Run Date: 05/20/2016

AZ DEPARTMENT OF WATER RESOURCES

WELL REGISTRY REPORT - WELLS55

Location B 4.0 3.0 10 A A A

Well Reg.No **55 -** 213204

AMA PHOENIX AMA

Registered Name CITY OF SURPRISE, PUBLIC WORKS DEPT., ENVIRONMENTAL DIV.
16000 N. CIVIC CENTER PLAZA
ATTN: CHRISTINE NUNEZ
SURPRISE AZ 85374

File Type NEW WELLS (INTENTS OR APPLICATIONS)
Application/Issue Date 09/14/2006

Owner OWNER
Driller No. 671
Driller Name ADT DRILLING dba Advanced Drilling Technology, LLC
Driller Phone
County MARICOPA
Parcel No. 503-81-018D
Intended Capacity GPM 1,500.00

Well Type NON-EXEMPT - WITHDRAWAL PERMIT
SubBasin WEST SALT RIVER VALLEY
Watershed AGUA FRIA RIVER
Registered Water Uses MUNICIPAL USES
Registered Well Uses WATER PRODUCTION
Discharge Method NO DISCHARGE METHOD LISTED
Power NO POWER CODE LISTED

Well Depth	1,509.00	**Case Diam**	17.00	**Tested Cap**	0.00
Pump Cap.	0.00	**Case Depth**	1,480.00	**CRT**	
Draw Down	0.00	**Water Level**	0.00	**Log**	X
		Acres Irrig	0.00	**Finish**	STEEL - PERFORATED OR SLOTTED CASING

Contamination Site: NO - NOT IN ANY REMEDIAL ACTION SITE

Tribe: Not in a tribal zone

Comments Recovery Well Permit No. 74-565003
On 5/3/2016, the Maricopa County Environmental Services Dept. (MCESD) issued a New Ground Water Source Approval to the City of Surprise (PWS # 07-538) listing this well (aka Buena Vista Well #1) as the source. File update conducted 5/20/2016. mib

Places Of Use

B 4 0 3 0 10 C C C

Current Action

7/10/2013 867 APP/NOI HYDRO/WATER QUALITY REVIEW COMPLETE
Action Comment: dgc

Action History

6/27/2013 600 PERMIT ISSUED (S, T, 59, 74)
Action Comment: cp

6/26/2013 867 APP/NOI HYDRO/WATER QUALITY REVIEW COMPLETE
Action Comment: dgc

6/11/2013 866 APP/NOI SENT TO HYDRO/WATER QUALITY REVIEW
Action Comment: cp

6/4/2013 305 APP RCVD FOR A WELL PERMIT FOR A CONVERSION (S, T)
Action Comment: cp

10/31/2007 750 WELL DRILLER REPORT AND WELL LOG RECEIVED/ENTERED
Action Comment: MO

9/22/2007 755 WELL CONSTRUCTION COMPLETED
Action Comment: MO

10/11/2006 600 PERMIT ISSUED (S, T, 59, 74)
Action Comment:

10/11/2006 855 CHANGE OF WELL LEGAL DESCRIPTION
Action Comment: OLD LEGAL DESC: B(4.0-3.0) 10 CCC

Run Date: 05/20/2016

AZ DEPARTMENT OF WATER RESOURCES

WELL REGISTRY REPORT - WELLS55

10/11/2006	550	DRILLING AUTHORITY ISSUED
Action Comment:		
9/14/2006	867	APP/NOI HYDRO/WATER QUALITY REVIEW COMPLETE
Action Comment:		
9/14/2006	400	HYDROLOGY APPLICATION REVIEW COMPLETE
Action Comment:		
9/14/2006	410	AMA APPLICATION/NOI REVIEW COMPLETE
Action Comment:		
8/28/2006	866	APP/NOI SENT TO HYDRO/WATER QUALITY REVIEW
Action Comment:		
8/28/2006	365	APP SENT TO HYDROLOGY FOR REVIEW
Action Comment:		
8/28/2006	355	APP SENT TO AMA FOR REVIEW
Action Comment:		
8/18/2006	315	APP RCVD FOR A WITHDRAWAL PERMIT FOR A NEW WELL (59)
Action Comment:		

Maricopa County

Environmental Services Department
Water and Waste Management Division

Water and Waste
Management Division
Drinking Water Program
1001 N. Central Ave., Suite 250
Phoenix, Arizona 85004
Phone: (602) 506-6935
Fax: (602) 372-0866
TDD: (602) 372-0622
www.maricopa.gov/env svc

New Ground Water Source Approval with Stipulations

Christine Nunez
City of Surprise
16000 N. Civic Center Plaza
Surprise, AZ 85374

PWS: # 07-538 System Name: City of Surprise Buena Vista
System Classification: Community
New Groundwater Source Proposed: DWR#: 55-213204
Local Well Name: Buena Vista well #1
Designated Entry Point to Distribution (EPDS) #: 001 (New EPDS)
Receipt #: 26736110785
Date: May 3, 2016

Dear Ms. Nunez,

This Department has reviewed your request to approve the above ground water source. *This review has been conducted in accordance with the drinking water quality requirements for a community public water system.* This Department has no objection to your development of this source, with the stipulations listed below.

The initial monitoring date assigned to this system was January 1, 2018. This date is used to determine future water quality monitoring and reporting for compliance requirements, and is reflected in the calculation of the dates shown in the stipulations listed below. All water sample monitoring frequencies and required reporting of analysis results are based on the initial monitoring compliance schedule. The monitoring requirements below are also based on an anticipated start date for the EPDS of **2018** provided on the new source approval application. Please contact the Department to any change in the start date.

STIPULATIONS:

1. **Construction Approvals.** The water system shall qualify for and obtain proper approvals on the construction and development of the well. A certificate of Approval to Construct the well must be obtained from this Department. Upon completion of the construction work, the system must receive a certificate of Approval of Construction. Please contact Wes Shonerd, P.E., at (602) 506-0376 for specific information on the procedure and application requirements.

2. **Microbiological water quality compliance.** The initial monitoring results indicate a **positive** result for total coliform. The system must obtain a negative result for total coliform before the source may be activated.

All public water systems are required to collect routine bacteriological water samples each month. The number of samples required and the frequency of collection will depend on the size of the population served by the public water system. Samples must be collected in accordance with a **Microbiological Site Sampling Plan**, which must be submitted to this Department for approval. The maximum contaminant levels (MCL) for total and fecal coliform bacteria is based on their presence in drinking water. The repeated presence of fecal coliform bacteria in drinking water represents an *acute* contaminant violation. Immediate corrective action must be initiated to

eliminate acute contaminant violations whenever they occur, or the water source must be disconnected and an approved alternate source of water established.

3. **Inorganic water quality compliance.** Submitted laboratory analyses are below the maximum levels for inorganic chemical water quality.

These contaminants will require routine sample collection and laboratory analysis every 3 years. If the system chooses to sample more frequently than once per year, compliance will be based on a running annual average. Sample collection for the next inorganic chemical water analysis profile must be conducted **after January 1, 2018 but before December 31, 2018.** The exceptions to this inorganic chemical monitoring schedule are listed below. The inorganic chemicals are sampled at the point of entry, including those that follow:

Arsenic. The laboratory reported arsenic as 0.0047 mg/l. which is below the MCL of 0.010 mg/l; therefore, **annual** sampling is required. If an EPDS sample exceeds the MCL of 0.010 mg/l, this would represent an *acute* contaminant violation, and the system would have to take immediate corrective action.

Nitrate. The indicated level of nitrate 0.85 mg/l is below the trigger level of 5 mg/l; therefore, **annual** sampling is required. If an EPDS sample exceeds the MCL of 10 mg/l, this would represent an *acute* contaminant violation, and the system would have to take immediate corrective action.

Nitrite. Routine nitrite sample collection and analysis must be performed at every point of entry every nine years. The nitrite level at this time is indicated as less than 0.20 mg/l. Sampling frequency for nitrite will increase to quarterly in the event it exceeds the trigger level of 0.5 mg/l. The next required **nitrite** analysis for compliance purposes must be based on water samples collected **after January 1, 2018 but before December 31, 2018**.

Asbestos. The initial asbestos level is less than 0.2 mfl. Samples for asbestos analysis must be collected at each point of entry or in distribution and reported every nine years. The next required sample collection for **asbestos analysis must be done after January 1, 2018 but prior to December 31, 2018**.

Fluoride. The fluoride level is 0.50 mg/l. Community water supplies are required to monitor for the amount of fluoride present in the water. The maximum contaminant level for fluoride is 4 mg/l. However, if the fluoride level is ever greater than 2 mg/l, the system must perform public notice. Fluoride samples must be collected and lab analysis conducted at least **every 3 years** at each point of entry.

Sodium. Community water systems are required to sample and report on the sodium level of the water every 3 years for groundwater sources. Initial sodium level is indicated as 40 mg/l. There is no maximum level for sodium in drinking water at this time. Samples for sodium analysis must be collected at each point where water treatment is conducted.

4. **Volatile Organic Chemical water quality compliance.** The Volatile Organic Chemical (VOC) water quality data submitted with your application indicate compliance with the maximum contaminant level water quality requirements. Initial sampling for VOCs must be conducted for four consecutive quarters during the assigned monitoring year. If VOC levels remain below the MCL, the system shall sample at least annually. After three years below MCL levels, the system

may request further reduction of VOC monitoring. The exceptions to this volatile organic chemical monitoring schedule are listed below.

Tolune. The laboratory reported Tolune as 0.00051 mg/l. which is above the trigger level of 0.0005 mg/l; therefore, **quarterly** sampling is required. If an EPDS sample exceeds the MCL of 1 mg/l, this would represent an *acute* contaminant violation, and the system would have to take immediate corrective action.

The next routine VOC samples should be taken for four consecutive quarters in 2018 at this EPDS.

Vinyl Chloride. This contaminant must be included with the routine analyses conducted for volatile organic chemicals only if certain volatile organic chemical contaminants are found to be present in the water.

5. **Synthetic Organic Chemical water quality compliance**. The Synthetic Organic Chemical (SOC) water quality results that were submitted were under laboratory detection limits.

The next routine SOC samples should be taken for four consecutive quarters in 2018 at this EPDS.

6. **Lead and Copper water quality compliance**. The results submitted with the new source application, lead 0.0017 mg/l and copper 0.0039 mg/l. The action level for lead is 0.015 mg/l; the copper action level is 1.3 mg/l.

Public water systems are required to collect water samples from distribution for lead and copper analysis in compliance with specific sample collection instructions. The initial monitoring for lead and copper must be done during two consecutive six-month periods. The required number of samples and the frequency of collection may be reduced if there is no exceedance of the action levels for lead or copper at or above the 90th percentile value. If the action level for these contaminants is exceeded in 10 or more percent of the samples taken, additional sampling or treatment of other water quality factors will be necessary. Samples for lead and copper analysis must be collected at sites specified in a site sampling plan.

7. **Radiochemicals.** The results submitted indicate radiochemical levels below the compliance limits. Radiochemicals are monitored for four consecutive quarters beginning within the first quarter after initiating use of a new source. **The system must monitor for radiochemicals for four consecutive quarters beginning the first quarter of initiating use of the source.**

8. **Activation of Water Source.** The water system is required to notify this Department once the source is activated and water is sent to the distribution system. The new source must be activated within one year from the date of initial approval. If the source is not activated within one year from the date of initial approval, another new source approval plan review with new compliance samples must be submitted and approved before the source can be used.

Failure of the water system to comply with these stipulations may result in this Department rescinding the authorization to use this groundwater source. The water system may be required to conduct public notification for failure to monitor should any of the monitoring stipulations not be

met. This Department would also place the public water system into a status of non-compliance if the system failed to abide by these stipulations within the required period.

Any changes, corrections or deletions in the development or use of this ground water source will require prior approval from this Department. No County legal action will result from this inspection. Please note that any new any additional information may result in a change in compliance status. If you have any questions or need additional information, please contact me at (602) 506-6644 or cynthiahernandez@mail.maricopa.gov.

Sincerely,

Cynthia Hernandez RS

Cynthia Hernandez, R.S.
Environmental Specialist

cc: Korissa Entringer, R.S., Drinking Water Program Supervisor
ADEQ
ADWR
Wes Shonerd, P.E.
PWS File 07538, Inspections

New Source Approval

INSPECTION RESULTS/GROUND WATER

DWR-16-00080

MARICOPA COUNTY
ENVIRONMENTAL SERVICES DEPARTMENT

WATER & WASTE MANAGEMENT DIVISION
1001 North Central Ave., Suite 250
Phoenix, AZ 85004
Phone (602) 506-6666 : Fax (602) 372-0866

Facility Information

PWSID # 07538

Facility Name: Surprise, SPA 3

Address: 22770 W. Villa Linda

Well Information

POE # 001, DWR # 55-213204

Based on an inspection conducted today the following deficiencies were noted and require corrective action.

	WELL DEFICIENCIES
001	** Water supply in flood zone **
002	** Well less than 50 feet from sewer **
003	* Well less than 100 feet from septic tank, APP discharge, UST, Haz. Waste Facility, Livestock
004	Well Site not properly graded
005	No slab/slab inadequate
006	Well casing annulus not sealed
007	Inadequate sanitary well seal/repair
008	Direct openings into well
009	Casing not 12" above slab
010	Improper lubricant
011	No/improperly installed sampling tap. No threads
012	Needed well vent not installed, not properly Installed or not properly screened
013	Needed vacuum relief valve not installed, not screened, or leaking
014	Needed check valve on pipe from well not installed or defective
015	Well building damaged or not secured
016	Site not properly fenced, damaged, or not locked
017	Site needs general clean-up
018	Emergency Chlorine facilities installed
019	Other deficiencies

	STORAGE TANK DEFICIENCIES
020	** No storage tank **
021	** Insufficient storage **
022	Storage tank top needs repair
023	Tank leaks – needs repair
024	Tank has deteriorated beyond repair
025	No overflow pipe installed
026	Overflow pipe not properly screened
027	No splash block below overflow
028	Hatch not secured
029	Hatch not sealed
030	Inadequate or no hatch curb
031	No tank drain valve
032	Tank vent inadequately installed
033	Vent not screened
034	No visual water level indicator
035	Water level target inoperative
036	Openings around target cable
037	No tank bedding ring
038	Tank bedding damage
039	Shut off valve on discharge side of tank provided
040	Bottom drain not provided
041	Exterior ladder not provided
042	Tank can be bypassed without interrupting service
043	Other deficiencies – storage tank

	CHLORINATION DEFICIENCIES
044	* Required chlorinator not installed *
045	** Inadequate chlorine residual **
046	** Not chlorinating, if required **
047	* Unapproved chlorination compound *
048	No chlorine injection nozzle
049	No standby chlorinator
050	Chlorine feed tank empty
051	Equipment not properly installed
052	Equipment not operating properly
053	Dosing cylinder empty
054	Line Plugged
055	Room not properly vented
056	No daily log of free chlorine residual
057	No chlorine test kit
058	Contact time less that 30 minutes
059	Room fan switch not outside
060	No inspection window, or like devices
061	No ammonia for leak detection
062	S.C.B.A. not mounted outside Cl room
063	Chlorinator subject to freezing
064	Other deficiencies

	PRESSURE TANK DEFICIENCIES
065	No pressure gauge
066	No bottom drain valve
067	No Water Level Sight
068	Appears to be Excessive Air
069	No Blowoff For Excess Air
070	No means for adding air
071	No Safety Relief Valve / Safety Relief not screened
072	Adequate Air Compressor
073	Tank Bypass not Provided
074	Other Deficiencies

	BOOSTER PUMPS DEFICIENCIES
075	Pump not capable of providing 20 PSI in the distribution system
076	Booster pumps have inadequate capacity
077	Booster glands leak
078	Check valve in good repair
079	Other deficiencies

	REQUIRED PLANS NOT PROVIDED
080	Current bacteriological site sampling plan
081	Current Emergency operation plan
082	Current backflow plan
083	OTHER SITE SAMPLING PLANS

	DISTRIBUTION SYSTEM DEFICIENCIES
084	** Cross-connections exist **
085	** Leaks in distribution system **
086	** Inadequate system pressure **
087	** Water main too close to sewer main **
088	Main less than three feet deep
089	Unapproved pipe material
090	Other deficiencies

	GENERAL DEFICIENCIES
091	* Construction without an Approval To Construct
092	* Operating with out Approval of Construction
093	No "As built" drawings submitted where required
094	* Construction does not conform to approved plans
095	** Contaminants near water supply source **
096	* No O&M manual on site (water treatment only)
097	Designate / Install POE Sampling Tap (No threads)
098	Electrical services not in good repair
099	Routine maintenance not performed
100	System frequently out-of-operation (power, etc.)
101	Water supply frequently depleted
102	User complaints being received
103	No certified operator
104	Certified operator not at appropriate grade
105	No distribution grade operator
106	No treatment grade operator
107	Other deficiencies

	WELL SIGN DEFICIENCIES
108	Water system name & PWSID number
109	Local well name & DWR 55 number
110	Well cadastral number
111	Daytime phone
112	Emergency phone
113	FD Hazard diamond

Other Comments, Special Instructions:

no signs of possible contamination

ADDITIONAL COMMENTS ON ATTACHED PAGES

All deficiencies denoted in bold or an "*" represents a **potential health risk** and will require **immediate action.**

TODAY'S OPERATIONAL AND MAINTENANCE INSPECTION HAS SHOWN THAT THIS FACILITY TO BE IN:

☒ COMPLIANCE ☐ SUBSTANTIAL COMPLIANCE ☐ NONCOMPLIANCE (MINOR) ☐ NONCOMPLIANCE (MAJOR)

Inspection Performed By: Cynthia Hernandez Date: 5 / 3 / 16 ; Phone 602 506 6644

Received By: _____ Date: ___ / ___ / ___ ; Phone _____

8800-094 04/14

Michael I. Ball

From: Cynthia Hernandez - ENVX <CynthiaHernandez@mail.maricopa.gov>
Sent: Thursday, May 19, 2016 8:24 AM
To: Michael I. Ball
Subject: NSA for PWS#07-538; 55-213204; BV1
Attachments: PWS#07-538; NSA Inspection Form; BV1; 3May16.pdf; PWS#07-538; NSA; 55-213204; BV1; 2016.pdf

Please let me know if you have any questions

Cynthia Hernandez, R.S.

Environmental Specialist| Safe Drinking Water Program
Maricopa County Environmental Services Department
1001 N Central Avenue, Suite 250, Phoenix, AZ 85004
Desk: 602.506.6644 | Fax: 602.372.0866

cynthiahernandez@mail.maricopa.gov| **esd.maricopa.gov**

Working with our community
to ensure a safe and healthy environment

Environmental Services Department

WELL INSTALLATION REPORT
BUENA VISTA WELL #1
ADWR NUMBER 55-213204

VOLUME I

Maricopa County, Arizona

Prepared for:

FRI Surprise 398, LLC
c/o True West Companies
8700 East Via De Ventura
Scottsdale, Arizona 85258

Prepared by:

Southwest Ground-water Consultants, Inc.
3033 North 44th Street
Suite 120
Phoenix, Arizona 85018

REGISTERED GEOLOGIST
CERTIFICATE NO.
17065
STEPHEN D.
NOEL
Date Signed 3/4/08
ARIZONA, U.S.A.

Expires: 9/30/09

March 4, 2008

EXECUTIVE SUMMARY
BUENA VISTA WELL #1

ADMINISTRATION:

Well Owner:	FRI Surprise 398, LLC, c/o True West Companies 8700 East Via De Ventura Scottsdale, Arizona 85258
Well ADWR Registry ID:	#55-213204 B(4-3) 10 AAA
GPS Coordinates (NAD 1983):	N 33° 42' 21.9" W 112° 32' 49.8" (Source: D. Erickson, SGC)
Date Completed:	October 2007

WELL PARAMETERS:

Static Water Level (swl):	327 feet bls (11-08-07)
Completed Well Depth:	1,480 feet bls
Casing Materials:	Blank Casing: 16 3/4-inch (OD) HSLA steel, A606 Type 4, (0.375-inch wall thickness) and 16 5/8-inch (OD) HSLA steel, A606 Type 4, (0.312-inch wall). Perforated Casing: 16 5/8-inch (OD) louvered "Ful Flo" HSLA steel, A606 Type 4, (0.312-inch wall, 0.060-inch slot).
Filter Pack Material:	Colorado Silica Sand, 6-9 mesh
Perforation Interval:	530 to 625 and 675 to 1,460 feet bls

PUMPING TEST RESULTS AND RECOMMENDATIONS:

Discharge Test Pumping Rate:	1,536 gpm	
Transmissivity:	64,000 gpd/ft	Drawdown vs. Time
	74,000 gpd/ft	Specific Drawdown vs. Time
	70,000 gpd/ft	Residual Drawdown vs. T/T' Ratio

Estimated Pumping Water Level at 1,500 gpm:

After 1 year of constant pumping: 415 feet bls (327 feet swl + 88 feet ddn)
After 10 years of constant pumping: 421 feet bls (327 feet swl + 94 feet ddn)
After 20 years of constant pumping: 422 feet bls (327 feet swl + 95 feet ddn)

PUMPED GROUND-WATER QUALITY:

New Source Water Quality: (11/08/07)	Arsenic: 0.0033 mg/L Fluoride: 0.59 mg/L Nitrate as (Nitrogen): 1.1 mg/L Total Dissolved Solids (TDS): 210 mg/L

VARIANCES:

Maximum Pumping Rate:	1,900 gpm
City of Surprise Well Efficiency Standard:	47 - 79%

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REGISTERED GEOLOGIST
CERTIFICATE NO.
17065
STEPHEN D.
NOEL
Date Signed 3/4/09
ARIZONA, U.S.A.

Expires: 9/30/09

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REGISTERED GEOLOGIST
CERTIFICATE NO.
17065
STEPHEN D.
NOEL
Date Signed 3/7/06
ARIZONA, U.S.A.

Expires: 9/30/09

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1.0 INTRODUCTION

Southwest Ground-water Consultants, Inc. (SGC) was contracted by FRI Surprise 398, LLC to provide professional services for the drilling and installation of Buena Vista Well #1. The Arizona Department of Water Resources (ADWR) registration number for Buena Vista Well #1 is 55-213204. This report describes the procedures and activities associated with the drilling, installation, and development of the well. Buena Vista Well #1 is located in the West Salt River Valley Sub-basin of the Phoenix Active Management Area, Maricopa County, Arizona. The permitted and installed location of Buena Vista Well #1 is the NE ¼ of the NE ¼ of the NE ¼ of Section 10, Township 4 North, Range 3 West, [B(4-3)10AAA], of the Gila and Salt River Baseline and Meridian. The location of Buena Vista Well #1 is shown on Figure 1.

An Application for Permit to Withdraw Groundwater for Hydrologic Testing Purposes within an Active Management Area for Buena Vista Well #1 was submitted and approved by ADWR. Permitting documentation is presented in Appendix A.

This report has been organized into two volumes. Volume I contains six sections: Section 1.0 is the introduction. Section 2.0 consists of a discussion of well construction and installation. Aquifer characterization and recommendations for the installation of permanent pump equipment are presented in Section 3.0. Final well completion activities are presented in Section 4.0, and variance requests are presented in Section 5.0. References are presented in Section 6.0.

Volume II of this report contains all the laboratory ground-water quality results (Attachments I through IV).

2.0 DRILLING AND WELL INSTALLATION

SGC developed technical specifications for the well, which are presented in the SGC document, "*Drilling, Installation, and Testing of Two Water Production Wells, Buena Vista Ranch, Maricopa County, Arizona*", dated November 1, 2006. Following the bid process, the well owner awarded the drilling contract to Arizona Beeman Drilling (Beeman), (ADWR Drillers License Number 360).

Based on analysis of data collected during drilling of the pilot hole, results of downhole geophysical logging, and zonal water quality sampling, design modifications were incorporated in the final well design. The As-built Diagram for Buena Vista Well #1 is presented as Figure 2.

Drilling and well installation operations were performed on a 24-hour per day, 7 day per week basis. Significant and/or critical field operations were documented by SGC personnel. Drilling equipment set up and excavation of mud pits began on July 10, 2007.

2.1 PILOT HOLE DRILLING

Prior to drilling the pilot borehole, a 30-inch diameter surface casing was installed. Drilling of the pilot hole commenced on July 11, 2007 and was completed on August 21, 2007. The pilot hole was drilled using a 16-inch tricone button bit to a depth of 1,520 feet below land surface (bls) using the reverse circulation mud rotary method. Copies of the daily drilling report forms completed by Beeman are presented in Appendix B.

Composite grab samples of drilled cuttings were collected by the drill crew at 10-foot intervals from the bottom of the surface casing to the total depth of the well boring. Representative samples from each interval were placed in cloth HUBCO sample bags and in plastic chip trays for future reference.

2.2 LITHOLOGIC LOG

A detailed lithologic log of the composite samples was prepared by an SGC geologist and is presented in Appendix C. In general, cuttings from the upper 640 feet of the borehole consist primarily of interbedded clay/sandy clay, clayey sand, sand, gravelly sand, and clayey sandy gravel. From 640 feet to 1,060 feet bls, the cuttings consist of finer-grained clay, silty clay, and

clayey sand. Cuttings from 1,060 feet bls to the total depth of the borehole at 1,520 feet are comprised of more coarse-grained sandy gravel and clayey sandy gravel.

Eight samples of drilled cuttings were submitted to Roscoe Moss Company for sieve analysis. The samples were selected from the following depth intervals: 550/560, 690/700, 700/710, 800/810, 980/990, 1080/1090, 1230/1240, and 1390/1400 feet bls. The Sieve Analysis Report dated August 29, 2007 is presented as Appendix D.

2.3 DOWNHOLE GEOPHYSICAL SURVEY

Southwest Exploration Services, LLC of Gilbert, Arizona conducted a series of downhole geophysical logs on August 21, 2007. The geophysical logs include: single-point resistivity; 8-inch, 16-inch, and 64-inch normal resistivity; natural gamma; spontaneous potential; sonic; caliper; deviation and temperature. Hard copies of the geophysical logs are presented in Appendix E. Summaries of the geophysical logs with the corresponding lithology are presented in Figures 3 and 4.

Results of the geophysical surveys appear to correlate with the lithologic log prepared for this borehole. In the upper 600 feet of the borehole, interbedding of the clay/sandy clay, clayey sand, sand, gravelly sand, and clayey sandy gravel is indicated by the zigzag response of the three resistivity curves (Figure 3). The relatively low resistivity of the sediments between approximately 600 and 1,060 feet bls reflects the increased porosity of the fine-grained clay, silty clay, and clayey sand. The more coarse-grained sandy gravel and clayey sandy gravel observed below 1,060 feet bls to the total depth of the borehole at 1,520 feet bls are denoted by an increase in the resistivity curves (Figure 3).

A 3-arm caliper log was run upon completion of the pilot hole to a total depth of 1,519 feet bls. The caliper log shows that in the depth interval from 40 to 600 feet bls, the pilot-hole gauge ranges from approximately 18 to 22 inches (Figure 4). In the depth interval from 600 to 960 feet bls, the pilot hole gauge is more variable, ranging from 18 to 28 inches. Below 960 feet to the total depth of the borehole, the pilot hole gauge averages 16-inches.

Borehole temperatures measured from the water table (327 feet bls) to the bottom of the pilot hole range from approximately 83 to 86 degrees Fahrenheit (Figure 4).

A deviation log was also conducted to determine plumbness and alignment of the pilot hole for Buena Vista Well #1. The closure distance measured at the depth of 1,519 feet bls, was 1.33 feet at an angle of 258.6 degrees (Appendix E). This translates to a displacement of 1.31 feet west and 0.26 feet south as compared to the top of the well. The survey results meet the well technical specifications.

