2005	5.66
8/12/2005	5.58
8/13/2005	5.70
8/14/2005	5.71
8/15/2005	5.87
8/16/2005	6.06
8/17/2005	6.37
8/18/2005	5.49
8/19/2005	5.45
8/20/2005	5.43
8/21/2005	5.45
8/22/2005	5.62
8/23/2005	5.59
8/24/2005	5.68
8/25/2005	5.31
8/26/2005	4.96
8/27/2005	4.85
8/28/2005	4.93
8/29/2005	4.96
8/30/2005	4.96
8/31/2005	5.01
9/1/2005	5.30
9/2/2005	5.20
9/3/2005	5.32
9/4/2005	5.27
9/5/2005	5.19
9/6/2005	5.07
9/7/2005	5.80
9/8/2005	5.27
9/9/2005	5.41
9/10/2005	5.76
9/11/2005	5.81
9/12/2005	5.62
9/13/2005	5.74
9/14/2005	5.69
9/15/2005	5.83
9/16/2005	5.88
9/17/2005	5.76
9/18/2005	5.96
9/19/2005	5.80
9/20/2005	20.17
9/21/2005	9.19
9/22/2005	5.97
9/23/2005	5.42
9/24/2005	5.32
9/25/2005	5.29
9/26/2005	5.30
9/27/2005	5.08
9/28/2005	4.93
9/29/2005	4.78
9/30/2005	4.75
10/1/2005	4.91
10/2/2005	4.80
10/3/2005	5.03
10/4/2005	5.56
10/5/2005	5.28
10/6/2005	5.25
10/7/2005	4.89
10/8/2005	4.79
10/9/2005	5.12
10/10/2005	5.27
10/11/2005	5.54
10/12/2005	5.38
10/13/2005	5.49
10/14/2005	5.18
10/15/2005	4.99
10/16/2005	6.71
10/17/2005	59.49
10/18/2005	117.98
10/19/2005	23.47
10/20/2005	8.99
10/21/2005	7.44
10/22/2005	6.91
10/23/2005	6.68
10/24/2005	6.42
10/25/2005	6.42

Date	Avg. Daily Discharge
	feet^3 per second
1/23/2007	2.20
1/24/2007	2.43
1/25/2007	3.39
1/26/2007	5.03
1/27/2007	10.15
1/28/2007	9.95
1/29/2007	8.80
1/30/2007	79.86
1/31/2007	261.91
2/1/2007	36.71
2/2/2007	16.84
2/3/2007	11.10
2/4/2007	10.60
2/5/2007	12.80
2/6/2007	15.14
2/7/2007	15.13
2/8/2007	11.46
2/9/2007	12.52
2/10/2007	13.83
2/11/2007	41.79
2/12/2007	51.83
2/13/2007	138.57
2/14/2007	56.71
2/15/2007	21.79
2/16/2007	18.46
2/17/2007	13.60
2/18/2007	10.81
2/19/2007	187.51
2/20/2007	82.47
2/21/2007	16.67
2/22/2007	18.14
2/23/2007	66.33
2/24/2007	12.09
2/25/2007	6.80
2/26/2007	10.22
2/27/2007	73.03
2/28/2007	64.86
3/1/2007	16.72
3/2/2007	7.93
3/3/2007	7.27
3/4/2007	11.22
3/5/2007	12.64
3/6/2007	11.45
3/7/2007	14.80
3/8/2007	13.99
3/9/2007	15.03
3/10/2007	17.63
3/11/2007	16.48
3/12/2007	15.64
3/13/2007	15.09
3/14/2007	19.40
3/15/2007	20.35
3/16/2007	18.80
3/17/2007	20.79
3/18/2007	22.93
3/19/2007	17.13
3/20/2007	4.61
3/21/2007	13.58
3/22/2007	6.84
3/23/2007	7.96
3/24/2007	5.91
3/25/2007	6.27
3/26/2007	3.91
3/27/2007	3.38
3/28/2007	2.71
3/29/2007	0.74
3/30/2007	0.75
3/31/2007	0.70
4/1/2007	1.44
4/2/2007	2.83
4/3/2007	4.47
4/4/2007	5.59
4/5/2007	5.05
4/6/2007	4.58
4/7/2007	3.83
4/8/2007	3.82
4/9/2007	5.18
4/10/2007	5.80
4/11/2007	5.42
4/12/2007	4.67
4/13/2007	2.34
4/14/2007	1.61
4/15/2007	2.16
4/16/2007	1.70
4/17/2007	2.08
4/18/2007	3.12
4/19/2007	1.63
4/20/2007	37.42
4/21/2007	35.64
4/22/2007	3.54
4/23/2007	15.64
