PETRA
Environmental Division

WELL INSTALLATION, TESTING, AND SAMPLING REPORT JACUMBA COMMUNITY SERVICE DISTRICT 44465 OLD HIGHWAY 80 JACUMBA, CALIFORNIA

PREPARED FOR

MR. TOM LINDENMEYER
JACUMBA COMMUNITY SERVICE DISTRICT
P.O. BOX 425
JACUMBA, CALIFORNIA

J.N. 267-05
JUNE 30, 2006

PETRA

OFFICES IN THE COUNTIES OF
ORANGE ▪ SAN DIEGO ▪ RIVERSIDE ▪ LOS ANGELES ▪ SAN BERNARDINO

June 30, 2006
J.N. 267-05

Mr. Tom Lindenmeyer
JACUMBA COMMUNITY SERVICE DISTRICT
P.O. Box 425
Jacumba, California 91934

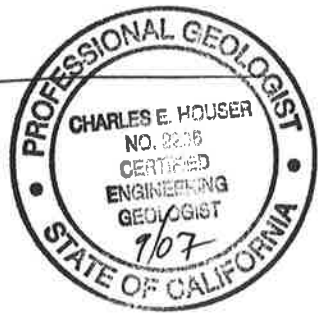
Subject: **Well Installation, Testing, and Sampling Report**
Jacumba Community Service District
44465 Old Highway 80
Jacumba, California

Dear Mr. Lindenmeyer:

Petra Geotechnical, Inc. (Petra) is pleased to present this report of well installation and sampling activities for the Jacumba Community Service District (JCSD) in Jacumba, California. This report has been prepared pursuant to our original proposal and contract, dated June 30, 2004, executed by JCSD March 23, 2005, and Amendments 1 and 2 to the proposal, dated September 12, 2005, and February 27, 2006, respectively.

Should you have any questions regarding this report, please call the undersigned at 858.485.5530.

Respectfully submitted,
PETRA GEOTECHNICAL, INC.



Charles E. Houser
Senior Project Geologist
CEG 2206

CEH:BV:mg

(2) Addressee
(1) Springer and Associates, Mr. David Kircher

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INTRODUCTION

JCSD manages distribution of potable water to the community of Jacumba in eastern San Diego County, California (Figure 1). The source of community water supply currently is a well located in the western portion of the town (Figure 2). It is our understanding that this well is relatively shallow (approximately 40 feet deep) and produces cool water at approximately 70^0 F. Other wells drilled to depths up to approximately 470 feet in the immediate vicinity of the community supply well (Figure 2) produce water at a temperature of about 96^0 F. At the request and authorization of JCSD, Petra recently conducted research, including review of aerial photographs and historical documents, and geological reconnaissance mapping pertaining to groundwater conditions in the community of Jacumba, California. The principal purpose of this research was to evaluate groundwater quality and conditions, particularly temperature, in various potential well locations in the community. During this research, Petra reviewed the following documents:

- *The Groundwater Hydrology of Jacumba Valley, California and Baja California*, unpublished master's thesis, Guy Andrew Swenson, III, San Diego State University, 1981

- *Hydrogeological Investigation, Proposed Jacumba Valley Ranch Development, San Diego County, California,* prepared by Barrett Consulting Group, dated October 18, 1995

- *Groundwater Outflow Estimation, Proposed Jacumba Valley Ranch Development, San Diego County, California*, prepared by Leighton and Associates, Inc., dated June 13, 1990

- *Water Supply for Jacumba Valley Ranch*, prepared by Kiyoshi W. Mido, dated May 1990

- *Jacumba Water & Sewer Feasibility Studies,* prepared by Hirsch & Company and Jordan/Avent & Associates, dated August 8, 1980

- *Groundwater Assessment Report and Sensitive Receptor Survey, Jacumba Texaco, 1451 Carrizo Gorge Road, Jacumba, California, DEH Case Number H02688,* prepared by Petra, dated May 24, 2005

Based on our research and field reconnaissance, it appears that shallow groundwater classified as hot (>90 degrees Fahrenheit) is likely limited to areas west of a fault trending north-northwest, and interpreted to extend from south of the US-Mexico border along just east of Railroad Street and to the northwest of the community. This fault, as well as the geology of the service district, are depicted on Figure 3 for the site and vicinity. According to Swenson (1981), thermal springs of Jacumba Valley all occur to the west of this fault. Swenson (1981) indicates that groundwater in the Table Mountain aquifer, located to the east of this fault, does not show any thermal contamination, and suggests that the fault restricts movement of thermal (hot) water by acting as a groundwater barrier.

Figure 4 is an oblique aerial photograph of Jacumba Valley and the region south of the US-Mexico border. The fault, as well as the approximate locations of several known thermal springs and wells, are depicted on this figure. Our research has indicated that wells east of the interpreted location of this fault have not encountered hot water, and wells west of the fault and deeper than approximately 50 feet generally have encountered hot water.

Early in the course of our research, it was our understanding that JCSD wished to locate sites for possible well points to evaluate groundwater conditions. Three possible sites for well points were located (Figure 5) based primarily on accessibility and proximity to existing infrastructure. One possible site was located northwest of the fire station at the north end of Jacumba Street and was eliminated because it was west of the interpreted fault and would, therefore, possibly encounter hot water. One site was located off the north end of Heber Street. This potential site was located on private property and was eliminated for the time being because the property owner could not be contacted regarding permission to access and drill the property. A third possible well point site was located south of Old Highway 80 in the central portion of Jacumba on JCSD property. This potential drill site was considered favorable for the following reasons:

utilities, namely the existing water transmission line for JCSD, with JCSD personnel prior to drilling. The nearest utilities reported by the USA respondents were located along the south edge of Old Highway 80 north of the drill site. JCSD reported that the underground water transmission line was located in an easement along with overhead power lines at least 250 feet south of the drill site.

FIELDWORK

Well Drilling and Installation

Well drilling and installation activities were conducted at the site December 12 through 15, 2005. Initially, two wells were proposed and approved by JCSD. However, only one groundwater monitoring well was drilled and sampled at the site (Figure 6). The reasons two wells were not drilled, as initially proposed, were as follows:

- The base of the alluvium was encountered at a depth of approximately 127 feet below grade, rather than 80 feet as originally anticipated; and
- Non- to low-cohesive sand deposits were encountered in the saturated zone requiring a more costly drill method to advance the well boring to the base of the alluvium.

Due to the deeper depth of the well completed in the alluvium and the greater drilling cost, it was decided by JCSD during the drilling that only the one well would be drilled and installed at this time. The well was drilled to a depth of approximately 110 feet below grade using air-rotary, casing hammer (ARCH). At approximately 110 feet, drilling refusal occurred when saturated, non- to low-cohesive sand flowed into the casing and drill pipe as a new connection for continued drilling was made. The drill pipe was removed and cleared, and the casing was pulled to a depth of approximately 60 feet. Drilling then continued with mud rotary to a total depth of approximately 127 feet where volcanic rock was encountered.

A California-professional geologist, and a geologist under the direct supervision of the registered professional, were on site to observe the drilling activity and describe collected soil samples. Soil samples were described in general accordance with the Unified Soil Classification System. A copy of the boring and well construction log is included as Appendix B.

At the client's request and to facilitate possible use of the well as an agricultural supply well, the well was constructed with 4-inch PVC casing and screen. Due to caving of the bottom three feet of the boring, the bottom of the well was set at approximately 124 feet below grade. The well was constructed with a 45 foot screened interval. After placement of the filter pack and prior to placement of the bentonite seal, the well was surged to settle and initiate development of the filter pack. The filter pack extended approximately 5 feet above the top of the screen. Upon completion of the placement of annular backfill materials, a flush mount, traffic rated well cover and completion was installed.

Well Development and Sampling

On December 19, 2005, the well was developed and sampled. During development, the well was initially bailed with a stainless steel bailer to remove mud, silt, and sand from the casing. The well was then surged to grade the filter pack. After surging, the well was bailed for a short period and then purged with a submersible pump. During purging, effluent was observed for turbidity. Measurements of turbidity, pH, and temperature were also made during purging. Approximately 45 gallons of water were removed by bailing and approximately 600 to 610 gallons removed by pumping. At the completion of purging, the effluent had no visible turbidity and turbidity measurements had dropped from 350 nephelometric units (ntu) at the beginning of pumping to 47 ntu at the completion.

Groundwater from the well was sampled at the effluent discharge. Laboratory-supplied containers were filled, tightly capped, and labeled. The sample containers were stored in an ice-filled cooler pending delivery to the laboratory for analysis. Chain-of-custody procedures were used for sample tracking. The groundwater sample was analyzed for chloride, fluoride, nitrate, sulfate, pH, and total dissolved solids (TDS).

Aquifer Testing

A submersible pump was installed in the well on March 14, 2006 by Fain Pump Company. According to pump contractor, the pump was capable of providing up to 80 gallon per minute (gpm) discharge at a draw-down of 100 feet. The pump test was initiated by a representative of Petra on March 13, 2006. The pump test continued through March 14, 2006. The well was pumped for approximately 15 hours using one, 3-hour step and three, 4-hour steps. The discharge was increased with each step while measurements of draw-down were measured in the annular area between the pump riser pipe and the well casing using an electric sounder and sounding tube. The water level before pumping was at a depth of 37.72 feet below the top of the sounding tube. The total draw-down was 48.03 feet or at a depth of 85.75 feet below the top of the sounding tube at the end of the 15-hour pumping period. The draw-down and recovery water level measurements, as well as test plots of drawdown vs. time, recovery vs. time, and drawdown vs. discharge are provided in Appendix C. After completion of the pumping period, the pump was shut off and recovering water levels were measured for a period of one hour at which time the water level in the well had recovered to 99% of the pre-pumping level. At the conclusion of the aquifer testing, a groundwater sample was obtained from the well and delivered to JCSD personnel to be submitted for analysis for primary and secondary water quality standards.

FINDINGS

Site Geology and Hydrogeology

The following sections provide an overview of the regional and local geologic setting and include information pertaining to groundwater conditions in the vicinity of the study area.

Regional Geology

The site is located in the Peninsular Ranges Geomorphic Province of Southern California. This province is typified by northwest to southeast-trending mountain ranges approximately parallel to the San Andreas and related regional fault systems. The Peninsular Ranges are generally characterized by granitic rocks of the Peninsular Ranges batholith with associated volcanic and metamorphic rocks. Sedimentary rocks ranging in age from Cretaceous to Pleistocene form the San Diego embayment and coastal terraces west of the batholith.

According to a geologic map prepared by R. G. Strand (California Division of Mines and geology [CDMG] Geologic Map of California, San Diego-El Centro Sheet, 1962), the site area is underlain by Quaternary-aged alluvium with Miocene-aged volcanic rock outcropping to the north and east of the site and pre-Cenozoic-aged granitic and metamorphic rock outcropping to the west. According to an earlier geologic map compiled by Harold F. Weber (Geology and Mineral Resources of San Diego County, California, CDMG County Report 3, 1958-59), the volcanic rock to the north and east of the site is part of the Tertiary-aged Alverson Andesite, and the crystalline rock to the west includes Cretaceous-aged hybrid gneisses and granodiorite, as well as undivided metasedimentary rock.

Site Geologic Conditions

Figure 3 depicts the geologic conditions at the site and site vicinity. Geologic materials encountered during drilling included alluvium and volcanic rock. Following is a brief description of these units.

Alluvium

This unit generally consisted of medium to coarse-grained poorly graded sand with or without silt and fine gravel. Colors noted in this unit included yellowish brown, olive brown, and gray. This unit was encountered to a depth of approximately 125 to 127 feet below grade.

Volcanic Rock

This unit was encountered at the base of the well boring. Drilling conditions changed and harder drilling was noted by the driller. Reddish brown cuttings were then observed in the drill mud.

Regional Hydrogeology

The site is interpreted to lie within the Regional Water Quality Control Board (RWQCB), Colorado River Basin Region 7, Anza-Borrego Hydrologic Unit (22.00). According to the RWQCB, the groundwater in this hydrologic unit has been classified as having existing beneficial uses for municipal and domestic supply, industrial service supply, and agricultural supply purposes. The hydrologic areas and water use designations were presented in the RWQCB's "Water Quality Control Plan (Plan), Colorado River Basin – Region 7" approved by the State Water Resources Control Board February 17, 1994. This Plan was reviewed and used during preparation of this report.

Swenson (1981) suggests that groundwater recharge occurs in the mountainous highlands and flows into the Jacumba Valley, where groundwater flow is primarily toward Carrizo Gorge at the north end of the valley. Based on our experience, the groundwater flow direction at the site would generally be toward the north as, under natural conditions, we would anticipate that groundwater would follow the general topographic gradient from the highlands west and south-southeast of the site northward through the broad, Jacumba Valley and to the north toward Carrizo Gorge. Figure 7 is a regional topographic map showing the overall topographic gradient and our interpretation of likely groundwater flow.

Groundwater Conditions

During drilling of the well boring, saturated conditions, exhibited by the presence of free water associated with the return cuttings, were encountered at approximately 55 feet below grade. At the time of well development, groundwater was measured at a depth of approximately 37 feet below grade. Temperature measurements made during development ranged from approximately 67.6 F at the first measurement to 66.6 F at the final measurement.

Laboratory Results

Following is a summary of the analytical results and maximum contaminant levels (MCLs) for the constituents analyzed:

Constituent/Parameter	Concentration	MCL
Chloride	90 milligrams per liter (mg/l)	250 mg/l
Fluoride	1.9 mg/l	2 mg/l
Nitrate as N	0.05 mg/l	
Sulfate as SO4	103 mg/l	250 mg/l
pH	6.92	
TDS	452 mg/l	500 mg/l

A copy of the laboratory report is included in Appendix D. After these results were reviewed initially by Petra, JCSD, and Springer and Associates (performing engineering services to JCSD), Springer and Associates asked that the groundwater from the well be analyzed for full primary and secondary standards for groundwater quality. This analysis was provided by JCSD and performed on the water sample obtained at the conclusion of the aquifer test conducted by Petra.

It is our understanding that most constituents and parameters analyzed were below MCLs. However, several volatile organic compounds (VOCs), including 1,2,4-trimethylbenzene, benzene, ethylbenzene, and toluene, were detected. The reported toluene concentration of 291 micrograms per liter (ug/l) was above the MCL for toluene of 150 ug/l. Because the laboratory

exceeded the hold time for analysis for VOCs, the laboratory arranged for a third sampling event on the well. The groundwater sample from the third sampling was reported to have detectable concentrations of benzene, chloroethane, and toluene. Again, the reported toluene concentration (199 ug/l during this event) was above the MCL. Petra collected a duplicate sample during this third sampling event and analyzed that sample for VOCs in general accordance with EPA Method 8260B. With the exception of toluene, no detectable concentrations of VOCs were reported in this duplicate sample. Toluene was reported at a concentration of 520 ug/l.

Pump Test Results

Pumping Test Analysis

The pumping levels measured during the step draw-down test versus well discharge were plotted on semi-log paper. The slopes of the plots for the first two steps were used to estimate values of transmissvity for the aquifer using the Jacob time-draw-down method. The slope of the plot for Step 1, yielded an estimated transmissivity of 7,900 gallons per day per foot of draw-down (gpd/ft.). The slope of the line for Step 2 yielded an estimated transmissivity of 10,400 gpd/ft. The step draw-down plots are provided in Appendix C. Assuming that the hydraulic conductivity of the formation does not vary significantly with depth as is indicated by the log of the materials encountered in the boring, the plot of the data for Steps 3 and 4 indicate that the specific capacity of the test well decreases significantly with increased discharge. This is likely due to turbulent flow and is not considered unusual since the test well was not designed as a production well and significant head losses are anticipated with increasing discharge. Therefore, the slope of the line for Step 3 and Step 4 were not used for estimating transmissivity. The storage coefficient of the aquifer can not be calculated using a single well pumping test.

Recovery Test Analysis

The recovering water levels were plotted on semi-log paper and used to calculate the formation transmissivity using the Cooper-Jacob approximation (Cooper, 1963). The recovery data plot is provided in Appendix C. The calculation of transmissivity using the recovery data plot is 9,131 gpd/ft. This value is close to the average transmissivity value calculated from Step 1 and Step 2 which is 9,150 gpd/ft..

DISCUSSION

Groundwater Quality - Temperature

During sampling at the time of well development and aquifer testing, groundwater temperatures of 19.2^0 C to 20.4^0 C were measured. These temperatures convert to 66.6^0 F to 68.7^0 F. These temperatures are consistent with the temperatures measured in wells encountering cool water.

Groundwater Quality – General Chemistry

The results of analysis conducted by Petra were within potable criteria and below MCLs for constituents analyzed. However, the presence of VOCs in the samples analyzed for full primary and secondary water quality standards, particularly the reported concentrations of toluene above MCLs, indicates groundwater has been impacted and is degraded in it's current condition. On May 26, 2006, a letter was submitted to the San Diego County Site Assessment and Mitigation (SAM) Program requesting SAM Program review of the site vicinity for possible petroleum hydrocarbon releases that might affect groundwater at the site. A copy of that letter is included as Appendix E.

Aquifer Characteristics

As previously stated, aquifer transmissivity calculated from the step drawdown test ranged from 7,900 gpd/ft to 10,400 gpd/ft. The transmissivity calculated from the recovery test was 9,131 gpd/ft.

Estimation of Draw-down at Higher Pump Discharge Rates

The pump used for the pumping test was capable of producing 71 gpm maximum at a draw-down of about 48 feet. An estimate of draw-down for higher pumping rates was derived as follows:

- The draw-down at the end of each step versus the average discharge for each step was plotted on normal scale. The plot is provided in Appendix C.
- The plot points from the first two steps were used along with the zero intercept to construct a slope which represents the draw-down versus discharge relationship. It should be noted that the plot points would represent some degree of well inefficiency which for purposes of estimation are not considered here.
- The slope of the line was extended and the draw-down was read at the 150 gpm and 200 gpm intercepts. The projected draw-down was determined to be 67 feet and 92 feet for 150 gpm and 200 gpm respectively. However, it is likely, that actual additional draw-downs will occur due to head losses at higher discharge rates. The head losses are the result of friction as water passes from the formation through the gravel pack and well screen.

According to Driscoll (1986), a production well that is designed well may operate at 70% to 80% efficiency. If the well design, construction, and development result in an efficiency value of at least 60%, then anticipated draw-downs of 95 feet and 130 feet might be expected at discharge rates of 150 gpm and 200 gpm respectively. Since the base of the alluvium in this vicinity is approximately 125 feet, an additional well depth will be required to obtain higher discharge rates. It is currently unknown what well yields and water quality might be expected from the underlying volcanic rock. If discharge rates greater than 150 gpm are required by the District, Petra recommends construction and testing of an additional well completed in volcanic rock to assess potential well yields and water quality. In addition, Petra recommends an additional well test be conducted using an observation well and the completed production well to assess aquifer storage coefficient and to assess long term pumping rates for a well constructed in this area.

CONCLUSIONS AND RECOMMENDATIONS

Based on our observations at the site and the results of sampling and analysis conducted during this assessment, Petra has made the following conclusions:

- Groundwater at the JCSD site appears to be cool. Hot water (+/-95 F) was not encountered during drilling, installation, development, or sampling of the well, or during subsequent aquifer testing.

- Based on the reported toluene concentrations, ranging from 199 ug/l to 520 ug/l, were above MCL of 150 ug/l, the groundwater at the site does not meet criteria for potable water.

- The results of the pumping tests indicate that the aquifer has an estimated transmissivity of approximately 9,000 gpd/ft. A well constructed in the vicinity of the test well might be expected to produce 150 gpm over the long term at a draw-down of 95 feet. This estimate is based on well construction and development which would result in a well efficiency of at least 60 %.

Based on the results of this investigation and our understanding of regulations pertaining to potable groundwater supply in San Diego County, the following recommendations are presented:

- Petra recommends conducting additional research to evaluate possible sources for the VOCs, including toluene, detected in the groundwater samples collected from the well. Such research would be conducted after the SAM Program responds to the above-referenced May 6, 2006 letter.