2.4 ZONAL GROUND-WATER QUALITY

The lithologic log and down-hole geophysical survey data were utilized to select seven suitable depth intervals for the collection of zonal ground-water quality samples. Sampling was conducted beginning with the deepest interval and finishing with the shallowest interval. The seven zonal water quality samples were collected at the following depths: 1,398, 1,240, 1,092, 988, 808, 699 and 556 feet bls (Figure 5). The samples were collected August 23 through August 28, 2007.

The procedure for collecting zonal ground-water samples is as follows. A formation water sampling tool was constructed from a 6-inch diameter, 20-foot long section of perforated steel casing attached to a 6-inch diameter eductor pipe with a 1.5-inch diameter air line. The lower end of the sampling tool was plugged with a steel plate welded across the bottom. The sampling intervals were constructed by backfilling the borehole with approved backfill material to within 20 feet of the lowest interval, followed by a bentonite seal. The sampling tool was then positioned in the borehole adjacent to the interval to be sampled. Approved gravel material was then placed in the borehole, around and above the sampling tool, followed by another bentonite seal, which isolated the interval to be sampled. The contractor then air-lifted ground water from the selected interval until the temperature, electrical conductivity, and pH of the air-lifted water stabilized, and the water was clear of colloidal material or drilling additives. Upon sample collection, the eductor pipe and sampling tool were raised to the next sampling interval, and the sampling process described above was repeated.

The zonal ground-water samples were collected in appropriate containers, sealed, labeled and then placed in a cooler containing ice for preservation prior to delivery to the laboratory. All of the samples were delivered to Aerotech Environmental Laboratories in Phoenix, Arizona. The samples were analyzed for metals, major anions and cations, alkalinity, and total dissolved solids (TDS). Results of the zonal ground-water samples are summarized in Table 1 and in the

following chart. A diagram depicting the zonal ground-water quality results is presented as Figure 5. Copies of the laboratory analytical results are presented in Volume II, Attachment I.

Zone	Sample Depth (feet bls)	Arsenic (mg/L)	Chromium (mg/L)	Fluoride (mg/L)	Nitrate-N (mg/L)	TDS (mg/L)
7	556	0.0037	0.014	0.64	1.1	210
6	699	0.0039	0.022	0.62	1.1	180
5	808	0.0027	<0.0010	0.67	1.0	190
4	988	0.0043	0.011	0.57	1.0	210
3	1,092	0.0040	0.0084	0.49	1.0	220
2	1,240	0.0059	0.0096	0.83	0.95	220
1	1,398	0.0073	0.018	0.91	0.89	190
MCL		**0.01**	**0.1**	**4.0**	**10**	NL
Secondary MCL		NL	NL	{2.0}	NL	{500}

Notes: mg/L = Milligrams per liter
Bold = Analytical result is greater than or equal to MCL.
{ } = Analytical result is greater than or equal to Secondary Drinking Water Standard.
NL = MCL or Secondary Drinking Water Standard is not listed for this constituent.

Review of the ground-water quality results indicates that concentrations of arsenic, chromium, fluoride, nitrate and total dissolved solids (TDS) did not exceed the current federal primary Maximum Contaminant Levels (MCL) and/or secondary MCLs in any of the zonal samples.

Based on the results of the zonal water quality sampling, SGC prepared a final well design, which was provided to Beeman on September 4, 2007.

2.5 PILOT HOLE REAMING

Reaming of the 16-inch diameter pilot hole commenced on September 4, 2007 and was completed on September 12, 2007. The pilot hole was reamed from 39 to 1,509 feet bls utilizing a 24-inch reamer and a 17 ½-inch button drag bit. Borehole reaming was conducted to increase the borehole diameter as specified in the final well design.

Upon completion of borehole reaming, a ream caliper log was conducted by Southwest Exploration Services, LLC on September 12, 2007. The ream caliper log is presented in Figure 4. An average borehole gauge of 24-inches was observed throughout the borehole except

for three zones located at depths of approximately 110, 660, and 890 feet bls. At these depths, the borehole gauge briefly increased to approximately 28 to 30-inches.

2.6 WELL INSTALLATION

Beeman installed the well screen and casing for Buena Vista Well #1 on September 13, 2007. The casing string was hung from the collar to a total depth of 1,480 feet bls prior to installation of the annular materials. The well screen is comprised of 16 5/8-inch (OD) louvered "Ful Flo" high strength low alloy (HSLA) steel casing (0.312-inch wall thickness, 0.060-inch slot). The blank casing at the bottom and between the well screen consists of 16 5/8-inch (OD) HSLA steel (0.312-inch wall thickness). The blank casing above the well screen consists of 16 3/4-inch (OD) HSLA steel (0.375-inch wall thickness). Detailed descriptions of the materials used to construct Buena Vista Well #1 are presented in the As-built Diagram (Figure 2). Copies of the pipe tally and well casing certification are presented in Appendix F.

Following installation of the well casing and screen, Beeman installed the annular materials on September 13 - 14, 2007. The method of annular material installation was consistent with the technical specifications, which required that all materials be installed via a tremie pipe set no greater than 100 feet above the interval to be filled commencing from the borehole bottom and working up. As the filter pack (6-9 mesh Colorado Silica sand) and disinfectant (chlorinating granules plus sanitizer and shock) were installed into the well annulus, clean water was circulated through the perforated casing and up the annular space outside the casing. Upon completion of filter pack emplacement, a swab tool was worked opposite the screen to settle the sand. Fine sand and bentonite were then added to seal the top of the filter packed interval, and the remainder of the annulus was sealed with cement grout (Figure 2).

2.7 WELL DEVELOPMENT

2.7.1 Rig Development

Rig development of Buena Vista Well #1 took place on September 15 - 21, 2007. A process of simultaneously swabbing and airlifting was utilized to develop the well. The swabbing tool consisted of a 30-foot perforated, double-flanged joint, of 6-inch (OD) steel tubing. A 1.5-inch airline was initially installed from surface to a depth of 560 feet bls. The 880-foot perforated interval of Buena Vista Well #1 was swabbed and airlifted from bottom to top (1,460 to 530 feet

bls) twice for minimum of 129 hours, or 8.8 minutes per foot of screen. Daily driller reports pertaining to rig development are presented in Appendix B.

During the final 50 hours of rig development (and second pass from bottom to top of the screened interval), SGC personnel periodically measured the temperature, pH, conductivity, TDS, and sand content of the discharge. The data obtained while monitoring this phase of the well development process are presented in Appendix G.

2.7.2 Pump Development

The Weber Group installed an inline turbine shaft pump at a depth of 640 feet bls in Buena Vista Well #1. Pump development was started on October 31, 2007 at a rate of approximately 674 gpm. Flow rates during pump development were measured with a flowmeter, totalizer, and 10"x8" orifice plate and manometer assembly. Three well column surges were periodically conducted, and water quality parameters (temperature, pH, conductivity, turbidity, and sand content) were frequently monitored throughout the process. Pump development was concluded on November 2, 2007 after pumping and surging for a total of 7.5 hours at which point a maximum pumping rate in excess of 2,200 gpm was achieved (Appendix G).

3.0 AQUIFER TESTING

To evaluate production capability and water quality of the well, the following tests were conducted at Buena Vista Well #1.

- Step Test (November 6 - 7, 2007)
- Constant Rate and Recovery Test (November 8 - 12, 2007)
- Dynamic Spinner Logging and Depth Specific Ground-water Sampling (Jan. 15, 2008)

The Weber Group operated the test pump and ancillary equipment used during the aquifer tests. The pump bowl intake for the step and constant rate tests was set at a depth of 640 feet bls. Flow rates were provided by a flowmeter, totalizer, and a 10"x8" orifice plate and manometer assembly. SGC field technicians collected data during the aquifer tests.

3.1 STEP RATE DISCHARGE AQUIFER TEST

A 20-hour step-rate discharge test was conducted at Buena Vista Well #1 from 11:30 AM to 7:30 AM on November 6 - 7, 2007. The step-rate discharge test was conducted to evaluate the production capability of the well. Results are summarized in the chart below.

Step No.	Duration (hours)	Discharge (gpm)	Pumping Water Level (feet bls)	Drawdown (feet)	Specific Capacity (gpm/foot)
1	4	1,044	373.31	47.71	21.882
2	4	1,261	385.70	60.10	20.982
3	4	1,551	402.95	77.35	20.052
4	4	1,845	419.35	93.75	19.680
5	4	2,224	442.20	116.60	19.074

A plot of drawdown versus time for the step-rate discharge test is presented in Figure 6. A plot of specific capacity versus discharge rate is presented in Figure 7. The step-rate discharge test data are presented in Appendix G.

3.2 CONSTANT RATE DISCHARGE AQUIFER TEST

A 48-hour constant rate discharge test was conducted on Buena Vista Well #1 from 11:00 AM on November 8, 2007 to 11:00 AM on November 10, 2007. Based on the data obtained from the step rate discharge test, a constant rate discharge test of 1,500 gpm was proposed. Review of the constant rate discharge results shows that an average pumping rate of approximately 1,536 gpm was maintained throughout the test.

Water levels were measured prior to start-up of the constant rate discharge test and every minute during the first 10 minutes. As water levels began to stabilize, the frequency of water level measurements was decreased to ten-minute, twenty-minute, 100-minute, and then 200-minute intervals. The constant rate discharge data are presented in Appendix G.

The maximum recorded drawdown during the constant rate test was 78.08 feet, equivalent to a pumping water level of 405.08 feet bls, or approximately 235 feet above the pump intake. Plots of the drawdown versus time and specific drawdown versus time data for the constant rate test are presented in Figures 8 and 9, respectively. Review of these data indicates that the calculated aquifer transmissivity, evaluated using the Cooper-Jacob (1946) straight-line method for drawdown versus time, and specific drawdown versus time is 64,000 and 74,000 gallons per day per foot (gpd/ft), respectively.

Air entrainment was not observed in the discharge during the constant rate test. The test data also do not indicate the presence of any negative aquifer boundaries.

3.3 RECOVERY TEST

A water level recovery test was conducted immediately following cessation of the constant rate discharge test at Buena Vista Well #1. Recovery water levels were measured frequently for the first 130 minutes following cessation of the test, and again at 24 and 48 hours. Review of the recovery test data indicates recovery was 91% complete 130 minutes after cessation of pumping, 98% complete after 24 hours and 99% complete after 48 hours. Recovery data for the constant rate discharge test are plotted in Figure 10 and test data are presented in Appendix G. The transmissivity for the recovery data was calculated to be 70,000 gpd/ft.

3.4 AQUIFER PARAMETERS

Aquifer parameters were estimated based upon the results of the constant rate discharge test and the constant rate water level recovery test. A summary of transmissivity estimates from the test data are presented in the following chart.

TRANSMISSIVITY VALUES – BUENA VISTA WELL #1	
Test Method	**Transmissivity (gpd/ft)**
Drawdown vs. Time	64,000
Specific Drawdown vs. Time	74,000
Residual Drawdown vs. T/T' Ratio	70,000

Typically the recovery data are more representative of aquifer conditions because fluctuations in pumping rates are averaged over the entire test period and well inefficiencies are minimized. Therefore, 70,000 gpd/ft is selected as a representative value for the transmissivity. The hydraulic conductivity (K) can be calculated by dividing the transmissivity (T) by the saturated perforated interval of the well (b), i.e., K=T/b. Given that there are 880 feet of saturated perforations in Buena Vista Well #1, the calculated aquifer hydraulic conductivity is 80 gallons per day per square foot (gal/day/ft^2), or approximately 11 feet per day (ft/day).

3.5 WELL EFFICIENCY AND PERCENT LAMINAR FLOW

Review of Figure 7 indicates that the well was not pumped at a high enough rate during the step rate test to identify a break in the slope of the specific capacity versus discharge curve. As a result, the maximum pumping rate tested (2,224 gpm) was not high enough to identify the point at which increases in the pumping rate result in significant decreases in well efficiency.

Determination of well efficiency should be based on the theoretical specific capacity of a well which is a function of transmissivity of the aquifer. Ideally, this requires test data from a fully penetrating test well and an observation well (Mogg, 1968). The November 2007 constant rate aquifer tests performed at Buena Vista Well #1 did not meet these criteria. Nevertheless, given that the true well efficiency is equal to the actual 1-day specific capacity (SC) divided by the theoretical specific capacity (Driscoll, 1989), then the estimated efficiency of Buena Vista Well #1 ranges from approximately 41 to 47%. The well efficiency is calculated as follows:

$$\text{Well Efficiency} = \frac{SC_{\text{actual}}}{SC_{\text{theoretical}}} = \frac{20}{46} \times 100 = 43\,\% \qquad \text{(Mogg, 1968)}$$

where:

$$SC_{\text{actual}} = \frac{Q}{s'} = \frac{1{,}536\ \text{gpm}}{76\ \text{ft}} = 20\ \text{gpm/ft} \qquad \text{(Test Data)}$$

$$SC_{\text{theoretical}} = \frac{Q}{s_a} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{70{,}000}{264 \log \frac{0.3(70{,}000)(1)}{(0.67)^2 (0.086)}} = 46\ \text{gpm/ft} \qquad \text{(Jacob's Equation)}$$

where:

Q = discharge rate = 1,536 gpm

s' = observed drawdown

s_a = theoretical aquifer drawdown

r = well radius = 0.67 feet

t = time = 1 day

T = transmissivity = 70,000 gpd/ft

S = Coefficient of storage = 0.086 (Unconfined aquifer conditions)

In the above analysis, the specific yield value of 0.086 selected for the coefficient of storage assumes that unconfined aquifer conditions exist in the vicinity of the well. The boring log (Appendix C) for Buena Vista Well #1 shows that the upper 640 feet of the borehole consist primarily of interbedded clay/sandy clay, clayey sand, sand, gravelly sand, and clayey sandy gravel. From 640 feet to 1,060 feet bls, the cuttings consist of finer-grained clay, silty clay, and clayey sand. Cuttings from 1,060 feet bls to the total depth of the borehole at 1,520 feet are comprised of more coarse-grained sandy gravel and clayey sandy gravel. Significant shifts observed in the electric and natural gamma geophysical logs of the pilot hole (Figures 3 and 4) also suggest that physical parameters of the aquifer change with depth. Given the layering observed in the lithologic and geophysical logs, locally confined to semi-confined aquifer characteristics could influence the drawdown observed during the pumping test of the well; therefore, the lower limit of the coefficient of storage is estimated at 0.01. The upper limit of the coefficient of storage is a specific yield value of 0.086 based on the Salt River Valley (SRV) Model of ground-water flow (Corell & Corkhill, 1994). Employing this range of storage

coefficients and the range of transmissivity values, results in an estimated well efficiency ranging from 41 to 54%.

The head loss due to laminar flow of the well was also evaluated based on data collected during the step test using a method described by Bierschenk (1964). The formation loss coefficient, B, and the well loss coefficient, C, were determined based on a linear regression analysis of the specific drawdown versus discharge (Figure 11). The remaining coefficients were used to calculate the percentage of laminar flow at pumping rates of 1,500 gpm (83.0%), 1,750 gpm (80.7%), and 2,100 gpm (77.7%).

When evaluating well efficiency, it is important to bear in mind that conventional well hydraulics theory assumes that laminar flow conditions exist in the aquifer during pumping. However, turbulent flow occurring in and/or near the well and in the formation itself can affect the assumptions upon which well hydraulic equations are based.

3.6 NEW SOURCE GROUND-WATER QUALITY

A ground-water sample was collected from Buena Vista Well #1 and analyzed for constituents that comprise the Arizona Department of Environmental Quality (ADEQ) New Source Approval. SGC personnel collected the water sample on November 8, 2007 after four hours of pumping at 1,536 gpm during the constant rate discharge test. The sample was submitted to Transwest Geochem, Inc., (Transwest) of Phoenix, Arizona for analysis. A copy of the laboratory New Source Approval Ground-water Quality Results is presented in Volume II, Attachment II. Results of the major anions, cations, alkalinity and total recoverable metals are summarized in the following chart.

New Source Ground-water Quality Results - Constant Rate Test[a] Buena Vista Well #1 (55-213204)			
ANIONS (mg/L)		**ALKALINITY (mg/L)**	
Sulfate	19	Bicarbonate (as $CaCO_3$)	120
Fluoride	0.59	Carbonate (as $CaCO_3$)	<2.0
Nitrate (as Nitrogen)	1.1	Hydroxide (as $CaCO_3$)	<2.0
Total Dissolved Solids	210	Total Alkalinity(as $CaCO_3$)	120
CATIONS AND TOTAL RECOVERABLE METALS (mg/L)			
Antimony	<0.0020	Copper	<0.010
Arsenic	0.0033	Lead	<0.0020
Barium	0.030	Mercury	<0.0002
Beryllium	<0.0010	Nickel	0.010
Cadmium	<0.0030	Selenium	<0.0020
Chromium	0.021	Thallium	<0.0005

Notes: [a] Sample BV1_NS_110807_ collected by SGC at 3:00 PM on 11/08/07 after 4 hours of pumping at 1,536 gpm. Results by Transwest Geochem, Inc.

mg/L = Milligrams per liter

Bold = Analytical result is greater than or equal to MCL.

{ } = Analytical result is greater than or equal to Secondary Drinking Water Standard.

Review of the New Source water quality results indicates that ground water pumped from Buena Vista Well #1 meets current safe drinking water standards for state primary and secondary Maximum Contaminant Levels (MCLs) for all the constituents analyzed (Vol. II, Attachment II).

3.7 GROUND-WATER QUALITY SUMMARY

SGC personnel collected ground-water samples from Buena Vista Well #1 at regular intervals throughout the step rate discharge test and the constant rate discharge test. The samples were collected on November 6 - 9, 2007 and submitted to Environmental Science Corporation for analysis of arsenic, chromium, fluoride, nitrate, and TDS. The ground-water quality results are summarized in Table 2, and the laboratory analytical reports are presented in Volume II, Attachment III. Review of the results presented in Table 2 indicate that arsenic, chromium, fluoride, nitrate, and TDS were not present at concentrations exceeding their respective primary or secondary MCLs in any of the ground-water samples.

3.8 DOWNHOLE SPINNER LOGGING

Downhole spinner logging determines the relative rate of fluid movement within a well. Spinner logs are created by lowering a flow meter tool down the well casing at a constant rate. The device continuously records, from the bottom of the spinner access tube to the bottom of the well, both the rate of movement of the device (line speed) and the rate at which the impeller spins in units of counts per second (cps). Using these data, the velocity of fluid movement in the well casing, and subsequently the volumetric flow rate are determined. The resulting depth profile of fluid movement identifies zones of productivity in a well.

Downhole spinner logging was conducted in Buena Vista Well #1 to evaluate the depth specific ground-water quality and contribution of flow derived from specific perforated intervals. The Weber Group installed a temporary Hitachi 200 HP pump at a depth of approximately 464 feet bls, and a 3" access tube for the spinner tool at a depth of 476 feet bls. On January 15, 2008, Southwest Exploration Services, LLC conducted a spinner flow meter survey (spinner log) at a discharge rate of approximately 1,500 gpm (Appendix H).

Buena Vista Well #1 is screened from 530 to 625, and 675 to 1,460 feet bls (Figure 2). The contribution of flow derived from each perforated interval is presented below.

FLOW PERCENTAGES PER SCREENED INTERVAL
BUENA VISTA WELL #1

Perforated Interval (feet bls)	Flow Contribution (gpm)	Flow Contribution (percent)
530-625, 675-700	100	7
700-800	100	7
800-900	200	13
900-1,040	150	10
1,040-1,200	800	53
1,200-1,460	150	10
Total	**1,500**	**100%**

Review of the spinner log information indicates that over half of the total flow (53%) in Buena Vista Well #1 is derived from the 160-foot perforated interval between 1,040 and 1,200 feet bls. Ten percent of the flow is derived from the screened portion of the well below 1,200 feet bls, and

approximately seven percent of the flow is derived from above 700 feet bls. The remaining 30% of the flow comes from the 340-foot perforated interval between 700 and 1,040 feet bls.

3.9 DEPTH SPECIFIC GROUND-WATER QUALITY

Following field interpretation of the spinner log, six sample points were selected for depth specific ground-water sampling at: 530, 700, 800, 900, 1,040, and 1,200 feet bls. On January 15, 2008, SGC personnel collected the depth specific ground-water samples and a composite water sample at the well head. The samples were delivered to Aerotech Environmental Laboratories and analyzed for major ions and metals including arsenic, chromium, fluoride, nitrate, and TDS. A copy of the analytical laboratory report is provided in Volume II, Attachment IV. A summary of the analytical results is presented in the following chart.

SPINNER LOG DATA AND DEPTH SPECIFIC WATER QUALITY RESULTS*
BUENA VISTA WELL #1

Sample Depth (feet bls)	Flow Rate at Sample Depth (gpm)	As (mg/L)	Cr (mg/L)	F (mg/L)	NO_3 as N (mg/L)	TDS (mg/L)
Well Head	1,500	0.0040	0.011	0.62	1.0	220
530	1,500	0.0042	0.015	0.62	1.0	240
700	1,400	0.0044	0.012	0.62	1.0	230
800	1,300	0.0043	0.012	0.62	1.0	220
900	1,100	0.0045	0.011	0.60	1.0	220
1,040	950	0.0045	0.011	0.60	1.0	200
1,200	150	0.0070	0.023	0.79	0.96	200
MCL		**0.01**	**0.1**	**4.0**	**10**	NL
Secondary MCL		NL	NL	{2.0}	NL	{500}

Notes: * = Measured concentrations (mg/L) at discrete sample depths (representing composite of all water entering casing below a given depth). Pump setting is 464 feet bls. Access tube at 476 feet bls. Discharge rate = 1,500 gpm.
Bold= Result highlighted in **bold** is greater than or equal to MCL.
{ } = Analytical result is greater than or equal to Secondary Drinking Water Standard.
NL = MCL or Secondary Drinking Water Standard is not listed for this constituent.

Review of the results indicates that concentrations of arsenic, chromium, fluoride, nitrate, and TDS are below current primary and secondary MCLs in each of the depth specific samples.

3.10 LONG-TERM PUMPING RATE PROJECTION

The long-term pumping rate for Buena Vista Well #1 has been evaluated based on projections of drawdown data obtained from the constant rate test as presented in Figure 12 and a static water level (swl) of 327 feet bls. Based on a review of the aquifer test data, the production capacity of Buena Well #1 is:

Long-term Discharge Rate: 1,500 gallons per minute

Pumping Water Level @ 1,500 gpm:

After 30 days of constant pumping: 409 feet bls (327 feet swl + 82 feet drawdown)
After 1 year of constant pumping: 415 feet bls (327 feet swl + 88 feet drawdown)
After 20 years of constant pumping: 422 feet bls (327 feet swl + 95 feet drawdown)

The allowable pumping rate may be less than 1,500 gpm due to well impact considerations. The pump setting should be based on the pump manufacturer's recommendation plus additional depth due to regional water level fluctuations. Typically, SGC recommends adding approximately 25 feet to the manufacturer's recommendation. Assuming a 24-hour constant pumping rate of 1,500 gpm will result in a predicted 20-year drawdown of 95 feet with a predicted pumping water level of 422 feet bls, then the pump could be set at a depth of at least 450 to 500 feet bls (Figure 2). At this depth, a pumping rate of 1,500 gpm should result in the long-term pumping water level remaining safely above the pump assembly.

The pumping water level drawdowns are based upon a static water level of approximately 327 feet bls and utilizing the proposed 24-hour constant pumping rate with no consideration for pump duty cycle rest. The pump duty cycle allows the pump to be rested for intervals to increase pump longevity. Pump off cycles will decrease the total projected drawdown for the periods calculated. Pump duty rest affords periods of water level recovery reducing the overall impact on the aquifer.

4.0 FINAL WELL COMPLETION ACTIVITIES

4.1 DOWNHOLE VIDEO SURVEY

A video survey of Buena Vista Well #1 was conducted by The Weber Group on February 13, 2008 (Appendix I). Allowing for approximately 2.0 feet of casing stick up, the observed locations of well screen perforations agree with those presented in the As-built Diagram (Figure 2). Approximately 1 foot of fill was observed at the bottom of the well (1,479 feet bls). No visible defects were found.

4.2 GYROSCOPIC DIRECTIONAL SURVEY

On February 29, 2008, a gyroscopic deviation survey was performed on Buena Vista Well #1 (Appendix J). A closure distance of 2.14 feet was measured at a depth of 1,460 feet bls and a bearing of 53.34 degrees. Based on this information, the bottom of the cased well is located approximately 1.72 feet east and 1.28 feet north with respect to the top of the well. These survey results meet the requirements for plumbness and alignment.

5.0 VARIANCE FOR PUMPING RATE AND WELL EFFICIENCY

On November 29, 2007, SGC requested variances from the City of Surprise (COS) standards for maximum pumping rate and minimum well efficiency requirements for Buena Vista Wells #1 and #2 (Appendix K). Both wells were constructed and developed to their greatest potential and in compliance with the standards and review of the COS, and the standards of the drilling industry. On December 18, 2007, the COS verbally approved the variance requests.