4/24/2007	5.55
4/25/2007	4.56
4/26/2007	6.60
4/27/2007	6.28
4/28/2007	8.51
4/29/2007	8.15
4/30/2007	8.49
5/1/2007	7.35
5/2/2007	8.03
5/3/2007	7.15
5/4/2007	3.98
5/5/2007	4.99
5/6/2007	4.24
5/7/2007	4.83
5/8/2007	6.62
5/9/2007	7.43
5/10/2007	9.36
5/11/2007	6.64
5/12/2007	7.39
5/13/2007	6.42
5/14/2007	7.15
5/15/2007	5.82
5/16/2007	4.79
5/17/2007	5.50
5/18/2007	6.64
5/19/2007	7.73
5/20/2007	8.23
5/21/2007	6.44
5/22/2007	5.83

Date	Avg. Daily Discharge
	feet^3 per second
9/24/2008	4.03
9/25/2008	4.06
9/26/2008	4.33
9/27/2008	3.94
9/28/2008	3.99
9/29/2008	3.87
9/30/2008	4.18
9/31/2008	4.30
9/1/2008	3.91
9/2/2008	3.76
9/3/2008	3.90
9/4/2008	3.72
9/5/2008	3.78
9/6/2008	3.97
9/7/2008	4.17
9/8/2008	4.21
9/9/2008	4.19
9/10/2008	3.92
9/11/2008	3.66
9/12/2008	4.01
9/13/2008	4.54
9/14/2008	4.24
9/15/2008	4.13
9/16/2008	4.07
9/17/2008	3.98
9/18/2008	3.93
9/19/2008	3.78
9/20/2008	3.79
9/21/2008	3.70
9/22/2008	3.71
9/23/2008	3.89
9/24/2008	3.98
9/25/2008	3.82
9/26/2008	3.59
9/27/2008	3.63
9/28/2008	3.69
9/29/2008	3.70
9/30/2008	3.53
10/1/2008	3.41
10/2/2008	3.40
10/3/2008	3.53
10/4/2008	3.71
10/5/2008	16.09
10/6/2008	6.62
10/7/2008	4.14
10/8/2008	3.62
10/9/2008	3.40
10/10/2008	3.74
10/11/2008	3.70
10/12/2008	3.65
10/13/2008	3.44
10/14/2008	3.38
10/15/2008	3.35
10/16/2008	3.47
10/17/2008	3.39
10/18/2008	3.41
10/19/2008	3.55
10/20/2008	3.68
10/21/2008	3.72
10/22/2008	3.62
10/23/2008	3.88
10/24/2008	3.34
10/25/2008	3.27
10/26/2008	3.28
10/27/2008	3.42
10/28/2008	3.48
10/29/2008	3.31
10/30/2008	3.27
10/31/2008	3.42
11/1/2008	3.44
11/2/2008	3.50
11/3/2008	3.99
11/4/2008	12.63
11/5/2008	14.37
11/6/2008	4.79
11/7/2008	3.84
11/8/2008	3.56
11/9/2008	4.80
11/10/2008	9.06
11/11/2008	4.54
11/12/2008	4.06
11/13/2008	3.97
11/14/2008	3.95
11/15/2008	3.78
11/16/2008	3.41
11/17/2008	3.41
11/18/2008	3.62
11/19/2008	3.80
11/20/2008	3.92
11/21/2008	4.07
11/22/2008	3.95
11/23/2008	3.96
11/24/2008	4.33
11/25/2008	4.51
11/26/2008	171.45
11/27/2008	82.69
11/28/2008	15.24
11/29/2008	6.52
11/30/2008	5.26
12/1/2008	4.69
12/2/2008	4.53
12/3/2008	4.38
12/4/2008	4.25
12/5/2008	4.24
12/6/2008	4.04
12/7/2008	3.91
12/8/2008	5.69
12/9/2008	4.74
12/10/2008	4.12
12/11/2008	3.95
12/12/2008	4.14
12/13/2008	4.22
12/14/2008	4.29
12/15/2008	384.88
12/16/2008	138.94
12/17/2008	528.65
12/18/2008	262.45
12/19/2008	29.00
12/20/2008	15.15
12/21/2008	11.05

Date	Avg. Daily Discharge
	feet^3 per second
3/21/2010	15.23
3/22/2010	15.23
3/23/2010	15.45
3/24/2010	14.58
3/25/2010	14.49
3/26/2010	14.43
3/27/2010	13.94
3/28/2010	12.88
3/29/2010	12.42
3/30/2010	12.76
3/31/2010	12.94
4/1/2010	65.44
4/2/2010	24.02
4/3/2010	14.95