- Additional drill sites should be evaluated. It is our understanding that the proposed drill site at the north end of Heber Street may now be an option based on the District's recent contact with the property owner. If this site becomes available, at a minimum, one groundwater monitoring well should be drilled and installed in the alluvial materials, the well should be sampled and the groundwater tested for primary and secondary water quality standards, and aquifer testing should be performed to evaluate potential well yield.

- It is currently unknown whether a well completed into the volcanic rock which underlies the alluvium would result in increased well yields. In addition the water quality of the groundwater in the volcanic rock is currently unknown. If additional well yields are required by the District, Petra recommends construction of a test well into the volcanic rock to assess potential well yields and groundwater quality evaluation from this formation.

INVESTIGATION LIMITATIONS

This report is based on the project analytical data and findings as presented herein. The materials encountered on the project site, described in other literature, and used in the analytical testing program are believed to be representative of the project area, and the conclusions and recommendations in this report are presented on that basis. However, soil and bedrock materials can vary laterally and vertically within a project site and those variations, if present, could affect the conclusions and recommendations contained herein. In addition, chemicals could be present at the site that escaped detection by the project sampling and analytical testing program.

Although this investigation has attempted to delineate petroleum hydrocarbon-bearing soil relative to the site, potential sources of chemicals may have escaped detection for reasons which include, but are not limited to, the following:

- Our reliance on inadequate or inaccurate information provided to us by third parties such as public agencies and other outside sources;
- The limited scope of this investigation; and
- The presence of undetected, unknown, or unreported environmental releases.

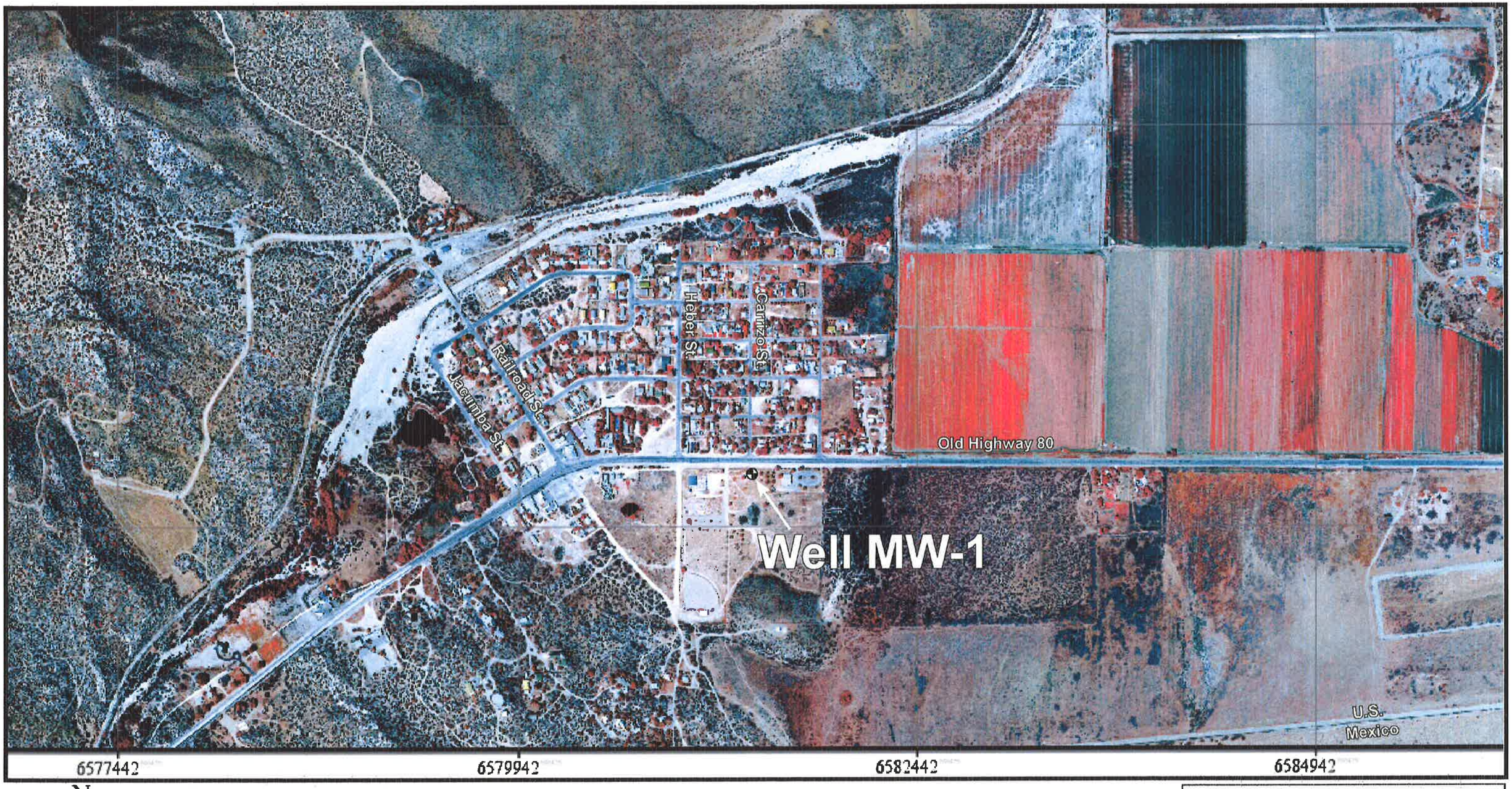
Should additional chemicals or other environmental conditions, beyond those already identified at the site, be detected during further progression of the project, Petra will be prepared to assist the client in evaluating the extent of and appropriate mitigation measures for such chemicals or conditions.

REPORT USAGE AND FUTURE SITE CONDITIONS

This report is intended for the sole usage of Jacumba Community Services District or their agents. The conclusions of this report are judged to be relevant at the time the work described in this report was conducted. Future site conditions may differ and this report should not be relied upon to represent future site conditions unless a qualified consultant familiar with the practice of similar environmental assessments is consulted to assess the necessity of updating this report.

FIGURES

PETRA



N
W E
S

0 500 1,000 2,000 3,000 4,000 5,000 Feet

EXPLANATION

Approximate location of well

PETRA GEOTECHNICAL, INC.
12225 WORLD TRADE DRIVE, SUITE P
SAN DIEGO, CALIFORNIA 92128
PHONE: (858) 485-5530
SAN DIEGO MURIETTA SANTA CLARITA DESERT REGION COSTA MESA

SITE & MONITORING WELL LOCATION MAP

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 1
DWG BY: JLJ	SCALE: See bar scale	

EXPLANATION

- Approximate location of main well
- Approximate locations of backup wells

0 500 1,000 Feet

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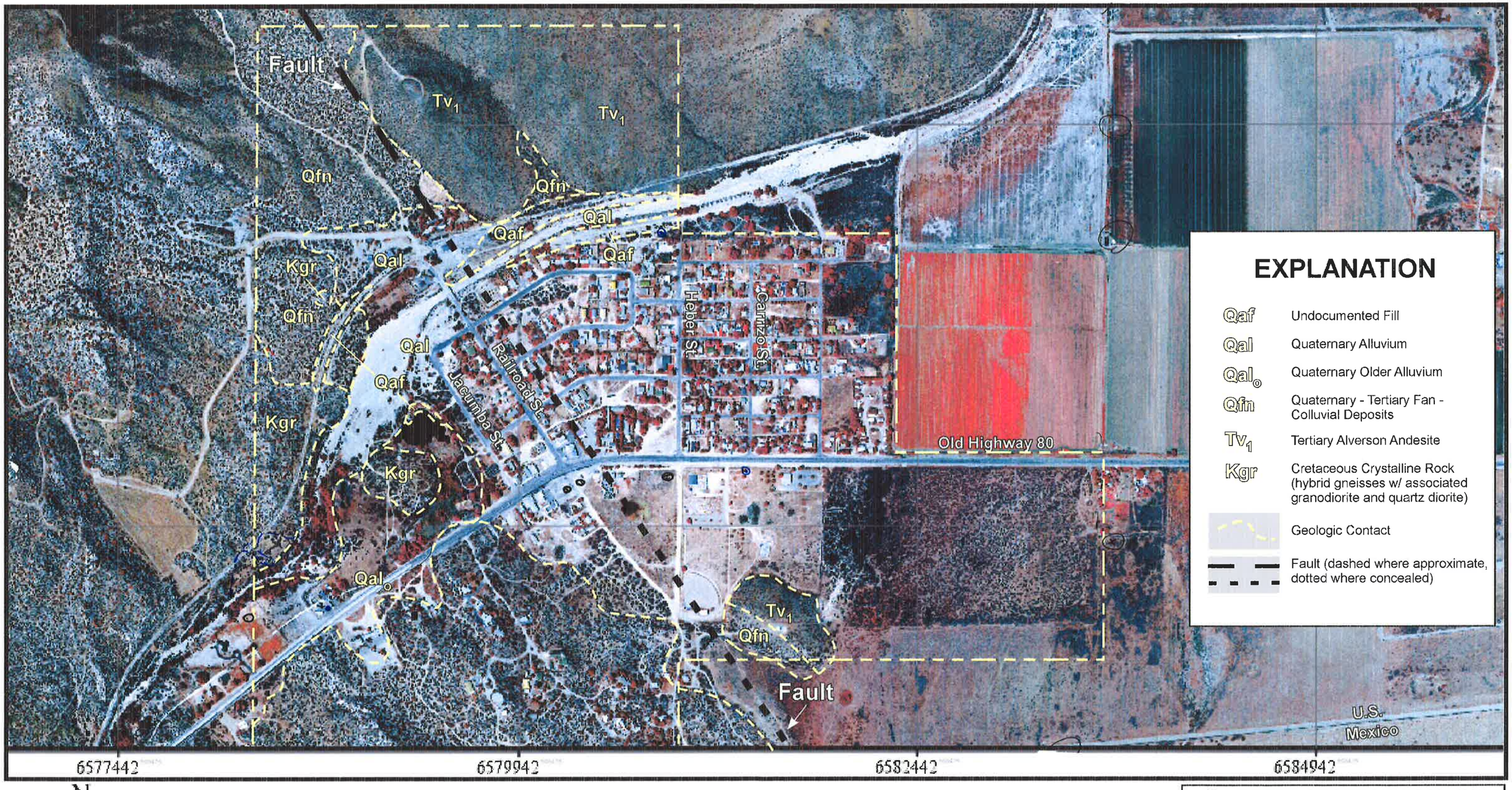
WELL LOCATION MAP

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 2
DWG BY: JLJ	SCALE: See bar scale	



EXPLANATION

Qaf	Undocumented Fill
Qal	Quaternary Alluvium
Qal_o	Quaternary Older Alluvium
Qfn	Quaternary - Tertiary Fan - Colluvial Deposits
Tv_1	Tertiary Alverson Andesite
Kgr	Cretaceous Crystalline Rock (hybrid gneisses w/ associated granodiorite and quartz diorite)
	Geologic Contact
	Fault (dashed where approximate, dotted where concealed)

N
W E
S

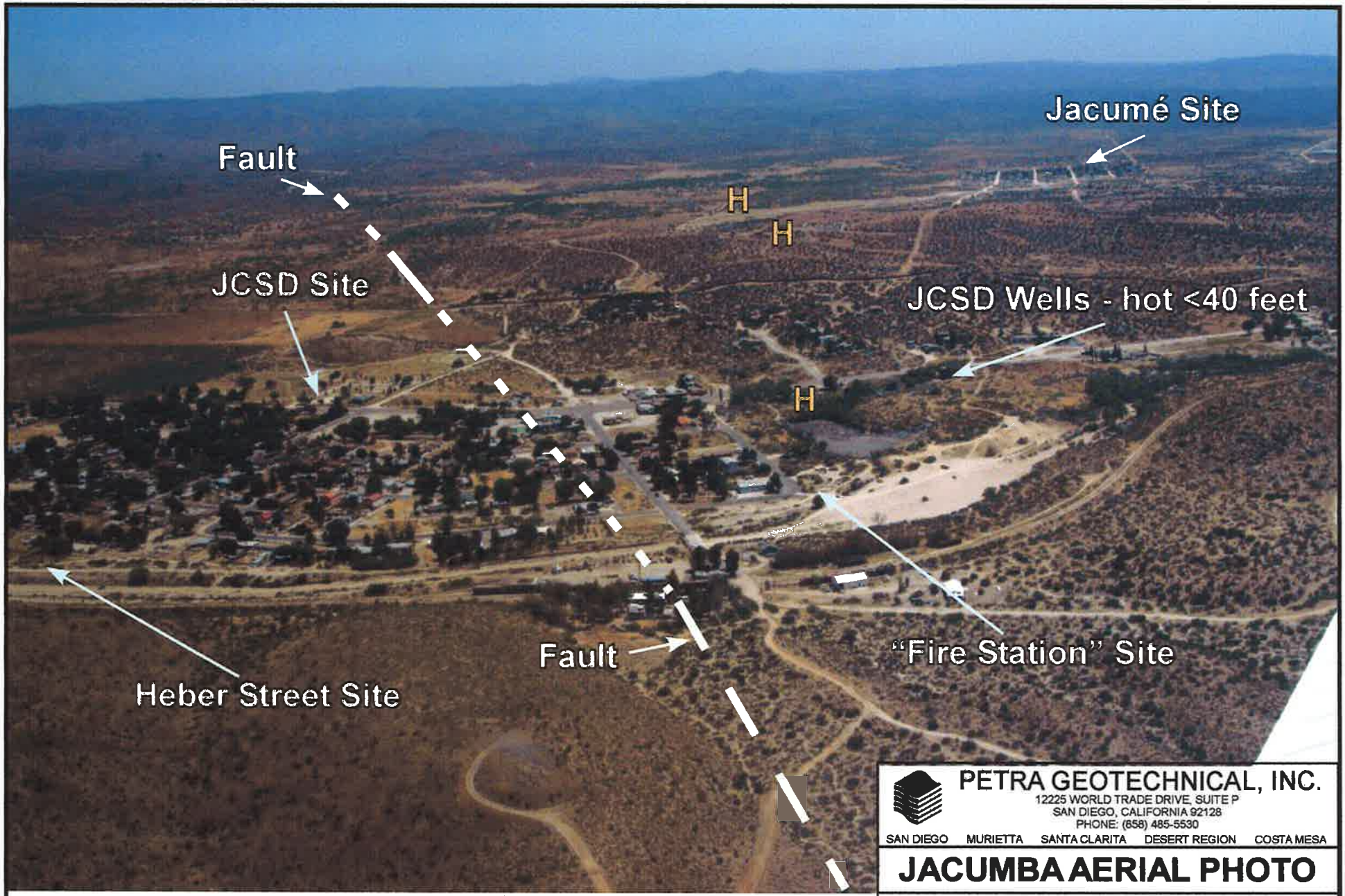
0 500 1,000 2,000 3,000 4,000 5,000
Feet

PETRA GEOTECHNICAL, INC.
12225 WORLD TRADE DRIVE, SUITE P
SAN DIEGO, CALIFORNIA 92128
PHONE (858) 485-5530
SAN DIEGO MURIETTA SANTA CLARITA DESERT REGION COSTA MESA

GEOLOGIC MAP

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 3
DWG BY: JLJ	SCALE: See bar scale	



EXPLANATION

H — Approximate locations of thermal springs or wells

Fault (dashed where approximate, dotted where concealed)

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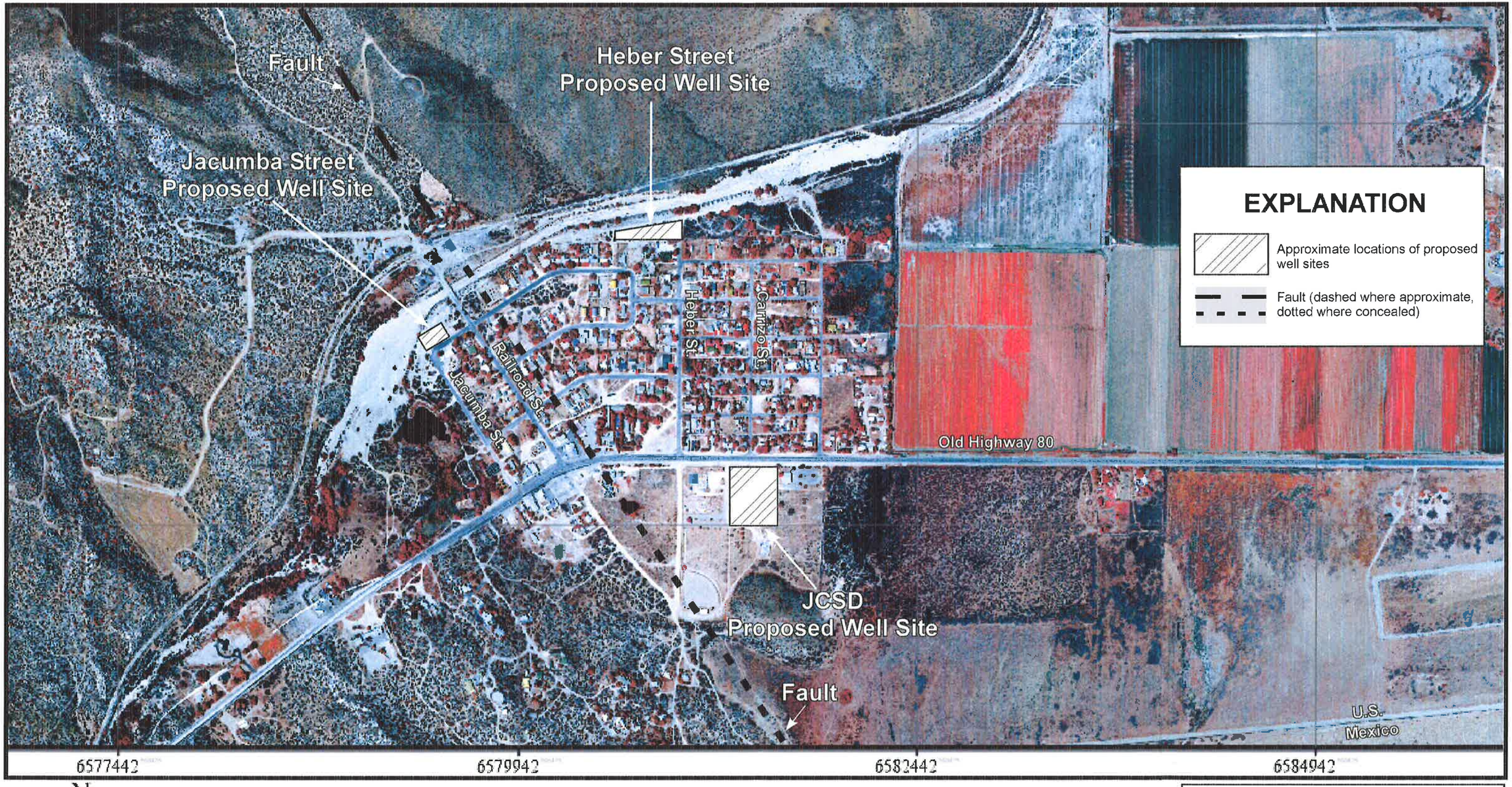
JACUMBA AERIAL PHOTO

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 4
DWG BY: JLJ	SCALE:	