6.0 REFERENCES

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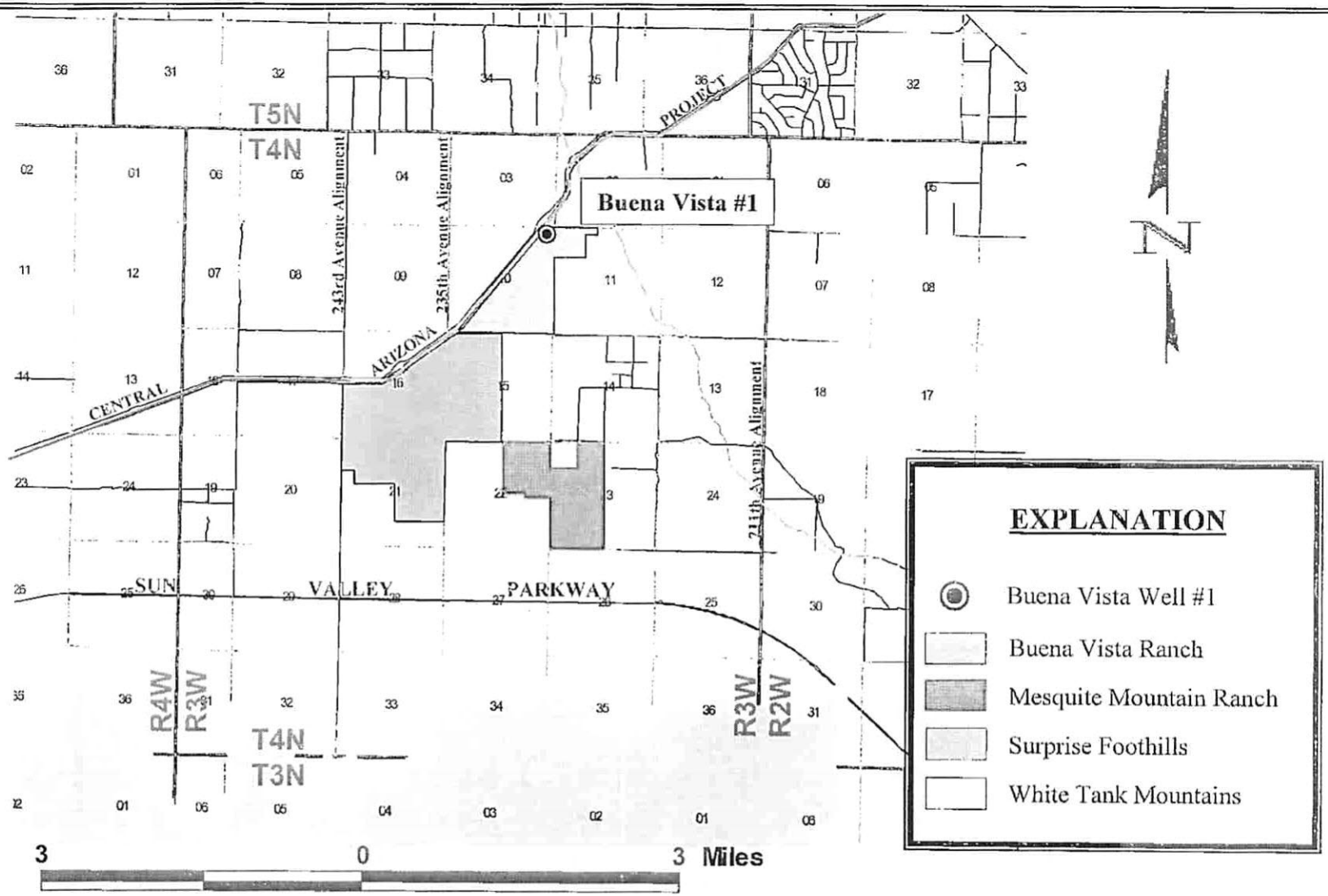
FIGURES

FIGURES



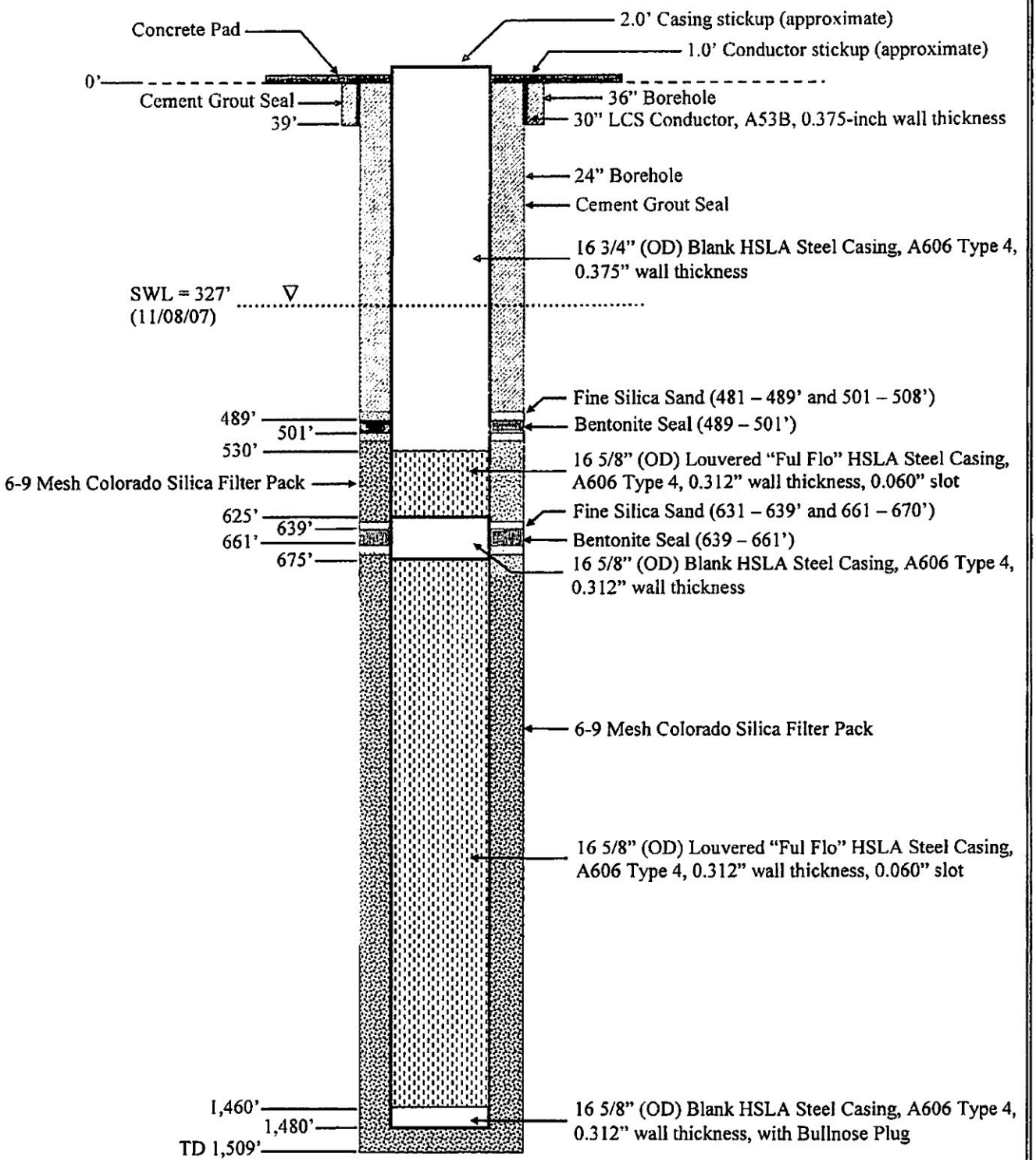
Southwest Ground-water Consultants, Inc.

March 4, 2008 Project B.1401

BUENA VISTA WELL #1
LOCATION MAP
B(4-3) 10AAA #55-213204

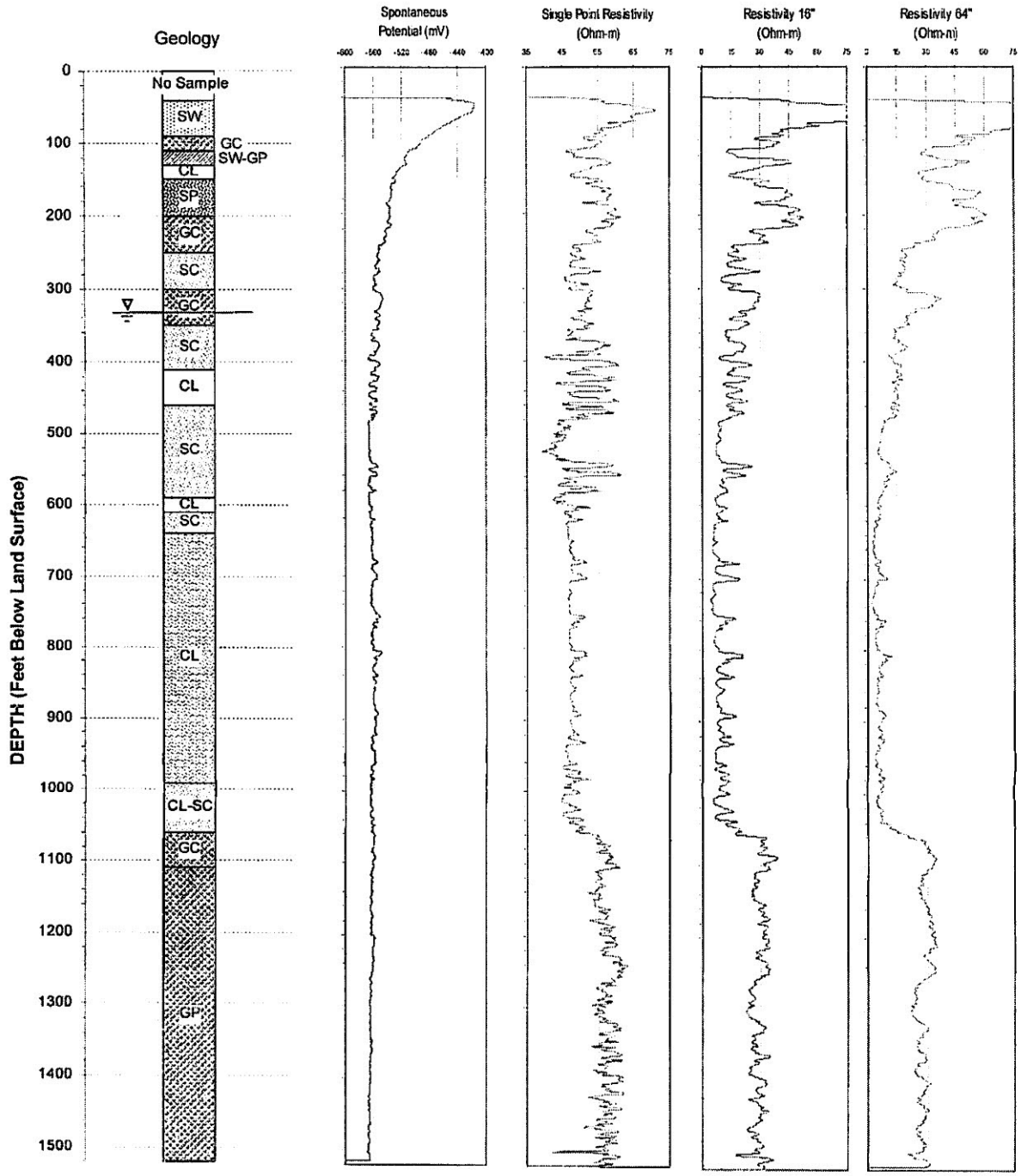
Maricopa County, Arizona

Figure 1



- Drawing Not to Scale. Casing Centralizers Every 80 feet.

Southwest Ground-water Consultants, Inc. **March 4, 2008 Project B.1401**	**AS-BUILT DIAGRAM** **BUENA VISTA WELL #1** **B(4-3) 10 AAA #55-213204** Maricopa County, Arizona	**Figure 2**



EXPLANATION

- CL = Clay / Sandy Clay
- CL = Silty Clay / Clay
- CL-SC = Clay / Clayey Sand
- SC = Clayey Sand
- SW = Sand
- SW-GP = Sand / Sandy Gravel
- SP = Gravelly Sand
- GC = Clayey Sandy Gravel
- GP = Sandy Gravel

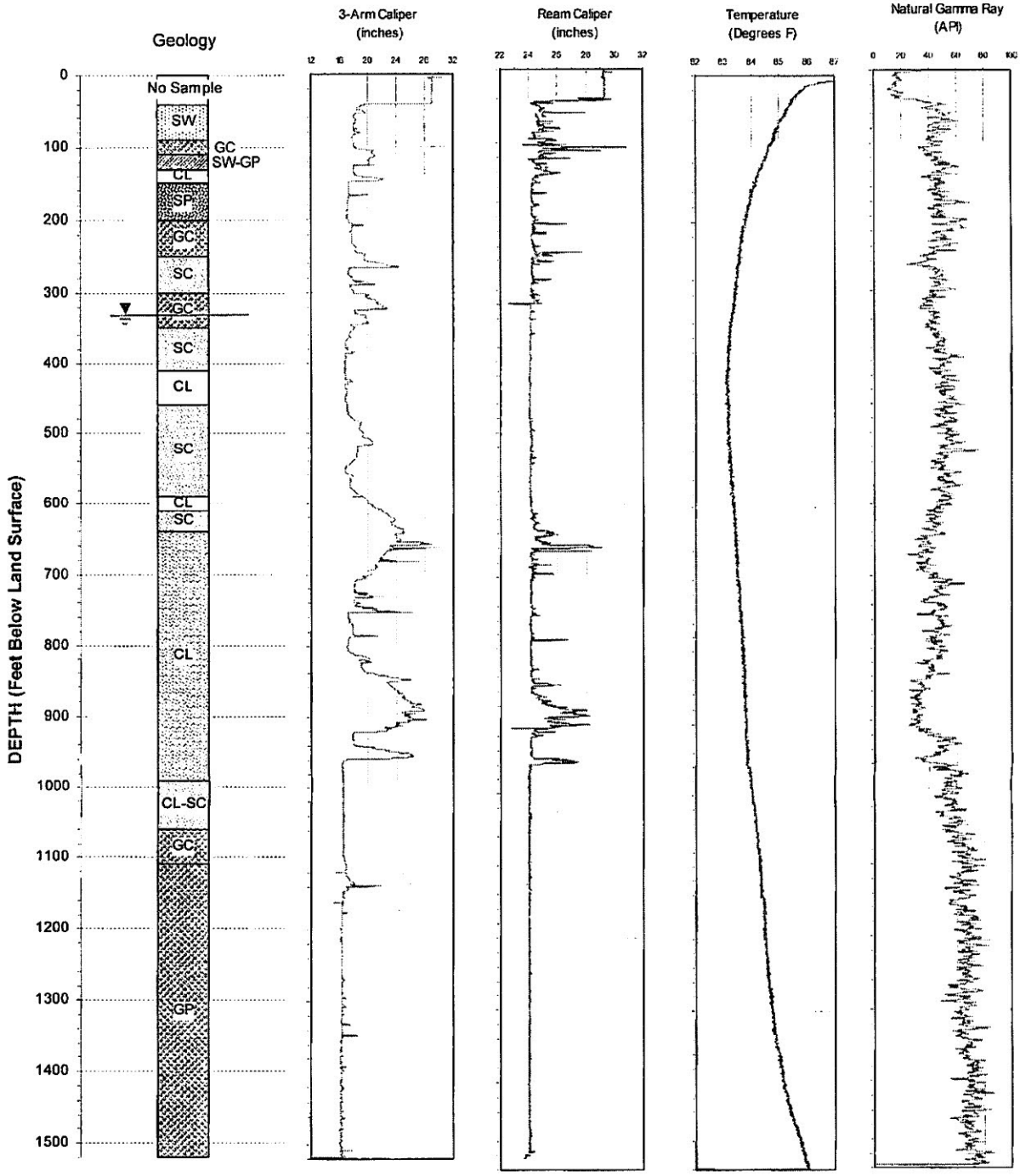
Southwest Ground-water Consultants, Inc.

March 4, 2008 Project B.1401

BUENA VISTA WELL #1
GEOPHYSICAL LOGS:
SPONTANEOUS POTENTIAL AND RESISTIVITY

Maricopa County, Arizona

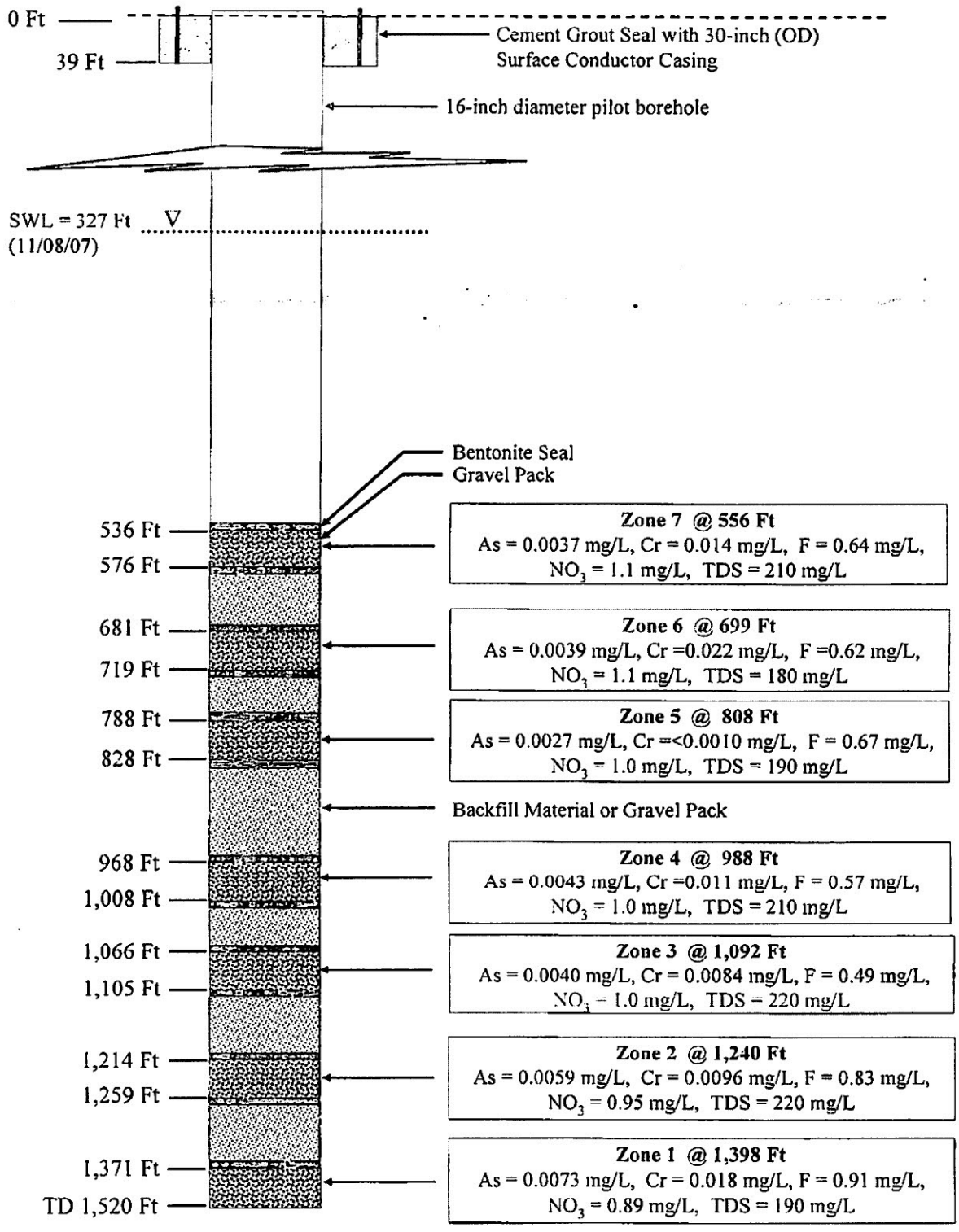
Figure 3



EXPLANATION

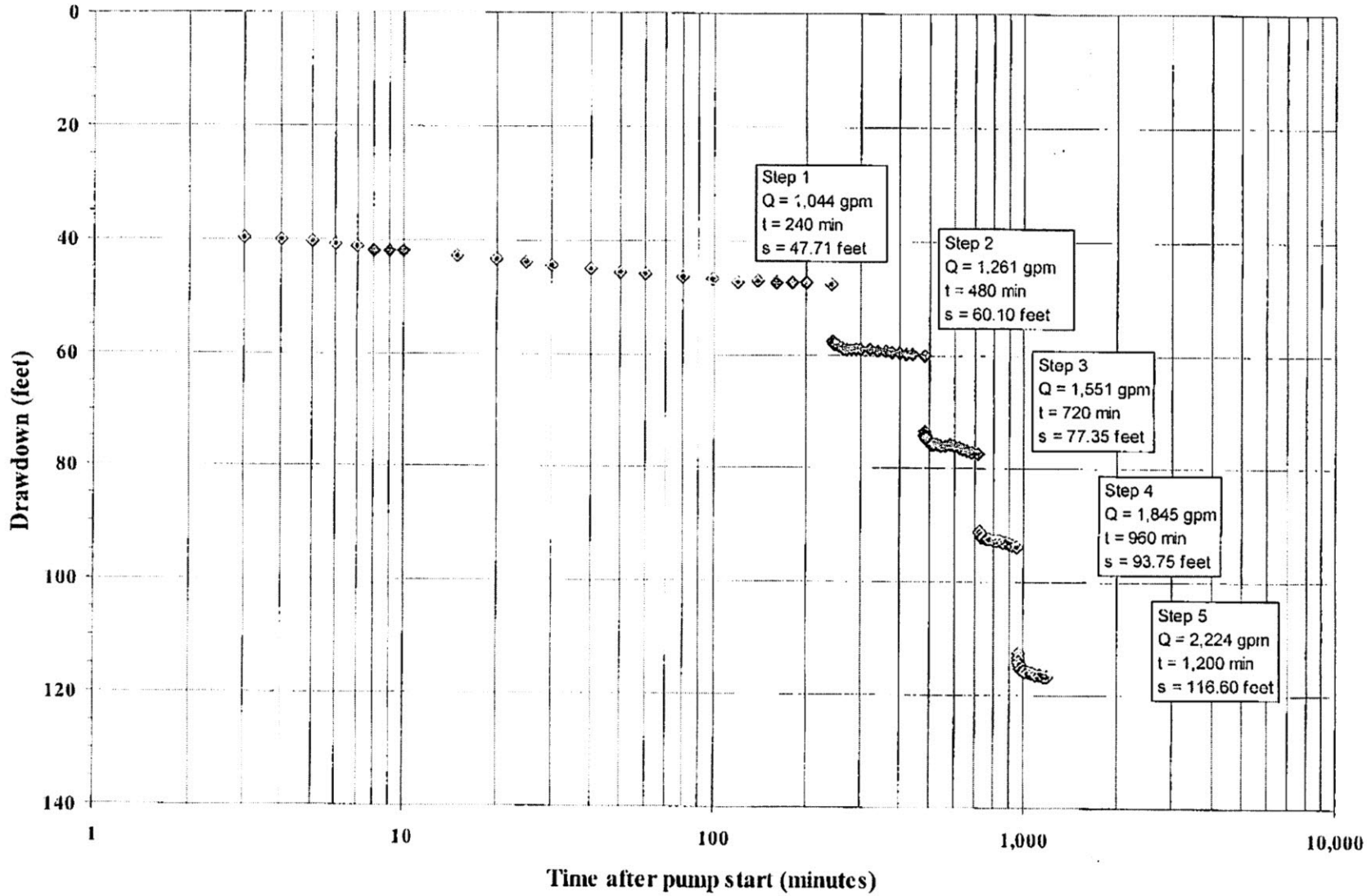
- CL = Clay / Sandy Clay
- CL = Silty Clay / Clay
- CL-SC = Clay / Clayey Sand
- SC = Clayey Sand
- SW = Sand
- SW-GP = Sand / Sandy Gravel
- SP = Gravelly Sand
- GC = Clayey Sandy Gravel
- GP = Sandy Gravel

Southwest Ground-water Consultants, Inc. March 4, 2008 Project B.1401	**BUENA VISTA WELL #1** **GEOPHYSICAL LOGS:** **CALIPER, TEMPERATURE & GAMMA** Maricopa County, Arizona	**Figure 4**



- Drawing Not to Scale. Water Quality Results by Aerotech Environmental Laboratories.

Southwest Ground-water Consultants, Inc. **March 4, 2008 Project B.1401**	**BUENA VISTA WELL #1 ZONAL GROUND-WATER QUALITY** **Maricopa County, Arizona**	**Figure 5**



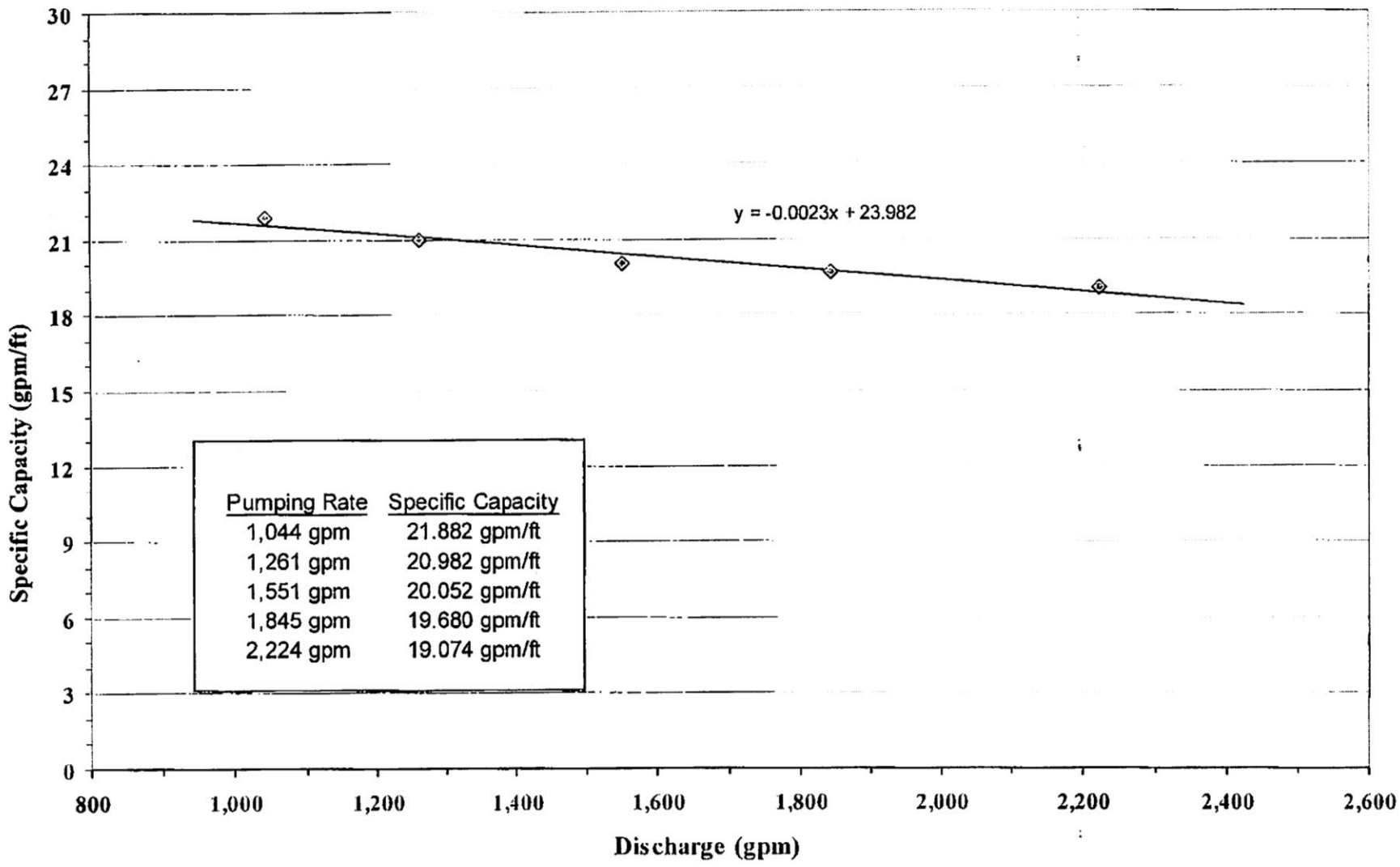
Southwest Ground-water Consultants, Inc.

March 4, 2008 Project B.1401

BUENA VISTA WELL #1
STEP RATE TEST, NOVEMBER 6 - 7, 2007
DRAWDOWN VS. TIME

City of Surprise, Maricopa County, Arizona

Figure 6

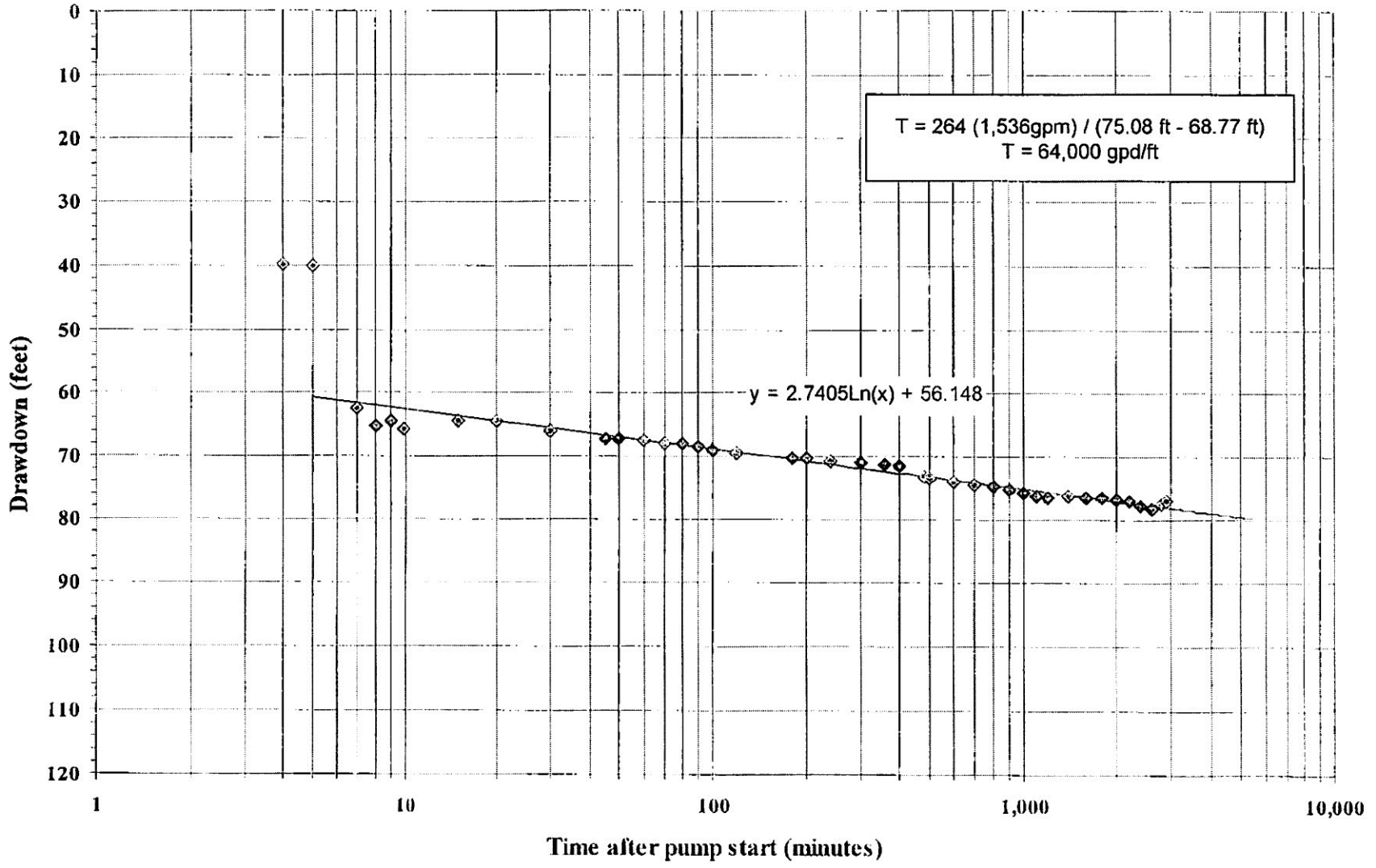


Southwest Ground-water Consultants, Inc.