4/4/2010	13.53
4/5/2010	23.98
4/6/2010	34.08
4/7/2010	14.90
4/8/2010	29.10
4/9/2010	12.57
4/10/2010	12.63
4/11/2010	11.98
4/12/2010	185.43
4/13/2010	50.08
4/14/2010	21.00
4/15/2010	17.47
4/16/2010	15.97
4/17/2010	14.87
4/18/2010	14.06
4/19/2010	14.11
4/20/2010	13.19
4/21/2010	24.10
4/22/2010	158.57
4/23/2010	41.50
4/24/2010	19.27
4/25/2010	15.85
4/26/2010	14.83
4/27/2010	14.06
4/28/2010	16.55
4/29/2010	16.72
4/30/2010	12.35
5/1/2010	11.78
5/2/2010	11.37
5/3/2010	10.99
5/4/2010	10.49
5/5/2010	10.38
5/6/2010	10.42
5/7/2010	10.26
5/8/2010	10.02
5/9/2010	9.59
5/10/2010	9.53
5/11/2010	9.51
5/12/2010	9.42
5/13/2010	9.33
5/14/2010	9.25
5/15/2010	9.27
5/16/2010	9.54
5/17/2010	10.01
5/18/2010	9.96
5/19/2010	9.77
5/20/2010	9.21
5/21/2010	8.95
5/22/2010	8.70
5/23/2010	8.40
5/24/2010	8.19
5/25/2010	8.20
5/26/2010	8.48
5/27/2010	8.32
5/28/2010	7.99
5/29/2010	7.93
5/30/2010	8.23
5/31/2010	7.86
6/1/2010	7.68
6/2/2010	7.89
6/3/2010	7.60
6/4/2010	7.37
6/5/2010	7.24
6/6/2010	7.09
6/7/2010	6.77
6/8/2010	6.74
6/9/2010	7.07
6/10/2010	7.54
6/11/2010	7.47
6/12/2010	7.55
6/13/2010	7.21
6/14/2010	6.76
6/15/2010	6.85
6/16/2010	6.56
6/17/2010	6.46
6/18/2010	6.48
6/19/2010	6.35
6/20/2010	6.21
6/21/2010	6.26
6/22/2010	6.11
6/23/2010	6.13
6/24/2010	6.39
6/25/2010	6.07
6/26/2010	6.34
6/27/2010	6.02
6/28/2010	5.96
6/29/2010	6.70
6/30/2010	6.77
7/1/2010	6.25
7/2/2010	6.22
7/3/2010	5.90
7/4/2010	5.51
7/5/2010	5.99
7/6/2010	6.54
7/7/2010	7.57
7/8/2010	7.67
7/9/2010	7.29
7/10/2010	6.66
7/11/2010	6.34
7/12/2010	5.97
7/13/2010	5.59
7/14/2010	5.39
7/15/2010	5.19
7/16/2010	5.26
7/17/2010	5.12
7/18/2010	5.11

Date	Avg. Daily Discharge
	feet^3 per second
10/26/2005	6.92
10/27/2005	5.98
10/28/2005	5.75
10/29/2005	5.46
10/30/2005	5.40
10/31/2005	5.34
11/1/2005	5.68
11/2/2005	5.42
11/3/2005	5.15
11/4/2005	5.13
11/5/2005	5.23
11/6/2005	7.01
11/7/2005	5.81
11/8/2005	5.71
11/9/2005	5.47
11/10/2005	5.47
11/11/2005	6.84
11/12/2005	5.16
11/13/2005	5.15
11/14/2005	5.12
11/15/2005	5.43
11/16/2005	4.98
11/17/2005	4.71
11/18/2005	4.90
11/19/2005	4.79
11/20/2005	4.79
11/21/2005	5.29
11/22/2005	7.13
11/23/2005	5.28
11/24/2005	5.53
11/25/2005	5.54
11/26/2005	5.78
11/27/2005	5.43
11/28/2005	5.49
11/29/2005	5.36
11/30/2005	5.33
12/1/2005	5.44
12/2/2005	5.62
12/3/2005	7.83
12/4/2005	6.58
12/5/2005	5.51
12/6/2005	5.47
12/7/2005	5.51
12/8/2005	5.40
12/9/2005	5.17
12/10/2005	5.16
12/11/2005	4.88
12/12/2005	4.81
12/13/2005	5.24
12/14/2005	7.05
12/15/2005	7.33
12/16/2005	5.73
12/17/2005	5.84
12/18/2005	5.65
12/19/2005	5.72
12/20/2005	5.50
12/21/2005	5.44
12/22/2005	5.26
12/23/2005	5.68
12/24/2005	5.68