0 500 1,000 2,000 3,000 4,000 5,000 Feet

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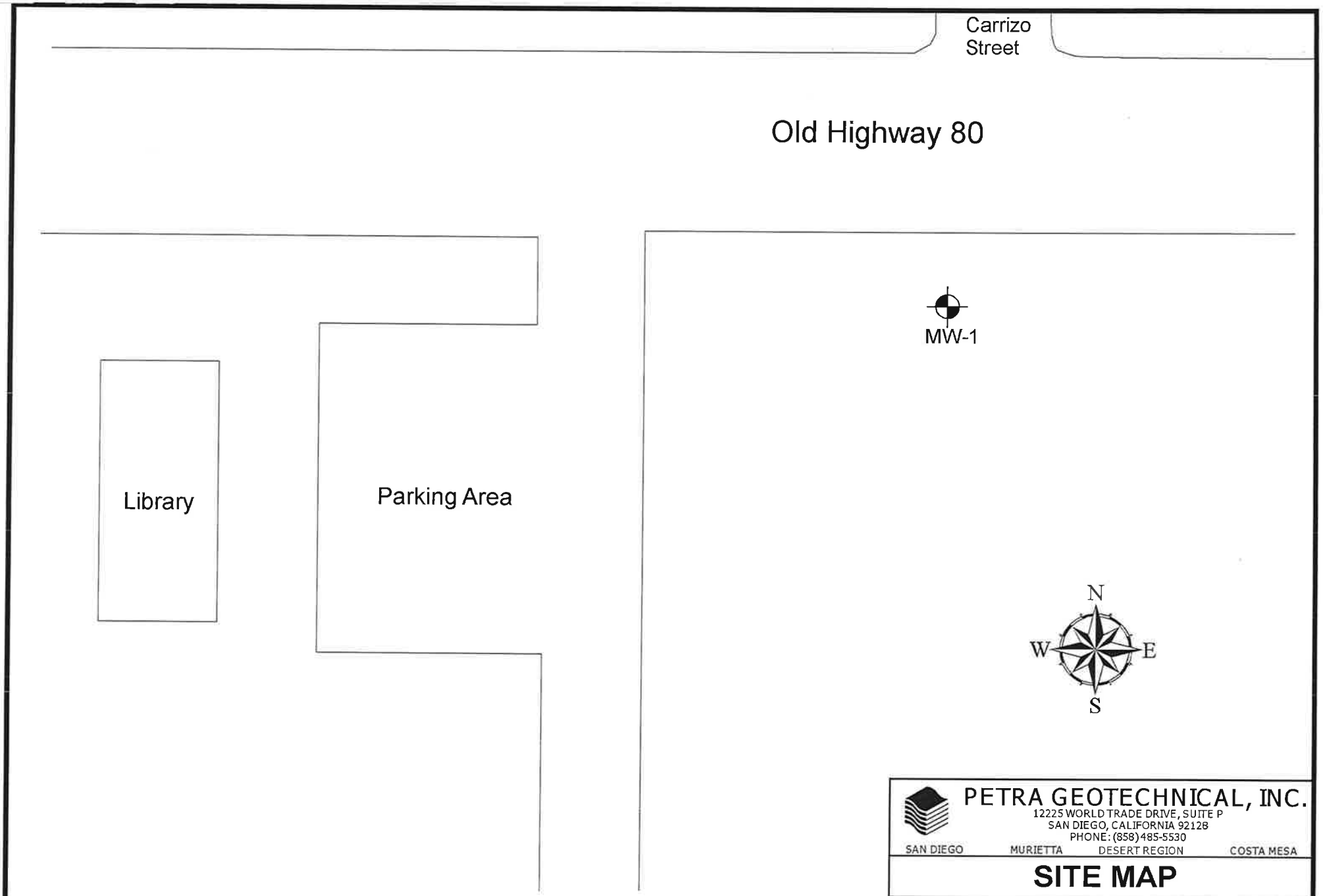
PROPOSED MONITORING WELL LOCATION MAP

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 5
DWG BY: JLJ	SCALE: See bar scale	



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SITE MAP

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 6
DWG BY: MAM	SCALE: Not to Scale	

EXPLANATION

Estimated regional groundwater flow direction

Round Mtn 3367

EASTERN

Titus

Jacumba

Gravel Pit

Gravel Pit

Jacumba Peak 3363

JEEP TR

ARIZONA

Gasoline

Creek

Valley

AND

Boundary

Jacumba

Site

BM 2807

BM 2798

Airport

BM 2863

BM 2967

United States
Mexico

DIEGO

BASE MAP: All Topp Maps, California Release 2, iGage, 2005

PETRA GEOTECHNICAL, INC.
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PHONE: (858) 485-5530
SAN DIEGO MURIETTA SANTA CLARITA DESERT REGION COSTA MESA

REGIONAL TOPOGRAPHIC MAP

Jacumba Community Services District

DATE: June 2006	J.N.: 267-05	Figure 7
DWG BY: JLJ	SCALE: 1:48,000	

APPENDICES

PETRA

APPENDIX A

APPROVED WELL PERMIT

PETRA

PERMIT #LMON103531
A.P.N. #660-140-07-00
EST # NONE

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
MONITORING WELL PROGRAM

MONITORING WELL AND BORING CONSTRUCTION AND DESTRUCTION PERMIT

PETRA GEOTECHNICAL, INC.
RECEIVED
NOV 15 2005
RECEIVED

SITE NAME: JACUMBA COMMUNITY SERVICE DISTRICT
SITE ADDRESS: 44465 OLD HY 80, JACUMBA, CA 91934
PERMIT FOR: **2 GROUNDWATER MONITORING WELLS**
PERMIT APPROVAL DATE: NOVEMBER 7, 2005
PERMIT EXPIRES ON: MARCH 7, 2006
RESPONSIBLE PARTY: JACUMBA COMMUNITY SERVICE DISTRICT

PERMIT CONDITIONS:

1. **The use of bentonite chips shall only be used below the water table or as a 3-foot transition seal above the well's sand pack and in the annual space below the water table. For the annular space above the water table and/or above the 3-foot transition seal, only an approved cement grout or a high solids bentonite grout to the base of the concrete surface seal can be used. In either case these grouts must be allowed to properly set prior to placement of the concrete surface seal.**

2. Wells must have a **minimum 3-foot concrete surface seal**. The surface seal shall consist of concrete able to withstand the maximum anticipated load without cracking or deteriorating. The concrete should meet Class A specifications of a minimum 4000-pound compressive strength.

3. All water and soil resulting from the activities covered by this permit must be managed, stored and disposed of as specified in the SAM Manual in Section 5, II, E- 4. (**http://www.sdcounty.ca.gov/deh/lwq/sam/manual_guidelines.html**). In addition, drill cuttings must be properly handled and disposed in compliance with the Stormwater Best Management Practices of the local jurisdiction.

4. Within 60 days of completing work, submit a well construction report, including all well and/or boring logs and laboratory data to the Well Permit Desk. This report must include all items required by the SAM Manual, Section 5, Pages 6 & 7.

5. This office must be given 48-hour notice of any drilling activity on this site and advanced notification of drilling cancellation. Please contact the Well Permit Desk at 338-2339.

APPROVED BY: Mike Vermette for CAROL SPANGENBERG DATE: 11/07/2005
CAROL SPANGENBERG

NOTIFIED: 11/07/05

DEH:SAM-9075 (3/05)

COUNTY OF SAN DIEGO

DEPARTMENT OF ENVIRONMENTAL HEALTH
1255 Imperial Avenue, 3rd Floor
San Diego, CA 92101
(619)338-2228

RECEIPT NUMBER: 05-85305
Cashier: EGARCIA

APN: 660-140-07-00
DATE ISSUED: 28-OCT-2005
PERMIT: LMON T103531
SCOPE: MONITORING WELL/CATHODIC WELL
SITE ADDRESS: 44465 OLD HY 80
SUBDIVISION:
CITY: JACUMBA, CA 91934

PARCEL OWNER: JACUMBA COMMUNITY SERVICES DIST
ADDRESS: PUBLIC AGENCY
CITY/STATE/ZIP: , 00000

PERMIT OWNER:
ADDRESS:
CITY/STATE/ZIP:

Fees Calculated 12 Months Back

Date	Fee Code	Description	Paid to Date	This Receipt	Balance Due
28-OCT-2005	6LW25--EHO	MONITORING WELL	$0.00	$345.00	$0.00
28-OCT-2005	6LW25-ZCRO	FISCAL YEAR 05/06 ONE-TIME 10% CREDIT	$0.00	-$34.50	$0.00
28-OCT-2005	6LWMAINEHO	WELL MAINTENANCE FEE	$0.00	$130.00	$0.00
28-OCT-2005	6LWMAINZCO	FISCAL YEAR 05/06 ONE-TIME 10% CREDIT	$0.00	-$13.00	$0.00
		Totals:		$427.50	$0.00

Payment Code	Description	Amount
CHECK	11900	$427.50

Tendered: $427.50
Change: $0.00
Balance Due: $0.00

Rec'd 10/28/05

PERMIT APPLICATION GROUNDWATER AND VADOSE MONITORING WELLS AND EXPLORATORY OR TEST BORINGS

OFFICE USE ONLY
PERMIT LMON # 103531
SAM CASE Y/N #
DATE RECEIVED:
FEE PAID:
CHECK #

A. RESPONSIBLE PARTY Jacumba Community Service District Phone 619 766-4359 (000) 000-000
(The person, persons, or company responsible for the construction, maintenance, and destruction of the proposed borings and/or wells.)
Mailing Address P.O. Box 425 City Jacumba State CA Zip 91934
Contact Person Tom Lindenmeyer Phone Same Ext. ____ Fax

B. SITE ASSESSMENT PROJECT NUMBER – IF APPLICABLE #

C. CONSULTING FIRM Petra Geotechnical, Inc.
Mailing Address 12225 World Trade Dr. Ste P City San Diego State CA Zip 92128
Registered Professional Charles Hoover Registration # 2206 (PG) CEG
Contact Person Charles Hoover Phone 858 485-5530 Ext. ____ Fax

D. DRILLING COMPANY TestAmerica Drilling Corporation C57# 819548
Contact Name Manuel Marquez
Mailing Address 3620 Kurtz Street City San Diego State CA Zip 92110-
Phone 619-686-5800 Fax 619-686-5809

E. CONSTRUCTION INFORMATION

TYPE OF WELLS/ BORINGS TO BE CONSTRUCTED

	#
☒ Groundwater	2
☐ Vadose	___
☐ Boring	___
☐ Other	___

NUMBER OF WELLS TO BE DESTROYED

☐ ___

MATERIALS TO BE USED

CASING
Not Applicable ____
Type PVC
Gauge 40
Diameter 1: 4" 2: 2"
Well Screen Size 0.020
Filter Pack #3

SEAL/BORING BACKFILL
☐ Neat Cement
☒ Cement & Bentonite
☐ Sand-Cement
☐ Bentonite
☐ Other

Borehole diameter 1: 10" 2: 8"

Drilling Method
☐ Auger ☒ Air Rotary
☐ Mud Rotary ☐ Other
☐ Percussion

PROPOSED CONSTRUCTION
Estimated groundwater depth: 15' ft.
Estimated depth of boring 1:80' 2:120' ft.

	0 to 3			
Concrete surface seal	1	2	1	2
Annular seal	0	0 to 65		105
Bentonite transition seal	65	105 to 68		109
Filter Pack	68	108 to 80		120
Perforation	70	110 to 80		120

NOTE:
Attach a well construction diagram for wells with multiple completions

I agree to comply with the requirements of the current Site Assessment and Mitigation Manual, and with all ordinances and laws of the County of San Diego and the State of California pertaining to well/boring construction and destruction.

DRILLER'S SIGNATURE _____ DATE 10/27/05

Within 60 days of completion, I will furnish the Monitoring Well Permit Desk with a complete and accurate well/boring log. I will certify the design and construction or destruction of the well/borings in accordance with the permit application.

PG/RCE SIGNATURE _____ DATE 10/27/05

F. SITE INFORMATION

1. **ASSESSOR'S PARCEL NUMBER** 660-140-07

Site Name _____

Site Address 44465 Old Hwy 80 City Jacumba Zip 91934

PROPERTY OWNER Jacumba Community Service District (JCSD)

Phone 619 766-4359 Ext. _____ Fax _____

Mailing Address P.O. Box _____ City _____ State _____ Zip _____

NUMBER OF WELLS 2 **TYPE OF WELLS** Groundwater Monitoring.

2. **ASSESSOR'S PARCEL NUMBER** _____

Site Name _____

Site Address _____ City _____ Zip _____

PROPERTY OWNER _____

Phone _____ Ext. _____ Fax _____

Mailing Address _____ City _____ State _____ Zip _____

NUMBER OF WELLS _____ **TYPE OF WELLS** _____

3. **ASSESSOR'S PARCEL NUMBER** _____

Site Name _____

Site Address _____ City _____ Zip _____

PROPERTY OWNER _____

Phone _____ Ext. _____ Fax _____

Mailing Address _____ City _____ State _____ Zip _____

NUMBER OF WELLS _____ **TYPE OF WELLS** _____

4. **ASSESSOR'S PARCEL NUMBER** _____

Site Name _____

Site Address _____ City _____ Zip _____

PROPERTY OWNER _____

Phone _____ Ext. _____ Fax _____

Mailing Address _____ City _____ State _____ Zip _____

NUMBER OF WELLS _____ **TYPE OF WELLS** _____

Permit Fees In Effect for July 1, 2005 - June 30, 2006

G. FEES (in effect beginning July 1, 2005, through June 30, 2006)

The County Board of Supervisors authorized a *10% credit, for the Fiscal Year ending June 30, 2006,* to be applied to the Department of Environmental Health customers. This credit is being provided to qualified fee-based programs that have contributed to the cost reduction/cost containment/cost avoidance efforts initiated by the Department. This *fee adjustment, for the Fiscal Year ending June 30, 2006,* is applicable to fees and permits due and/or obtained during this period. The 10% is not applicable to enforcement fees or fees relating to non-compliance of permit regulations.

ACTIVITY	FEE SCHEDULE FEE -- ONE-TIME FISCAL YEAR 10% CREDIT	AMOUNT
Permit for Well Installations Only (Groundwater Monitoring Wells, Vadose, Vapor Extraction Wells)	$185.00 for the first monitoring well $185.00 – 10% <$18.50> =	1 x $166.50 $ 166.50
Permit for Well Maintenance Inspection **(Valid for three years)**	$100.00 for first well maintenance inspection $100.00 – 10% <$10.00> =	1 x $ 90.00 $ 90
Each Additional New Well	$160.00 for each additional well installation $160.00 – 10% <$16.00> = $ 30.00 for each additional well maintenance inspection $ 30.00 – 10% <$ 3.00> =	1 x $144.00 $ 144 1 x $ 27.00 $ 27
Permit for Borings Only *(CPT's, Hydropunch, Geoprobes,* Temporary Well Points, etc.)	$185.00 for the first boring $185.00 – 10% <$18.50> = $ 50.00 for each additional boring $ 50.00 – 10% <$ 5.00> =	1 x $166.50 $_____ _____ x $ 45.00 $_____
Permit for Well Destructions Only	$185.00 for the first destruction $185.00 – 10% <$18.50> = $120.00 for each additional destruction $120.00 – 10% <$12.00> =	1 x $166.50 $_____ _____ x $108.00 $_____
Permit for any Combination of Well Installations, Borings, & Destructions ***(except UST backfill permit)*** **Permit for any Combination of Well Installations, Borings, & Destructions** ***(except UST backfill permit)***	The first activity will be $185.00. $185.00 – 10% <$18.50> = Additional activities will be as follows: $160.00 for each additional well $160.00 – 10% <$16.00> = $100.00 for first well maintenance inspection $100.00 – 10% <$10.00> = $ 30.00 for each additional well maintenance inspection $ 30.00 – 10% <$ 3.00> = $ 50.00 for each additional boring $ 50.00 – 10% <$ 5.00> = $120.00 for each well destruction $120.00 – 10% <$12.00> =	1 x $166.50 $_____ _____ x $144.00 $_____ 1 x $ 90.00$_____ _____ x $ 27.00 $_____ _____ x $ 45.00 $_____ _____ x $108.00 $_____
	TOTAL COST OF PERMIT	$ 427.50
Permit for Underground Storage Tank Monitoring System in Backfill *(i.e. Enhanced Leak Detection)*	(Flat Fee) $320.00 – 10% <$32.00> =	$288.00

H. **QUESTIONNAIRE: Please answer all applicable questions completely.** ***For well destructions, complete only #1 below and submit any required supportive documentation.***

1. If wells are to be destroyed, provide a description of method of destruction N/A

2. What is the purpose of the well/boring investigation?

   ☐ a. Part of an ongoing site assessment case in which DEH or another government regulator is the lead agency.

   ☐ b. Part of a Phase I investigation for property ownership transfer or: _____

   ☐ c. Geotechnical investigation for proposed construction, land stabilization or:

   ☒ d. Other: Groundwater resource study

3. What procedures will be used to prevent the well/boring from providing an avenue to contamination during construction?
   Well will be installed and annular seal installed immediately after drilling.

4. What field procedures will be utilized to determine if contamination exists?
   None. Contamination not anticipated/suspected.

5. What procedures will be used to determine whether samples will be sent for laboratory testing or archiving?
   Soil samples will not be analyzed.

6. What constituents will be monitored and tested (Include EPA Laboratory Test Methods to be used)?
   N/A

7. How will samples be transported and preserved? N/A

8. What sampling methods will be used? N/A

9. Are you proposing a variation from the methods and/or procedures presented in the requirements for the construction or destruction of Vadose and Groundwater Monitoring Wells (Current SAM Manual Requirements)? If yes, specify these variations and include a well construction diagram and all required supporting documentation. Refer to the SAM Manual Appendix B for monitoring well guidelines (http://www/sdcounty.ca.gov/deh/lwq/sam/monitoring_well.html). :Yes ☐ No ☒

10. Are you proposing a variation in drilling and destruction of soil borings from the methods and/or procedures specified in the current SAM manual? If yes, specify these variations and *include a destruction diagram.*
    Yes ☐ No ☒

11. What procedures will be used to ensure that the drilling equipment will introduce no contamination?
    Drilling equipment will be cleaned prior to drilling.

12. What methods will be used to clean sampling equipment? N/A

13. What cleaning method will be used to clean casing and screen prior to installation? Casing and screen will be delivered to the site in factory plastic wrap.

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
LAND AND WATER QUALITY DIVISION
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
619-338-2222/FAX 619-338-2315/1-800-253-9933
www.sdcounty.ca.gov/deh/lwq

RICHARD HAAS
ASSISTANT DIRECTOR

PROPERTY OWNER RESPONSIBILITY ACKNOWLEDGEMENT

Proposed locations for subsurface work:

Property Address:
44465 010 Hwy 80
Jacumba, CA 91934

Assessor's Parcel Number (APN):
660-140-07

I, Tom Lindenmeyer - rep for JCSD, owner of the property/properties listed above, give my permission to Petra Geotechnical, Inc. (consulting company, contractor) to conduct the following work at the locations stated above.

☒ Install 2 monitoring wells ☐ Destroy _____ monitoring wells ☐ Drill _____ soil borings

The person who causes to have a monitoring well installed or an existing well destroyed on this property is defined as the *Responsible Party*. San Diego County Code, Section 67.424, states that: "Monitoring wells shall be maintained to meet construction or destruction standards. If a monitoring well does not meet construction or destruction standards, the *Responsible Party* must repair, reconstruct or destroy the monitoring well so it meets the standards. The property owner, if different than the *Responsible Party*, must take the necessary actions to repair, reconstruct or destroy the monitoring well so it meets the standards if the *Responsible Party* does not complete the necessary actions."

A soil boring is used specifically to sample soil and, because there are construction and destruction standards, is included in the definition of a monitoring well even though no maintenance is required. These standards are outlined in the County of San Diego Site Assessment and Mitigation (SAM) Manual and the State of California Well Standards Bulletin 74-90.

I understand that Chuck Hooser (registered professional) of Petra Geotechnical (consulting company) and an authorized signer for Test America WHD (drilling company) have submitted a signed application to the Department of Environmental Health in which they have agreed to complete the above-stated work according the requirements of the current SAM Manual, all ordinances and laws of the County of San Diego and the State of California pertaining to well/boring construction and destruction.

I also understand that if either the registered professional and/or the licensed drilling company should fail in their responsibilities as defined in San Diego County Code, Section 67.424, I, as the property owner, must take the necessary actions to repair, reconstruct or destroy the monitoring well so it meets the standards if the Responsible Party does not complete the necessary actions.