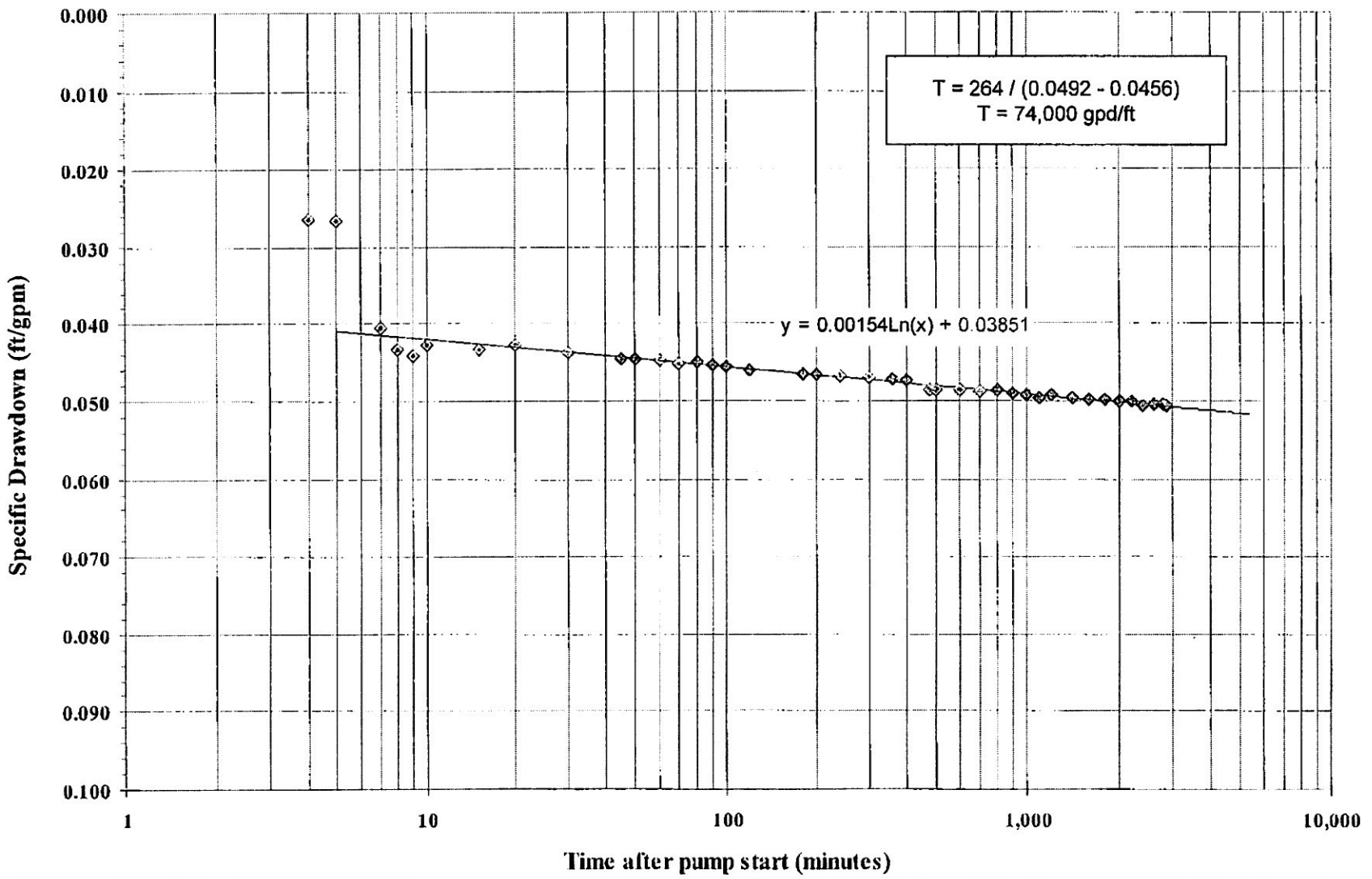
March 4, 2008 Project B.1401

BUENA VISTA WELL #1
STEP RATE TEST, NOVEMBER 6 - 7, 2007
SPECIFIC CAPACITY VS. DISCHARGE
City of Surprise, Maricopa County, Arizona

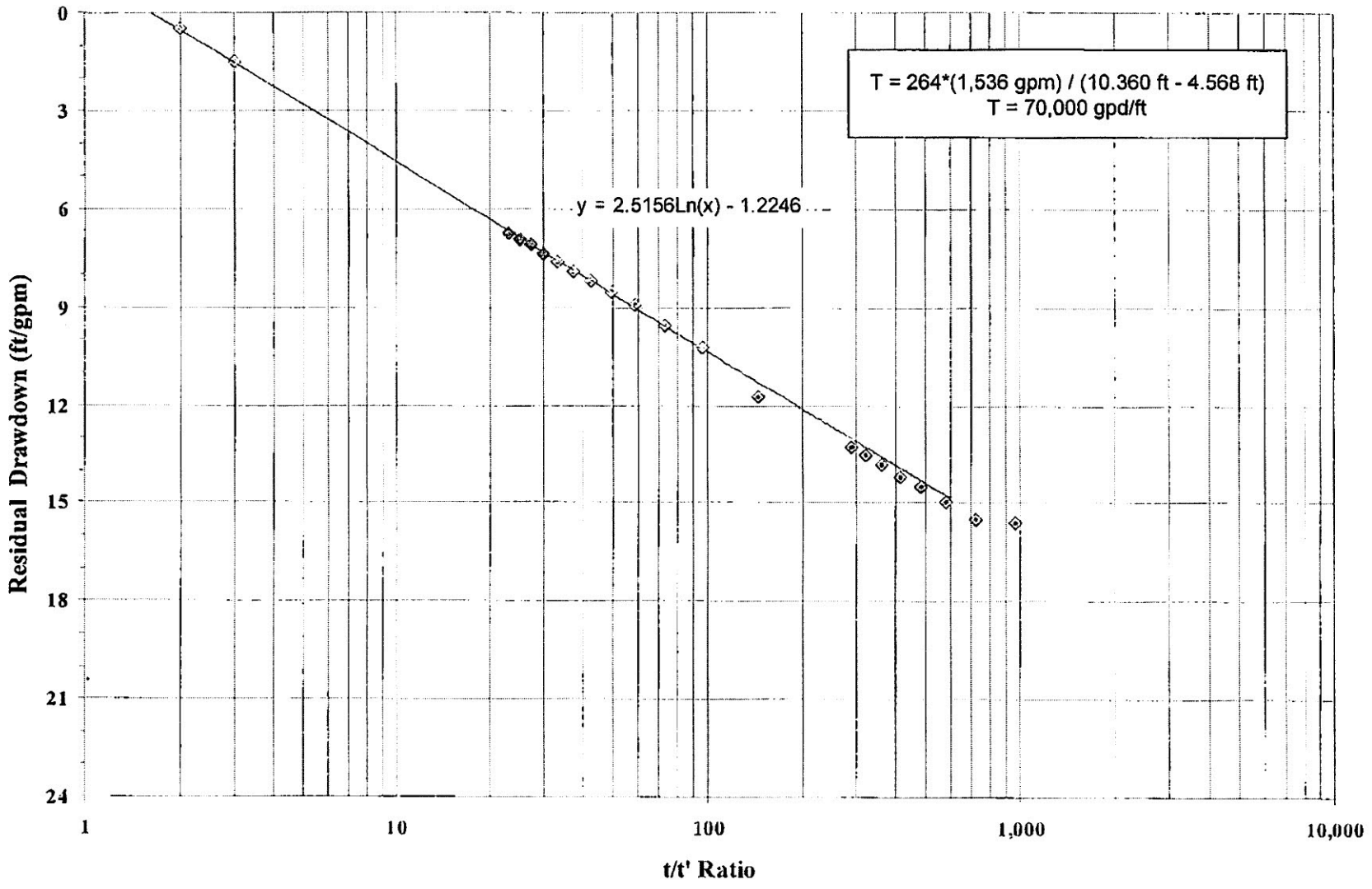
Figure 7



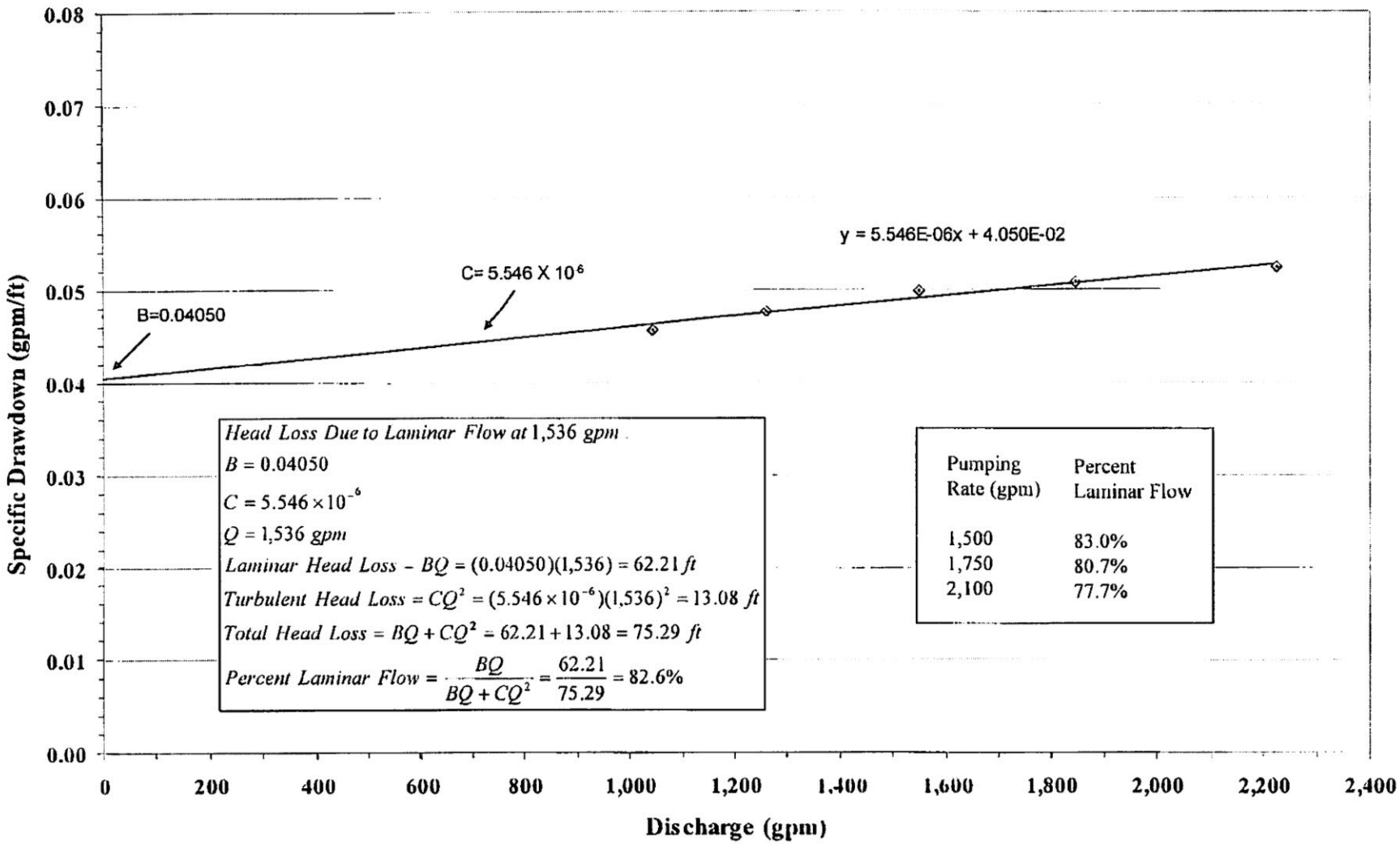
Southwest Ground-water Consultants, Inc. March 4, 2008 Project B.1401	BUENA VISTA WELL #1 CONSTANT RATE TEST, NOVEMBER 8 - 10, 2007 DRAWDOWN VS. TIME City of Surprise, Maricopa County, Arizona	Figure 8



Southwest Ground-water Consultants, Inc. March 4, 2008 Project B.1401	BUENA VISTA WELL #1 CONSTANT RATE TEST, NOVEMBER 8 - 10, 2007 SPECIFIC DRAWDOWN VS. TIME City of Surprise, Maricopa County, Arizona	Figure 9



Southwest Ground-water Consultants, Inc. **March 4, 2008** **Project B.1401**	**BUENA VISTA WELL #1** **CONSTANT RATE RECOVERY TEST, NOV. 10 - 12, 2007** **RESIDUAL DRAWDOWN VS. T/T' RATIO** **City of Surprise, Maricopa County, Arizona**	**Figure** **10**

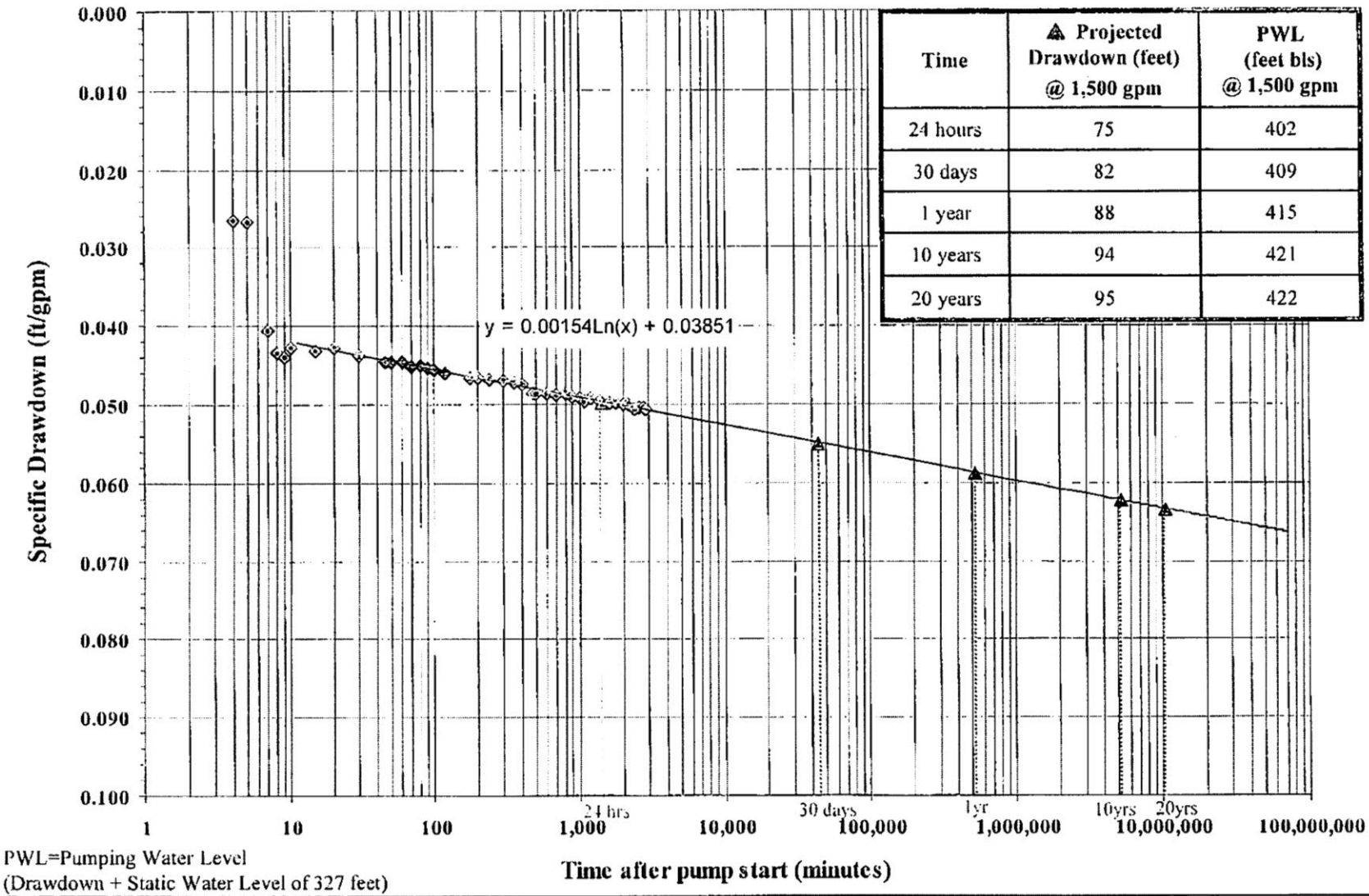


Southwest Ground-water Consultants, Inc.

March 4, 2008 Project B.1401

BUENA VISTA WELL #1
STEP RATE TEST, NOVEMBER 6 - 7, 2007
SPECIFIC DRAWDOWN VS. DISCHARGE
City of Surprise, Maricopa County, Arizona

Figure 11



Time	▲ Projected Drawdown (feet) @ 1,500 gpm	PWL (feet bls) @ 1,500 gpm
24 hours	75	402
30 days	82	409
1 year	88	415
10 years	94	421
20 years	95	422

PWL=Pumping Water Level
(Drawdown + Static Water Level of 327 feet)

Southwest Ground-water Consultants, Inc.

March 4, 2008 Project B.1401

BUENA VISTA WELL #1
CONSTANT RATE TEST, NOV. 8 - 10, 2007
20-YEAR DRAWDOWN PREDICTION
City of Surprise, Maricopa County, Arizona

Figure 12

TABLES

TABLES

TABLE 1

ANALYTICAL RESULTS FOR ZONAL GROUND-WATER QUALITY SAMPLES
BUENA VISTA WELL #1 (ADWR #55-213204)

SAMPLE ID (Approximate Flow Rate)	SAMPLE DATE	SAMPLE DEPTH (feet)	ARSENIC Method EPA 200.8 (mg/L)	CHROMIUM Method EPA 200.8 (mg/L)	FLUORIDE Method EPA 300 (mg/L)	NITRATE-N Method EPA 300 (mg/L)	TOTAL DISSOLVED SOLIDS Method SM2540C (mg/L)
BVNorth-556-082807 (60 gpm)	08/28/07	556	0.0037	0.014	0.64	1.1	210
BVNorth-699-082807 (80 gpm)	08/28/07	699	0.0039	0.022	0.62	1.1	180
BVNORTH-808-082607 (50 gpm)	08/26/07	808	0.0027	<0.0010	0.67	1.0	190
BV#1-988-08252007 (50 gpm)	08/25/07	988	0.0043	0.011	0.57	1.0	210
BVNorth-082507 (50 gpm)	08/25/07	1,092	0.0040	0.0084	0.49	1.0	220
BVNorth-1240-082407 (40 gpm)	08/24/07	1,240	0.0059	0.0096	0.83	0.95	220
BVNorth-1398-082307 (30 gpm)	08/23/07	1,398	0.0073	0.018	0.91	0.89	190
Maximum Contaminant Level (MCL)			**0.01**	**0.1**	**4.0**	**10**	NL
Secondary MCL			NL	NL	{2.0}	NL	{500}

Notes: Results by Aerotech Environmental Laboratories

mg/L = Milligrams per Liter

Bold = Analytical results in **bold** font are greater than or equal to MCL.

NL = MCL or Secondary Drinking Water Standard is not listed for this constituent.

{ } = Analytical result is greater than or equal to Secondary Drinking Water Standard.

TABLE 2
GROUND-WATER QUALITY SUMMARY
BUENA VISTA WELL #1 (55-213204)

Sample ID	Sample Date	Sample Time	Time since step/pump start (min)	Arsenic (mg/L)	Chromium (mg/L)	Fluoride (mg/L)	Nitrate as N (mg/L)	TDS (mg/L)
Step Rate Discharge Test								
Step 1: Ave Q ≈ 1,044 gpm at 11:30 hours on 11/6/07								
STEP1-SAMP1	11/6/2007	11:45	t = 15	0.0031	0.0075	0.48	0.68	210
STEP1-SAMP2	11/6/2007	12:30	t = 60	0.0033	0.0086	0.46	0.73	210
STEP1-SAMP3	11/6/2007	13:30	t = 120	0.0035	0.0090	0.46	0.73	210
STEP1-SAMP4	11/6/2007	15:30	t = 240	0.0040	0.010	0.42	0.80	210
Step 2: Ave Q ≈ 1,261 gpm at 15:30 hours on 11/6/07								
STEP2-SAMP5	11/6/2007	15:45	t = 15	0.0035	0.0094	0.45	0.72	210
STEP2-SAMP6	11/6/2007	16:30	t = 60	0.0036	0.0094	0.46	0.72	210
STEP2-SAMP7	11/6/2007	17:30	t = 120	0.0036	0.0095	0.46	0.74	210
STEP2-SAMP8	11/6/2007	19:30	t = 240	0.0039	0.010	0.43	0.78	200
Step 3: Ave Q ≈ 1,551 gpm at 19:30 hours on 11/6/07								
STEP3-SAMP9	11/6/2007	19:45	t = 15	0.0036	0.0097	0.43	0.72	190
STEP3-SAMP10	11/6/2007	20:30	t = 60	0.0037	0.0096	0.43	0.73	210
STEP3-SAMP11	11/6/2007	21:30	t = 120	0.0038	0.0097	0.44	0.71	200
STEP3-SAMP12	11/6/2007	23:30	t = 240	0.0039	0.010	0.42	0.80	210
Step 4: Ave Q ≈ 1,845 gpm at 23:30 hours on 11/6/07								
STEP4-SAMP13	11/6/2007	23:45	t = 15	0.0037	0.010	0.46	0.72	200
STEP4-SAMP14	11/7/2007	0:30	t = 60	0.0037	0.0098	0.47	0.74	210
STEP4-SAMP15	11/7/2007	1:30	t = 120	0.0037	0.010	0.41	0.80	210
STEP4-SAMP16	11/7/2007	3:30	t = 240	0.0040	0.011	0.42	0.80	210
Step 5: Ave Q ≈ 2,224 gpm at 03:30 hours on 11/7/07								
STEP5-SAMP17	11/7/2007	3:45	t = 15	0.0038	0.010	0.42	0.80	190
STEP5-SAMP18	11/7/2007	4:30	t = 60	0.0037	0.010	0.44	0.80	190
STEP5-SAMP19	11/7/2007	5:30	t = 120	0.0038	0.010	0.42	0.80	200
STEP5-SAMP20	11/7/2007	7:30	t = 240	0.0040	0.011	0.42	0.79	210
Constant Rate Test. Pump on at 11:00 hours on 11/8/07. Average Q = 1,536 gpm								
BV-1 CR-5	11/8/2007	11:05	t = 5	0.0027	0.0072	0.40	0.69	210
BV-1 CR-15	11/8/2007	11:15	t = 15	0.0034	0.0091	0.46	0.76	210
BV-1 CR-30	11/8/2007	11:30	t = 30	0.0036	0.0095	0.46	0.78	210
BV-1 CR-45	11/8/2007	11:45	t = 45	0.0037	0.0099	0.43	0.78	220
BV-1 CR-60	11/8/2007	12:00	t = 60	0.0037	0.010	0.43	0.78	220
BV-1 CR-120	11/8/2007	13:00	t = 120	0.0040	0.011	0.44	0.77	210
BV-1 CR-180	11/8/2007	14:00	t = 180	0.0035	0.0098	0.43	0.71	220
BV-1 CR-240	11/8/2007	15:00	t = 240	0.0037	0.011	0.43	0.73	220
BV-1 CR-360	11/8/2007	17:00	t = 360	0.0040	0.011	0.42	0.74	210
BV-1 CR-480	11/8/2007	19:00	t = 480	0.0040	0.011	0.42	0.73	210
BV-1 CR-600	11/8/2007	21:00	t = 600	0.0040	0.011	0.41	0.74	200
BV-1 CR-1440	11/9/2007	11:00	t = 1440	0.0040	0.011	0.42	0.73	220
Maximum Contaminant Level (MCL)				**0.01**	**0.1**	**4.0**	**10**	NL
USEPA Secondary Drinking Water Standard				NL	NL	{2.0}	NL	{500}

Notes: Results by Environmental Science Corporation
mg/L = Milligrams per liter
Bold = Analytical Results in **bold** font are greater than or equal to MCL.
NL = MCL or Secondary Drinking Water Standard is not listed for this constituent.
{ } = Analytical result is greater than or equal to Secondary Drinking Water Standard.

APPENDICES

APPENDIX A

APPENDIX A

BUENA VISTA WELL #1 PERMIT DOCUMENTS

ARIZONA DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT DIVISION

3550 North Central Avenue
Phoenix, Arizona 85012

REISSUED

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILL OPERATIONS

WELL REGISTRATION NO: 55-213204 **PERMIT NO.:** 59-213203

AUTHORIZED DRILLER: ARIZONA BEEMAN DRILLING **LICENSE NO:** 360

AUTHORITY TO DRILL A NON-EXEMPT WELL(s) INSIDE THE PHOENIX ACTIVE MANAGEMENT AREA FOR HYDROLOGIC TESTING HAS BEEN GRANTED TO:

WELL OWNER: FRI Surprise 398 LLC 8700 E. Via De Ventura Scottsdale AZ 85258

The well(s) is/are to be located in the:

NE ¼ of the NE ¼ of the NE ¼ Section 10 Township 4 North Range 3 West

No. of well(s) in this project: 1

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE 28TH DAY OF SEPTEMBER, 2007.

WATER MANAGEMENT DIVISION

THE DRILLER MUST FILE A LOG OF THE WELL WITHIN 30 DAYS OF COMPLETION OF DRILLING

GREAT SEAL OF THE STATE OF ARIZONA
DITAT DEUS
1912

Southwest Ground-water Consultants, Inc.

RECEIVED
JAN 12 2007
PHOENIX AMA

January 11, 2007

Ms. Darlene Sumpter-King
Arizona Department of Water Resources
Water Management Support Section- NOI Unit
3550 North Central Avenue
Phoenix, Arizona 85012

SUBJECT: FRI Surprise 398, LLC PERMIT FOR HYDROLOGIC TESTING PURPOSES – WELL #55-213204

Dear Ms. Sumpter-King:

Please note that the location of ADWR Well #55-213204 needs to be changed from B(4-3)10 CCC to B(4-3)10 AAA. The approximate latitude and longitude for the new location are:

Latitude 33° 42' 38" Longitude 112° 32' 52"

As previously indicated to you, the driller selected to drill this well is Arizona Beeman Drilling (ADWR License # 360, ROC License Category A-04).