12/25/2005	5.49
12/26/2005	5.60
12/27/2005	5.62
12/28/2005	5.54
12/29/2005	5.73
12/30/2005	5.83
12/31/2005	7.28
1/1/2006	57.28
1/2/2006	215.87
1/3/2006	143.61
1/4/2006	18.42
1/5/2006	12.02
1/6/2006	9.36
1/7/2006	8.16
1/8/2006	12.10
1/9/2006	9.60
1/10/2006	7.43
1/11/2006	7.01
1/12/2006	6.79
1/13/2006	6.38
1/14/2006	6.31
1/15/2006	6.66
1/16/2006	7.45
1/17/2006	6.15
1/18/2006	6.20
1/19/2006	7.03
1/20/2006	6.06
1/21/2006	5.79
1/22/2006	5.40
1/23/2006	5.36
1/24/2006	5.16
1/25/2006	5.26
1/26/2006	5.46
1/27/2006	5.56
1/28/2006	5.70
1/29/2006	5.67
1/30/2006	5.98
1/31/2006	6.03
2/1/2006	5.90
2/2/2006	5.68
2/3/2006	5.78
2/4/2006	6.08
2/5/2006	6.16
2/6/2006	5.91
2/7/2006	5.20
2/8/2006	5.10
2/9/2006	5.05
2/10/2006	5.71
2/11/2006	6.64
2/12/2006	6.58
2/13/2006	6.40
2/14/2006	6.57
2/15/2006	6.75
2/16/2006	6.43
2/17/2006	6.35
2/18/2006	16.32
2/19/2006	32.28
2/20/2006	10.95
2/21/2006	6.51
2/22/2006	6.19

Date	Avg. Daily Discharge
	feet^3 per second
5/23/2007	13.77
5/24/2007	11.08
5/25/2007	10.48
5/26/2007	9.12
5/27/2007	9.27
5/28/2007	8.99
5/29/2007	9.73
5/30/2007	7.70
5/31/2007	9.63
6/1/2007	8.10
6/2/2007	8.07
6/3/2007	8.63
6/4/2007	10.76
6/5/2007	11.14
6/6/2007	10.30
6/7/2007	7.38
6/8/2007	4.66
6/9/2007	2.07
6/10/2007	2.07
6/11/2007	3.38
6/12/2007	4.81
6/13/2007	4.12
6/14/2007	5.54
6/15/2007	6.92
6/16/2007	6.39
6/17/2007	6.18
6/18/2007	5.60
6/19/2007	4.85
6/20/2007	6.02
6/21/2007	5.97
6/22/2007	5.29
6/23/2007	5.50
6/24/2007	5.93
6/25/2007	5.56
6/26/2007	4.94
6/27/2007	5.82
6/28/2007	5.33
6/29/2007	6.37
6/30/2007	6.53
7/1/2007	8.57
7/2/2007	8.19
7/3/2007	8.51
7/4/2007	8.11
7/5/2007	7.14
7/6/2007	9.78
7/7/2007	10.46
7/8/2007	9.75
7/9/2007	8.40
7/10/2007	7.42
7/11/2007	8.13
7/12/2007	7.99
7/13/2007	8.10
7/14/2007	9.24
7/15/2007	9.50
7/16/2007	9.35
7/17/2007	9.03
7/18/2007	9.08
7/19/2007	9.25
7/20/2007	8.28
7/21/2007	8.44
7/22/2007	8.16
7/23/2007	9.16
7/24/2007	11.12
7/25/2007	10.12
7/26/2007	10.83
7/27/2007	10.94
7/28/2007	8.15
7/29/2007	7.90
7/30/2007	6.77
7/31/2007	7.97
8/1/2007	7.27
8/2/2007	4.28
8/3/2007	1.52
8/4/2007	1.75
8/5/2007	0.78
8/6/2007	0.38
8/7/2007	0.99
8/8/2007	0.17
8/9/2007	0.48
8/10/2007	0.20
8/11/2007	0.69
8/12/2007	0.17
8/13/2007	0.10
8/14/2007	0.10
8/15/2007	0.39
8/16/2007	0.94
8/17/2007	0.11
8/18/2007	0.10
8/19/2007	0.10
8/20/2007	0.09
8/21/2007	0.15
8/22/2007	0.10
8/23/2007	0.10
8/24/2007	0.42
8/25/2007	0.11
8/26/2007	279.93
8/27/2007	16.80
8/28/2007	4.69
8/29/2007	2.32
8/30/2007	2.68
8/31/2007	2.28
9/1/2007	1.58
9/2/2007	0.60
9/3/2007	0.58
9/4/2007	0.22
9/5/2007	0.10
9/6/2007	0.59
9/7/2007	0.09
9/8/2007	0.08
9/9/2007	0.09
9/10/2007	0.09