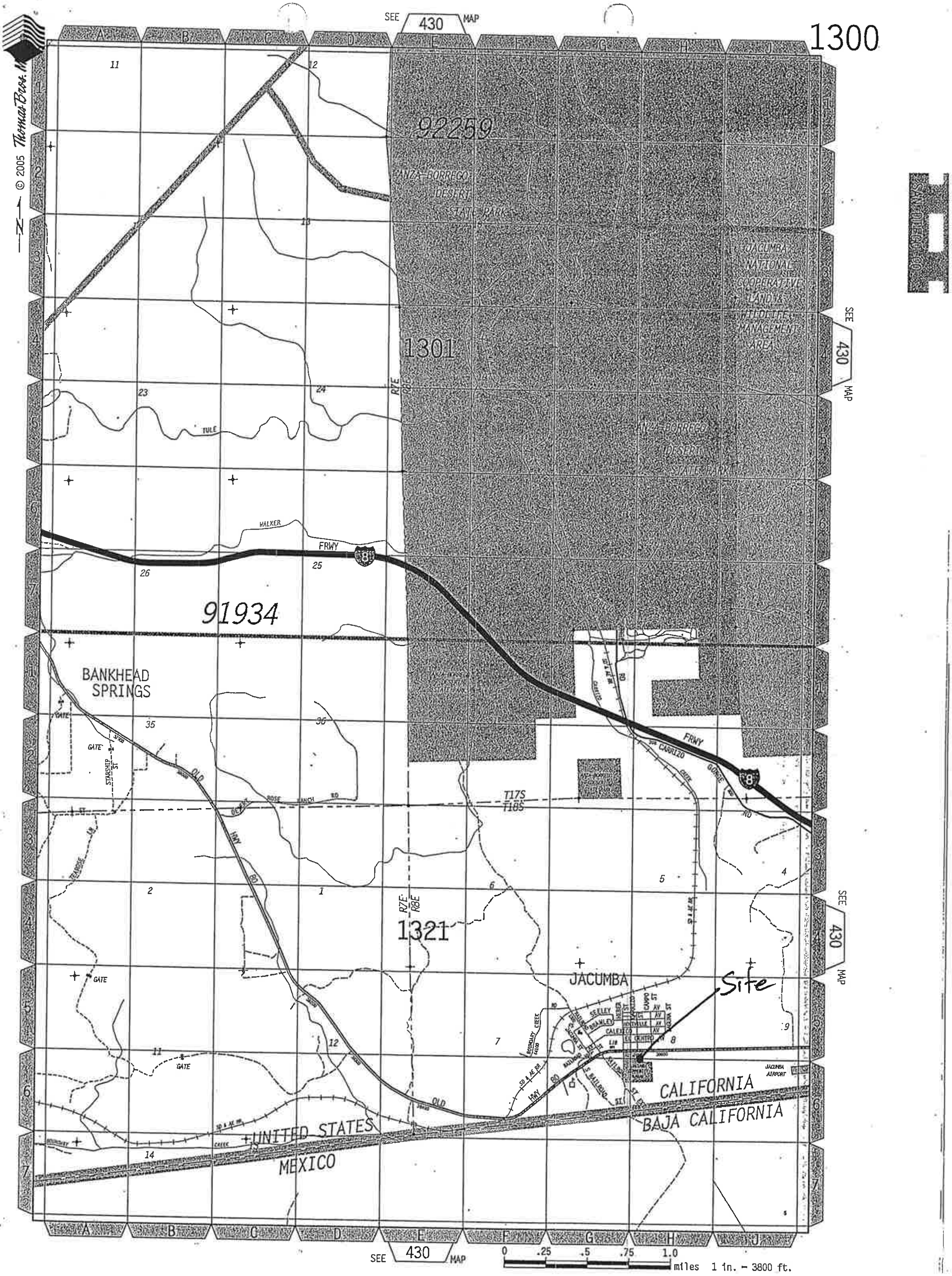
The scope of work covered by this Acknowledgement will expire one year from the date of the property owner's signature below. If an extension of time beyond one year is required to complete the proposed drilling activities or additional work is proposed, a new Property Owner Responsibility Agreement will be required.

Property Owner Signature: Tom Lindenmeyer Date: 10-14-05

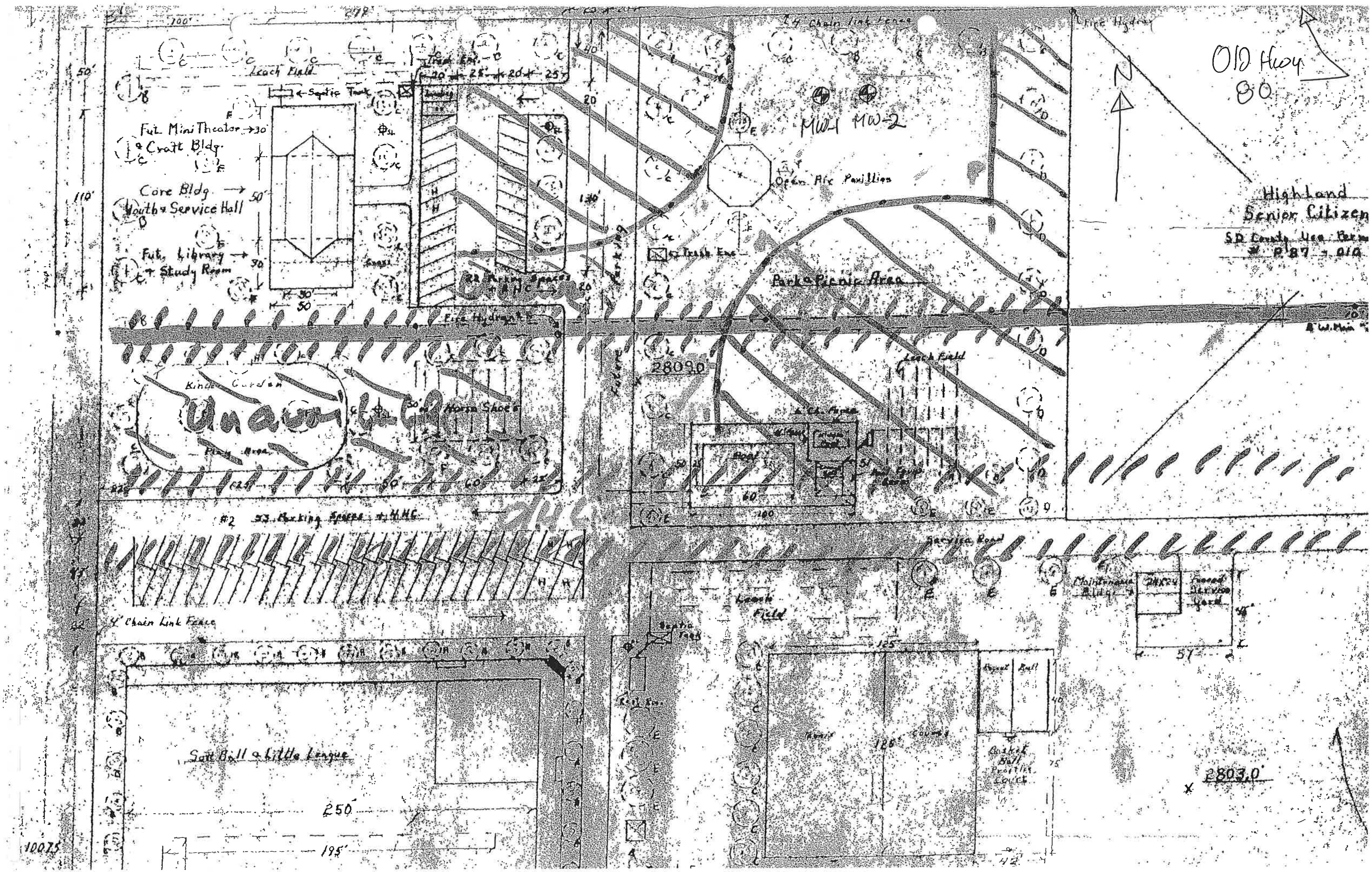
Print Name: TOM LINDENMEYER Title: GENERAL MANAGER

Company: JACUMBA C.S.D.

Mailing Address: P.O. 425 JACUMBA CA 91934



SEE 430 MAP
© 2005 Thomas Bros. Maps
92259
ANZA-BORREGO DESERT STATE PARK
JACUMBA NATIONAL COOPERATIVE LAND & WILDLIFE MANAGEMENT AREA
1301
TULE
WALKER
FRWY
8
91934
BANKHEAD SPRINGS
GATE
STARSHIP ST
OLD HWY 80
ROSE RANCH RD
T17S
T18S
CARRIZO GORGE RD
R7E R8E
1321
JACUMBA
Site
SEELEY
BRAWLEY
CALEXICO
EL CENTRO
JACUMBA AIRPORT
CALIFORNIA
BAJA CALIFORNIA
UNITED STATES
MEXICO
BOUNDARY CREEK
SEE 430 MAP
0 .25 .5 .75 1.0 miles 1 in. = 3800 ft.
SAN DIEGO CO.


Old Hwy 80
MW-1 MW-2
Highland Senior Citizen
SD County Use Permit
P87-010
Fut. Mini Theater
& Craft Bldg.
Core Bldg.
Youth & Service Hall
Fut. Library
& Study Room
Leach Field
Septic Tank
Open Air Pavillion
Trash Enc.
Park & Picnic Area
Fire Hydrant
Kinder Garden
Play Area
Horse Shoes
2809.0'
Leach Field
Pool
53 Parking Spaces + H.HC
4' Chain Link Fence
Service Road
Maintenance Bldg.
Fenced Service Yard
Septic Tank
Leach Field
Soft Ball & Little League
250'
195'
Tennis Courts
120'
Basket Ball Practice Court
2803.0'

APPENDIX B

BORING/WELL LOG

PETRA

FIELD EXPLORATION LOG

Sheet 1 of 6

Exploration No.: MW-1 Date: 12/13/05

Project Name: Jacumba Community Service District Job No.: 267-05

Project Location: 44465 Old Highway 80, Jacumba, California Logger: _____

Type of Rig: Air/Mud Rotary Hole Diameter: 10" Drive Weight: _____ lbs. Drop: _____ in.

Elevation to Top of Hole: _____ ft. Reference or Datum: MSL

Depth (feet)	Soil Description	USCS	Samples: core/chunk	Samples: Bulk	Samples: Blow Count (per 6")	Laboratory Tests: Well Diagram	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Data and Comments
1–3	Alluvium: Light olive brown (2.5Y 5/3) medium to very coarse poorly graded quartz sand, slightly moist.	SP						Traffic rated well cover; Concrete
4–11	Light olive brown (2.5Y 5/3) fine to medium poorly graded sand, slightly moist.	SP						Bentonite Grout; 4" Sch 40 PVC Blank casing
12–13	Olive brown (2.5Y 4/3) fine to medium poorly graded sand with silt, slightly moist.	SP-SM						
14–17	Light yellowish brown (2.5Y 6/3) fine to coarse poorly graded sand, slightly moist.	SP						
18–25	Pale yellow (2.5Y 7/3) medium to very coarse poorly graded sand with gravel, slightly moist.	SP						

PETRA GEOTECHNICAL, INC.

12225 WORLD TRADE DR. SUITE P
SAN DIEGO, CA 92128
PHONE: (858) 485-5530

SAN DIEGO MURRIETA LOS ANGELES COSTA MESA

FIELD EXPLORATION LOG

Sheet 2 of 6

Exploration No.: MW-1 Date: 12/13/05

Project Name: Jacumba Community Service District Job No.: 267-05

Project Location: 44465 Old Highway 80, Jacumba, California Logger: _____

Type of Rig: Air/Mud Rotary Hole Diameter: 10" Drive Weight: _____ lbs. Drop: _____ in.

Elevation to Top of Hole: _____ ft. Reference or Datum: MSL

Depth (feet)	Soil Description	USCS	Samples: core/chunk	Samples: Bulk	Samples: Blow Count (per 6")	Laboratory Tests: Well Diagram	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Data and Comments
26	Olive brown (2.5Y 4/3) fine to medium poorly graded sand, moist.	SP						
27								
28								Bentonite Grout
29								4" Sch 40 PVC Blank casing
30	Little gravel	SP						
31								
32								
33								
34	Light olive brown (2.5Y 5/4) medium to coarse poorly graded sand with silt, moist,	SP-SM						
35	trace to little gravel to 1/8".							
36								
37								
38								
39								
40	Light yellowish brown (2.5Y 6/3) medium to very coarse poorly graded quartz sand, trace	SP						
41	silt, moist.							
42								
43	Light yellowish brown (2.5Y 6/3) fine to medium poorly graded sand, trace to little silt, moist.	SP						
44	Light yellowish brown (2.5Y 6/3) medium to very coarse poorly graded quartz sand, trace	SP						
45	silt, moist.							
46	Light olive brown (2.5Y 5/3) fine silty sand, very moist.	SM						
47								
48	Free water in return cuttings.							
49								
50	Light yellowish brown (2.5Y 6/3) medium to very coarse poorly graded sand, wet.	SP						

PETRA GEOTECHNICAL, INC.

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SAN DIEGO MURRIETA LOS ANGELES COSTA MESA

FIELD EXPLORATION LOG

Sheet 3 of 6

Exploration No.: MW-1 Date: 12/13/05

Project Name: Jacumba Community Service District Job No.: 267-05

Project Location: 44465 Old Highway 80, Jacumba, California Logger: _____

Type of Rig: Air/Mud Rotary Hole Diameter: 10" Drive Weight: _____ lbs. Drop: _____ in.

Elevation to Top of Hole: _____ ft. Reference or Datum: MSL

Depth (feet)	Soil Description	USCS	Samples: Core/chunk	Samples: Bulk	Samples: Blow Count (per 6")	Laboratory Tests: Well Diagram	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Data and Comments
51	Light yellowish brown (2.5Y 6/3) medium to very coarse poorly graded sand, wet.	SP						
52								
53								Bentonite Grout
54								4" Sch 40 PVC Blank casing
55								
56								
57								
58								
59								
60								
61								
62								
63								
64								
65								
66								
67								
68								
69								
70								Hydrated bentonite seal
71								
72								
73								No. 3 sand
74								
75								

PETRA GEOTECHNICAL, INC.

12225 WORLD TRADE DR. SUITE P
SAN DIEGO, CA 92128
PHONE: (858) 485-5530

SAN DIEGO MURRIETA LOS ANGELES COSTA MESA

FIELD EXPLORATION LOG

Sheet 4 of 6

Exploration No.: MW-1 Date: 12/13/05

Project Name: Jacumba Community Service District Job No.: 267-05

Project Location: 44465 Old Highway 80, Jacumba, California Logger: _____

Type of Rig: Air/Mud Rotary Hole Diameter: 10" Drive Weight: _____ lbs. Drop: _____ in.

Elevation to Top of Hole: _____ ft. Reference or Datum: MSL

Depth (feet)	Soil Description	USCS	Samples: core/chunk	Samples: Bulk	Samples: Blow Count (per 6")	Laboratory Tests: Well Diagram	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Data and Comments
76	"Clumps" of very dark gray (2.5Y 3/1) fine clayey/silty sand/sandy silt/clay.							
77								No. 3 sand
78								
79								4" Sch 40 PVC 0.020 slotted casing
80	Coarse sand/gravel.	SP						
81								
82								
83								
84								
85								
86	"Clumps" of very dark gray (2.5Y 3/1) fine clayey/silty sand/sandy silt/clay.							
87								
88	Grayish brown (2.5Y 5/2) medium to coarse poorly graded sand, little silt, wet.	SP						
89								
90								
91	Coarser sand- medium to very coarse							
92								
93								
94	Gray (2.5Y 5/1) medium to very coarse poorly graded sand with gravel (quartz to 1")	SP						
95								
96								
97								
98								
99								
100								

PETRA GEOTECHNICAL, INC.

12225 WORLD TRADE DR. SUITE P
SAN DIEGO, CA 92128
PHONE: (858) 485-5530

SAN DIEGO MURRIETA LOS ANGELES COSTA MESA

FIELD EXPLORATION LOG

Sheet 5 of 6

Exploration No.: MW-1 Date: 12/13/05

Project Name: Jacumba Community Service District Job No.: 267-05

Project Location: 44465 Old Highway 80, Jacumba, California Logger: _____

Type of Rig: Air/Mud Rotary Hole Diameter: 10" Drive Weight: _____ lbs. Drop: _____ in.

Elevation to Top of Hole: _____ ft. Reference or Datum: MSL

Depth (feet)	Soil Description	USCS	Samples: Core/chunk	Samples: Bulk	Samples: Blow Count (per 6")	Laboratory Tests: Well Diagram	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Data and Comments
101								
102								No. 3 sand
103								
104								4" Sch 40 PVC 0.020 slotted casing
105	Gray (2.5Y 5/1) medium to very coarse poorly graded sand with gravel (to 1.5"), trace to little silt, wet.	SP						
106								
107								Pipe/casing plugged. Switch to mud rotary.
108								
109								
110								
111								
112								
113								
114								
115								
116								
117								
118								
119								
120								
121								
122								
123								
124								Bottom Cap
125								

PETRA GEOTECHNICAL, INC.

12225 WORLD TRADE DR. SUITE P
SAN DIEGO, CA 92128
PHONE: (858) 485-5530

SAN DIEGO MURRIETA LOS ANGELES COSTA MESA

FIELD EXPLORATION LOG

Sheet 6 of 6

Exploration No.: MW-1 Date: 12/13/05

Project Name: Jacumba Community Service District Job No.: 267-05

Project Location: 44465 Old Highway 80, Jacumba, California Logger: _____

Type of Rig: Air/Mud Rotary Hole Diameter: 10" Drive Weight: _____ lbs. Drop: _____ in.

Elevation to Top of Hole: _____ ft. Reference or Datum: MSL

Depth (feet)	Soil Description	USCS	Samples: core/chunk	Samples: Bulk	Samples: Blow Count (per 6")	Laboratory Tests: Well Diagram	Laboratory Tests: Dry Density (pcf)	Laboratory Tests: Other Lab Data and Comments
126								
127	Weathered volcanics-reddish brown, medium to very coarse granules.							No. 3 sand
128								
129								
130								
131								
132								
133								
134								
135								
136								
137								
138								
139								
140								
141								
142								
143								
144								
145								
146								
147								
148								
149								
150								

PETRA GEOTECHNICAL, INC.