If you have any questions please contact me at 602-955-5547.

Sincerely,

Southwest Ground-water Consultants, Inc.

Kevin Hebert, R.G.

3033 N. 44th Street, Suite 120
Phoenix, Arizona 85018
(602) 955-5547 Fax (602) 955-7585

Phoenix, Arizona
Prescott, Arizona

From: David Christiana
To: Ward, Sharon
Date: 1/16/07 4:06PM
Subject: Re: FRI Surprise 398 LLC, Hydrotest App # 59-213203, Well # 55-213204

No water quality issues with the change in location.

Dave Christiana

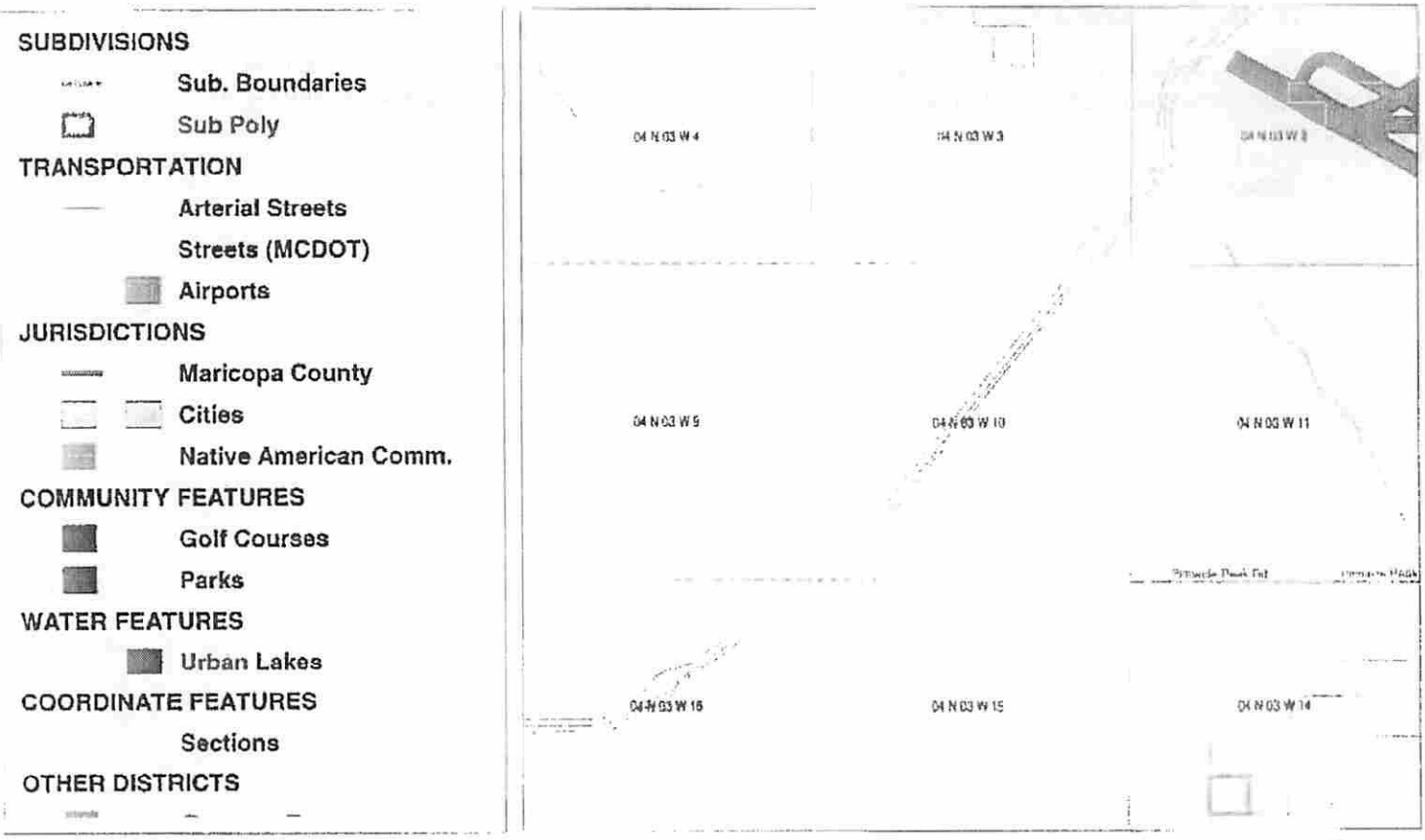
>>> Sharon Ward 1/16/2007 12:15:01 PM >>>
Hi David and Welcome Back. Hope you have a very nice holiday.

You signed-off on this Hydrotest on September 14, 2006, but the applicant is not requesting that the location be changed from B(4-3)10 **CCC** to B(4-3)10 **AAA** . Does this make a difference on your sign-off?

Thanks,
Sharon

T4N, R3W, SECTION 10

55-213204



SCALE 1 : 34,520

2,000 0 2,000 4,000 6,000

FEET

N

T4N, R3W, SECTION 10

55-213204

SUBDIVISIONS
- Sub. Boundaries
- Sub Poly

TRANSPORTATION
- Arterial Streets
- Streets (MCDOT)
- Airports

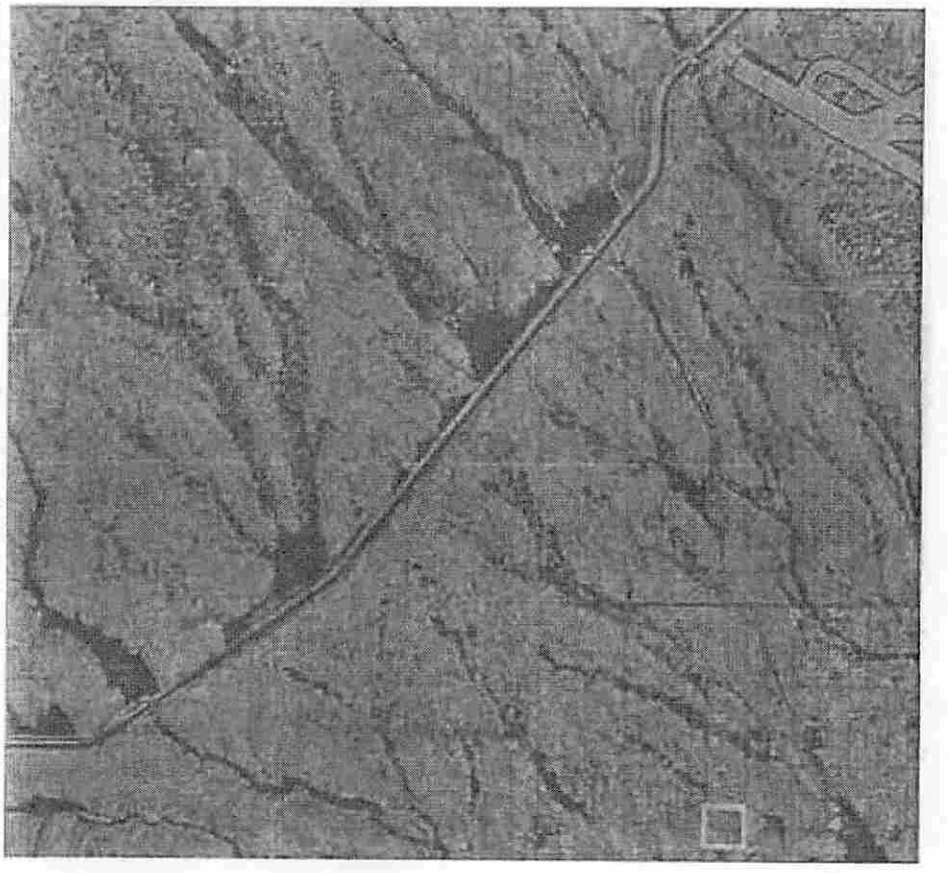
JURISDICTIONS
- Maricopa County
- Cities
- Native American Comm.

COMMUNITY FEATURES
- Golf Courses
- Parks

WATER FEATURES
- Urban Lakes

COORDINATE FEATURES
- Sections

OTHER DISTRICTS



SCALE 1 : 34,520

2,000 0 2,000 4,000 6,000
FEET

N

T4N, R3W, SECTION 10, SW 1/4

55-213204

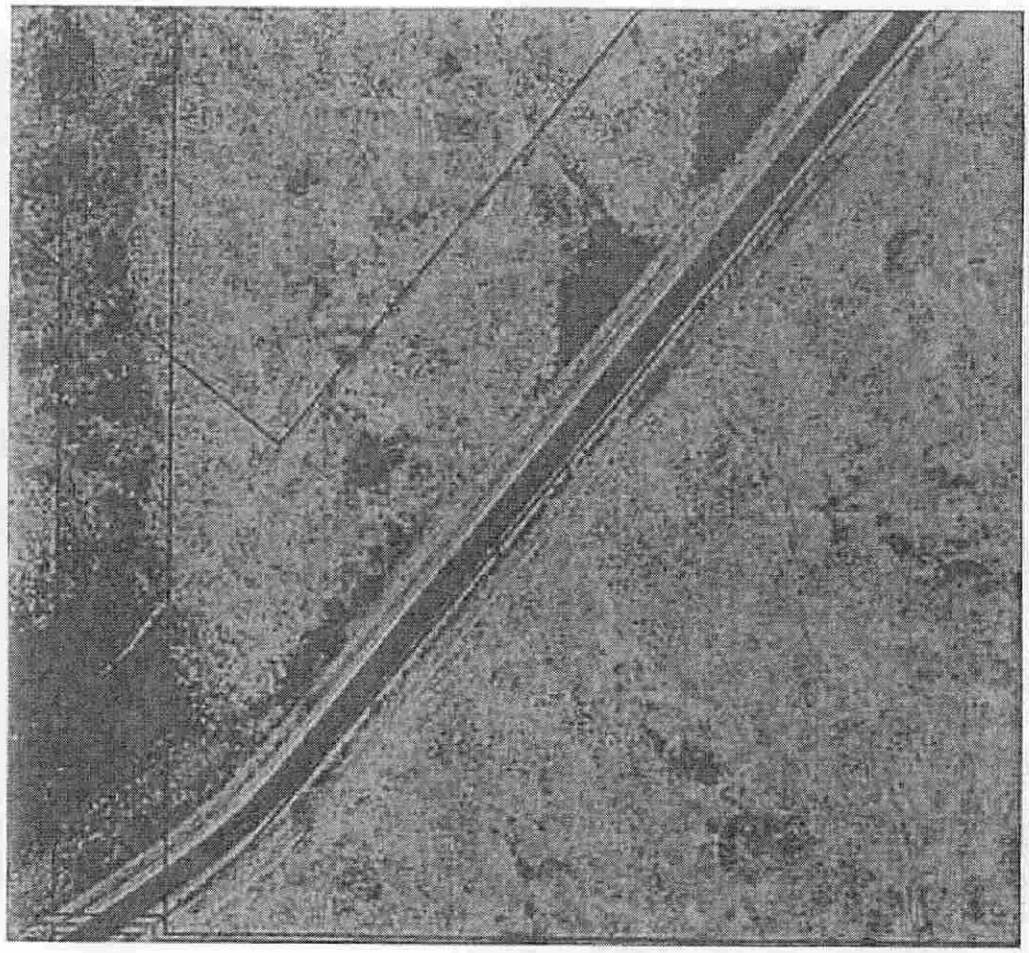
PARCELS
- Parcels

SUBDIVISIONS
- Sub. Boundaries
- Sub Poly

TRANSPORTATION
- Streets (MCDOT)
- Streets (ASSR)

COORDINATE FEATURES
- Sections

AERIAL PHOTOS - PREV. YEARS
- 2005 Aerial Photos



SCALE 1 : 6,296

500 0 500 1,000 1,500

FEET

N

T4N, R3W, SECTION 10, SW 1/4, SW 1/4

55-213204

PARCELS
- Parcels

SUBDIVISIONS
- Sub. Boundaries
- Sub Poly

TRANSPORTATION
- Abc Street Names
- Streets (MCDOT)
- Streets (ASSR)

COORDINATE FEATURES
- Sections

AERIAL PHOTOS - PREV. YEARS
- 2005 Aerial Photos

SCALE 1 : 3,622

200 0 200 400 600

FEET

N

T4N, R3W, SECTION 10, SW 1/4, SW 1/4, SW 1/4

55-213204

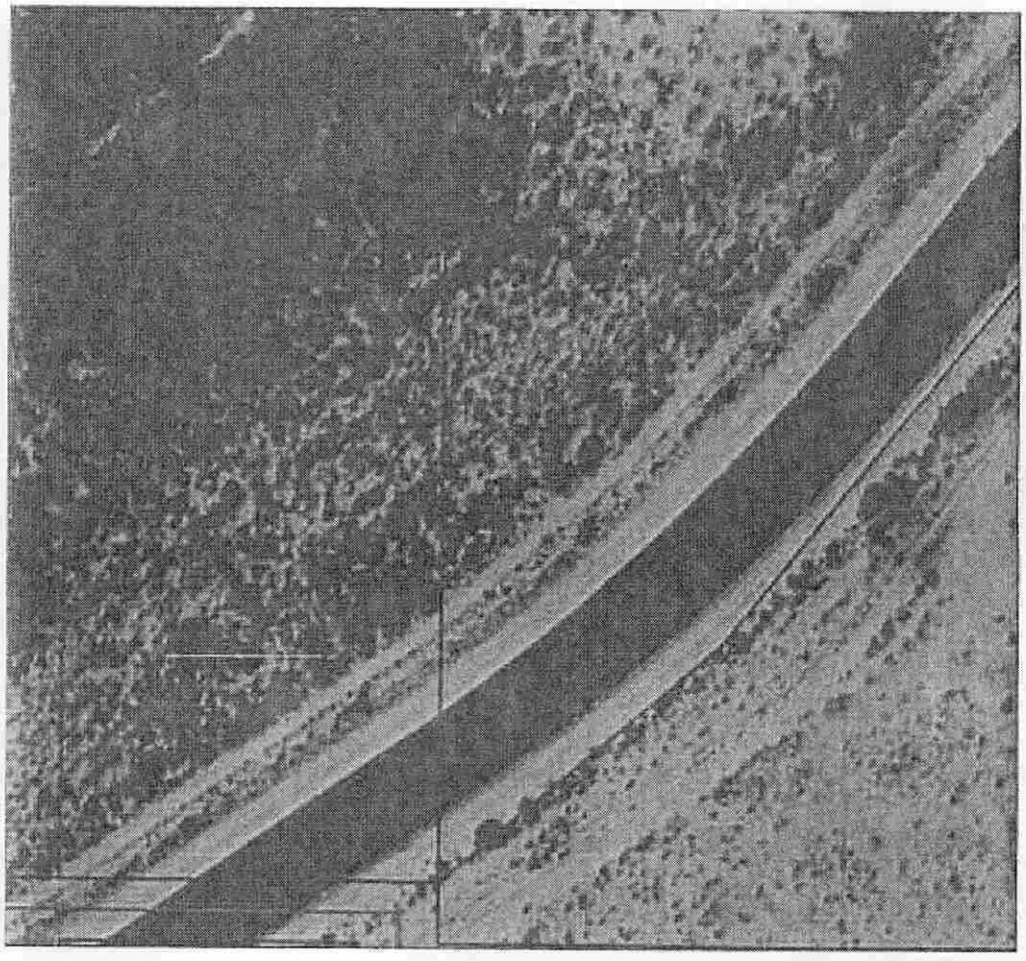
PARCELS
- Parcels

SUBDIVISIONS
- Sub. Boundaries
- Sub Poly

TRANSPORTATION
- Abc Street Names
- Streets (MCDOT)
- Streets (ASSR)

COORDINATE FEATURES
- Sections

'ERIAL PHOTOS - PREV. YEARS
- 2005 Aerial Photos



SCALE 1 : 1,861

100 0 100 200 300

FEET

N

Groundwater Rights within 3000 Feet of
Cadastral Location B040030100 00

09/12/06 Scale 1:10560

55-813204

0

09

10

11

- IRRIGATION RIGHT
- IRRIGATION NON-APPURTENANT
- TYPE 1 RIGHT
- TYPE 1 NON-APPURTENANT
- EXEMPT SMALL RIGHT
- EXEMPT SMALL GROUPING
- EXTINGUISHED SMALL GROUPING
- EXTINGUISHED/IRR RIGHT
- EXTINGUISHED/IRR NON-APPURTENANT
- EXTINGUISHED/TYPE 1 RIGHT
- EXTINGUISHED/TYPE 1 NON-APPURTENANT
- WITHDRAWN FROM IRRIGATION
- PARTIAL RETIRED/PARTIAL INACTIVE/DEVELOPED (SEE PLAT IN FILE)
- PARTIAL RETIRED/PARTIAL INACTIVE/DEVELOPED NON-APPURTENANT (SEE PLAT IN FILE)
- PARTIAL EXTINGUISHMENT/PARTIAL IRRIGATION RIGHT (SEE PLAT IN FILE)
- PARTIAL EXTINGUISHMENT/PARTIAL IRRIGATION RIGHT NON-APPURTENANT (SEE PLAT IN FILE)
- PARTIAL EXTINGUISHMENT/ PARTIAL TYPE 1 (SEE PLAT IN FILE)
- PARTIAL EXTINGUISHMENT/PARTIAL TYPE 1 NON-APPURTENANT (SEE PLAT IN FILE)
- PARTIAL EXTINGUISHMENT/PARTIAL INACTIVE/DEVELOPED (SEE PLAT IN FILE)
- PARTIAL EXTINGUISHMENT/PARTIAL INACTIVE/ DEVELOPED NON-APPURTENANT (SEE PLAT IN FILE)
- INACTIVE/DEVELOPED

ARIZONA DEPARTMENT OF WATER RESOURCES

Southwest Ground-water Consultants, Inc.

September 27, 2006

Ms. Darlene Sumpter-King
Arizona Department of Water Resources
Water Management Support Section- NOI Unit
3550 North Central Avenue
Phoenix, Arizona 85012

SUBJECT: KB HOME PERMIT FOR HYDROLOGIC TESTING PURPOSES – WELLS #55-213204 AND 55-213206

Dear Ms. Sumpter-King:

Please note that the driller selected to drill the above referenced wells (ADWR #55-213204 and 55-213206) needs to be changed from Arizona Beeman to ADT Drilling (ADWR License # 671, ROC License Category A-04).

If you have any questions please contact me at 602-955-5547.

Sincerely,

Southwest Ground-water Consultants, Inc.

Kevin Hebert, R.G.

3033 N. 44th Street, Suite 120
Phoenix, Arizona 85018
(602) 955-5547 Fax (602) 955-7585

Phoenix, Arizona
Prescott, Arizona

ARIZONA DEPARTMENT OF WATER RESOURCES
GROUNDWATER MANAGEMENT DIVISION
500 North Third Street - Phoenix, Arizona 85004-3903
Telephone 602-417-2470
Fax 602-417-2422

RECEIVED
AUG 18 2006
PHOENIX AMA

Buena Vista #6

NEW WELL CONSTRUCTION SUPPLEMENT (form DWR-55.9m)

Well Registration Number 55-213204
(FOR DEPARTMENT USE ONLY)

1. **Well Location:**

   SW ¼ of the SW ¼ of the SW ¼, Sec. 10, Township 4 N Range 3W.
   10AC 40AC 160AC

2. **Position Location of the Well:**

   Latitude 33 ° 41 ' 51 " Longitude 112 ° 33 ' 47 "

3. County Maricopa.

4. Date construction to start: September 2006.

5. Time period well will remain in use: Indefinitely.

6. Is pump equipment to be installed? Yes If so, design pump capacity: 1,500 GPM.

7. Well construction plan:

   a. Drilling method (mud rotary, hollow-stem auger, etc.) Reverse Rotary.

   b. Borehole diameters 36 inches from 0 feet to 39 feet.
      24 inches from 39 feet to 1,540 feet.

   c. Casing materials Copper Bearing Steel.

   d. Method of well development (bail, air lift, surge, etc.) Swab and airlift, pump and surge

   e. Will surface or conductor casing extend above grade? Yes.

8. Include a detailed construction diagram of the proposed well design. The diagram should verify consistency with minimum construction requirements specified in the Department's well construction rules found in Arizona Administrative Code (A.A.C.) R12-15-801 *et. seq.* Specifically, the diagram should include borehole diameters; casing materials and diameters; perforation intervals; the expected water level; depth and thickness of the surface seal; proposed grouting materials; and the length that the surface or conductor casing will extend above grade, or vault details, if specified. See Attached Diagram

9. Proposed materials and method of abandonment if well is to be abandoned after project is completed (Minimum requirements per A.A.C. R12-15-816):

   N/A

10. Is the proposed wellsite within 100 feet of a septic tank system, sewage disposal area, landfill, hazardous waste facility, storage area of hazardous material, or petroleum storage area or tank? _____Yes __X__No

11. Is this well to monitor existing contamination? ____Yes __X__No

Potential contamination?_____Yes ___X_No If yes, please provide explanation:_____

_____

_____

12. Will the proposed well be a replacement well in the same location (A.R.S. §§ 45-596 and 45-597, A.A.C. R12-15-840)? A replacement well is one located no more than 660 feet from the original well that it is replacing, and which is not expected to withdraw on an annual basis more groundwater than historical annual withdrawals from the original well. ____Yes __X__No

If yes then indicate the following:

(a) Record the registration number for the well that will be replaced: 55-_____

(b) Will the original well to be replaced be _____Capped, _____ Abandoned _____Other.

If Other, please explain: _____.

13. Name of Consulting firm, if any : Southwest Ground-water Consultants, Inc.

3033 North 44th Street, Suite 120	Phoenix	Az	85018
Address	City	State	Zip

Contact Person: Kevin Hebert Telephone Number (602) 955-5547

14. Drilling firm: Arizona Beeman Drilling

DWR License Number: # 360 ROC License Category: A-04

15. Special construction standards, if any, required pursuant to A.A.C. R12-15-821:_____

N/A

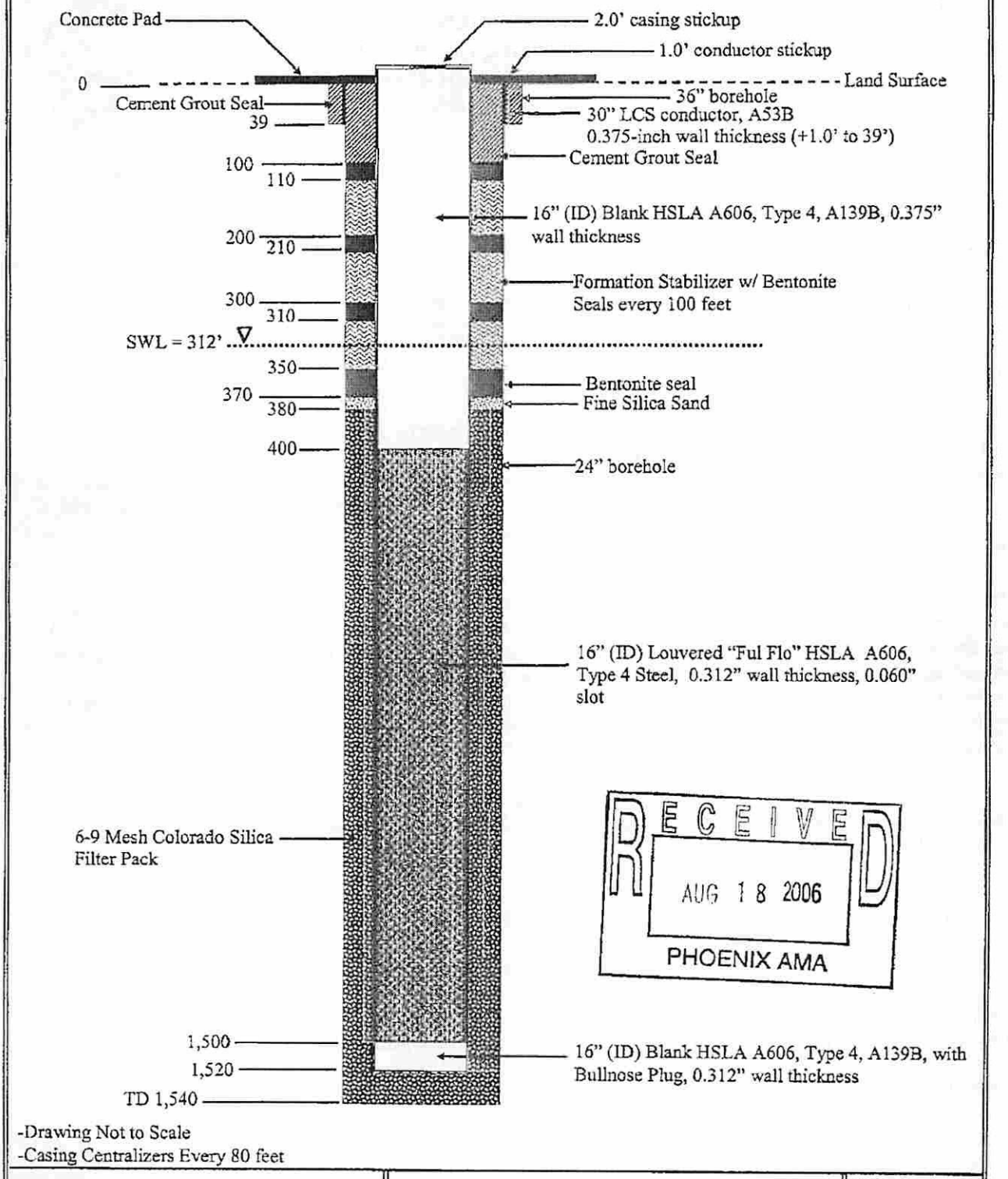
I (we), _____ hereby swear that all information provided in this application is true and correct to the best of my/our knowledge and belief.
(print name)

Signature of Applicant: Authorized Agent Date: 8/16/06

DWR-55-90 (Rev 9/02)

RECEIVED
AUG 18 2006
PHOENIX AMA

55-203204



RECEIVED
AUG 18 2006
PHOENIX AMA

-Drawing Not to Scale
-Casing Centralizers Every 80 feet

Southwest Ground-water Consultants, Inc. **August 11, 2006 Project B.1126**	**PRELIMINARY WELL DESIGN** **Maricopa County, Arizona**	**Figure**

COPY

ARIZONA DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT DIVISION
3550 North Central Avenue, Phoenix, Arizona 85012
Telephone 602-771-8585
Fax 602-771-8688

Janet Napolitano
Governor

Herbert R. Guenther
Director

October 11, 2006

FRI Surprise 398, LLC
c/o True West Companies
8700 East Via De Ventura
Scottsdale, Arizona 85258

RE: Permit to Withdraw Groundwater for Hydrologic Testing No. 59-213203.0000
Well Registration No. 55-213204; File No. B (4-3) 10 CCC

Dear Permittee:

Your permit as referenced above is enclosed for your records. Please be aware that the approval of this hydrologic testing permit does not constitute a commitment by the Department for the granting of a right to withdraw groundwater or converting the test well into a water production well. A site inspection is not required at this time; however, if you apply in the future to convert the hydrologic testing well into a water production well, a site inspection will be required at that time. During that site inspection, the Department will verify the location of the well.

Pursuant to the provisions of A.R.S. § 45-604, any person withdrawing groundwater from a well is required to use a water measuring device to record rates of withdrawal in order to provide or allow the computation of an annual volume of pumpage from the well. The total volume of pumpage shall be reported on an annual report. The first annual reporting period shall be from the date of issuance of this permit until the end of the year 2006, or the expiration date of the permit, whichever comes first. Additionally, within sixty (60) days upon completion of the hydrologic testing, the permittee shall provide the results of the test data to the Arizona Department of Water Resources, to Darlene Sumpter-King, Water Management Division office for evaluation.