9/11/2007	0.08
9/12/2007	0.08
9/13/2007	0.08
9/14/2007	0.08
9/15/2007	0.08
9/16/2007	0.08
9/17/2007	0.08
9/18/2007	0.08
9/19/2007	0.08

Date	Avg. Daily Discharge
	feet^3 per second
12/22/2008	121.72
12/23/2008	50.05
12/24/2008	13.32
12/25/2008	43.83
12/26/2008	91.05
12/27/2008	12.96
12/28/2008	9.42
12/29/2008	8.45
12/30/2008	7.92
12/31/2008	7.36
1/1/2009	6.95
1/2/2009	6.72
1/3/2009	7.16
1/4/2009	8.60
1/5/2009	6.44
1/6/2009	6.21
1/7/2009	6.33
1/8/2009	6.33
1/9/2009	6.29
1/10/2009	6.01
1/11/2009	5.66
1/12/2009	5.63
1/13/2009	6.06
1/14/2009	7.12
1/15/2009	6.53
1/16/2009	5.90
1/17/2009	5.82
1/18/2009	5.73
1/19/2009	5.66
1/20/2009	5.65
1/21/2009	5.78
1/22/2009	5.75
1/23/2009	5.91
1/24/2009	6.79
1/25/2009	5.82
1/26/2009	6.63
1/27/2009	7.50
1/28/2009	6.01
1/29/2009	5.78
1/30/2009	5.69
1/31/2009	5.64
2/1/2009	5.58
2/2/2009	5.70
2/3/2009	5.53
2/4/2009	5.53
2/5/2009	18.17
2/6/2009	243.58
2/7/2009	413.74
2/8/2009	128.33
2/9/2009	252.17
2/10/2009	157.46
2/11/2009	27.77
2/12/2009	21.03
2/13/2009	16.07
2/14/2009	76.09
2/15/2009	15.85
2/16/2009	185.82
2/17/2009	100.28
2/18/2009	27.11
2/19/2009	19.23
2/20/2009	15.72
2/21/2009	13.73
2/22/2009	12.38
2/23/2009	12.03
2/24/2009	11.20
2/25/2009	10.72
2/26/2009	10.31
2/27/2009	10.11
2/28/2009	10.03
3/1/2009	9.72
3/2/2009	9.34
3/3/2009	9.15
3/4/2009	9.07
3/5/2009	9.49
3/6/2009	9.34
3/7/2009	9.17
3/8/2009	9.02
3/9/2009	9.09
3/10/2009	8.85
3/11/2009	8.71
3/12/2009	8.69
3/13/2009	8.74
3/14/2009	8.57
3/15/2009	8.73
3/16/2009	8.56
3/17/2009	8.31
3/18/2009	8.05
3/19/2009	7.98
3/20/2009	7.92
3/21/2009	7.93
3/22/2009	14.92
3/23/2009	17.03
3/24/2009	8.57
3/25/2009	7.78
3/26/2009	7.63
3/27/2009	7.56
3/28/2009	7.29
3/29/2009	7.31
3/30/2009	7.45
3/31/2009	7.29
4/1/2009	7.42
4/2/2009	7.58
4/3/2009	7.62
4/4/2009	7.55
4/5/2009	7.17
4/6/2009	6.66
4/7/2009	6.66
4/8/2009	8.71
4/9/2009	8.82
4/10/2009	11.65
4/11/2009	13.31
4/12/2009	9.05
4/13/2009	7.51
4/14/2009	7.34
4/15/2009	7.42
4/16/2009	6.77
4/17/2009	6.63
4/18/2009	6.52
4/19/2009	6.27
4/20/2009	6.06

Date	Avg. Daily Discharge
	feet^3 per second
7/19/2010	5.26
7/20/2010	5.21
7/21/2010	5.70
7/22/2010	6.04
7/23/2010	5.83
7/24/2010	5.81
7/25/2010	5.75
7/26/2010	5.71
7/27/2010	5.90
7/28/2010	5.88
7/29/2010	5.76
7/30/2010	5.75
7/31/2010	5.72
8/1/2010	5.68
8/2/2010	5.60
8/3/2010	5.51
8/4/2010	5.50
8/5/2010	5.50
8/6/2010	5.47
8/7/2010	5.54
8/8/2010	5.63
8/9/2010	5.37
8/10/2010	5.34
8/11/2010	5.38
8/12/2010	5.37
8/13/2010	5.40
8/14/2010	5.50
8/15/2010	5.45
8/16/2010	5.44
8/17/2010	5.48
8/18/2010	5.40
8/19/2010	5.34
8/20/2010	5.32
8/21/2010	5.32
8/22/2010	5.35
8/23/2010	5.33
8/24/2010	5.24