12225 WORLD TRADE DR. SUITE P
SAN DIEGO, CA 92128
PHONE: (858) 485-5530

SAN DIEGO MURRIETA LOS ANGELES COSTA MESA

APPENDIX C

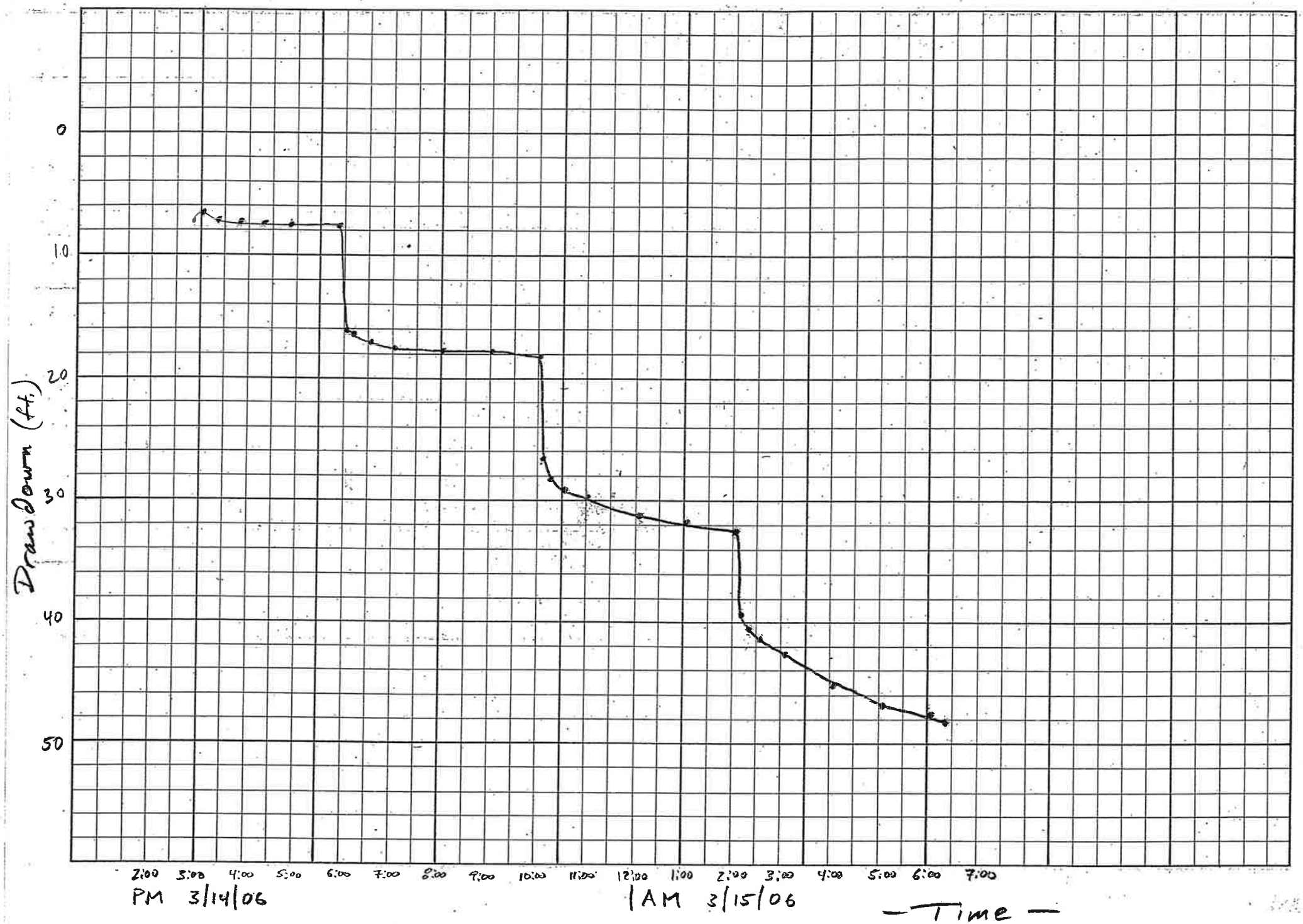
AQUIFER TEST DATA

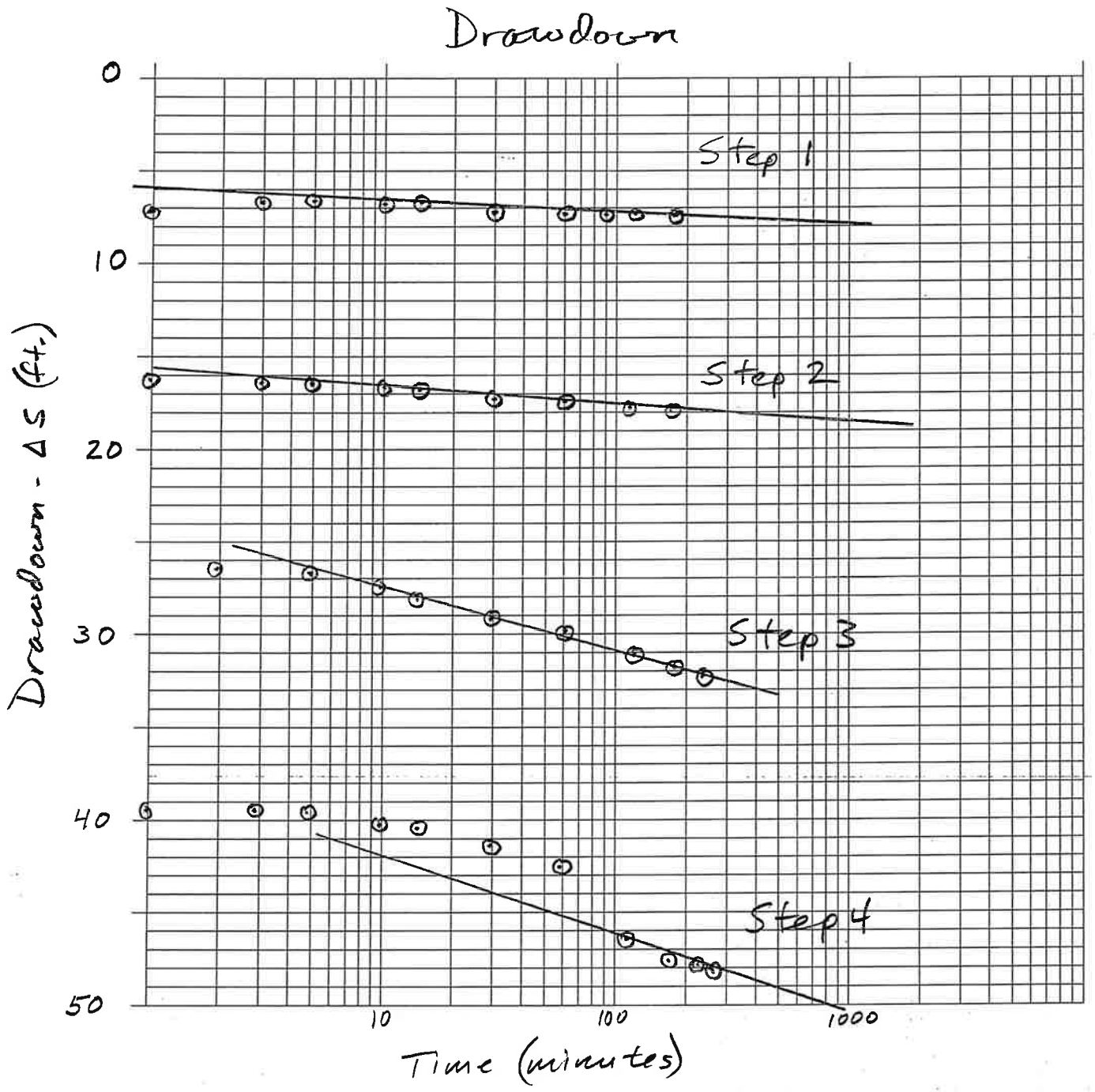
PETRA

Step	Time	Elapsed Time	Depth to Water	Change in Depth to Water	TDS	pH	Temperature (degrees Celsius)	Discharge	Totalizer Reading
Step 1	2:52	0	37.72	0					28067
	2:53	1	44.85	7.13					
	2:55	3	44.44	6.72					28125
	2:57	5	44.44	6.72	430	10.44	20.4	18.8	28161
	3:02	10	44.35	6.63				17.4	28248
	3:07	15	44.43	6.71				17.8	28337
	3:22	30	44.75	7.03	430	9.85	20.2	16.5	28585
	3:52	60	44.88	7.16	420			18.5	29140
	4:22	90	44.92	7.20	430			17.66	29670
	4:52	120	44.95	7.23	430			17.23	30205
	5:52	180	45.05	7.33	440			18.25	31300
Step 2	6:01	1	53.75	16.03				43.5	31450
		3	53.89	16.15					
	6:06	5	54.14	16.42					
	6:11	10	54.40	16.68	450				31810
	6:16	15	54.55	16.83					
	6:31	3060	54.85	17.13				39.1	32625
	7:01	120	55.19	17.47	430			39.8	33840
	8:01	180	55.55	17.88	430			39.75	36225
	9:01	240	55.63	17.91				41	38705
	10:01	240	58.78	18.06				38.75	41030
Step 3	10:04	2	64.08	26.36					
		5	64.55	26.83	430				
		10	65.37	27.65					
	10:16	15	65.75	28.03				60	41790
	10:31	30	66.25	29.03	430			60.5	43000
	11:01	60	67.64	29.92	430			60	44800
	12:01	120	68.92	31.20	400				48400
	01:01	180	69.63	31.91	400				51810
	02:01	240	70.15	32.43	450				55330
	02:05								

Step	Time	Elapsed Time	Depth to Water	Change in Depth to Water	TDS	pH	Temperature (degrees Celsius)	Discharge	Totalizer Reading
Step 4	02:06	1	77.3	39.58					
	02:08	3	77.24	39.52					
	02:10	5	77.33	39.61					
	02:15	10	77.82	40.10				71	56400
	02:20	15	78.14	40.42					56810
	02:35	30	79.18	41.47					57860
	03:05	60	80.26	42.55	410				59285
	04:05	120	83.05	45.33	430			84	64325
	05:05	180	84.41	46.69	400			71.58	68620
	06:05	240	85.54	47.82	430			71.33	72900
	06:22	257	85.75	48.03					74109

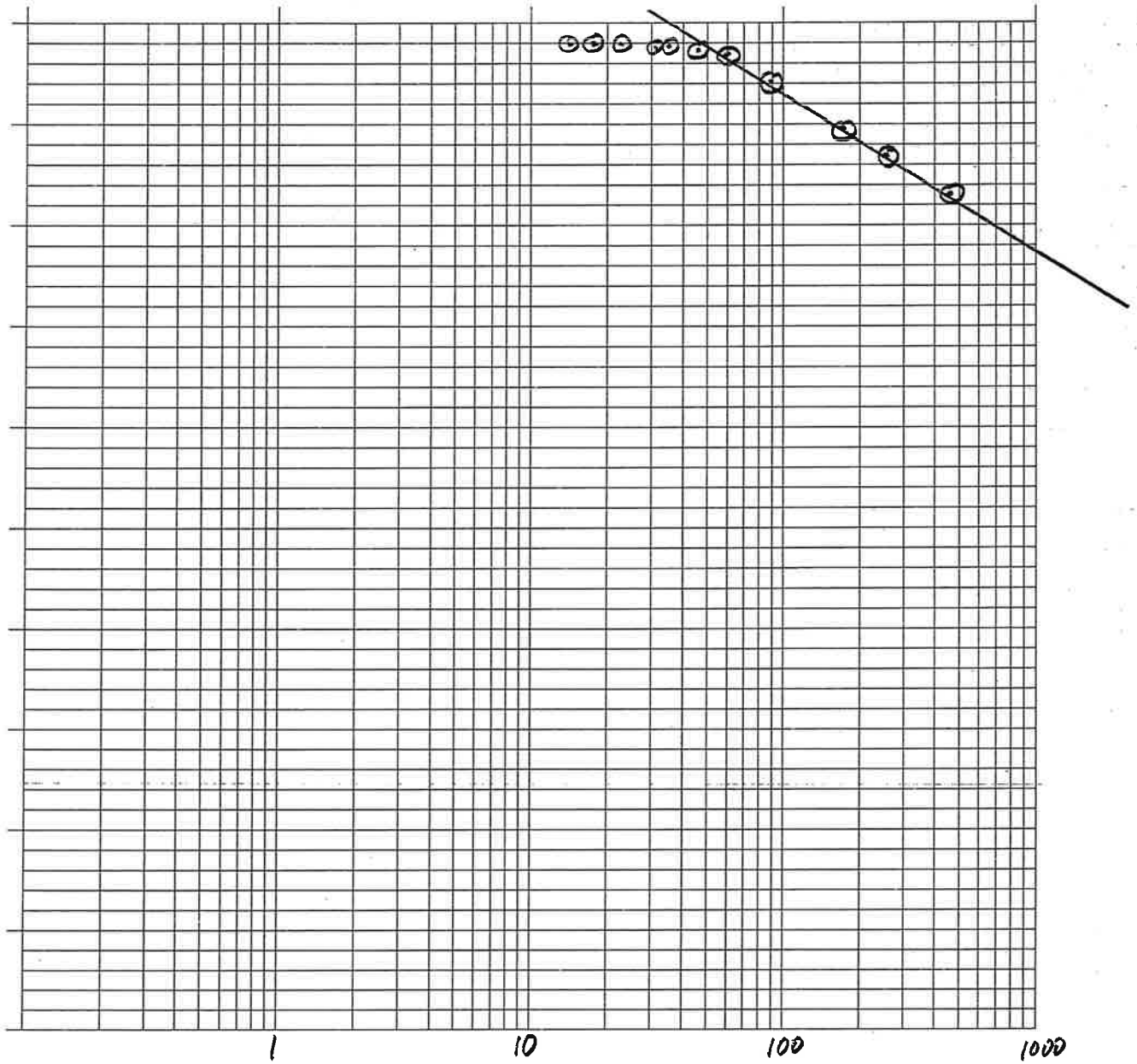
Drawdown vs. Time Plot





Semi-Log Plot of Transmissivity Test Data

Recovery Test



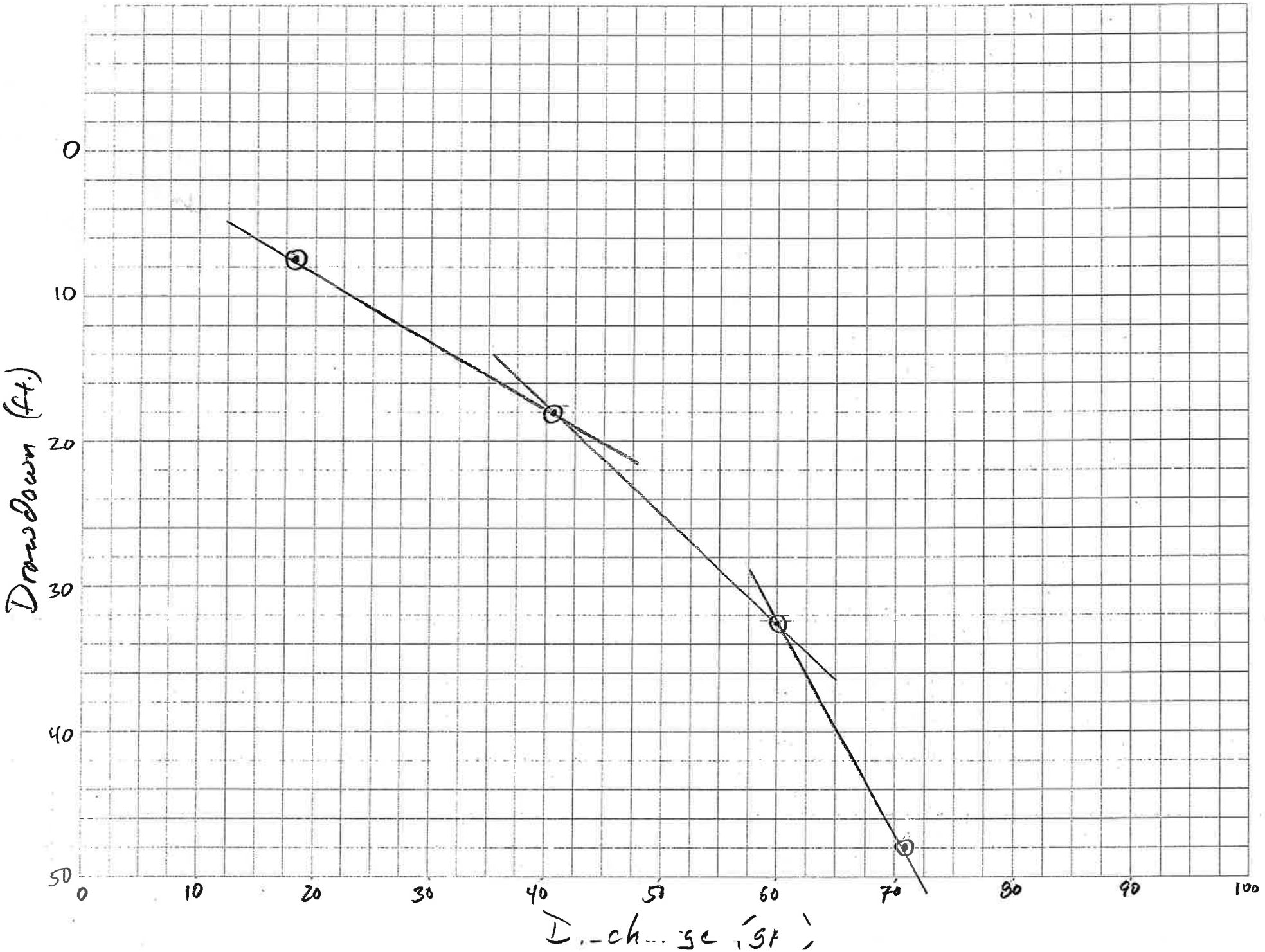
t/t' =

t = time since pumping

t' = time since recovery

Semi-Log Plot of Transmissivity Test Data

Drawdown vs. Discharge



APPENDIX D

LABORATORY REPORTS AND DATA PLOTS

PETRA

EnviroMatrix Analytical, Inc.

30 December 2005

PETRA Geotechnical, Inc.
Attn: Chuck Houser
12225 World Trade Drive, Suite P
San Diego, California 92128

EMA Log #: 0512315

Project Name: Jacumba CSD

Enclosed are the results of analyses for samples received by the laboratory on 12/20/05 07:29. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 2564

Client Name: PETRA Geotechnical, Inc.
Project Name: Jacumba CSD

EMA Log #: 0512315

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	0512315-01	Water	12/19/05 12:50	12/20/05 07:29

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: PETRA Geotechnical, Inc.
Project Name: Jacumba CSD

EMA Log #: 0512315

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1 (0512315-01) Water	**Sampled: 12/19/05 12:50**	**Received: 12/20/05 07:29**							
Chloride	**90.0**	0.05	mg/l	1	5122220	12/22/05	12/27/05	SM4500 Cl C	
Fluoride	**1.9**	0.1	"	"	5122204	12/22/05	12/22/05	SM4500 F C	
Nitrate as N	**0.05**	0.05	"	"	5122032	12/20/05	12/20/05	SM4500 NO3 E	
pH	**6.92**	0.10	pH Units	"	5122101	12/20/05	12/20/05	EPA 150.1	
Total Dissolved Solids	**452**	20	mg/l	"	5122111	12/20/05	12/22/05	SM2540 C	
Sulfate as SO4	**103**	25.0	"	5	5122702	12/27/05	12/27/05	SM4500 SO4 E	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: PETRA Geotechnical, Inc.
Project Name: Jacumba CSD

EMA Log #: 0512315

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5122032										
Blank (5122032-BLK1)				Prepared & Analyzed: 12/20/05						
Nitrate as N	ND	0.05	mg/l							
LCS (5122032-BS1)				Prepared & Analyzed: 12/20/05						
Nitrate as N	0.50	0.05	mg/l	0.500		100	80-120			
LCS Dup (5122032-BSD1)				Prepared & Analyzed: 12/20/05						
Nitrate as N	0.51	0.05	mg/l	0.500		102	80-120	2	20	
Duplicate (5122032-DUP1)		Source: 0512315-01		Prepared & Analyzed: 12/20/05						
Nitrate as N	0.06	0.05	mg/l		0.05			18	20	
Matrix Spike (5122032-MS1)		Source: 0512315-01		Prepared & Analyzed: 12/20/05						
Nitrate as N	0.53	0.05	mg/l	0.500	0.05	96	80-120			
Matrix Spike Dup (5122032-MSD1)		Source: 0512315-01		Prepared & Analyzed: 12/20/05						
Nitrate as N	0.56	0.05	mg/l	0.500	0.05	102	80-120	6	20	
Reference (5122032-SRM1)				Prepared & Analyzed: 12/20/05						
Nitrate as N	4.32	0.50	mg/l	4.32		100	87-113			
Batch 5122101										
Duplicate (5122101-DUP1)		Source: 0512315-01		Prepared & Analyzed: 12/20/05						
pH	6.89	0.10	pH Units		6.92			0.4	20	
Reference (5122101-SRM1)				Prepared & Analyzed: 12/20/05						
pH	8.83	0.10	pH Units	9.10		97	97-103			