Under A.R.S. § 45-593, the person to whom a well is registered must notify the Department of a change in ownership, physical characteristics or any other data about the well in order to keep the well registration records current and accurate. For future changes, a Request to Change Well Information form is enclosed.

The Department has issued this hydrologic testing permit pursuant to A.R.S. § 45-519.01 of the Groundwater Code. The legal nature of the water withdrawn from your well may be the subject of court action in the future as part of a determination of surface water rights in your area. If there are court proceedings that could affect your well, you will be notified and be given the opportunity to participate.

The permit has been issued by this Department without a hearing. As such, it is an appealable agency action. You are entitled to appeal and your rights are described in the enclosed notice of right to appeal.

If you have any questions about the permit, please call Sharon Ward of the Phoenix AMA office at 602-771-8585.

Sincerely,

Darlene Sumpter-King
Water Resource Specialist

Enclosures

cc: Kevin Hebert, R.G., Southwest Ground-water Consultants
Sharon Ward, Phoenix Active Management Area

COPY

ARIZONA DEPARTMENT OF WATER RESOURCES

PERMIT TO WITHDRAW GROUNDWATER FOR

HYDROLOGIC TESTING

PURSUANT TO A.R.S. § 45-519.01

PERMIT NO. 59-213203.0000

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

This is to certify that Application No. 59-213203.0000 meets the requirements of Title 45, Chapter 2, Article 7 for a Permit to Withdraw Groundwater for Hydrologic Testing. The Director hereby grants authority to construct and operate a well for hydrologic testing pursuant to A.R.S. § 45-519.01, subject to the following limitations and conditions:

Permit Limitations

Permittee:	FRI Surprise 398, LLC c/o True West Companies 8700 East Via De Ventura Scottsdale, Arizona 85258
Active Management Area:	Phoenix
Sub-basin:	West Salt River Valley
Authorized purpose of hydrologic testing:	To test aquifer transmissivity and ground-water quality

PERMIT NO. 59-213203.0000

Maximum Authorized Withdrawals: 12 acre-feet

Disposition of Groundwater: No Beneficial Use

Authorized Well Registration Number	File Number	Depth of Well	Casing Diameter	Casing Material
55-213204	B (4-3) 10 CCC	1540 feet	16 inches	Steel

Effective Date of Permit: October 11, 2006

Expiration Date of Permit: October 10, 2007

Permit Conditions

1. Within sixty (60) days upon completion of the hydrologic testing, the permittee shall provide the results of the test data to the Arizona Department of Water Resources for evaluation. Results shall be mailed to Darlene Sumpter-King, Phoenix Active Management Area, Arizona Department of Water Resources, 3550 North Central Avenue, Phoenix, Arizona 85012.

2. This approval for test wells and pump test does not constitute a commitment by the Department for the granting of a right to withdraw groundwater or converting the test well into a production well.

3. The well drilled for this project shall be drilled in compliance with the Arizona Department of Water Resources minimum well construction standards, A.A.C. R12-15-811.

4. The issuance of the permit does not waive any federal, state, county or local government ordinances, regulations or permits for which the facility may have to comply.

5. The permittee shall monitor withdrawals of groundwater and shall report the total amount of groundwater withdrawn on an annual water withdrawal and use report. The first annual reporting period shall be from the date of issuance of this permit through December 31, 2006, or the expiration date of this permit, whichever comes first.

WITNESS my hand and seal of office this 11th day of October 2006.

Sandra Fabritz-Whitney

Sandra Fabritz-Whitney, Assistant Director

COPY

From: Sharon Ward
To: Darlene Sumpter-King
Date: 9/14/06 11:53AM
Subject: FRI Surprise, Hydrotest App # 59-213203, Well # 55-213204

The Phoenix AMA recommends approval of the above-referenced application for Hydrologic Testing. There is no beneficial use as there are no GFR's in the area. The amount of groundwater to be withdrawn is 12 AF and the duration of the permit/drill card is 12 months.

Thank you,
Sharon

CC: J.Scott Miller; Jeff Tannler

ARIZONA DEPARTMENT OF WATER RESOURCES
HYDROLOGY DIVISION – TECHNICAL SUPPORT UNIT

MEMORANDUM

TO: Darlene Sumpter-King, Phoenix AMA
Scott Miller, Phoenix AMA

FROM: David Christiana
Technical Support Unit

DATE: September 14, 2006

SUBJECT: **Application for a Permit to Withdraw Groundwater for Hydrologic Testing Purposes**
Well 55-213204; Application 59-213203
Well 55-213206; Application 59-213205
FRI Surprise 398, LLC

Hydrology has reviewed the above referenced permits to withdraw groundwater for hydrologic purposes in the Phoenix AMA for water quality concerns and well construction for conformance to Arizona well construction standards.

Water Quality

1. The proposed wells are not in an area of known groundwater contamination that is being remediated pursuant to an U.S. Environmental Protection Agency, Arizona Department of Environmental Quality (ADEQ), or Department of Defense program.

2. No water quality data are readily available. Water quality data will be submitted pursuant to these permits.

Well Construction Standards

3. The proposed wells will be drilled to 1520 feet and screened from 400 to 1500 feet. The wells will be completed in the lower alluvial unit and will not cross any aquifer boundaries. No special well construction requirements are necessary.

The Hydrology WQARF Unit has no objections to approving this permit. If additional information is needed, please contact me at extension 1-8548.

From: Carol Norton
To: Sumpter-King, Darlene
Date: 8/29/06 12:16PM
Subject: 59-213203, 59-210205 FRI Surprise 398, L.L.C. Hydro Tests

The Hydrology Division, Water Resources Section, supports issuance of these permits and drill cards.
8/29/6

Carol Norton
Hydrology Division

CC: Ward, Sharon; Zachreson, Tana

COPY

ARIZONA DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT SUPPORT SECTION
MAIL TO: P.O. BOX 458, PHOENIX, ARIZONA 85001-0458
500 NORTH 3RD STREET - PHOENIX, ARIZONA 85004-3903
Phone (602) 417-2470 Fax (602) 417-2422

Buena Vista #6

APPLICATION FOR PERMIT TO WITHDRAW GROUNDWATER FOR HYDROLOGIC TESTING PURPOSES WITHIN AN ACTIVE MANAGEMENT AREA (A.R.S. §45-519.01)

I. INSTRUCTIONS

1. **COMPLETE ALL APPROPRIATE ITEMS ON THIS APPLICATION AND SIGN IN DESIGNATED PLACE.**
2. Mail to: P.O. Box 458, Phoenix, Arizona 85001-0458 or deliver in person to the above address.
3. Pursuant to A.R.S. § 45-113, the application fee is $50.00, and the permit fee is $50.00. You may submit both checks at the time of filing the application.

FOR DEPARTMENT USE ONLY
Application/Permit No. 59-213203
Rec'd 8/18/2006
AMA Phoenix
AUG 18 2006
B 04 W/S 06
OFFICE OF ASSURED WATER SUPPLY

RECEIVED
AUG 18 2006
PHOENIX AMA

II. GENERAL DATA

Please check one:
[X] New Application
[ ] Renewal or [ ] Modification of Permit No. 59-_____.

1. NAME OF APPLICANT_____

Mailing Address_____

City State Zip Code Telephone Number

2. NAME OF LAND OWNER where groundwater will be withdrawn FRI SURPRISE 398 L.L.C.
Mailing address c/o TRUE WEST COMPANIES, 8700 E. VIA DE VENTURA
SCOTTSDALE AZ 85258 480.315.8085
City State Zip Code Telephone Number

3. PURPOSE OF THIS TESTING PERMIT (check only one box):

[ ] To obtain groundwater samples not exceeding 3 acre feet per annum for testing groundwater quality in order to comply with applicable environmental controls for a period of up to 10 years (A.R.S. § 45-519.01.A.)

[ ] To test hydrologic characteristics and conditions, including groundwater quality. Groundwater withdrawn shall not exceed 10 acre feet nor shall the period of withdrawal exceed 90 days, (A.R.S. § 45-519.01.B.)

[X] To withdraw more than 10 acre feet of groundwater for hydrologic testing purposes, and/or for a period greater than 90 days include specifics of testing circumstances that require such withdrawal and/or period, (A.R.S. § 45-519.01.D.)

[ ] To withdraw groundwater to test the hydrologic characteristics of a potential artificial groundwater recharge project site, or a potential underground storage and recovery project site. The period of withdrawal may not exceed 2 years (A.R.S. § 45-519.01.E.)

4. Groundwater will be withdrawn within the West Salt River Valley sub-basin of the Phoenix Active Management Area.

5. The specific purpose for the hydrologic testing is: Test aquifer transmissivity and ground-water quality

6. Please be specific how the groundwater withdrawn will be put to beneficial use and the groundwater right number for that use if applicable. N/A

7. If applicant cannot reasonably put the withdrawn groundwater to a beneficial use or provide it to a rightholder, explain why. There are no right holders (irrigation rights, Type 1 or Type 2 non-irrigation rights) in the vicinity.

8. Legal description of land where groundwater will be used: Section 10, T4N, R3W

9. Name and mailing address of the owner of the land where groundwater will be used: Same as Number 1 above

Mailing Address	City	State	Zip Code	Telephone No.

10. Total amount of groundwater for which application is being made: 12 acre feet.

11. Anticipated duration of the hydrologic testing 90 Days 0 Months.

12. Requested duration of the hydrologic testing permit 0 Days 12 Months.

13. State the testing circumstances that require withdrawals in excess of 10 acre feet or a testing period for more than 90 days: Due to the potentially high yield of the well, withdrawals during testing may exceed 10 acre-feet, but not be greater than 12 acre feet.

14. Indicate the system by which the groundwater withdrawn for a test involving a potential recharge or storage and recovery project will be added back to the aquifer. N/A

15. Groundwater to be withdrawn by means of:

A. WELLS ALREADY IN EXISTENCE:

Registration No.	Location	Depth	Diameter of Casing	Case Type
55-				
55-				

B. WELLS TO BE NEWLY CONSTRUCTED:

Complete and attach New Well Construction Supplement, DWR form 55-90, for each new well to be drilled.

16. State your plans for the well(s) after testing is completed: The well may be converted for municipal use.

It is understood that the Permit, if granted, will be in accordance with the Groundwater Management Code (Title 45, Chapter 2). The permittee will be bound by the provisions of such law and the provisions of the Permit issued.

I (we) _____ hereby swear that all information provided in this application is true and correct to the best of my/our knowledge and belief.
(print name)

Signature of Applicant Otis Gordinier Authorized Agent Date 8/16/06

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AUG 18 2006
PHOENIX AMA

51901AP.doc rev 10/02

Southwest Ground-water Consultants, Inc.

RECEIVED
AUG 25 2006
PHOENIX AMA

August 24, 2006

Ms. Darlene Sumpter-King
Arizona Department of Water Resources
Water Management Support Section- NOI Unit
3550 North Central Avenue
Phoenix, Arizona 85012

SUBJECT: PERMITS FOR HYDROLOGIC TESTING PURPOSES – WELL LOCATIONS B(4-3)11 BCB AND B(4-3)10CCC

Dear Ms. Sumpter-King:

Please note that the Applicant for the above referenced permits should be the same as the listed Land Owner, which is FRI Surprise 398, LLC.

If you have any questions please contact me at 602-955-5547.

Sincerely,

Southwest Ground-water Consultants, Inc.

Kevin Hebert, R.G.

3033 N. 44th Street, Suite 120
Phoenix, Arizona 85018
(602) 955-5547 Fax (602) 955-7585

Phoenix, Arizona
Prescott, Arizona

ARIZONA DEPARTMENT OF WATER RESOURCES
WATER MANAGEMENT DIVISION
3550 North Central Avenue
Phoenix, Arizona 85012

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILL OPERATIONS

WELL REGISTRATION NO: 55-213204 **PERMIT NO.: 59-213203.0000**

AUTHORIZED DRILLER: ADT DRILLING **LICENSE NO: 671**

AUTHORITY TO DRILL A NON-EXEMPT WELL INSIDE THE PHOENIX ACTIVE MANAGEMENT AREA FOR HYDROLOGIC TESTING HAS BEEN GRANTED TO:

WELL OWNER: FRI Surprise 398, LLC 8700 E. Via De Ventura Scottsdale, AZ 85258

The well(s) is/are to be located in the:

SW¼ of the SW¼ of the SW¼ Section 10 Township 4 North Range 3 West

No. of well(s) in this project: 1

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE 10TH DAY OF OCTOBER 2007.

WATER MANAGEMENT DIVISION

THE DRILLER MUST FILE A LOG OF THE WELL WITHIN 30 DAYS OF COMPLETION OF DRILLING

Arizona Dept of Water Resources – Patty Curtis
PHOENIX AMA - CHECK DEPOSIT REQUEST

Date: August 28, 2006

Applicant: FRI Surprise 398, LLC .

Payment submitted by: Southwest Ground-water Consultants, Inc. .

Address on check: 3033 N. 44th Street #120 Phoenix, Arizona 85018

Application No. 59-213203.0000 & 55-213204

Code	Type of Fee:	Amount:	Check No.
55	Application for Well Permit **($150.00)**		
55	Well Permit Fee **($30.00)**		
58	Type I Conversion Request Flex Account Transfers **($100.00)**		
59	Application for Permit to Withdraw **($50.00 or $150.00)**	$50.00	10975
59	Withdrawal Permit Fee **($50.00)**	$50.00	10975
59	Conveyance of Groundwater Withdrawal Application and/or Permit **($35.00)**		
Gen Fund	Legal Noticing Fees **(Various)**		
55	Notice of Intent for Non-Exempt Wells **($150.00)**		

APPENDIX B

APPENDIX B

BUENA VISTA WELL #1 DAILY DRILLER REPORT FORMS

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: Thu DATE: 7-10-07
REPORT NO: 1
SHIFT: ✓ Day ____ Night

COMPANY: Southwest
PROJECT: Buena Vista
HOLE NO: # 1
RIG: 70K

JOB FOREMAN: MANDO SR
DRILLER: STORM
HELPER: JOSIAH
HELPER: [illegible]

DRILLER:
HELPER:
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
0			1000	2200	12hr	Back up Caller TRAILER To Rig Broke Apart REAMER & bit
						put 16' bit for pilot hole mix mud 3500 Compressor Down
						hooked up & using 40+ Compressor, 20' AIR line
						Fill Pits, WATER location, START To Pack down site with mud
						& A-B Gravel Fill yellow WATER TANK Full, circulate pit
						Fluids START Rotation of Rig 2130

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
1	16"	button		RIG TIME OPERAING		MAX Gel - 23 Bags
				STANDBY TIME		Poly Plus 2600 1 bucket
				AUX. AIR COMP		10 Trips to Fire hydrant
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES: Topped OF FRCT

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: WED. DAT. 13 May 07
REPORT NO: 2
SHIFT: _____ Day ✓ _____ Night

COMPANY: South West
PROJECT: Boring 11/15/19
HOLE NO: 1
RIG: 70K

JOB FOREMAN: MANDO C. SR.
DRILLER: STORM
HELPER: JOSIAH
HELPER: Derrick

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
60	93	33	7:00am	10:30am	12.5	Arrive on site Review Pass-vis. H/u hammer line Drill
						Pilot hole w/ 16" b/t & 70' PVC. P/M & Add 20' PVC
						Tot. 40' PVC. Continued water down & Pulling rod & cole
						H/u compressor (air) Blow ash to ship
93	148	55	1030	10		Arrive on site and Beeper Brought 10 bags of Soda Ash
						hook up Shot Shot line & test. Shot shot hole 3/4"
						off hand to Release Hole 4 times Pull Back to Kickoff hole
						C.P. with D.P. Tracker, Kelly Seal leaking, Fix pull up
						Rigup truck down, Flow in Spring time Low in Transmission 2 DP
						set a time with back hoe until Tie gear fixed, notified
						mechanic, sent someone out but never showed. Tighten up all
						hammer union on top of kelly & kelly hose, still leaks

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED Nights	Days
1	16"	Button		RIG TIME OPERAING		Max Gel 1	Max Gel 1/11
				STANDBY TIME		Soda Ash 1	Polymer Foam 1/2
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:

Mud Log [illegible]

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: Thur. DAT 25 July 07
REPORT NO: 3
SHIFT: _____ Day _____ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: #1
RIG: 70K

JOB FOREMAN: Mando CL SR
DRILLER: Cron Kins
HELPER: Dollek
HELPER: Josiah

DRILLER: Chris
HELPER: Frabe
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
148			22 [illegible]			Arrive on site Receive Pass-ons Drill pilot hole w/ 16" bit thru
						and 40' PVC. Mechanic on site. Grad tire on Pre-up truck
						Move D.P. Trailer in place. Pen Gravel around at hand. Observations.
	148	50'		[illegible]	22 hrs.	Added 40' PVC = 80' total
198'			10:30			Drilling 16" Pilot, cleaning up around job site, sprayings
	265'			22:00		Down location for dust control

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED Night	MATERIAL USED DAY
				RIG TIME OPERAING		MAX Gel - 1	Diesel - 2
				STANDBY TIME		Poly Plus - 1	5000 ASH - 1.5
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:

All - Safe

Diesel @ 11:00 952 hours
Crew @ 12:00, 13:25.
Vol @ 5:50 PM OK, Hyd. Pump OK, Comp. OK.

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: FRIDAY DATE 13 July 07
REPORT NO: 4
SHIFT: _____ Day _____ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: H1
RIG: 7K

JOB FOREMAN: MANUEL SR
DRILLER: Leon King
HELPER: DEREK
HELPER: JOSIAH

DRILLER: Chris
HELPER: Eddie
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
265'			22:00 p.m.			Arrive on-site - Receive Passions. Drill 16" Pilot hole w/
						200' PVC & CARB at 120' Work on Pull Down Table, water hauled
	303	38			12	site for Dust Control.
303'			10:00			DRILL 16" PILOT HOLE
				6:52		COMPRESSOR DIED. 907 RUNNING
			7:37	9:50		START DRILLING 16" PILOT
			9:50	10:20	12:20	PULL DOWN CABLE BROKE CALLED NATE HE SAID CUT IT
	369					CUTTING CABLE.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
						Alights
				RIG TIME OPERAING		Pull Down - 25 / Polymer /
				STANDBY TIME		Soda Ash /
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES: DAY - Fuel @ 11:00 / Rig 2 gallons / Comp - 1 gallon / Light Plant OK /
Fuel @ 9:00pm Rig OK / Comp OK / Light Plant OK /

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: Sunday DATE: [illegible]
REPORT NO: 16
SHIFT: _____ Day ✓ Night

COMPANY: Smith West
PROJECT: Buena Vista
HOLE NO: 1
RIG: 70K

JOB FOREMAN: Mario C. SR
DRILLER: Storm
HELPER: Derrick.
HELPER:

DRILLER: Chas
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
463			2200 hrs			Arrive on site. Receive Pass-ons. Drill 16" pilot hole w/
						7 20' PVC. Water air (Dust Control) Mark P.T. Run Survey
	508	45'		1000 hrs.	12	at 508'. (3/10°).
508			1000			Receive pass-ons. Drill 16" pilot hole w/ 280' AIR Line
				1230		Need more Diesel. Lost AIR line & Carburetor at 1230
			1330	1900		proceed to Fish out PVC w/ lock, proceed to Trip out pipe to
						find AIR line total 15 cable broke for elevator counter
						weight. Trip back in hole Fixed AIR line Carburetor on good
						need one needed, Fixed elevator counter weight
	535	27'	1900	2200	12hr	Drill 16" pilot hole.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	Work	MATERIAL USED	Days
1	16	hammer		RIG TIME OPERAING		Poly 7 20'd - 1	MAX Gel	11
				STANDBY TIME		Sodatol - 1.5		
				AUX. AIR COMP				
				AUX. MUD PUMP				
				WATER TRUCK				

COMMENTS / NOTES:
Greased Back hoe / Days
2 tubes Grease

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: Monday DATE 16 July 07
REPORT NO: 7
SHIFT: _____ Day ✓ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: 1
RIG: 70K

JOB FOREMAN: MANDO C. SR.
DRILLER: Storm
HELPER: ~~Derrick~~ DCRECK
HELPER: JOSIAH.

DRILLER: Chris
HELPER: GEORGE
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
535'			2200hrs.			Arrive on-site, Review Risk-ons Drill 16" pilot hole w/
						28" PVC. Problems w/ Compressor shutting down. Allowed to cool &
						spray down w/ water truck. Compressor Fixed. Swap out w/ GD250
	561'	26'		1930hrs	12.0hr	to SS 2500, then w/ SS2500 to 70K. Marked pit.
561	601	40'	1020	~~1400~~ 2200	11:40hr	Arrive, hook up 70 K Compressor to rig, check Fluids
						on everything, Compressor overheating let cool down START
						compressor again. Took Deck Panel off Compressor to
						help keep cool, sprayed Compressor down. Fill with water
						from ~~tank~~ water truck to Compressor Radiator.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED Nights / DAYS.
1	16"	bottom		RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK / DAYS		

COMMENTS / NOTES:

Filled light oil TANK almost empty
Rig oil — 2 qt
Compressor Fluid — 3 qts Compressor Fluid / add water to radiator

AM oil - oil - ok. All water to radiator

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: Tuesday DAT. 7 July
REPORT NO: 8
SHIFT: _____ Day ✓ Night

COMPANY: South West
JOB FOREMAN: MANDO C. SR.
DRILLER: Chris
PROJECT: Buena Vista
DRILLER: Steven
HELPER: Frank
HOLE NO: 1
HELPER: Derek
HELPER:
RIG: 90K
HELPER: JOSIAH.
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
600'			7:00 hrs.			Arrive on-site Review Ass-ms Drill 16" pilot hole w/
						7.8m' PVC. Survey 1.6° at 600' Results 4/10°.
	646'	45'		7:45 hrs	12.5 hrs	P.M. on Rig. Mudded Arts, Run Water.
646'	to		11:45			Drill 16" pilot hole 280' AFBT ROP, Survey 700'
	756	104'				Results 3/10° mucked pit. Run water!

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED: Nights	MATERIAL USED: Days
1	16"	Rotary		RIG TIME OPERAING		Soda Ash - .5 Sack	Soda ash ~~2.5~~ 3.5
				STANDBY TIME			mag gel - 1
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:
Rig on Pin - 79 hrs. oil / Rig/compressor 19.40 / gal total
Hydraulic ok / Compressor PM - 19 gal engine oil, 2 gal rear end oil

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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DAY: Wed. DAT: 8/24/07
REPORT NO: 9
SHIFT: _____ Day ✓ Night

COMPANY: South West
PROJECT: Buen Vista
HOLE NO: 1
RIG: 760

JOB FOREMAN: MANDO C. SR.
DRILLER: STORM
HELPER: Dereck
HELPER: JOSIAH

DRILLER: Chris
HELPER: OSWALDO
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
750			7:00 hrs			Arrive on site, Receive Ass-ons. Drill 16" pilot hole w
						~~16"~~ 780° Airline ~~Acted dry~~ lost air pressure. Tripped out
						Air. Found Broken airline. Replaced Airline. Tripped Air back in.
	775	25		7:00 hrs.	12 hrs	w/ Carb at 140' Water Run, Marked Pit
775	813	37'	1000			Arrive on site, Receive pass-ons Drill 16" pilot hole
						w/ 280° Airline / Carb at 140'; Survey 800' Resume 3/10°
						Weld on Rig to fix water leak on Gooseneck for kelly hose.
						Weld drill hold still leaks but called Foreman. Tripped pipe out hand
						drilling, lost AIRline. 2045 have to Fish it out, no luck
						need more pvc.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED Nights / Days
7	16"	Button		RIG TIME OPERAING		Rig Fuel - .5 Jug
				STANDBY TIME		Soda Ash - .5 sack
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:
PM - Rig - ✓ ok
Compressor - 1/2 gt. oil

DAILY DRILLING LOG:

Arizona
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A Morex Investments, LLC Company

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DAY: Thu DAT' 9 July 07
REPORT NO: 70
SHIFT: _____ Day ✓ Night

COMPANY: SouthWest
PROJECT: Buena Vista
HOLE NO: 1
RIG: 70k

JOB FOREMAN: Mando Sr.
DRILLER: Storm
HELPER: DeRede
HELPER: Tostah.

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
813	813	12	12:00AM	1200	12hr	Arrive on site Receive Pass-ons. Begin Cleaning for lost mine.
						Airline Gold out Fixed Pan on (D) side of wench.
						Straighted-out black cables Tripped- out all D.P. to
						collars.
413	930	17'	1000	2200	12hr.	Arrived on site Receive Pass-ons Take inspect Gooseneck
						weld on gooseneck, Bolt Gooseneck back together, Fix oil leak
						& Hydraulic leak In hoses Temp. need mechs to come replace them.
						tighten bolts up on seal Air leak, Fix seal, Turn compressor
						on to see if leak holds, START TO Trip D.P. in hole. Got
						34 1/2 D.P. Tripped In 260' AIR line - Cable 120'; Drill 16"
						pilot hole, mud ch in 1st P.T. to lower water level in casing
						to keep from flooding out the site.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	Nights	MATERIAL USED	DAYS
1	16"	Button		RIG TIME OPERAING			Soda Ash	1.5
				STANDBY TIME				
				AUX. AIR COMP				
				AUX. MUD PUMP				
				WATER TRUCK				

COMMENTS / NOTES:

16ft. out in Pr.

Rig motor on 2 gal.
Filled water truck - 1

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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DAY: Friday DAT 13 July 07
REPORT NO: 11
SHIFT: _____ Day ✓ Night

COMPANY: SouthWest
PROJECT: Buena Vista
HOLE NO: 1
RIG: 710K

JOB FOREMAN: Mando C. Sr.
DRILLER: STORM
HELPER: JOSTAH
HELPER: Dereck

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
830'	~~86~~		22 Hrs.			Arrive on-site. Receive Pass-ons. Drill 16" pilot hole w
						~~260~~ 260' pvc / CARB at 120'. Added Lube to rear diff on
						Back-Hoe. Inspected Air filter, notified Mechanic to see
						on ordering a new one. Added Hydrolic Fluid to Rig.
						P.M. on Rig - OK. P.M. on Compressor - O.K. Found Duff Hose (3")
	869'	39'		1015 hrs	12.15 hrs	on Trash-Pump (left side). Worked on new. Mando to bring out new hose.
869'	945	76'	1030	2200	11.5 hr	Arrived on site. brought pressure out to the pressure wash
						Day house, Rig & welder. Drill 16" pilot hole. Fuel arrive
						620 gals, Light all empty had to Fill up. Do hook up surershot.
						Survey 900' Results 3/10. Kelly swivel Leaking. Tighten down
						bolts. Grease. need bolts for swivel housing they broke off
						260' ATR pvc, 120' CARB. muck out Both pits and Turn out

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	Nights	MATERIAL USED DAY
1	16"	Button		RIG TIME OPERAING		Soda Ash - 1	half Bag Sock ash.
				STANDBY TIME		Poly Quick - 1	
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES: Kelly Seal still Leak after tighten up bolts & greasing.
1 water Run.