8/25/2010	5.24
8/26/2010	5.26
8/27/2010	5.23
8/28/2010	5.24
8/29/2010	5.22
8/30/2010	5.16
8/31/2010	5.20
9/1/2010	5.28
9/2/2010	5.30
9/3/2010	5.31
9/4/2010	5.33
9/5/2010	5.28
9/6/2010	5.26
9/7/2010	5.18
9/8/2010	5.13
9/9/2010	5.13
9/10/2010	5.11
9/11/2010	5.13
9/12/2010	5.10
9/13/2010	5.02
9/14/2010	4.96
9/15/2010	4.92
9/16/2010	4.94
9/17/2010	4.99
9/18/2010	5.34
9/19/2010	5.27
9/20/2010	5.28
9/21/2010	5.32
9/22/2010	5.42
9/23/2010	5.23
9/24/2010	5.21
9/25/2010	5.04
9/26/2010	4.88
9/27/2010	4.99
9/28/2010	5.03
9/29/2010	5.15
9/30/2010	5.67
10/1/2010	17.92
10/2/2010	7.75
10/3/2010	6.00
10/4/2010	6.09
10/5/2010	7.90
10/6/2010	21.58
10/7/2010	19.11
10/8/2010	7.01
10/9/2010	5.90
10/10/2010	5.56
10/11/2010	5.31
10/12/2010	5.55
10/13/2010	5.55
10/14/2010	5.67
10/15/2010	5.89
10/16/2010	7.64
10/17/2010	8.76
10/18/2010	15.26
10/19/2010	638.56
10/20/2010	348.41
10/21/2010	74.47
10/22/2010	20.74
10/23/2010	14.60
10/24/2010	11.49
10/25/2010	51.06
10/26/2010	22.13
10/27/2010	10.63
10/28/2010	8.78
10/29/2010	8.13
10/30/2010	31.51
10/31/2010	17.99
11/1/2010	9.25
11/2/2010	7.99
11/3/2010	7.20
11/4/2010	7.04
11/5/2010	7.02
11/6/2010	7.10
11/7/2010	7.34
11/8/2010	9.64
11/9/2010	12.22
11/10/2010	7.67
11/11/2010	7.74
11/12/2010	7.34
11/13/2010	7.01
11/14/2010	6.74
11/15/2010	6.74

Date	Avg. Daily Discharge
	feet^3 per second
2/23/2006	5.59
2/24/2006	5.39
2/25/2006	5.43
2/26/2006	5.49
2/27/2006	5.47
2/28/2006	257.67
3/1/2006	37.82
3/2/2006	13.70
3/3/2006	10.50
3/4/2006	12.29
3/5/2006	8.30
3/6/2006	7.71
3/7/2006	11.35
3/8/2006	14.64
3/9/2006	10.24
3/10/2006	46.39
3/11/2006	286.00
3/12/2006	76.15
3/13/2006	51.81
3/14/2006	16.45
3/15/2006	13.29
3/16/2006	11.58
3/17/2006	10.76
3/18/2006	54.28
3/19/2006	30.87
3/20/2006	15.82
3/21/2006	65.03
3/22/2006	18.34
3/23/2006	10.59
3/24/2006	9.09
3/25/2006	8.84
3/26/2006	15.84
3/27/2006	10.38
3/28/2006	10.83
3/29/2006	173.80
3/30/2006	23.46
3/31/2006	14.69
4/1/2006	10.65
4/2/2006	8.37
4/3/2006	8.04
4/4/2006	15.57
4/5/2006	328.82
4/6/2006	53.45
4/7/2006	20.31
4/8/2006	14.87
4/9/2006	12.40
4/10/2006	11.24
4/11/2006	11.56
4/12/2006	10.14
4/13/2006	9.37
4/14/2006	19.56
4/15/2006	85.30
4/16/2006	22.09
4/17/2006	12.05
4/18/2006	10.18
4/19/2006	9.81
4/20/2006	9.41
4/21/2006	8.91
4/22/2006	8.48
4/23/2006	11.18
4/24/2006	9.21
4/25/2006	7.45
4/26/2006	7.89
4/27/2006	7.40
4/28/2006	7.85
4/29/2006	8.18
4/30/2006	8.56
5/1/2006	8.86
5/2/2006	9.10
5/3/2006	8.26
5/4/2006	7.96
5/5/2006	7.00
5/6/2006	7.08
5/7/2006	7.11
5/8/2006	7.13
5/9/2006	7.48
5/10/2006	7.40
5/11/2006	7.88
5/12/2006	7.85
5/13/2006	7.84
5/14/2006	6.76
5/15/2006	7.01
5/16/2006	7.50