Client Name: PETRA Geotechnical, Inc.
Project Name: Jacumba CSD

EMA Log #: 0512315

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5122111										
Duplicate (5122111-DUP1)		**Source: 0512228-02**		Prepared: 12/20/05 Analyzed: 12/22/05						
Total Dissolved Solids	760	20	mg/l		785			3	20	
Duplicate (5122111-DUP2)		**Source: 0512266-02**		Prepared: 12/20/05 Analyzed: 12/29/05						
Total Dissolved Solids	3750	20	mg/l		3760			0.3	20	
Reference (5122111-SRM1)				Prepared: 12/20/05 Analyzed: 12/22/05						
Total Dissolved Solids	242	20	mg/l	216		112	86-114			
Batch 5122204										
Blank (5122204-BLK1)				Prepared & Analyzed: 12/22/05						
Fluoride	ND	0.1	mg/l							
LCS (5122204-BS1)				Prepared & Analyzed: 12/22/05						
Fluoride	0.9	0.1	mg/l	1.00		90	80-120			
LCS Dup (5122204-BSD1)				Prepared & Analyzed: 12/22/05						
Fluoride	0.9	0.1	mg/l	1.00		90	80-120	0	20	
Duplicate (5122204-DUP1)		**Source: 0512315-01**		Prepared & Analyzed: 12/22/05						
Fluoride	1.9	0.1	mg/l		1.9			0	20	
Matrix Spike (5122204-MS1)		**Source: 0512315-01**		Prepared & Analyzed: 12/22/05						
Fluoride	2.8	0.1	mg/l	1.00	1.9	90	80-120			
Matrix Spike Dup (5122204-MSD1)		**Source: 0512315-01**		Prepared & Analyzed: 12/22/05						
Fluoride	2.8	0.1	mg/l	1.00	1.9	90	80-120	0	20	

Client Name: PETRA Geotechnical, Inc.
Project Name: Jacumba CSD

EMA Log #: 0512315

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5122204										
Reference (5122204-SRM1)				Prepared & Analyzed: 12/22/05						
Fluoride	4.5	0.1	mg/l	4.73		95	86-114			
Batch 5122220										
Blank (5122220-BLK1)				Prepared: 12/22/05 Analyzed: 12/29/05						
Chloride	ND	0.05	mg/l							
LCS (5122220-BS1)				Prepared: 12/22/05 Analyzed: 12/27/05						
Chloride	202	0.05	mg/l	200		101	80-120			
LCS Dup (5122220-BSD1)				Prepared: 12/22/05 Analyzed: 12/27/05						
Chloride	204	0.05	mg/l	200		102	80-120	1	20	
Duplicate (5122220-DUP1)		**Source: 0512264-01**		Prepared: 12/22/05 Analyzed: 12/27/05						
Chloride	266000	12.5	mg/l		264000			0.8	20	
Matrix Spike (5122220-MS1)		**Source: 0512264-01**		Prepared: 12/22/05 Analyzed: 12/27/05						
Chloride	315000	12.5	mg/l	50000	264000	102	80-120			
Matrix Spike Dup (5122220-MSD1)		**Source: 0512264-01**		Prepared: 12/22/05 Analyzed: 12/27/05						
Chloride	314000	12.5	mg/l	50000	264000	100	80-120	0.3	20	
Batch 5122702										
Blank (5122702-BLK1)				Prepared & Analyzed: 12/27/05						
Sulfate as SO4	ND	5.0	mg/l							

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: PETRA Geotechnical, Inc.
Project Name: Jacumba CSD

EMA Log #: 0512315

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 5122702										
LCS (5122702-BS1)				Prepared & Analyzed: 12/27/05						
Sulfate as SO4	8.8	5.0	mg/l	10.0		88	80-120			
LCS Dup (5122702-BSD1)				Prepared & Analyzed: 12/27/05						
Sulfate as SO4	8.9	5.0	mg/l	10.0		89	80-120	1	20	
Duplicate (5122702-DUP1)		**Source: 0512315-01**		Prepared & Analyzed: 12/27/05						
Sulfate as SO4	101	25.0	mg/l		103			2	20	
Matrix Spike (5122702-MS1)		**Source: 0512315-01**		Prepared & Analyzed: 12/27/05						
Sulfate as SO4	149	25.0	mg/l	50.0	103	92	80-120			
Matrix Spike Dup (5122702-MSD1)		**Source: 0512315-01**		Prepared & Analyzed: 12/27/05						
Sulfate as SO4	146	25.0	mg/l	50.0	103	86	80-120	2	20	

he results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CHAIN-OF-CUSTODY RECORD

EnviroMatrix Analytical, Inc.
4340 Viewridge Ave., Ste. A • San Diego, CA 92123 • Phone (858) 560-7717 • Fax (858) 560-7763

EMA LOG #: 0512315

EMA DATE/TIME STAMP

Client: Petra Geotechnical
Address: 12225 World Trade Dr., Ste P
San Diego, CA 92128
Attn: Chuck Houser Phone: (858) 485-5530
Sampled by: Chuck Houser Fax: (858) 485-8215
Billing Address: 3185-A Airway Ave
Costa Mesa, CA
Project: Jacumba CSD PO #:

REQUESTED ANALYSIS

EMA ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container(s) #	Container(s) Type*	418.1 (TRPH)	Oil & Grease 413.1__ 413.2__ 1664__	TPH (8015B) Gas__ Diesel__	TPH-Extended 8015B__ ASTM D2887__	602 / 8021 BTXE__ MTBE__	601 / 8021 (Purgeable Halocarbons)	608 / 8081 (Pesticides)	608 / 8082 (PCB's)	624 / 8260 (Volatile Organics)	625 / 8270 (Semi Volatile Organics)	TTLC Metals (CAC Title 22)	STLC Metals (CAC Title 22)	TCLP (RCRA) Metals__ Organics__	Cd Cr Cu Pb Ni Ag Zn	pH EC TSS TDS	TDS	Chloride	Nitrate	Sulfate	pH	Fluoride		
1	MW-1	12/19/05	12:50	Water																		X	X	X	X	X	X		
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													

*Container Types: B=Brass Tube; V=VOA; G=Glass; P=Plastic; O=Other (list)

Tamper-Proof Seals Intact: Yes No N/A Correct Containers: Yes No

Sample(s): Cold Ambient Warm VOAs w/ZHS: Yes No N/A

All Samples Properly Preserved: Yes No N/A

Disposal: N/C (aqueous) *EMA (@$5.00/sample) Return Hold

Turnaround Time: 24 hr 48 hr 3 day 4 day 5 day (Normal)

Comments: T = 10°C

RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature	12/20/05 7:29	Signature
Print: Chuck Houser		Print: Vassilka Vatcarska
Company: Petra		Company: EMA
Signature	12/20/05 7:29	Signature
Print		Print
Company:		Company:
Signature		Signature
Print		Print
Company:		Company:

*EMA reserves the right to return samples that do not match our waste profile.

White - EMA Canary - Accounting Pink - Client (w/Report) Goldenrod - Client (Relinquish Samples)

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer	**Matrix:**	WATER	
	JACUMBA COMM.SERVICE DIST.	**Sampled:**	03/15/2006	6:05
	BOX 425	**Received:**	03/15/2006	11:45
	JACUMBA, CA 92034	**Collection Address:**		
Reference:	0631270	**Sample Location:**	MW-1	
Lab ID:	0631270-001	**Description:**		
Sample #:		**Date Started:**	03/15/2006	
Project#:		**Date Completed:**	04/11/2006	
Comment:	VOC analyzed past holding time	**PS Code:**	WAT	

Analyzed: 3/24/2006 @ 13:32 **Method:** EPA 504.1
Analyst: BSK **Dilution Factor:** 1

EDB And DBCP By EPA 504

Parameter	Result %	MCL %	RL %
Bromoform	**120**	-	-
Dibromochloropropane (DBCP)	**ND**	0.2	0.01
Ethylene Dibromide (EDB)	**ND**	0.05	0.02

Report Date: 04/11/2006

Approval: _____
Director

RECEIVED
MAY 24 2006

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer	**Matrix:**	WATER
	JACUMBA COMM.SERVICE DIST.	**Sampled:**	03/15/2006 6:05
	BOX 425	**Received:**	03/15/2006 11:45
	JACUMBA, CA 92034	**Collection Address:**	
Reference:	0631270	**Sample Location:**	MW-1
Lab ID:	0631270-001	**Description:**	
Sample #:		**Date Started:**	03/15/2006
Project#:		**Date Completed:**	04/11/2006
Comment:	VOC analyzed past holding time	**PS Code:**	WAT

Analyzed: 4/5/2006 @ 14:34 **Method:** EPA 524.2

Analyst: **Dilution Factor:** 1

VOC By EPA 502.2/524.2

Parameter	Result ug/L	MCL ug/L	RL ug/L	Parameter	Result ug/L	MCL ug/L	RL ug/L
1,1,1,2-Tetrachloroethane	ND	80	0.5	Chloroethane	ND	80	0.5
1,1,1-Trichloroethane	ND	200	0.5	Chloroform	ND	80	0.5
1,1,2,2-Tetrachloroethane	ND	1	0.5	Chloromethane	ND	80	0.5
1,1,2-Trichloroethane	ND	5	0.5	Cis-1,2-Dichloroethylene	ND	6	0.5
1,1-Dichloroethane	ND	5	0.5	Cis-1,3-Dichloropropene	ND	80	0.5
1,1-Dichloroethylene	ND	6	0.5	Dibromochloromethane	ND	80	0.5
1,1-Dichloropropene	ND	80	0.5	Dibromomethane	ND	80	0.5
1,2 Dichlorobenzene (o-DCB)	ND	600	.5	Dichlorodifluoromethane	ND	80	0.5
1,2,3-Trichlorobenzene	ND	80	0.5	Dichloromethane(Methylenchlor)	ND	5	0.5
1,2,3-Trichloropropane	ND	-	0.5	Ethylbenzene	0.50	300	0.5
1,2,4-Trichlorobenzene	ND	5	0.5	Hexachlorobutadiene	ND	80	0.5
1,2,4-Trimethylbenzene	0.50	80	0.5	Isopropylbenzene (Cumene)	ND	80	0.5
1,2-Dichloroethane	ND	0.5	0.5	Methyl Ethyl Ketone	ND	-	5
1,2-Dichloropropane	ND	5	0.5	Methyl Tert-butyl Ether (MTBE)	ND	5	1.0
1,3,5-Trimethylbenzene	ND	80	0.5	Monochlorobenzene	ND	70	0.5
1,3-Dichlorobenzene	ND	80	0.5	Napthalene	ND	80	0.5
1,3-Dichloropropane	ND	80	0.5	N-butylbenzene	ND	80	0.5
1,3-Dichloropropene	ND	0.5	0.5	Nitrobenzene	ND	-	0.5
1,4-Dichlorobenzene (p-DCB)	ND	5	0.5	N-propylbenzene	ND	80	0.5
2,2-Dichloropropane	ND	80	0.5	Pentachlorothane	ND	-	0.5
2-Chlorotoluene	ND	80	0.5	P-isopropyltoluene	ND	80	0.5
4-Chlorotoluene	ND	80	0.5	Sec-butylbenzene	ND	80	0.5
Benzene	0.70	1.0	0.5	Styrene	ND	100	0.5
Bromobenzene	ND	80	0.5	Tert-butylbenzene	ND	80	0.5
Bromochloromethane	ND	80	0.5	Tetrachloroethylene (PCE)	ND	5	0.5
Bromodichloromethane	ND	80	0.5	Toluene	291	150	0.5
Bromoform	ND	80	0.5	Total Trihalomethanes	ND	80	0.5
Bromomethane	ND	80	0.5	Trans-1,2-dichloroethylene	ND	10	0.5
Carbon Tetrachloride	ND	0.5	0.5	Trans-1,3-dichloropropene	ND	80	0.5

Report Date: 04/11/2006

Approval: _____
Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

EEL Analytical

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer JACUMBA COMM.SERVICE DIST. BOX 425 JACUMBA, CA 92034	**Matrix:**	WATER	
		Sampled:	03/15/2006	6:05
		Received:	03/15/2006	11:45
		Collection Address:		
Reference:	0631270	**Sample Location:**	MW-1	
Lab ID:	0631270-001	**Description:**		
Sample #:		**Date Started:**	03/15/2006	
Project#:		**Date Completed:**	04/11/2006	
Comment:	VOC analyzed past holding time	**PS Code:**	WAT	

Analyzed: 4/5/2006 @ 14:34 **Method:** EPA 524.2

Analyst: **Dilution Factor:** 1

VOC By EPA 502.2/524.2

Parameter	Result ug/L	MCL ug/L	RL ug/L	Parameter	Result ug/L	MCL ug/L	RL ug/L
Trichloroethylene (TCE)	ND	5	0.5				
Trichlorofluoromethane	ND	150	5.00				
Trichlorotrifluoromethane	ND	1200	10.0				
Vinyl Chloride	ND	0.5	0.5				
Xylenes	ND	1750	0.5				

Surrogates	% Recovered	QC Limits (%)	
4-Bromofluorobenzene	70%	40	140

Report Date: 04/11/2006

Approval: _____ Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer	**Matrix:**	WATER	
	JACUMBA COMM.SERVICE DIST.	**Sampled:**	03/15/2006	6:05
	BOX 425	**Received:**	03/15/2006	11:45
	JACUMBA, CA 92034	**Collection Address:**		
Reference:	0631270	**Sample Location:**	MW-1	
Lab ID:	0631270-001	**Description:**		
Sample #:		**Date Started:**	03/15/2006	
Project#:		**Date Completed:**	04/11/2006	
Comment:	VOC analyzed past holding time	**PS Code:**	WAT	

Carbamates By 531.1

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
3-Hydroxycarbofuran	ND	µg/L	3	NA	1	EPA 531.1	03/27/2006 13:34	BSK
Aldicarb	ND	µg/L	3	NA	1	EPA 531.1	03/27/2006 13:34	BSK
Aldicarb Sulfoxide	ND	µg/L	3	NA	1	EPA 531.1	03/27/2006 13:34	BSK
Aldicard Sulfone	ND	µg/L	2	NA	1	EPA 531.1	03/27/2006 13:34	BSK
BDMC	100	%	-	-	1	EPA 531.1	03/27/2006 13:34	BSK
Carbaryl	ND	µg/L	5	NA	1	EPA 531.1	03/27/2006 13:34	BSK
Carbofuran	ND	µg/L	5	18	1	EPA 531.1	03/27/2006 13:34	BSK
Methomyl	ND	µg/L	2	NA	1	EPA 531.1	03/27/2006 13:34	BSK
Oxamyl	ND	µg/L	20	50	1	EPA 531.1	03/27/2006 13:34	BSK

Coliform Total (1) Colilert

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Chlorine Residual	NA	mg/L	0.1		1	SM4500G	03/15/2006 13:50	MEH
Coliform, E. Coli.	Absent	None	0	0	1	SM 9223	03/15/2006 13:50	MEH
Total Coliform	Absent	None	0	0	1	SM 9223	03/15/2006 13:50	MEH

General Physical

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Color, Visual	<4	UNITS	3	15	1	SM 2120B	03/20/2006 16:16	FN
Odor	ND	TON	1		1	SM 2150	03/20/2006 16:16	FN
Turbidity	4.08	NTU	0.10	1.0	1	SM2130B	03/16/2006 17:01	FN

Gross Alpha and Beta

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Gross Alpha Counting Error	0.710	pCi/L	0	0	1	EPA900.0	03/30/2006 14:32	TLI
Gross Beta Counting Error	0.660	pCi/L	0	0	1	EPA900.0	03/30/2006 14:32	TLI
Radioactivity, Gross Alpha	0.00	pCi/L	0	15	1	EPA900.0	03/30/2006 14:32	TLI
Radioactivity, Gross Beta	1.29	pCi/L	0	0	1	EPA900.0	03/30/2006 14:32	TLI

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

EEL Analytical

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer		**Matrix:**	WATER	
	JACUMBA COMM.SERVICE DIST.		**Sampled:**	03/15/2006	6:05
	BOX 425		**Received:**	03/15/2006	11:45
	JACUMBA, CA 92034		**Collection Address:**		
Reference:	0631270		**Sample Location:**	MW-1	
Lab ID:	0631270-001		**Description:**		
Sample #:			**Date Started:**	03/15/2006	
Project#:			**Date Completed:**	04/11/2006	
Comment:	VOC analyzed past holding time		**PS Code:**	WAT	

Herbicides by EPA 515.1

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
2,4-D (Dichlorophenoxy) Acetic Acid	ND	µg/L	10	70	1	EPA 515.1	03/21/2006 13:33	MEH
2.4.5-T	ND	µg/L	1	NA	1	EPA 515.1	03/21/2006 13:33	BSK
Bentazon	ND	µg/L	2	18	1	EPA 515.1	03/21/2006 13:33	BSK
Dalapon	ND	µg/L	10	200	1	EPA 515.3	03/21/2006 13:33	BSK
Dicamba	ND	µg/L	1.5	NA	1	EPA 515.1	03/21/2006 13:33	BSK
Dinoseb	ND	µg/L	2	7	1	EPA 515.1	03/21/2006 13:33	BSK
Pentachlorophenol	ND	µg/L	0.2	1	1	EPA 515.1	03/21/2006 13:33	BSK
Picloram	ND	µg/L	1	500	1	EPA 515.1	03/21/2006 13:33	BSK
Silvex	ND	µg/L	1	50	1	EPA 515.1	03/21/2006 13:33	BSK

Pesticides and PCBs by EPA 505

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Aldrin	ND	µg/L	0.075	NA	1	EPA 505	03/20/2006 13:32	BSK
Chlordane	ND	µg/L	0.1	0.1	1	EPA 505	03/20/2006 13:32	BSK
Chlorothalonil (Daconil, Bravo)	ND	µg/L	5.0	NA	1	EPA 505	03/20/2006 13:32	BSK
Dieldrin	ND	µg/L	0.02	NA	1	EPA 505	03/20/2006 13:32	BSK
Endrin	ND	µg/L	0.1	2	1	EPA 505	03/20/2006 13:32	BSK
Heptachlor	ND	µg/L	0.01	0.01	1	EPA 505	03/20/2006 13:32	BSK
Heptachlor epoxide	ND	µg/L	0.01	0.01	1	EPA 505	03/20/2006 13:32	BSK
Hexachlorobenzene	ND	µg/L	0	1	1	EPA 505	03/20/2006 13:32	BSK
Hexachlorocyclopentadiene	ND	µg/L	1	50	1	EPA 505	03/20/2006 13:32	BSK
Lindane (BHC gamma isomer)	ND	µg/L	0.2	0.2	1	EPA 505	03/20/2006 13:32	BSK
Methoxychlor	ND	µg/L	10	30	1	EPA 505	03/20/2006 13:32	BSK
PCBs: Arolchlor Screen	ND	µg/L	0.2	0.5	1	EPA 505	03/20/2006 13:32	BSK
Toxaphene	ND	µg/L	1	3	1	EPA 505	03/20/2006 13:32	BSK
Trifluralin	ND	µg/L	1	NA	1	EPA 505	03/20/2006 13:32	BSK

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

ENVIRONMENTAL ENGINEERING LABORATORY, INC.
3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient: Tom Lindenmeyer
JACUMBA COMM.SERVICE DIST.
BOX 425
JACUMBA, CA 92034
Reference: 0631270
Lab ID: 0631270-001
Sample #:
Project#:
Comment: VOC analyzed past holding time

Matrix: WATER
Sampled: 03/15/2006 6:05
Received: 03/15/2006 11:45
Collection Address:
Sample Location: MW-1
Description:
Date Started: 03/15/2006
Date Completed: 04/11/2006
PS Code: WAT

SVOCs By EPA 525.2 (Full List)