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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DAY: Saturday DAT 7 July 11
REPORT NO: 12
SHIFT: _____ Day ✓ _____ Night

COMPANY: South West
PROJECT: Bowen Vista
HOLE NO: 1
RIG: 40K

JOB FOREMAN: Mando C. Sr.
DRILLER: Storm
HELPER: Derek
HELPER:

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
945			2200hrs.	1400hrs		Arrive on site, Receive Passions. DO P.M. on Rig. Drill 16" pilot
						hole w/ 260' Pvc / CARB at 120'. H/up drash pump w/ and hose
						water/air. Work stuck bolts brought-out to fix swivel housing. Day Crew
						without bringing out new 5.70. Pin and elevators & sub for 25' pipe. H/up hose
	980P	35'		1000hrs.	12hrs.	~~Set Back Tools Prepare~~ from hydrant (Farmer water source).
980	1025	45'	1000	2200	12hr.	Arrive on-site. Receive Passions. Drill 16" pilot hole w/ 260' Pvc
						CARB 120'. Reworks bolts on 40" fix swivel housing
						p.m. Rig & compressor change out Grease cups on swivel fix oiling
						~~Event~~ Re-tighten Bolts on swivel seal. Drove still looks as if to
						be Bent-Tucker, Survey 1020' Results Pin, change parking
						and drive age n Need new 4" Seal for bottom of between
						Kelly pipe and swivel. Measure new D.P. Delivered to Day.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
1	16"	bottom		RIG TIME OPERAING		DAY
				STANDBY TIME		Sale Ach - 1
				AUX. AIR COMP		MAX Gel - 2.
				AUX. MUD PUMP		Potassium PAK - .5
				WATER TRUCK		

Shut down 4:11
Further work.

COMMENTS / NOTES:
PM's - Rig - OK
Cutting - 1½' cobble

DAILY DRILLING LOG:

Arizona
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DAY: Sunday DATE: 7 July 07
REPORT NO: 13
SHIFT: _____ Day ✓ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: 1
RIG: HR

JOB FOREMAN: Mando C. Sr.
DRILLER: Storm
HELPER: Derek
HELPER: JOSIAH

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1025	1025	0	22 hrs	1000	12hr	Arrive on-site. Review Pass-downs. View Bottom Seal leaking.
						Hours without start in days. Notified Mando (left message) and Abe
						(left message). Notified Sergio - said we may have to take a point and bring in
						Circulate and Power wash rig. Standby - By for further Info.
						Begin Trip-out of Active and all D.P. up to collars. Prep for Break-
						down / take in Swivel. (Pin prime to start-up/ac - add 1000 gal. water at ac.
1025	1025	0	1000	1900		Arrive on site, trip out of hole D.P. all but 6 D.P.
						were already on D.P. trailer when we arrived on site
						Break & secured off. Pick up Tools & loaded up Swivel
						to take back to shop.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
1	16"	Button		RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

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DAY: Wed DAT 15 Jul 07
REPORT NO: 14
SHIFT: ✓ Day ____ Night

COMPANY: Southwest
PROJECT: Buena Vista
HOLE NO: # 1
RIG: 70K

JOB FOREMAN: MANDO SR
DRILLER: STORM
HELPER: Derek
HELPER: [redacted] JOSIAH

DRILLER:
HELPER:
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
0	0	0	1000	2200	12 hr	Arrive on-site, [redacted] Repair, [redacted] swivel, Trip to all D.P.
						hook up Trash pump, get compressors from 2500, Hook up
						to rig, get some more tools from other Rig, Rig up for 25'
						D.P. pull Rig truck + trail out of way, make list of
						missing tools to give supervisor, Fill gas cans, Clean up
						Dog house, need new Dog house door, Trip 45 pieces of
						D.P. In hole, Spinners have leak around hydro Fittings
						need new pull down cable, measured V-saver - Sub - 1'
						Drill pipe, got bolts for swivel housing, bolted steel swivel
						[redacted] tube back to swivel, put new hose for Diesel tank
						on. [redacted] cleaned up location.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
1	16"	Button		RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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DAY: Thursday DATE: 6 July 07
REPORT NO: 15
SHIFT: _____ Day ✓ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: #7
RIG: 700

JOB FOREMAN: Mando C. Sr.
DRILLER: Storm
HELPER: Dereck
HELPER: Josiah.

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1025'			22 hours			Arrive on site, receive Pass-ons. Finish re-work Pipe connection
						Connect new subs (for larger O.D.). Trip in 300' Pipe w/ cones
	1041'	16'		10 hrs.	12 hrs	@ 1410' Initiate drilling @ 1025'
1041'	1089	48	1000	2200	12 hr.	Arrive, speed up drilling, clean up site level ground,
						make waterway, tighten up top seal on overhead Drive on swivel
						measure new 25' D.P., muck pit Add clean water viscosity
						needs to be lowered. Drilling threw granite clean off goose neck
						trailer, pick up trash load in pickup to transport to shop
						4 25' left on ground, tighten up bolts on swivel. Fill water truck
						wash off Deck & Bushing has hydrolic leak need new hose &
						Fittings.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	Nights	MATERIAL USED	DAY
1	16"	button		RIG TIME OPERAING		Poly Vinyl - 7	Soda Ash - 7#	
				STANDBY TIME				
				AUX. AIR COMP				
				AUX. MUD PUMP				
				WATER TRUCK			10 pumps of Grease In Fittings	
							on swivel every connection	

COMMENTS / NOTES:
Nights- PM Rig - 24 hrs, Water in Pitts / Manpower - 1.5 Safe approx.

DAYS Fill up Light plant.
P.M Rig ok
Compressor ok

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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DAY: Friday DATE: 13 July 07
REPORT NO: 16
SHIFT: _____ Day ✓ Night

COMPANY: Southwest
PROJECT: Rincon Vista
HOLE NO: #1
RIG: KBR

JOB FOREMAN: Mando C. Sr.
DRILLER: Storm
HELPER: Darrell
HELPER: Josiah.

DRILLER: Chris
HELPER: Gerber
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
7089			2200 hrs			Arrive on site. Review Pass-ons. Continue drill pilot hole - 8½"
						w/ 3000' gyro / carbon at 7416'. Lost Acline. Found & retightened.
						Resume drill pilot hole. Swivel leaking, extremely bad, even
						after greasing & tightening. Mando notified and Sergio called (left message).
						After short line, leak worse. Mando & Sergio arrived. Sergio's
						on way out to site. Work on mud clean-up. Sergio arrived 1900
						(Mando left hrs. Ok'd day - long out to SSZ500 - also returned (left to
						P/U). Changed-out seal (Swivel). Changed-out grease-seal. At time-
	1107	7		1000 hrs	12 hrs	Heavy mud leaking
1107	1114	7	1000			Helper on site. Fix leak, Add D.P. Continue Drill 11" pilot hole
				@1300		AIR line busted (1300). Build Fishing tool. Mando Brought
			1300	2200	12 hrs	G-D 2500 fishing tool + Acline, NATE shut 7th down to take

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
						Nights: 23' DP on lower work DAY
				RIG TIME OPERAING		Daily zero - 1/4
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:
Nights -
DM-6 - Gallon engine oil / water added to radiator // 1000 gal

P.M. Rig

P.M. Compressor

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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DAY: SAT DAT: 8-July-07
REPORT NO: 17
SHIFT: ✓ Day ____ Night

COMPANY: Southwest
PROJECT: Buena Vista
HOLE NO: #1
RIG: 70k

JOB FOREMAN: Mando SR
DRILLER: Storm
HELPER: Dereck
HELPER: JOSIAH

DRILLER:
HELPER:
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			1000	2200	12 HR	Brought out more 20' D.P. Trip out D.P. from hole
						Fish for air line. Back Tractor TRAILer up to Rig.
						Set up for tripout, 39 D.P. pulled. 320' AIRline.
						Tighten all AIR line Cuplings & Put off to side, Set up for trip
						D.P. Back in hole.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
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DAY: Sunday DAT 9 July 07
REPORT NO: 18
SHIFT: _____ Day ✓ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: #7
RIG: 70K

JOB FOREMAN: MANDOC. SR.
DRILLER: Storm
HELPER: Deseric
HELPER: JOSIAH.

DRILLER: Chris
HELPER: GEORGE
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1114'			2200hrs			Arrive on-site, Receive Pass-ons. Continue Trip-in d.P.
						and Pk. Trip-in D.P. up to 7083 (48 stands) &
						Airline up to 2000' (Probs breaking off subs from drilling
	1114'			2200hrs.	12	D & nw.) & Casb set at 1140'
1114			1000			Arrive on site - get Pass-ons, Put 1½ D.P in hole
						add 60' AIRLINE TOTAL 260' casb set at 1140'
						Drill 16" pilot hole RALPH showed on site (at 1945)
						Left site (at 2015) Spinners Found broken when hooked
						to make connection. RALPH ~~from~~ Driving back and
						Forth between 70K Rig & 40T. Keep at slow speed
	1140'	26		2200hrs.	12	Back out Torque & Down Pressure

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED Nights	DAY
1	11	Liaton		RIG TIME OPERAING			
				STANDBY TIME			
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:
PM on Rig - OK.
rama out ✓

DAILY DRILLING LOG:

Arizona
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DAY: Monday DAT 30 June of 07
REPORT NO: 19
SHIFT: _____ Day ✓ Night

COMPANY: South West
PROJECT: Buena Vista
HOLE NO: #9
RIG: 760

JOB FOREMAN: Manuel C. Sr.
DRILLER: Storm
HELPER: Sean
HELPER: JOSEPH

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1140			7:00 am			Arrive on site, Receive Pass-on. Drill pilot hole - 16", w/
	1198	58'		7:00 am	72	PDC @ 760'/CARB @ 940'. Mark Pit' Pelief hole,
						D/G supplies. MARKED Kelly reared & started circulation.
						Was notified via Manuel that Geo should be out today to insert
						pulleys. Helper left for approx 2 hours to assist on WOT.
1198	1203	5	1015	[redacted]		Arrived on-site. Brought supplies. START Drilling 16" pilot
						hole, Brought oil, hydraulic line, soda ash, manuel
						Reboured Dolfo from AL to hold on Drill to just circulate
						until Geo arrives and AL gives go ahead. Geo showed
						on site 1230 collect samples, AL called Trip out hole
						Sol check bit. set up For Trip-out. START to pull Pipe out
						of hole. AL called 1330 START to trip out. Manuel showed

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED: Night	MATERIAL USED: DAY
1	16"	Button		RIG TIME OPERAING		1/2 sack Soda Ash	1/2 soda ash
				STANDBY TIME		1/4 Tank of Poly Foam	1 Jug of Poly Foam
				AUX. AIR COMP			1/2 gallon of oil to Comp
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:
Pre-Rig - 1gal motor oil, Coolant ok
Comp. - 2gals. Comp oil, 5gals. compressor fluid

1500 lbs at torqued pin

Manuel

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
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DAY: MONDAY DAT 30 July 07
REPORT NO: 19
SHIFT: _____ Day ✓ _____ Night

COMPANY: S. W.
PROJECT: Buena Vista
HOLE NO: #1
RIG: 70K

JOB FOREMAN: MANDO SR
DRILLER: STORM
HELPER: SEAN
HELPER: JOSIAH.

DRILLER: Chris
HELPER: George
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
	1203			2200	11.5	grabed storm took back to shop to pick up 12" drill collar
						Storm Arrived back on site 2100 start to Trip out D.P.
						again, Tripped out 31 D.P.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

#2

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DATE: ~~DAY:~~ 31 July 07 DAY ~~DATE:~~ Tuesday

REPORT NO: 24

SHIFT: _____ Day _____ Night

COMPANY: South West

PROJECT: Buena Vista

HOLE NO: #1

RIG: Air

JOB FOREMAN: MANDO

DRILLER: _____

HELPER: _____

HELPER: _____

DRILLER: Chris

HELPER: George

HELPER: _____

APPROVED BY: _____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1203			22 Hrs.			Arrive on-site, Review PASS-ONS. Do PM on Rig - V'Sout ok. (Water and oil)
						Begin trip-out of D.P. (Borrowed helper from 40-T.).
						Replaced Broken Break-out RAM CABLE. 8 PM. on rig -
	1203					Approx. 1½-2 gal. water to radiator. Noticed that when finish!
						trip, to begin prep for Rig-down and move.

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SAT DATE: 1-18-07
REPORT NO: 7
SHIFT: ✓ Day ____ Night

COMPANY: ____
PROJECT: BUENA VISTA RANCH
HOLE NO: H 1
RIG: SS-2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO. O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: ____
HELPER: ____
HELPER: ____
APPROVED BY: ____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			10:00			HAUL WATER SET UP FOR DRILL
0	837'			22:00	12 HR	TRIP IN HOLE W/ 16" BIT

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		POLY 1A
				STANDBY TIME		SODA 1
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SUN DATE: 9-19-07
REPORT NO: 2
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: #1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS-M
HELPER: MEMO.R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
837'	1026'	189	22:00	10:00	12 HR	REDRILL HAUL WATER W/16" BIT
1026'	1185'	159'	10:00	14:00	4 HR	CLEAN HOLE BACK FILL
1185'	1265'	80'	14:00	22:00	8 HRS	DRILL 16" PILOT HOLE R.C

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED DAYS	NIGHT
				RIG TIME OPERAING		POLY 1	POLY - 1
				STANDBY TIME		SODA ASH 1	SODA ASH - 1
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

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PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: MONDAY DATE 3-20-07
REPORT NO: 3
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: # 1
RIG: CS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS M
HELPER: MEMO.R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1265'	1370		22:00	3:00		DRILL 16" PILOT HOLE R.C
		105'	3:00	10:00	12 HR.	SURVEY @ 1310' DEGREES 5/10.
1370'	1466	96'	10:00	22:00	12 HR	DRILL 16" PILOT HOLE (R.C) SURVEY -4 @ 1405'

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED DAYS	NIGHT
				RIG TIME OPERAING		POLY 11	Poly Plus - 11
				STANDBY TIME		SODA ASH 1	Soda 1/2
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			SERVICE AT 7:00 AM
							R.6-(1 QT) A Comp- (ok)
							GEN. (OK)

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: TUES DATE: 2/ /07
REPORT NO: 4
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO-D
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS W
HELPER: MEMO R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1466'	1522'	56'	22:00	6:25	7:25 HR	DRILL 16" PILOT HOLE RC
			6:25	7:45		CIRCULATE CLEAN PITS SURVEY AT 1520 - 4/10
			7:45	10:00	2 HR	START TRIP OUT HOLE
			10:00	12:30	2.5 HR	TRIP OUT OF HOLE W/ 16" BIT
			12:30	14:30	2 HR	WAIT FOR LOGGER
			14:30	22:00	7.5 HR	LOGGING HOLE

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: WED DATE: [illegible]
REPORT NO: 5
SHIFT: ✓ Day ____ Night

COMPANY: ____
JOB FOREMAN: NATE LITTLE
DRILLER: CRIS M
PROJECT: BUENA VISTA RANCH
DRILLER: MO.O
HELPER: MEMO.R
HOLE NO: 1
HELPER: ANGEL
HELPER: ____
RIG: SR 2500
HELPER: ____
APPROVED BY: ____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
0'	1291	[illegible]	[illegible]			START TRIP IN SAMPLE TOOL FOR WATER [illegible]
				[illegible]		#1
			10:00	11:30	1.5 HR	TRIP IN 4 JOINT D.P TO SET UP FOR ZONE SAMPLE
			11:30	15:30	4 HR	START BUILD ZONE SAMPLE
			15:30	16:30	1 HR	LET HIDRATE TOP SEAL
			17:30			AIR LIFT DEVELOPMENT ZONE #1 @ 1398' W/750 CFM

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		9 3/4 YARDS GRAVEL [illegible]
				STANDBY TIME		16 BAGS BENT CHIPS [illegible] OK
				AUX. AIR COMP		[illegible] OK
				AUX. MUD PUMP		[illegible] OK
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: TUE DATE: 23-07
REPORT NO: ✓
SHIFT: ✓ Day ✓ Night

COMPANY:
JOB FOREMAN: NATE LITTLE
DRILLER: CRIS M
PROJECT: BUENA VISTA RANCH
DRILLER: MO-O
HELPER: MEMO-R
HOLE NO: /
HELPER: ANGEL
HELPER:
RIG: SS 2500
HELPER: JOSIAH
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			22:00			AIR LIF DEVELOPMENT ZONE #1 @ 1392' W/750 CFM
				9:15	9.15 HR	GEOLOGIST GOT WATER SAMPLE
						PREPARE ZONE #2 - 1240
			10:00	11:15	1.15	TRIP OUT 7 JOINTS AND TRIP IN 2 JOINTS TO NEXT ZONE
			11:15	14:45	3.30	START BUILD ZONE #2
			14:45	16:00	1.15	LET HIDRATE TOP SEAL
			16:00	22:00	6 HR	AIR LIFT DEVELOPMENT ZONE #2 @ 1240' C.T W/750 CFM

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		9½ YARDS GRAVEL
				STANDBY TIME		26 BAGS BENT CHIPS
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: Friday DATE 7-24-07
REPORT NO: 7
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: Buena Vista Ranch
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: Nate Little
DRILLER: Mo.O
HELPER: Angel
HELPER: —

DRILLER: Cris. M
HELPER: Memo. R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			22:00			AIR LIFT DEVELOPMENT ZONE #2 @ 1240' CT
				8:00	10 HR.	W/750 CFM - 640' AIRLINE - 1½
			8:00	10:00	2 HR	TRIP OUT AIR LINE NEXT ZONE #3 - 1090' CT
			10:00	14:00	4 HR	START BUILD ZONE #3
			14:00	15:30	1.5 HR	LET HIDRATE TOP SEAL
			15:30	22:00	6.5	AIR LIFT DEVELOPMENT ZONE #3 @ 1092 C.T W/750 CFM

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		8½ YARDS GRAVEL
				STANDBY TIME		26 BAGS BENT CHIPS
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SAT DATE 2507
REPORT NO: 8
SHIFT: _____ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO:
RIG: SS 2500

JOB FOREMAN:
DRILLER:
HELPER:
HELPER:

DRILLER: CRIS. M
HELPER: MEMO. R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			22:00			AIR LIFT DEVELOPMENT ZONE #3 @ 1092' CT
						W/750 CFM- 640' AIR LINE 1½
				5:00		GEOLOGIST GOT SAMPLE #3 - 1092' CT
			5:00	8:30		START ZONE #4 - 988' CT
			8:30	10:00	12 HR	LET HIDRATE TOP SEAL + RUN- 800' AIR LINE
			10:00	11:00	1 HR	ADD MORE A. LINE
			11:00	22:00	11 HR	AIR LIFT DEVELOPMENT ZONE #4 988 CT

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS
				RIG TIME OPERAING	
				STANDBY TIME	
				AUX. AIR COMP	
				AUX. MUD PUMP	
				WATER TRUCK	

MATERIAL USED NIGHT
7 YARD GRAVEL.
27 BAGS BENT SEAL.

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SUND DATE: 26-07
REPORT NO: 9
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 3500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: —

DRILLER: CRIS. M
HELPER: MEMO.R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			22:00	11:30		AIRLIFT DEVELOPMENT ZONE #4 988 CT- 640 AIRL-
			11:30	4:30		LET HIDRATE BENT SEAL ONTOP
			7:30	10:00	12 HR.	AIR LIFT DEVELOPMENT ZONE #5 808'
			10.00	20:00	10 HR	AIR LIFT DEVELOPMENT ZONE #5 @ 808' w/ 750 CFM COMP
			20:00			TRIP OUT TO NEXT ZONE

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
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PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: MOND DATE 3-27-07
REPORT NO: 10
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: —

DRILLER: CRIS.M
HELPER: MEMO.R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			22:00	10:00	12 HR	TRIP IN AIR LINE PICK UP TRASH LOAD COSENECK
			10:00	13:30	3.5 HR	WAIT FOR GRAVEL CLEAN JOB SITE AND CHANGE OIL ON
			13:30	16:00	2.5	START BUILD ZONE #6" RIG BLUE COMPR
			16:00	17:30	1.5 HR	LET HIDRATE TOP SEAL
			17:30	22:00	4.5 HR	AIR LIFT DEVELOPMENT ZONE #6 @ 699' C.T W/750 CFM COMPR

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		36 BAGS BENT CHIPS
				AUX. AIR COMP		7 1/4 YARD GRAVEL
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: TUESDAY DATE: 28-07
REPORT NO: 11
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO. O
HELPER: ANGEL
HELPER: —

DRILLER: CRIS M
HELPER: MEMO R
HELPER:
APPROVED BY:

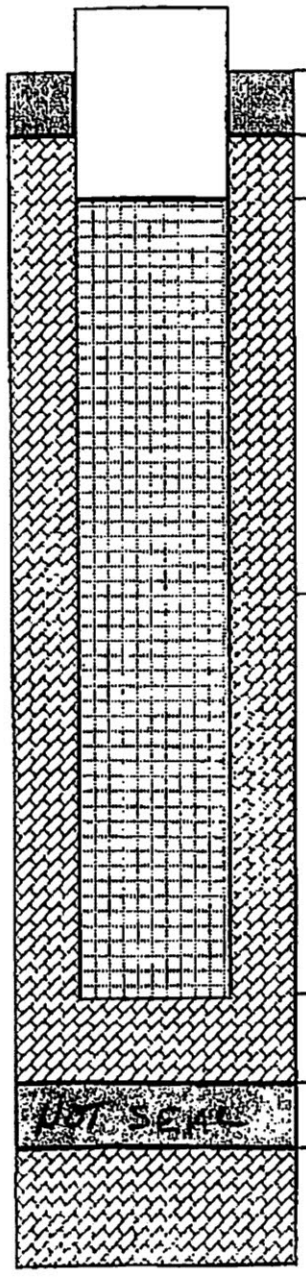
INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			22:00			AIRLIFT DEVELOPMENT ZONE #6 @ 699' CT
				2:00	4 HR	W 750 CFM COMPRESSOR 600' AIRLINE 1½
			2:00	7:30		TRIP OUT AIRLINE AND DRILL PIPE NEXT ZONE #7
			7:30	10:00	2 HR	AIRLIFT DEVELOPMENT ZONE #7 @ 556' - (520') AIRLINE
			10:00	21:00	11 HR	AIR LIFT DEVELOPMENT ZONE #7 " " "
			21:00	22:00		TRIP OUT A.L

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

Zonal Samples (1408 - 1388)

Date: 8·22·07 Zone: #1 Depth: 1398 CT

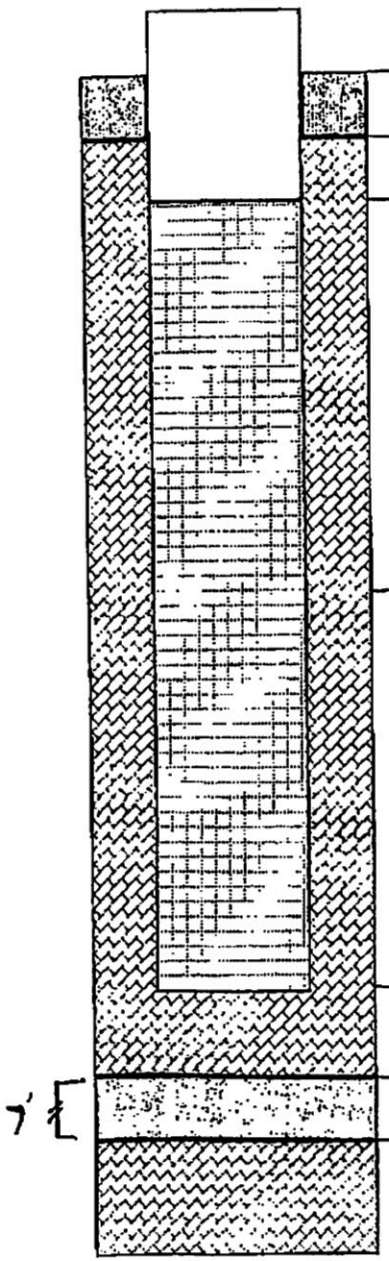


Zonal Water/Gravel Log

Time	Temp	MS	PPT	PH	Bag #	Tagged	Tot Gain

Zonal Samples (1250 - 1230)

Date: 8-23-08 Zone: #2 Depth: 1240. CT



Top of Seal

1214 Top of Gravel

1230 Top of Screen

6 YARDS GRAVEL FROM
1371' TO 1284 = 87'
1 YARD GRAVEL FROM
1284 TO 1266' = 18'
10 BAGS BENT CHIPS
FROM 1266' TO 1259' = 7
1 1/2 YARD GRAVEL FROM

1240' Center of Screen

1259' TO 1245 = 14'
1 YARD GRAVEL FROM
1245' TO 1214' = 31
16 BAGS BENT CHIPS FROM.
1214' TO 1193 = 21

1250 Bottom of Screen

1259 Bottom of Gravel

7' Bottom of Seal

1381'

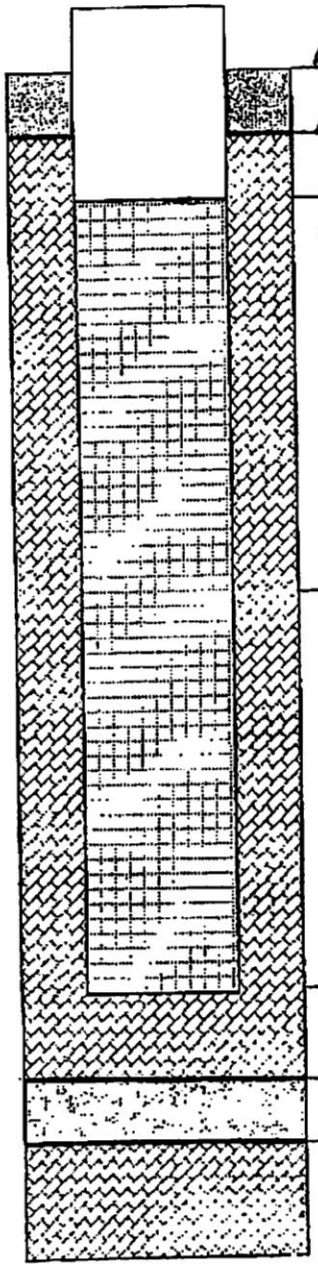
Zonal Water/Gravel Log

Time	Temp	MS	PPT	PH	Bag #	Ta	Td Gal

Zonal Samples

(1102 TO 1082

Date: 8-24-07 Zone: #3 Depth: 1092 CT



1051' Top of Seal

1066' Top of Gravel

1082 Top of Screen

4 1/2 YARDS GRAVEL FROM 1218' TO 1136' = 82'

1 YARD GRAVEL FROM 1136' TO 1125 = 11

1 YARD GRAVEL FROM 1125' TO 1109'

1092' Center of Screen

BAGS BENT CHIPS FROM 1109' TO 1105' = 4

1 1/2 YARD GRAVEL FROM 1105' TO 1080' = 25

1/2 YARD FROM 1080' TO 1066 = 14

18 BAGS BENT CHIPS FROM 1066' TO

1102 Bottom of Screen

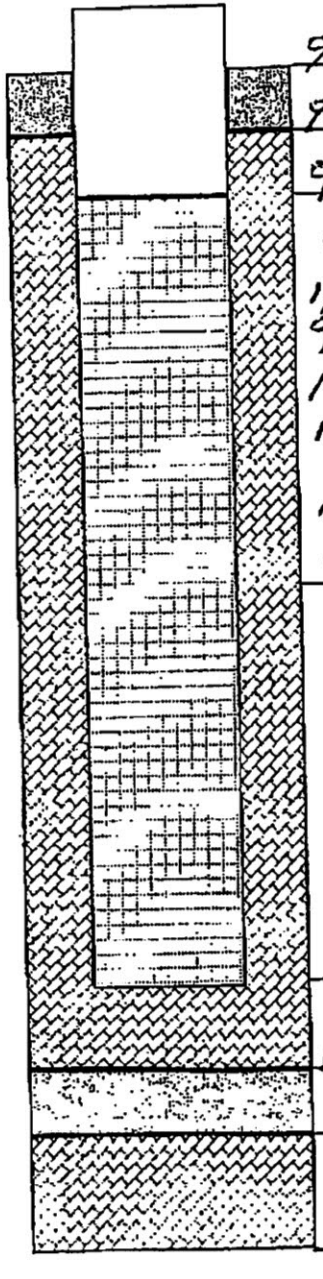
1105' Bottom of Gravel

1109 Bottom of Seal

Time	Temp	MS	PPT	PH	Bag #	Tagged	Tal C

Zonal Samples

Date 8-25-07 Zone: # 4 Depth 988 CT



954 Top of Seal

968 Top of Gravel

978 Top of Screen

4 ½ YARD GRAVEL - FROM 988 TO 1013 = 25'
8 BAG OF BENT SEAL - 1009' = 4'
1 YARD GRAVEL FROM - 1009 TO 986 = 23'
1 YARD GRAVEL FROM 986' TO 968' = 18'
19 BAG BENTSEAL FROM 968' 954' = 14'