5/17/2006	8.41
5/18/2006	7.03
5/19/2006	6.42
5/20/2006	4.94
5/21/2006	4.36
5/22/2006	116.46
5/23/2006	16.54
5/24/2006	7.22
5/25/2006	6.43
5/26/2006	5.68
5/27/2006	5.87
5/28/2006	4.87
5/29/2006	3.06
5/30/2006	3.97
5/31/2006	4.33

Date	Avg. Daily Discharge
	feet^3 per second
9/20/2007	0.08
9/21/2007	0.06
9/22/2007	0.07
9/23/2007	0.08
9/24/2007	0.06
9/25/2007	0.07
9/26/2007	0.07
9/27/2007	0.07
9/28/2007	0.08
9/29/2007	0.08
9/30/2007	0.07
10/1/2007	0.08
10/2/2007	0.08
10/3/2007	0.08
10/4/2007	0.08
10/5/2007	0.08
10/6/2007	0.06
10/7/2007	0.05
10/8/2007	0.04
10/9/2007	0.03
10/10/2007	0.04
10/11/2007	0.06
10/12/2007	0.06
10/13/2007	1.47
10/14/2007	0.33
10/15/2007	0.07
10/16/2007	0.07
10/17/2007	3.07
10/18/2007	4.02
10/19/2007	3.40
10/20/2007	3.15
10/21/2007	3.55
10/22/2007	3.91
10/23/2007	2.77
10/24/2007	2.29
10/25/2007	1.63
10/26/2007	1.18
10/27/2007	2.19
10/28/2007	3.16
10/29/2007	2.72
10/30/2007	2.93
10/31/2007	2.54
11/1/2007	2.27
11/2/2007	4.55
11/3/2007	5.31
11/4/2007	5.08
11/5/2007	5.10
11/6/2007	4.62
11/7/2007	4.65
11/8/2007	4.12
11/9/2007	3.82
11/10/2007	1.93
11/11/2007	0.81
11/12/2007	2.26
11/13/2007	1.40
11/14/2007	1.02
11/15/2007	0.78
11/16/2007	1.67
11/17/2007	3.18
11/18/2007	2.58
11/19/2007	3.71
11/20/2007	1.76
11/21/2007	1.85
11/22/2007	0.78
11/23/2007	0.28
11/24/2007	0.09
11/25/2007	0.07
11/26/2007	1.17
11/27/2007	0.51
11/28/2007	0.08
11/29/2007	0.08
11/30/2007	422.91
12/1/2007	405.42
12/2/2007	35.53
12/3/2007	13.86
12/4/2007	16.41
12/5/2007	13.78
12/6/2007	15.13
12/7/2007	125.17
12/8/2007	110.91
12/9/2007	73.70
12/10/2007	14.35
12/11/2007	13.23
12/12/2007	9.94
12/13/2007	8.48
12/14/2007	7.15
12/15/2007	6.59
12/16/2007	5.94
12/17/2007	6.40
12/18/2007	6.91
12/19/2007	51.03
12/20/2007	23.59
12/21/2007	42.50
12/22/2007	10.13
12/23/2007	7.07
12/24/2007	6.76
12/25/2007	6.23
12/26/2007	5.12
12/27/2007	6.18
12/28/2007	8.70
12/29/2007	8.59
12/30/2007	8.38
12/31/2007	8.29

Date	Avg. Daily Discharge
	feet^3 per second
4/21/2009	5.94
4/22/2009	5.80
4/23/2009	6.38
4/24/2009	6.16
4/25/2009	6.24
4/26/2009	5.99
4/27/2009	6.11
4/28/2009	6.13
4/29/2009	5.95
4/30/2009	5.87
5/1/2009	5.92
5/2/2009	5.96
5/3/2009	6.03
5/4/2009	9.21
5/5/2009	6.47
5/6/2009	6.07
5/7/2009	5.80
5/8/2009	5.93
5/9/2009	6.60
5/10/2009	6.06
5/11/2009	5.68
5/12/2009	5.91
5/13/2009	5.78
5/14/2009	5.67
5/15/2009	5.96
5/16/2009	5.63
5/17/2009	5.72
5/18/2009	5.78
5/19/2009	5.85
5/20/2009	5.75
5/21/2009	5.64
5/22/2009	5.60
5/23/2009	5.57
5/24/2009	5.55
5/25/2009	5.56
5/26/2009	5.56
5/27/2009	5.67
5/28/2009	5.61
5/29/2009	5.99
5/30/2009	6.95
5/31/2009	7.26
6/1/2009	6.85
6/2/2009	6.28
6/3/2009	5.68