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
1,3-Dimethyl-2-nitrobenzene	110	%	-	-	1	EPA 525.2	04/04/2006 13:34	BSK
Alachlor	ND	µg/L	1	2	1	EPA 525.2	04/04/2006 13:34	BSK
Atrazine	ND	µg/L	0.5	1	1	EPA 525.2	04/04/2006 13:34	BSK
Benzo (a) Pyrene	ND	µg/L	0.1	0.2	1	EPA 525.2	04/04/2006 13:34	BSK
Bis(2-ethylhexyl)adipate	ND	µg/L	3	400	1	EPA 525.2	04/04/2006 13:34	BSK
Bis(2-ethylhexyl)phthalate	ND	µg/L	3	4	1	EPA 525.2	04/04/2006 13:34	BSK
Bromacil (Hyvar)	ND	µg/L	10	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Butachlor	ND	µg/L	0.38	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Diazinon	ND	µg/L	0.25	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Dimethoate (Cygon)	ND	µg/L	10	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Metolachlor	ND	µg/L	0.5	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Metribuzin	ND	µg/L	0.5	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Molinate (Ordram)	ND	µg/L	2	20	1	EPA 525.2	04/04/2006 13:34	BSK
Prometryn (Caparol)	ND	µg/L	2	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Propachlor	ND	µg/L	0.5	NA	1	EPA 525.2	04/04/2006 13:34	BSK
Simazine	ND	µg/L	1	4	1	EPA 525.2	04/04/2006 13:34	BSK
Thiobencarb (Bolero)	ND	µg/L	1	70	1	EPA 525.2	04/04/2006 13:34	BSK

Test Parameters

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Diquat By EPA 549	ND	ug/L	4.0	20	1	549	03/17/2006 13:31	BSK
Endothall By EPA 548	ND	ug/L	45	100	1	548.1	03/20/2006 13:31	BSK
Glyphosate By EPA 547	ND	ug/L	25	700	1	547	03/17/2006 13:31	BSK
Uranium	ND	pCi/L	2.0	20	1	EPA 908.0	03/28/2006	BSK

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

EEL Analytical

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer	**Matrix:**	WATER	
	JACUMBA COMM.SERVICE DIST.	**Sampled:**	03/15/2006	6:05
	BOX 425	**Received:**	03/15/2006	11:45
	JACUMBA, CA 92034	**Collection Address:**		
Reference:	0631270	**Sample Location:**	MW-1	
Lab ID:	0631270-001	**Description:**		
Sample #:		**Date Started:**	03/15/2006	
Project#:		**Date Completed:**	04/11/2006	
Comment:	VOC analyzed past holding time	**PS Code:**	WAT	

Title 22 Primary Inorganic Chemicals

Parameter	Result	Units	RL	MCL	Dilution Factor	Method	Analyzed	Analyst
Aluminum	770	ug/L	50.0	1000	1	SM 3120B	03/29/2006 10:43	JLA
Antimony	ND	ug/L	6.0	6	1	SM 3113B	03/29/2006 10:44	JLA
Arsenic	ND	ug/L	2.0	50	1	SM 3120B	03/29/2006 10:44	JLA
Barium	180	ug/L	100.0	1000	1	SM 3120B	03/29/2006 10:44	JLA
Beryllium	ND	ug/L	1.0	4	1	SM 3120B	03/29/2006 10:44	JLA
Cadmium	ND	ug/L	1.0	5	1	SM 3120B	03/29/2006 10:44	JLA
Chromium, Total (screen)	ND	µg/L	1.0	-	1	SM 3120B	03/29/2006 10:44	MEH
Cyanide, Total	ND	ug/L	100	150	1	SM4500E	03/21/2006	MEH
Fluoride	1.96	mg/L	0.1	2.0	1	EPA 300.0	03/15/2006 16:49	MEH
Lead	ND	ug/L	5.0	15	1	SM 3113B	03/29/2006 10:44	JLA
Mercury	ND	ug/L	1.0	2	1	SM3112B	03/29/2006 10:44	JLA
Nickel	ND	ug/L	10	100	1	SM 3120B	03/29/2006 10:44	JLA
Nitrate + Nitrite (as N)	ND	µg/L	400	10,000	1	EPA 300.0	03/15/2006 10:43	MEH
Nitrogen, Nitrate (as NO3)	ND	mg/L	2.0	45	1	EPA 300.0	03/15/2006 14:38	MEH
Nitrogen, Nitrite (as N)	ND	ug/L	400	1000	1	EPA 300.0	03/15/2006 14:38	MEH
Selenium	ND	ug/L	5.0	50	1	SM 3113B	03/29/2006 10:44	JLA
Thallium	ND	ug/L	1.0	2	1	EPA 200.9	03/29/2006 10:44	JLA

Report Date: 04/11/2006

Approval: _____
Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

EEL Analytical

ENVIRONMENTAL ENGINEERING LABORATORY, INC.
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Recipient:	Tom Lindenmeyer	**Matrix:**	WATER	
	JACUMBA COMM.SERVICE DIST.	**Sampled:**	04/18/2006	
	BOX 425	**Received:**	04/18/2006	2:40
	JACUMBA, CA 92034	**Collection Address:**		
Reference:	0631569	**Sample Location:**	Old Hwy 80	
Lab ID:	0631569-001	**Description:**		
Sample #:		**Date Started:**	04/18/2006	
Project#:		**Date Completed:**	05/03/2006	
Comment:		**PS Code:**	WAT	

Analyzed: 4/28/2006 @ **Method:** EPA 524.2
Analyst: **Dilution Factor:** 1

VOC By EPA 502.2/524.2

Parameter	Result ug/L	MCL ug/L	RL ug/L	Parameter	Result ug/L	MCL ug/L	RL ug/L
1,1,1,2-Tetrachloroethane	ND	80	0.5	Chloroethane	0.60	80	0.5
1,1,1-Trichloroethane	ND	200	0.5	Chloroform	ND	80	0.5
1,1,2,2-Tetrachloroethane	ND	1	0.5	Chloromethane	ND	80	0.5
1,1,2-Trichloroethane	ND	5	0.5	Cis-1,2-Dichloroethylene	ND	6	0.5
1,1-Dichloroethane	ND	5	0.5	Cis-1,3-Dichloropropene	ND	80	0.5
1,1-Dichloroethylene	ND	6	0.5	Dibromochloromethane	ND	80	0.5
1,1-Dichloropropene	ND	80	0.5	Dibromomethane	ND	80	0.5
1,2 Dichlorobenzene (o-DCB)	ND	600	.5	Dichlorodifluoromethane	ND	80	0.5
1,2,3-Trichlorobenzene	ND	80	0.5	Dichloromethane(Methylenchlor)	ND	5	0.5
1,2,3-Trichloropropane	ND	-	0.5	Ethylbenzene	ND	300	0.5
1,2,4-Trichlorobenzene	ND	5	0.5	Hexachlorobutadiene	ND	80	0.5
1,2,4-Trimethylbenzene	ND	80	0.5	Isopropylbenzene (Cumene)	ND	80	0.5
1,2-Dichloroethane	ND	0.5	0.5	Methyl Ethyl Ketone	ND	-	5
1,2-Dichloropropane	ND	5	0.5	Methyl Tert-butyl Ether (MTBE)	ND	5	1.0
1,3,5-Trimethylbenzene	ND	80	0.5	Monochlorobenzene	ND	70	0.5
1,3-Dichlorobenzene	ND	80	0.5	Napthalene	ND	80	0.5
1,3-Dichloropropane	ND	80	0.5	N-butylbenzene	ND	80	0.5
1,3-Dichloropropene	ND	0.5	0.5	Nitrobenzene	ND	-	0.5
1,4-Dichlorobenzene (p-DCB)	ND	5	0.5	N-propylbenzene	ND	80	0.5
2,2-Dichloropropane	ND	80	0.5	Pentachlorothane	ND	-	0.5
2-Chlorotoluene	ND	80	0.5	P-isopropyltoluene	ND	80	0.5
4-Chlorotoluene	ND	80	0.5	Sec-butylbenzene	ND	80	0.5
Benzene	0.70	1.0	0.5	Styrene	ND	100	0.5
Bromobenzene	ND	80	0.5	Tert-butylbenzene	ND	80	0.5
Bromochloromethane	ND	80	0.5	Tetrachloroethylene (PCE)	ND	5	0.5
Bromodichloromethane	ND	80	0.5	Toluene	199	150	0.5
Bromoform	ND	80	0.5	Total Trihalomethanes	ND	80	0.5
Bromomethane	ND	80	0.5	Trans-1,2-dichloroethylene	ND	10	0.5
Carbon Tetrachloride	ND	0.5	0.5	Trans-1,3-dichloropropene	ND	80	0.5

Report Date: 05/03/2006

Approval: _____
Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

EEL Analytical

ENVIRONMENTAL ENGINEERING LABORATORY, INC.

3538 Hancock St. San Diego, CA 92110 | P:(619)298-6131 | F:(619)298-6141 | ELAP Cert.#2616

Recipient:	Tom Lindenmeyer	**Matrix:**	WATER	
	JACUMBA COMM.SERVICE DIST.	**Sampled:**	04/18/2006	
	BOX 425	**Received:**	04/18/2006	2:40
	JACUMBA, CA 92034	**Collection Address:**		
Reference:	0631569	**Sample Location:**	Old Hwy 80	
Lab ID:	0631569-001	**Description:**		
Sample #:		**Date Started:**	04/18/2006	
Project#:		**Date Completed:**	05/03/2006	
Comment:		**PS Code:**	WAT	

Analyzed: 4/28/2006 @ **Method:** EPA 524.2
Analyst: **Dilution Factor:** 1

VOC By EPA 502.2/524.2

Parameter	Result ug/L	MCL ug/L	RL ug/L	Parameter	Result ug/L	MCL ug/L	RL ug/L
Trichloroethylene (TCE)	ND	5	0.5				
Trichlorofluoromethane	ND	150	5.00				
Trichlorotrifluoromethane	ND	1200	10.0				
Vinyl Chloride	ND	0.5	0.5				
Xylenes	ND	1750	0.5				

Surrogates	% Recovered	QC Limits (%)	
4-Bromofluorobenzene	69%	40	140

Report Date: 05/03/2006

Approval: _____
Director

RL = Reporting Limit MCL = Maximum Contaminant Level MDL = Method Detection Limit N/A = Not Applicable

MOBILE GEOCHEMISTRY

H&P

20 April 2006

Ms. Melissa Monti
Petra Geotechnical
12225 World Trade Drive, Suite P
San Diego, CA 92128

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APR 24 2006

RE: PG041906-31

Enclosed are the results of analyses for samples received by the laboratory on 19-Apr-06 . If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Rebecca L Johnson for

Tamara Davis
Laboratory Director

H&P Mobile Geochemistry operates under CA Environmental Lab Accreditation Program Numbers 1317, 1561, 1667, 1745, 1746, 1839, 2088, 2278, 2530, 2543, 2579 and 2595.

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148 South Vinewood Street, Escondido, California 92029 | 760 735.3208 — Fax 760 735.2469
3825 Industry Avenue, Lakewood, California 90712 | 562 426.6991 — Fax 562 426.6995
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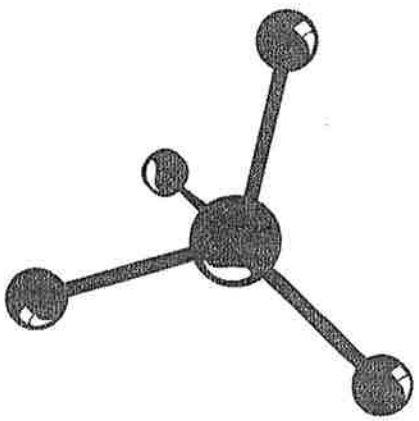


MOBILE GEOCHEMISTRY
H&P

Petra Geotechnical 12225 World Trade Drive, Suite P San Diego CA, 92128	Project: PG041906-31 Project Number: Jacumba Community Service District Project Manager: Ms. Melissa Monti	Reported: 20-Apr-06

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	E604068-01	Water	18-Apr-06	19-Apr-06

MOBILE GEOCHEMISTRY

H&P

Petra Geotechnical	Project: PG041906-31	
12225 World Trade Drive, Suite P	Project Number: Jacumba Community Service District	Reported:
San Diego CA, 92128	Project Manager: Ms. Melissa Monti	20-Apr-06

Volatile Organic Compounds by EPA Method 8260B/5030

H&P Mobile Geochemistry

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
MW-1 (E604068-01) Water Sampled: 18-Apr-06 Received: 19-Apr-06									
Dichlorodifluoromethane	ND	1.0	ug/l	0.1	ED61905	19-Apr-06	19-Apr-06	EPA 8260B	
Chloromethane	ND	1.0	"	"	"	"	"	"	
Vinyl chloride	ND	1.0	"	"	"	"	"	"	
Bromomethane	ND	1.0	"	"	"	"	"	"	
Chloroethane	ND	1.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.0	"	"	"	"	"	"	
Methylene chloride	ND	1.0	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
Di-isopropyl ether	ND	1.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.0	"	"	"	"	"	"	
Ethyl tert-butyl ether	ND	1.0	"	"	"	"	"	"	
2,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.0	"	"	"	"	"	"	
Chloroform	ND	1.0	"	"	"	"	"	"	
Bromochloromethane	ND	1.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.0	"	"	"	"	"	"	
1,1-Dichloropropene	ND	1.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.0	"	"	"	"	"	"	
Tert-amyl methyl ether	ND	1.0	"	"	"	"	"	"	
Benzene	ND	0.5	"	"	"	"	"	"	
Trichloroethene	ND	1.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.0	"	"	"	"	"	"	
Bromodichloromethane	ND	1.0	"	"	"	"	"	"	
Dibromomethane	ND	1.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.0	"	"	"	"	"	"	
Toluene	520	5.0	"	1	"	"	19-Apr-06	"	
trans-1,3-Dichloropropene	ND	1.0	"	0.1	"	"	19-Apr-06	"	
1,1,2-Trichloroethane	ND	1.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	1.0	"	"	"	"	"	"	
1,3-Dichloropropane	ND	1.0	"	"	"	"	"	"	
Tetrachloroethene	ND	1.0	"	"	"	"	"	"	
Dibromochloromethane	ND	1.0	"	"	"	"	"	"	
Chlorobenzene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	0.5	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	

MOBILE GEOCHEMISTRY

H&P

Petra Geotechnical	Project: PG041906-31	
12225 World Trade Drive, Suite P	Project Number: Jacumba Community Service District	Reported:
San Diego CA, 92128	Project Manager: Ms. Melissa Monti	20-Apr-06

Volatile Organic Compounds by EPA Method 8260B/5030

H&P Mobile Geochemistry

Analyte	Result	Reporting Limit	Units	Dilution Factor	Batch	Prepared	Analyzed	Method	Notes
MW-1 (E604068-01) Water Sampled: 18-Apr-06 Received: 19-Apr-06									
m,p-Xylene	ND	1.0	ug/l	0.1	ED61905	19-Apr-06	19-Apr-06	EPA 8260B	
o-Xylene	ND	0.5	"	"	"	"	"	"	
Styrene	ND	1.0	"	"	"	"	"	"	
Bromoform	ND	1.0	"	"	"	"	"	"	
Isopropylbenzene	ND	1.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.0	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	1.0	"	"	"	"	"	"	
n-Propylbenzene	ND	1.0	"	"	"	"	"	"	
Bromobenzene	ND	1.0	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
2-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
4-Chlorotoluene	ND	1.0	"	"	"	"	"	"	
tert-Butylbenzene	ND	1.0	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	1.0	"	"	"	"	"	"	
sec-Butylbenzene	ND	1.0	"	"	"	"	"	"	
p-Isopropyltoluene	ND	1.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
n-Butylbenzene	ND	1.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.0	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	1.0	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
Hexachlorobutadiene	ND	1.0	"	"	"	"	"	"	
Naphthalene	ND	1.0	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	1.0	"	"	"	"	"	"	
Tert-butyl alcohol	ND	5.0	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*90.2 %*	*75-125*		"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*92.4 %*	*62-139*		"	"	"	"	
Surrogate: Toluene-d8		*88.2 %*	*75-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*95.2 %*	*75-125*		"	"	"	"	

MOBILE GEOCHEMISTRY
H&P

Petra Geotechnical	Project: PG041906-31	
12225 World Trade Drive, Suite P	Project Number: Jacumba Community Service District	Reported:
San Diego CA, 92128	Project Manager: Ms. Melissa Monti	20-Apr-06

Volatile Organic Compounds by EPA Method 8260B/5030 - Quality Control
H&P Mobile Geochemistry

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch ED61905 - EPA 5030										
Blank (ED61905-BLK1)				Prepared & Analyzed: 19-Apr-06						
Dichlorodifluoromethane	ND	1.0	ug/l							
Chloromethane	ND	1.0	"							
Vinyl chloride	ND	1.0	"							
Bromomethane	ND	1.0	"							
Chloroethane	ND	1.0	"							
Trichlorofluoromethane	ND	1.0	"							
1,1-Dichloroethene	ND	1.0	"							
Methylene chloride	ND	1.0	"							
Methyl tert-butyl ether	ND	1.0	"							
trans-1,2-Dichloroethene	ND	1.0	"							
Di-isopropyl ether	ND	1.0	"							
1,1-Dichloroethane	ND	1.0	"							
Ethyl tert-butyl ether	ND	1.0	"							
2,2-Dichloropropane	ND	1.0	"							
cis-1,2-Dichloroethene	ND	1.0	"							
Chloroform	ND	1.0	"							
Bromochloromethane	ND	1.0	"							
1,1,1-Trichloroethane	ND	1.0	"							
1,1-Dichloropropene	ND	1.0	"							
Carbon tetrachloride	ND	1.0	"							
1,2-Dichloroethane	ND	1.0	"							
Tert-amyl methyl ether	ND	1.0	"							
Benzene	ND	0.5	"							
Trichloroethene	ND	1.0	"							
1,2-Dichloropropane	ND	1.0	"							
Bromodichloromethane	ND	1.0	"							
Dibromomethane	ND	1.0	"							
cis-1,3-Dichloropropene	ND	1.0	"							
Toluene	ND	0.5	"							
trans-1,3-Dichloropropene	ND	1.0	"							
1,1,2-Trichloroethane	ND	1.0	"							
1,2-Dibromoethane (EDB)	ND	1.0	"							
1,3-Dichloropropane	ND	1.0	"							
Tetrachloroethene	ND	1.0	"							

MOBILE GEOCHEMISTRY
H&P

Petra Geotechnical	Project: PG041906-31	
12225 World Trade Drive, Suite P	Project Number: Jacumba Community Service District	Reported:
San Diego CA, 92128	Project Manager: Ms. Melissa Monti	20-Apr-06

Volatile Organic Compounds by EPA Method 8260B/5030 - Quality Control
H&P Mobile Geochemistry

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch ED61905 - EPA 5030										
Blank (ED61905-BLK1)				Prepared & Analyzed: 19-Apr-06						
Dibromochloromethane	ND	1.0	ug/l							
Chlorobenzene	ND	1.0	"							
Ethylbenzene	ND	0.5	"							
1,1,1,2-Tetrachloroethane	ND	1.0	"							
m,p-Xylene	ND	1.0	"							
o-Xylene	ND	0.5	"							
Styrene	ND	1.0	"							
Bromoform	ND	1.0	"							
Isopropylbenzene	ND	1.0	"							
1,1,2,2-Tetrachloroethane	ND	1.0	"							
1,2,3-Trichloropropane	ND	1.0	"							
n-Propylbenzene	ND	1.0	"							
Bromobenzene	ND	1.0	"							
1,3,5-Trimethylbenzene	ND	1.0	"							
2-Chlorotoluene	ND	1.0	"							
4-Chlorotoluene	ND	1.0	"							
tert-Butylbenzene	ND	1.0	"							
1,2,4-Trimethylbenzene	ND	1.0	"							
sec-Butylbenzene	ND	1.0	"							
p-Isopropyltoluene	ND	1.0	"							
1,3-Dichlorobenzene	ND	1.0	"							
1,4-Dichlorobenzene	ND	1.0	"							
n-Butylbenzene	ND	1.0	"							
1,2-Dichlorobenzene	ND	1.0	"							
1,2-Dibromo-3-chloropropane	ND	1.0	"							
1,2,4-Trichlorobenzene	ND	1.0	"							
Hexachlorobutadiene	ND	1.0	"							
Naphthalene	ND	1.0	"							
1,2,3-Trichlorobenzene	ND	1.0	"							
Tert-butyl alcohol	ND	5.0	"							
Surrogate: Dibromofluoromethane	*4.61*		"	*5.00*		*92.2*	*75-125*			
Surrogate: 1,2-Dichloroethane-d4	*4.86*		"	*5.00*		*97.2*	*62-139*			
Surrogate: Toluene-d8	*4.46*		"	*5.00*		*89.2*	*75-125*			