6/4/2009	6.87
6/5/2009	5.73
6/6/2009	5.56
6/7/2009	5.55
6/8/2009	5.51
6/9/2009	5.52
6/10/2009	5.49
6/11/2009	5.61
6/12/2009	5.60
6/13/2009	5.72
6/14/2009	5.71
6/15/2009	5.56
6/16/2009	5.62
6/17/2009	5.65
6/18/2009	5.54
6/19/2009	5.53
6/20/2009	5.52
6/21/2009	5.69
6/22/2009	5.55
6/23/2009	5.62
6/24/2009	5.67
6/25/2009	5.68
6/26/2009	5.68
6/27/2009	5.70
6/28/2009	5.68
6/29/2009	5.62
6/30/2009	5.67
7/1/2009	5.65
7/2/2009	5.57
7/3/2009	5.60
7/4/2009	5.59
7/5/2009	5.71
7/6/2009	5.75
7/7/2009	5.73
7/8/2009	5.71
7/9/2009	5.63
7/10/2009	5.62
7/11/2009	5.61
7/12/2009	5.65
7/13/2009	5.65
7/14/2009	5.65
7/15/2009	5.41
7/16/2009	4.60
7/17/2009	4.16
7/18/2009	4.08
7/19/2009	4.07
7/20/2009	3.98
7/21/2009	3.99
7/22/2009	3.96
7/23/2009	3.91
7/24/2009	3.89
7/25/2009	3.90
7/26/2009	3.88
7/27/2009	3.93

Date	Avg. Daily Discharge
	feet^3 per second
11/16/2010	6.94
11/17/2010	6.91
11/18/2010	6.75
11/19/2010	6.86
11/20/2010	61.55
11/21/2010	209.03
11/22/2010	41.27
11/23/2010	14.03
11/24/2010	40.79
11/25/2010	16.62
11/26/2010	10.43
11/27/2010	9.92
11/28/2010	24.65
11/29/2010	10.88
11/30/2010	8.52
12/1/2010	8.17
12/2/2010	7.98
12/3/2010	7.81
12/4/2010	7.66
12/5/2010	7.59
12/6/2010	7.69
12/7/2010	7.83
12/8/2010	7.70
12/9/2010	7.61
12/10/2010	7.61
12/11/2010	7.73
12/12/2010	7.68
12/13/2010	13.01
12/14/2010	9.83
12/15/2010	7.92
12/16/2010	13.24
12/17/2010	15.66
12/18/2010	122.45
12/19/2010	94.03
12/20/2010	485.01
12/21/2010	970.23
12/22/2010	1841.28
12/23/2010	310.23
12/24/2010	140.95
12/25/2010	84.24
12/26/2010	186.20
12/27/2010	69.44
12/28/2010	50.95
12/29/2010	451.88
12/30/2010	246.01
12/31/2010	108.56
1/1/2011	73.26
1/2/2011	93.62
1/3/2011	288.60
1/4/2011	165.35
1/5/2011	81.16
1/6/2011	61.97
1/7/2011	51.93
1/8/2011	45.33
1/9/2011	40.44
1/10/2011	37.35
1/11/2011	35.06
1/12/2011	29.78
1/13/2011	27.44
1/14/2011	26.14
1/15/2011	24.44
1/16/2011	23.22
1/17/2011	22.45
1/18/2011	21.90
1/19/2011	20.90
1/20/2011	20.26
1/21/2011	19.95
1/22/2011	18.62
1/23/2011	19.09
1/24/2011	17.28
1/25/2011	17.27
1/26/2011	16.77
1/27/2011	15.87
1/28/2011	15.65
1/29/2011	15.59
1/30/2011	15.69
1/31/2011	103.37
2/1/2011	23.27
2/2/2011	19.14
2/3/2011	16.21
2/4/2011	15.73
2/5/2011	15.84
2/6/2011	15.37
2/7/2011	14.65
2/8/2011	14.58
2/9/2011	14.34
2/10/2011	13.54
2/11/2011	13.40
2/12/2011	13.15
2/13/2011	12.76
2/14/2011	12.59
2/15/2011	12.45
2/16/2011	46.32
2/17/2011	46.22
2/18/2011	67.30
2/19/2011	317.47
2/20/2011	216.60
2/21/2011	41.06
2/22/2011	29.10
2/23/2011	23.46
2/24/2011	22.32
2/25/2011	19.99
2/26/2011	556.91
2/27/2011	161.04
2/28/2011	61.32

Notes:

1 Well Location

X	Y
-117.22640	33.04823