MOBILE GEOCHEMISTRY

H&P

Petra Geotechnical	Project: PG041906-31	
12225 World Trade Drive, Suite P	Project Number: Jacumba Community Service District	Reported:
San Diego CA, 92128	Project Manager: Ms. Melissa Monti	20-Apr-06

Volatile Organic Compounds by EPA Method 8260B/5030 - Quality Control
H&P Mobile Geochemistry

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch ED61905 - EPA 5030										
Blank (ED61905-BLK1)				Prepared & Analyzed: 19-Apr-06						
Surrogate: 4-Bromofluorobenzene	*5.59*		*ug/l*	*5.00*		*112*	*75-125*			
LCS (ED61905-BS1)				Prepared & Analyzed: 19-Apr-06						
1,1-Dichloroethene	6.00	1.0	ug/l	5.00		120	75-125			
Benzene	5.60	0.5	"	5.00		112	75-125			
Trichloroethene	5.60	1.0	"	5.00		112	75-125			
Toluene	5.37	0.5	"	5.00		107	74-125			
Chlorobenzene	5.57	1.0	"	5.00		111	75-125			
Surrogate: Dibromofluoromethane	*4.77*		*"*	*5.00*		*95.4*	*75-125*			
Surrogate: 1,2-Dichloroethane-d4	*4.98*		*"*	*5.00*		*99.6*	*75-125*			
Surrogate: Toluene-d8	*4.25*		*"*	*5.00*		*85.0*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*4.87*		*"*	*5.00*		*97.4*	*75-125*			
LCS Dup (ED61905-BSD1)				Prepared & Analyzed: 19-Apr-06						
1,1-Dichloroethene	5.91	1.0	ug/l	5.00		118	75-125	1.51	20	
Benzene	5.50	0.5	"	5.00		110	75-125	1.80	20	
Trichloroethene	5.51	1.0	"	5.00		110	75-125	1.62	20	
Toluene	5.17	0.5	"	5.00		103	74-125	3.80	20	
Chlorobenzene	5.28	1.0	"	5.00		106	75-125	5.35	20	
Surrogate: Dibromofluoromethane	*4.83*		*"*	*5.00*		*96.6*	*75-125*			
Surrogate: 1,2-Dichloroethane-d4	*5.56*		*"*	*5.00*		*111*	*75-125*			
Surrogate: Toluene-d8	*4.39*		*"*	*5.00*		*87.8*	*75-125*			
Surrogate: 4-Bromofluorobenzene	*5.16*		*"*	*5.00*		*103*	*75-125*			

MOBILE GEOCHEMISTRY
H&P

Petra Geotechnical	Project: PG041906-31	
12225 World Trade Drive, Suite P	Project Number: Jacumba Community Service District	Reported:
San Diego CA, 92128	Project Manager: Ms. Melissa Monti	20-Apr-06

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CHAIN-OF-CUSTODY RECORD

MOL: PG041706-31

MOBILE ONE LABORATORIES INC.

148 So. Vinewood Street, Escondido, CA 92029-1921 (760) 735-3208 FAX (760) 735-2469

Date: 4/19/06 Page 1 of 1

Client: Petra Geotechnical, Inc

Site Address: 12225 World Trade Dr, Ste P
San Diego, CA 92128

Project: Jacumba Community Service District

Sampler (signature): Melissa Monti

Turnaround Requested:
- ☐ Onsite/24-48 hrs.
- ☐ Offsite
- ☒ Other Std

Analysis Requested

Sample ID	Date	Time	Location	TPHg+d-8015M	TPHg-8015M (P&T)	BTEX-8020	TPHg/BTEX-8015M/8020	TRPH-418.1	8260 (VOC's-8240)	8260 VOC - Full (Scan (+ oxy)	Matrix: Soil (S), Sludge (SL), Aqueous (W)	Number of containers
MW-1	4/18/06	12:45							X		W	5

1. RELINQUISHED BY:	Date:	2. RELINQUISHED BY:	Date:	3. RELINQUISHED BY:	Date:
Signature:* Melissa Monti		Signature:*		Signature:*	
Printed Name: Melissa Monti	Time:	Printed Name:	Time:	Printed Name:	Time:
Company: Petra Geotechnical		Company:		Company:	
1. RECEIVED BY:	Date: 4/19/06	**2. RECEIVED BY:**	Date:	**3. RECEIVED BY:**	Date:
Signature:* Ann Kim		Signature:*		Signature:*	
Printed Name: Ann Kim	Time: 10:20am	Printed Name:	Time:	Printed Name:	Time:
Company: H+P		Company:		Company:	

*Signature constitutes authorization to proceed with analysis and acceptance of conditions on back.

Sample Receipt
Intact: (Yes) No
Seal Intact: Yes No (N/A)
Cold: (Yes) No
N/A (Received on site)

Special Instructions

APPENDIX E

LETTER TO SAM PROGRAM

PETRA

PETRA

OFFICES IN THE COUNTIES OF
ORANGE ▪ SAN DIEGO ▪ RIVERSIDE ▪ LOS ANGELES ▪ SAN BERNARDINO

May 26, 2006
J.N. 267-05

Mr. Kevin Heaton, Hydrogeologist
SAN DIEGO COUNTY SAM PROGRAM
P.O. Box 129261
San Diego, California 92112-9261

Subject: **Jacumba Community Services District, Community of Jacumba , San Diego County, California.**

Dear Mr. Heaton:

On behalf of our client, Jacumba Community Services District (JCSD), Petra Geotechnical, Inc. (Petra) requests your evaluation of our site, described below, relative to petroleum hydrocarbon releases in the Jacumba area that may be affecting our site. The purpose of this request is to determine, if possible, the source of contamination reported in water samples collected from a groundwater monitoring well installed on JCSD property.

BACKGROUND

Petra recently conducted research, including review of historical documents and geological reconnaissance mapping pertaining to groundwater conditions in the community of Jacumba, California. The principal purpose of this research was to evaluate likely groundwater quality and conditions, particularly temperature, in various potential well locations in the community. Based on our research and field reconnaissance, it appears that shallow groundwater, classified as hot (>90 degrees farenheit), is likely limited to areas west of a fault trending north-northwest, and interpreted to extend from south of the US-Mexico border along just east of Railroad Street and to the northwest of the community. Our research has indicated that wells east of the interpreted location of this fault have not encountered hot water, and wells west of the fault and deeper than approximately 50 feet have encountered hot water.

Early in the course of our research, it was our understanding that JCSD wished to locate sites for possible well points to evaluate groundwater conditions. Three possible sites for well points

were located. Two sites, one located northwest of the fire station at the north end of Jacumba Street and one located off the north end of Heber Street, were eliminated. The well site near the fire station was west of the fault and was considered, therefore, likely to encounter hot water. Attempts to contact the property owner for the well site at the north end of Heber Street were unsuccessful.

A third possible well site was located south of Old highway 80 in the central portion of Jacumba on JCSD property. This potential drill site was considered favorable for the following reasons:

- It is located east of the interpreted fault and would not be expected to encounter hot water;
- It is located on JCSD property and therefore will not have access issues; and
- It is located near underground water transmission piping that would be used to transport extracted water to the JCSD water storage facilities in the southern portion of the community. The presence of existing water transmission infrastructure would expedite the process of using groundwater production wells drilled in this area and would save JCSD considerable expense in construction of water transmission infrastructure for wells drilled in other portions of the community.

During mid-December, 2005, one groundwater monitoring well was drilled and installed on JCSD property south of Old Highway 80 and roughly across the highway from Carrizo Street (see Figure 1, attached). The well was located several feet south of the highway and east of the community library (Figure 2). Groundwater was encountered at a depth of approximately 38 feet below grade, and the well was installed to a depth of approximately 124 feet below grade. The screened interval in the well is from 84 to 124 feet below grade. The well boring was advanced to approximately 127 feet below grade, and penetrated deposits interpreted to be alluvium nearly to the total depth. Material interpreted to be volcanic rock was encountered at approximately 127 feet below grade.

During March 2006, Petra conducted a step drawdown test on this well to evaluate aquifer conditions. At the completion of the drawdown and recovery test, the well was sampled and the sample analyzed for full primary and secondary water quality standards. The analysis was conducted by Environmental Engineering Laboratory, Inc. (EEL). The following volatile organic compounds (VOCs), analyzed in general accordance with EPA Method 8260B, were reported in the groundwater sample:

- 1,2,4-Trimethylbenzene – 0.50 micrograms per liter (ug/l);
- Benzene – 0.70 ug/l;
- Ethylbenzene – 0.50 ug/l; and
- Toluene – 291 ug/l.

Due to the laboratory not analyzing the VOCs within the 14 day hold time for this analysis, the well was resampled on April 18, 2006, and the sample analyzed in general accordance with EPA Method 8260B. The following VOCs were reported by EEL:

- Benzene – 0.70 ug/l;
- Chloroethane – 0.60 ug/l; and
- Toluene – 199 ug/l.

A split sample was also collected on April 18, 2006, and submitted to H&P Mobile Geochemistry (H&P) for confirmation analysis in general accordance with EPA Method 8260B. H&P reported a toluene concentration of 520 ug/l and no detectable concentrations of other VOCs. The reported toluene concentrations were above the maximum contaminant level (MCL) of 150 ug/l in all three samples analyzed.

The source of this contamination is not known to JCSD, and while several historic gasoline service stations are or were located in the town of Jacumba, JCSD and Petra have not identified an obvious candidate for the source of the petroleum hydrocarbons detected in the well. Again, we request that you review information pertaining to the community and evaluate possible sources for the contamination reported in the groundwater samples from the JCSD monitoring well.

If you have any questions regarding this letter, please contact the undersigned.

Respectfully submitted,

PETRA GEOTECHNICAL, INC.
ENVIRONMENTAL DIVISION

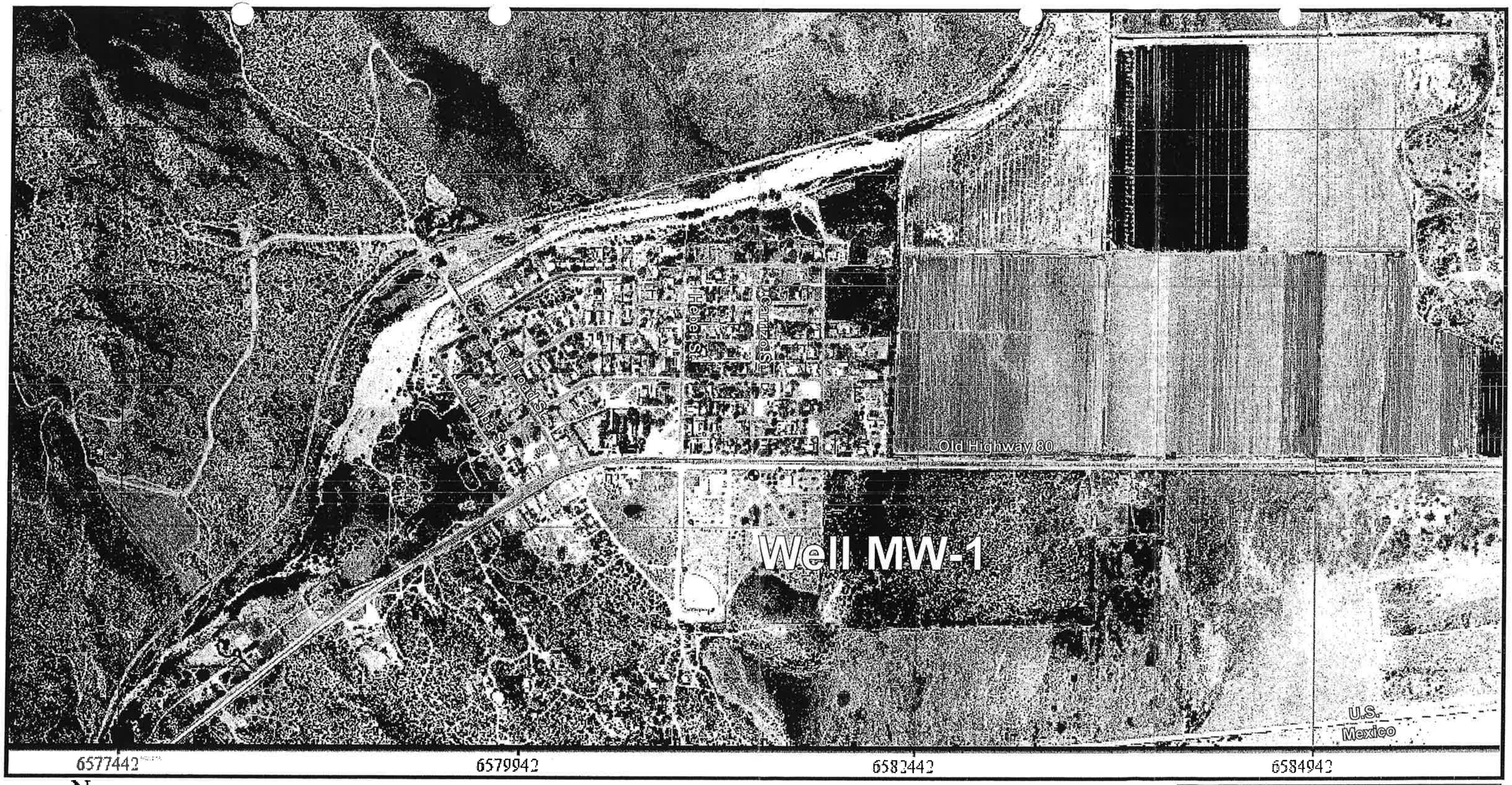
PROFESSIONAL GEOLOGIST
CHARLES E. HOUSER
NO. 2206
CERTIFIED
ENGINEERING
GEOLOGIST
9/07
STATE OF CALIFORNIA

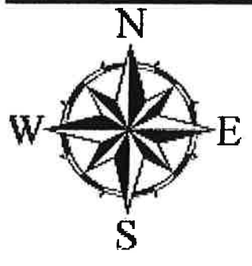
Charles E. Houser, CEG
Senior Project Geologist

CEH/MLM/mm

Distribution: (1) Addressee, via U.S. Hand Delivery
(1) JCSD, via U.S. Mail

Attachments: Figure 1 – Monitoring Well Location Map
Figure 2 – Site Plan





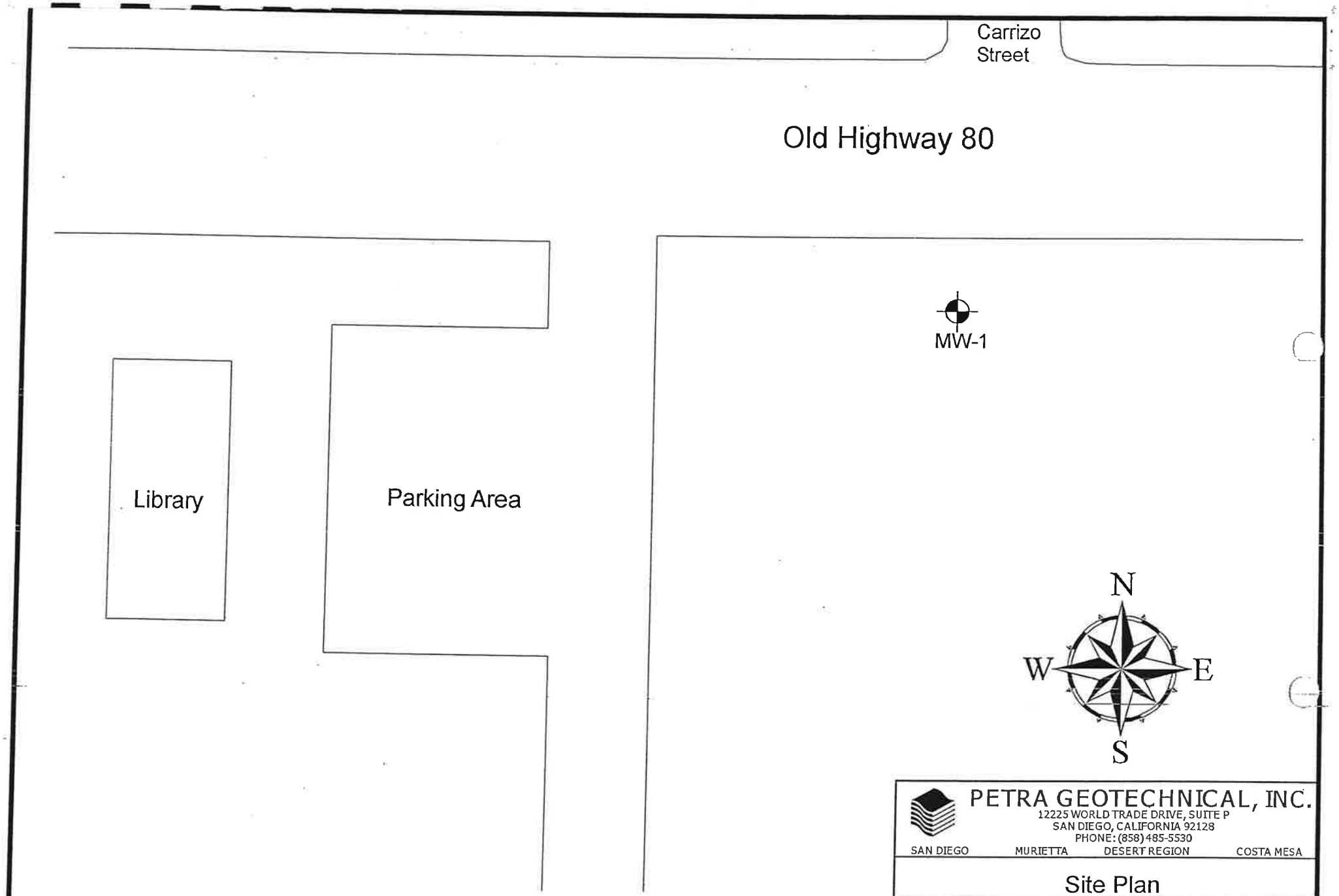
0 500 1,000 2,000 3,000 4,000 5,000 Feet

PETRA GEOTECHNICAL, INC.
12225 WORLD TRADE DRIVE, SUITE P
SAN DIEGO, CALIFORNIA 92128
PHONE: (858) 485-5530
SAN DIEGO MURIETTA SANTA CLARITA DESERT REGION COSTA MESA

MONITORING WELL LOCATION MAP

Jacumba Community Services District

DATE: May 2006	J.N.: 267-05	Figure 1
DWG BY: JLJ	SCALE: 1"=1000'	



PETRA GEOTECHNICAL, INC.
12225 WORLD TRADE DRIVE, SUITE P
SAN DIEGO, CALIFORNIA 92128
PHONE: (858) 485-5530
SAN DIEGO MURIETTA DESERT REGION COSTA MESA

Site Plan

Jacumba Community Services District
Jacumba, Callifornia

DATE: May 2005	J.N.: 267-05	Figure 2
DWG BY: MAM	SCALE:	

PETRA

Orange County / Environmental / Corporate

3185-A Airway Avenue
Costa Mesa, California 92626
T: 714-549-8921 F: 714-549-1438

San Diego County

12225 World Trade Drive, Suite P
San Diego, California 92128
T: 858-485-5530 F: 858-485-8215

Riverside County

38655 Sky Canyon Drive, Suite A
Murrieta, California 92563
T: 951-600-9271 F: 951-600-9215

Los Angeles County

26639 Valley Center Drive, Suite 109
Santa Clarita, California 91351
T: 661-255-5790 F: 661-255-5242

San Bernardino County

3535 Inland Empire Blvd., Suite 35
Ontario, California 91764
T: 909-941-2505 F: 909-941-2547

Desert Region

42-240 Green Way, Suite E
Palm Desert, California 92211
T: 760-340-5303 F: 760-340-5096