988 Center of Screen

998 Bottom of Screen

1008 Bottom of Gravel

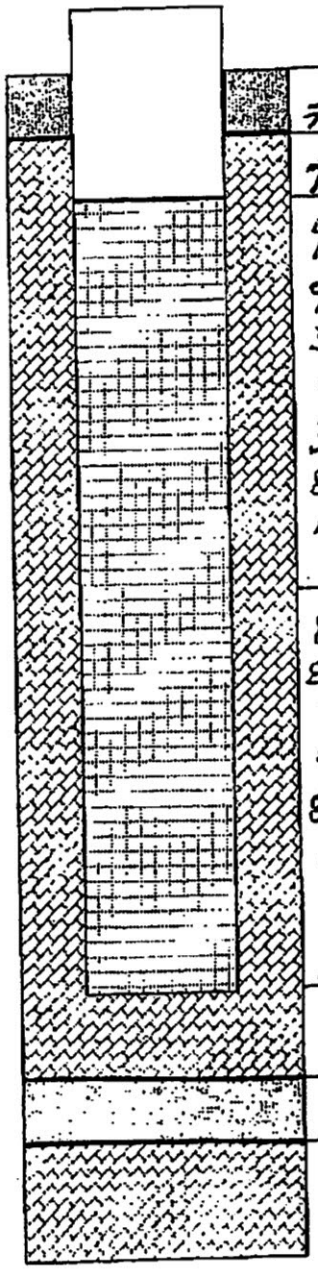
1013 Bottom of Seal

1088'

Time	Temp	MS	PPT	PH	Bag #	gged	Tel G

Zonal Samples

Date: 08-26-07 Zone: #5 Depth: 808' CT



Top of Seal

788' Top of Gravel

798' Top of Screen

4 YARD GRAVEL FROM
965' TO 906' = 59'
3 YARD GRAVEL FROM
906' TO 881' = 25
3 YARD GRAVEL FROM
881 TO 845 = 34
1 YARD GRAVEL FROM

808' Center of Screen

845' TO 833 = 12'
8 BAG BENT SEAL ON BOTTOM
833' TO 828' = 5
2 YARD GRAVEL FROM
828' TO 783' = 45'
18 BAGS BENT TOP SEAL
788 TO 775 = 13'

818' Bottom of Screen

828' Bottom of Gravel

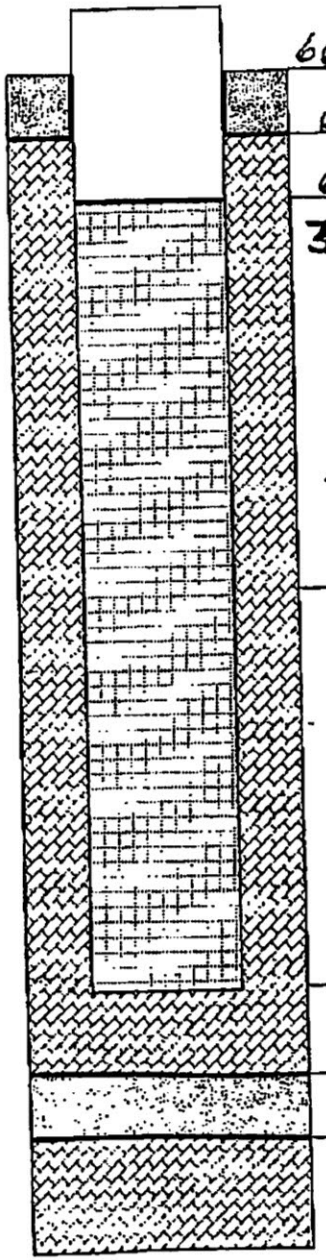
833' Bottom of Seal

965'

Time	Temp	MS	PPT	PH	Bag #	Tal	Tal Gain

Zc Samples (709 - 689)

Date 08 · 27 · 07 Zone: # 6 Depth 699'



667' Top of Seal

681' Top of Gravel

689' Top of Screen

3 1/2 YARD GRAVEL FROM
775' TO 723' = 52
10 BAGS BENT CHIPS FROM
723' TO 718' = 5
2 1/4 YARD GRAVEL FROM
718' TO 695' = 23'

699' Center of Screen

1 1/2 YARD GRAVEL FROM
695' TO 681' = 14'
18 BAGS BENT CHIPS FROM
681' TO 675' = 6
8 BAGS BENT CHIPS FROM
675' TO 672' = 3

709' Bottom of Screen

719' Bottom of Gravel

724' Bottom of Seal

→ 775

Time	T	MS

08-28-07

Air Lift/Swab Development

Start	Finish	To	From	IMHOFF	Notes
ZONE #7				DEPTH = 556 CT	
				522	Top of SEAL
				536	Top of GRAVEL
				546	Top SCREEN
				3 YARD	OF GRAVEL FROM:
				682'	to 640' = 42
				3 YARD	OF GRAVEL FROM
				640 to	601 = 39
				1½ YARD	OF GRAVEL FROM
				601'	TO 581 = 20
				9 BAG	BENT SEAL FROM
CT	556				~~581 to 576 = 5~~
				556	
					CENTER OF SCREEN
				2 YARD	OF GRAVEL FROM
					~~536 to 554 = 22~~
				1 YARD	OF GRAVEL FROM
				554'	TO 536 = 18
				20 BAG	BENTSEAL FROM
				536 to	522 = 14
				566	Bottom of SCREEN
				576	Bottom of GRAVEL
				581	Bottom of SEAL
				682'	

OCT-29-2007 14:20 FROM: TO:602 955 7585 P.9/9

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: WED DATE 1-29-07
REPORT NO: 12
SHIFT: _____ Day ✓ Night

COMPANY: _____
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: _____
DRILLER: _____
HELPER: _____
HELPER: _____

DRILLER: CRIS M
HELPER: MEMO R.
HELPER: _____
APPROVED BY: _____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
587'			22:00			TRIP OUT DRILL PIPE FINISH WATER ZONES
						FILL GRAVEL PICK UP ALL TOOLS
						MOVE TOOL HOUSE OUT JOB SITE
						GENERATOR.
				7:00	9 HR.	PICK UP GARBAGE

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona BEEMAN DRILLING
A Morex Investments, LLC Company
P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: TUES DATE 9-4-07
REPORT NO: 13 W/REAMER
SHIFT: ✓ Day ____ Night

COMPANY: ____
PROJECT: BUENA VISTA RANCH
HOLE NO: 4
RIG: SS-2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: ____
HELPER: ____
HELPER: ____
APPROVED BY: ____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			10:00	18:00	8 HR	HAUL WATER MUCK PITS SET UP FOR REAMER
39	84	45	18:00	22:00	4 HR	START REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	DAYS / MATERIAL USED
#2	24"	REAM	BUTTON	RIG TIME OPERAING		POLY III
#3	17½	DRAG BIT	BUTTON	STANDBY TIME		DRIS
				AUX. AIR COMP		SODA ASH 1
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

AILY DRILLING LOG:

rizona
BEEMAN DRILLING
A Morex Investments, LLC Company

P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: WED DAT 5-07
REPORT NO: 2 14
SHIFT: ✓ Day ✓ Night

COMPANY:
JOB FOREMAN: NATE LITTLE
DRILLER: CRIS .M
PROJECT: BUENA VISTA RANCH
DRILLER: MO.O
HELPER: MEMO .R
HOLE NO: 1
HELPER: ANGEL
HELPER:
RIG: SS 2500
HELPER: JOSIAH
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
84'	147'	63'	22:00	10:00	12HR	REAM 24" HOLE (R.C)
147'	204'	57'	10:00	22:00	12HR	REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED DAYS	NIGHT
#2	24"	BUTTON		RIG TIME OPERAING		POLY 1	Poly Plus - 1
#3	17 1/2	DRAGGER BIT		STANDBY TIME		SODA ASH 1	SODA ASH - 1
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: THUR DATE 2-06-15
REPORT NO: 3 / W REAMER
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS.M
HELPER: MEMO.R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
204'	265'	61'	22:00	10:00	12.HR	REAM 24" HOLE (R.C)
265'	357'	92'	10:00	22:00	12HR	REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		POLY 11 / Poly Plus 1
				STANDBY TIME		DRIS 0 / Soda 6
				AUX. AIR COMP		SODA ASH 1
				AUX. MUD PUMP		
				WATER TRUCK		
						SERVICE: AT - 28.00 HRS

COMMENTS / NOTES: SERVICE 19:30 RIG (OK) COMPR (OK) TRASH PUMP (OK

SERVICE AT 7:40 AM

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: FRID DATE: 10-07-07
REPORT NO: 4 / W REAMER 16
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS.M
HELPER: MEMO.R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
357'	440'	83'	22:00	10:00	12HR	REAM 24" HOLE (RC)
440'	547'	107'	10:00	22:00	12 HR	REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED DAYS	NIGHT
				RIG TIME OPERAING		POLY 11	Poly Plus-1
				STANDBY TIME		SODA ASH 1	SODA ASH-1
				AUX. AIR COMP			
				AUX. MUD PUMP			
				WATER TRUCK			
							SERVICE AT 8:00 AM

COMMENTS / NOTES: SERVICE 19:30 RIG (OK) TRASH PUMP (OK) GEN (OK) 400 COMPR (OK)
RIG-OK AIR COMP-1 GALL
GEN-OK AIR TANK

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SAT DATE 9-08-07
REPORT NO: 4 / W REAMER 17
SHIFT: / Day / Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: /
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO. O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS. M
HELPER: MEMO. R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
547'	648'	101'	22:00	10:00	12 HR.	REAM 24" HOLE (R.C)
648'	806'	158	10:00	22:00	12HR	REAM 24" HOLE R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED NIGHT
				RIG TIME OPERAING		POLY 11 / Poly Plus - 1
				STANDBY TIME		SODA ASH 1
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		SERVICE AT 7:00 AM
						RIG-(OK) TRASH PUMP (OK)
						GEN (OK) AIR COMP. 2QT ON AIR TANK.

COMMENTS / NOTES:

DAILY DRILLING LOG:

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BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SUN DATE: 09-07-18
REPORT NO: 5/W REAMER
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS.M
HELPER: MEMO-R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
806'	930'	124'	22:00	10:00	12:00	REAM 24" HOLE (R.C)
930'	1060'	130	10:00	22:00	12 HR	REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS
				RIG TIME OPERAING	
				STANDBY TIME	
				AUX. AIR COMP	
				AUX. MUD PUMP	
				WATER TRUCK	

MATERIAL USED

DAYS	NIGHT
POLY III	Poly Plus - 1
SODA ASH 1	

SERVICE AT 7:00 AM
RIG-(OK) GEN-(OK)
AIR comp-(OK)
1 RASH Pump-(OK)

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
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15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: MON DATE: 10-07-19
REPORT NO: 6 W/REAMER.
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: /
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: ~

DRILLER: CRIS. M
HELPER: MEMO. R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1060'	1150'	90'	22:00			REAM 24" HOLE (R.C)
				10:00	12HR	WEIDING DISCHARGE COUPLE ON SWIVEL
1150'	1242'	92'	10:00	22:00	12HR	REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS
				RIG TIME OPERAING	
				STANDBY TIME	
				AUX. AIR COMP	
				AUX. MUD PUMP	
				WATER TRUCK	

MATERIAL USED

DAYS	NIGHT
POLY III	POLY P-1
SODA ASH 1	
	SERVICE 8:00 AM
	RIG (OK) GEN (OK)
	AIR COMPR 1 GAL. ON AIR TANK

COMMENTS / NOTES: SERVICE 19:30 RIG (OK) GEN (OK) TRASH PUMP (OK) COMPR (OK)

DAILY DRILLING LOG:

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BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DATE: 9-11-07 DATE: TUE
REPORT NO: 7/W REAMER
SHIFT: _____ Day ✓ Night

COMPANY: _____
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS-2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS.M
HELPER: MEMO.R
HELPER: _____
APPROVED BY: _____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1242	1320'	78'	22:00	10:00	12 HR	REAM 24" HOLE (R.C)
1330'	1435'	105'	10:00	22:00	12HR	REAM 24" HOLE (R.C)

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	DAYS	MATERIAL USED NIGHT
				RIG TIME OPERAING		POLY III	Poly Plus - 1
				STANDBY TIME		SODA 1	
				AUX. AIR COMP			
				AUX. MUD PUMP			SERVICE AT 9:40
				WATER TRUCK			RIG - (OK) GEN - (OK)
							AIR COMP - (1/2 GAL)
							COMP AIR TANK
							TRASH PUMP - (OK)

COMMENTS / NOTES: SERVICE 20:20 RIG (OK) COMPR (OK
TRASH PUMP (OK)

DAILY DRILLING LOG:

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BEEMAN DRILLING
A Morex Investments, LLC Company
P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: WED DATE 9-12-07 21
REPORT NO: 8 1/4 REAMER
SHIFT: _____ Day ✓ Night

COMPANY: _____ JOB FOREMAN: NATE LITTLE DRILLER: CRIS M
PROJECT: BUENA VISTA RANCH DRILLER: MOJO HELPER: MEMO R
HOLE NO: _____ HELPER: ANGEL HELPER: _____
RIG: SS 2500 HELPER: JOSIAH APPROVED BY: _____

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1435			22:00	6:30	7:30	REAM 24" HOLE (RC) TD 1509'
			7:20	10:00	2:40	AIRLIFT CLEAN HOLE CLEAN PITS START TRIP OUT
			10:00	13:30	3.5 HR	TRIP OUT OF HOLE W/24" REAMER
			13:30	14:00	.5 HR	SET UP FOR LOGGER
			14:00	15:30	1.5 HR	LOGGING HOLE
			15:30	16:00	.5 HR	SET UP FOR TRIMMY PIPE
			16:00	18:00	2 HR	START RUN TRIMMY PIPE @ 997'
			18:00	21:30	3.5	SET UP FOR CASING AND WAIT FOR WELDERS
Ø	160'	160	21:30	22:00	.5 HR	START WELD CASING

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: THR DATE: 12-13-07
REPORT NO: 9 - 1st REAMER
SHIFT: ✓ Day ✓ Night

COMPANY:
JOB FOREMAN: NATE LITTLE
DRILLER: CRIS M
PROJECT: BUENA VISTA RANCH
DRILLER: MO.O
HELPER: MEMO R
HOLE NO: 1
HELPER: ANGEL
HELPER: VANCE
RIG: SS 2500
HELPER: JOSIAH
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
160'	1480'		22:00	08:00		WELD CAISING ; RUN 16" CASING
			08:00	08:45		LANDING CASING
			08:45	11:00	13 HR	LET COOL LANDING PLATES AND SET UP FOR D. PIPES
			11:00	16:00	5 HR	START TRIP IN HOLE W/ SWAB TOOL
			16:00	17:00	1 HR	SET UP FOR GRAVEL
1504'	1051'	453	17:00	22:00	5 HR	START RUN GRAVEL PACK

BIT NO	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		25 5/5 COLORADO SILICA SAND
				STANDBY TIME		8 LBS CLORINATE
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: FRID DATE: 14-23
REPORT NO: 10
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: JOSIAH

DRILLER: CRIS.M
HELPER: MEMO.R.
HELPER: VANCE.L
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1051'	642'		22:00			TRIP OUT 120' TRIMMY PIPE
			630	730		LET HIDRATE SEAL
631'	508'	123'	10:00	13:00	3 HR	RUN GRAVEL PACK
508'	481'		13:00	14:00	1 HR	RUN TOP SEAL
			14:00	14:30	.5 HR	WAIT FOR CEMENT
481	294	187'	14:30	17:00	2.5 HR	START RUN CEMENT
~~481~~	~~187'~~	~~294'~~	17:00	19:30	2.5 HR	CLEAN JOB SITE AND SECURITY LOCATION

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED NIGHT	
				RIG TIME OPERAING		~~7 BAGS GRAVEL~~	20 COLORADO SILICA
				STANDBY TIME		7 BAGS GRAVEL	7 LB CLORINATE
				AUX. AIR COMP	3000 PS	1 BAG FINE SAND	1 BAG FINE SAND 3000 PSI
				AUX. MUD PUMP		3 POUNDS CLORINATE	
				WATER TRUCK		7.5 YARDS w/ 14.5 LBS / GAL	

COMMENTS / NOTES:

DAILY DRILLING LOG:

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BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SAT DATE: 15-07 24
REPORT NO: 11 W/REAMER
SHIFT: ✓ Day ✓ Night

COMPANY:
JOB FOREMAN: NATE LITTLE
DRILLER: CRIS M
PROJECT: BUENA VISTA RANCH
DRILLER: MO.O
HELPER: MEMOR
HOLE NO: 1
HELPER: ANGEL
HELPER: VENCE
RIG: SS 2500
HELPER: JOSIAH
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
			24:00	3:30	3.5	RUN AQUA CLEAR SWABBING TWISE TOP TO DOWN
			3:30	7:30	4 HR	LET SET AGUA CLEAR
			7:30	9:00	1.5 HR	TRIP OUT AND SWABBING TWICE BOTTOM TO TOP
			9:00	10:00	1 HR	RUN CEMENT 15 YARDS
			10:00	11:30	1.5 HR	TRIP IN TO OF HOLE
			11:30	13:00	1.5 HR	SET UP FOR A. LIFT
1480'	1453'	27'	13:00	22:00	9 HR	AIR LIFT DEVELOPMENT W/750 CFM COMPR 560' A.L

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		7½ YARD CEMENT W/14.8 LBS/GAL
				STANDBY TIME		7½ YARD CEMENT W/15.1 LBS/GAL.
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

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BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: SUN DATE: 16-07
REPORT NO: 12 - W/REAMER - 25
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER:

DRILLER: CRIS. M
HELPER: MEMO. R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1421'	1389'		22:00	1:30		AIRLIFT DEVELOPMENT W/750 (CFM) comp 560' AL
			1:			
13	1359	1327				
1327	1200	127	10:00	22:00	12HR	AIRLIFT DEVELOPMENT w/750 (CFM) COMPR
0						

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company

15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: MONDAY DATE: 7-17-07 26
REPORT NO: 13 W/REAMER
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO:
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O
HELPER: ANGEL
HELPER: —

DRILLER: CRIS. M
HELPER: MEMO. R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
1200'	1073	127'	22:00	10:00	12:00	AIR LIFT DEVELOPMENT W/750 CFM COMP
1073'	946'	127'	10:00			AIR LIFT DEVELOPMENT W/750 CFM COMPR

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		SERVICE AT 9:30
				AUX. AIR COMP		AIR COMP (3 QT)
				AUX. MUD PUMP		RIG-(1/2 QT)
				WATER TRUCK		GEN-(OK)

COMMENTS / NOTES: SERVICE
GEN - OK
RIG - OK AIR COMP - OK TRASH PUMP OK

DAILY DRILLING LOG:

Arizona
BEEMAN DRILLING
A Morex Investments, LLC Company
15563 East Hwy 60 • Gold Canyon, Arizona 85218
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: TUESDAY DATE: 9-18-07
REPORT NO: 14 / W REPORTER 27
SHIFT: ✓ Day ✓ Night

COMPANY:
JOB FOREMAN: NATE LITTLE
DRILLER: CRIS . M
PROJECT: BUENA VISTA RANCH
DRILLER: MO.O
HELPER: MEMO . R
HOLE NO: 1
HELPER: JOSIAH
HELPER:
RIG: SS 2500
HELPER: —
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
9/5'	821'	94'	22:00	10:00	12 HR	AIRLIFT DEVELOPMENT W/750 CFM COMPR
821'	695'	126'	10:00	22:00	12 HR	AIR LIFT DEVELOPMENT W/750 CFM COMPR

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED
				RIG TIME OPERAING		
				STANDBY TIME		
				AUX. AIR COMP		
				AUX. MUD PUMP		
				WATER TRUCK		

COMMENTS / NOTES:

DAILY DRILLING LOG:

izona
BEEMAN DRILLING
A Morex Investments, LLC Company
P.O. BOX 3370, APACHE JUNCTION, AZ 85217
PH: (480) 983-2542 • FAX: (480) 983-4816

DAY: WED DATE 7-19-07
REPORT NO: 15 W/REAMER 28
SHIFT: ✓ Day ✓ Night

COMPANY:
PROJECT: BUENA VISTA RANCH
HOLE NO: 1
RIG: SS 2500

JOB FOREMAN: NATE LITTLE
DRILLER: MO.O - ALBERTO
HELPER: ANGEL -
HELPER: JOSINH

DRILLER: CRIS. M
HELPER: MEMO-R
HELPER:
APPROVED BY:

INTERVALS			TIME			"REMARKS & EVENTS"
FROM	TO	TOTAL	FROM	TO	TOTAL	
695'	569		22:00	10:00	12 HR.	AIRLIFT DEVELOPMENT W/750 CFM COMPR
569'	535'	34	10:00	15:30	5.5	AIRLIFT DEVELOPMENT 90 P.S.I. ; 750 COMPR.
535'	569'	34'	15:30	22:00	6.5	AIR LIFT DEVELOPMENT W/750 CFM COMPR TOP TO BOTTOM

BIT NO.	BIT SIZE	BIT USED	TOTAL FT. DRILLED	HOURLY RATES	TOTAL HOURS	MATERIAL USED NIGHT	
				RIG TIME OPERAING		SERVICE AT 17:00	SERVICE AT 4:00
				STANDBY TIME		AIR COMPR 1/2 GAL	AIR COMPR OK
				AUX. AIR COMP		RIG	RIG
				AUX. MUD PUMP		GEN (OK)	GEN - (OK)
				WATER TRUCK			

COMMENTS / NOTES:

APPENDIX C

APPENDIX C

BUENA VISTA WELL #1 LITHOLOGIC LOG

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 1 OF 8

PROJECT: Buena Vista Well #1 (North) PROJECT NO. B.1401 ADWR No. 55-213204
WELL LOCATION: B(4-3) 10 AAA FOREMAN: Nate Little
DRILLING CONTRACTOR: Arizona Beeman Drilling LOGGED BY: G. Waters
DRILLING EQUIPMENT: 70K & SS 2500 START DATE: 07/11/07 FINISH DATE: 08/21/07 (pilot)
DRILLING METHOD: Rev. Circ. Rotary WATER LEVEL: 327 feet bls (11/08/07)
TOTAL DEPTH: 1,520 feet bls SAMPLING METHOD: drilled cuttings

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
10, 20, 30		NO SAMPLE 0 – 40'	
40	SP	**GRAVELLY SAND** – Lt. brown, poorly sorted. Sand (60%): v. fine to v. coarse-grained (1/16 - 2mm), angular to sub-rounded. Gravel (40%): v. fine to coarse-grained (2 – 20mm) angular to sub-rounded.	
50, 60, 70, 80	SW	**SAND** – Lt. gray to tan, well sorted. Sand (95%): predominantly medium to v. coarse-grained (1/4 - 2mm), sub-angular to sub-rounded quartz. Gravel (~5%): v. fine-grained (2 – 4mm) sub-angular to sub-rounded. Trace silt.	
90	GC	**CLAYEY SANDY GRAVEL** – Lt. brown, poorly sorted. Gravel (45%): v. fine to coarse-grained (2 - 32mm), sub-angular to rounded aphanitic mafic rocks, quartz & feldspar. Sand (40%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular to rounded. Silt & clay (15%).	
100	SC	**CLAYEY SAND** – Lt. brown, low to med-plasticity, strong reaction w/ HCl. Sand (70%): v. fine to med-grained (1/16 – 1/2mm). Silt & clay (30%)	
110	SW	**SAND** – Tan to lt. gray, mod. sorted. Sand (90%): predom. med to crs-grained (1/4 – 2mm), ang to sub-rounded quartz. Gravel (~10%) is v. fine to med-grained (2 – 16mm) sub-angular to rounded. Trace silt.	
120	GP	**SANDY GRAVEL** – Lt. brn to gray, poorly sorted. Gravel (80%): v. fine to med-grained (2 - 12mm), sub-ang to sub-rnded. Sand (~20%): med to v. crs-grained (1/4 – 2mm), sub-ang to sub-rnded. Some silt & clay.	
130	CL	**CLAY** – Lt. brown, medium to high plasticity, strong reaction w/ HCl. Clay (90%). Silt & v. fine to fine-grained sand (10%).	
140, 150	CL	**SANDY CLAY** – Lt. brown, medium plasticity, strong reaction w/ HCl. Clay & silt (60%). Sand (40%): predominantly v. fine to coarse-grained (1/16 – 1mm).	

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 2 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
150	SP	**GRAVELLY SAND** – Lt. gray to tan, poorly sorted. Sand (70%): v. fine to v. coarse-grained (1/16 – 2mm), angular to sub-rounded quartz. Gravel (25%): v. fine to coarse-grained (2 – 32mm) granite/diorite, aphanitic mafic rocks, feldspar & quartz. Silt & clay (~5%).	
160			
170			
180			
190			
200	GC	**CLAYEY SANDY GRAVEL** – Lt. gray to lt. brown, poorly sorted. Gravel (60%): v. fine to coarse-grained (2 – 32mm), angular to rounded granite/diorite, aphanitic mafic rocks, basalt, feldspar & quartz. Sand (25%): v. fine to v. coarse-grained (1/16 – 2mm), angular to rounded quartz & feldspar. Silt & clay (15%).	
210			
220			
230			
240			
250	SC	**CLAYEY SAND** – Lt. brown, low to medium plasticity, strong reaction w/ HCl. Sand (60 - 70%): v. fine to coarse-grained (1/16 – 1mm), angular to sub-rounded. Silt & clay (30 - 40%).	
260			
270			
280			
290			
300	GC	**CLAYEY SANDY GRAVEL** – Lt. gray to lt. brown, poorly sorted. Gravel (50 - 60%): v. fine to coarse-grained (2 – 20mm), sub-angular to rounded granite/diorite, aphanitic felsic rocks, feldspar & quartz. Sand (25 - 30%): v. fine to v. coarse-grained (1/16 – 2mm), angular to rounded. Silt & clay (25 - 30%).	
310			
320			
330			
340			
350			

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 3 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
350	SC	**CLAYEY SAND** – Lt. brown, low plasticity, strong reaction w/ HCl. Sand (75%): v. fine to medium-grained (1/16 – 1/2mm). Silt & clay (25%).	
360			
370			
380	SC	**CLAYEY SAND** – Same as above except: increase in Sand (85%) decrease in Silt & clay (15%) Gravel (trace)	
390			
400			
410	CL	**SILTY CLAY** – Lt. brown, low to med. plasticity, v. strong reaction w/ HCl. Some v. fine to fine-grained (1/16 – 1/4mm) sand.	
420			
430			
440	CL	**SANDY CLAY** – Lt. brown, low to medium plasticity, v. strong reaction w/ HCl. Silt & clay (50 – 60%). Sand (40 – 50%): predominantly v. fine to medium-grained (1/16 – 1/2mm), sub-angular.	
450			
460	SC	**CLAYEY SAND** – Lt. brown, low plasticity, moderate reaction w/ HCl. Sand (80%): v. fine to coarse-grained (1/16 – 1mm), sub-angular. Silt & clay (20%).	
470	SC	**CLAYEY SAND** – Lt. brown, low to medium plasticity, strong reaction w/ HCl. Sand (60%): predominantly v. fine to medium-grained (1/16 – 1/2mm). Silt & clay (40%).	
480			
490			
500			
510			
520		NO SAMPLE 520 – 530'	
530	CL	**SILTY CLAY** – Lt. brown, low to med. plasticity, v. strong reaction w/ HCl. Some v. fine to fine-grained (1/16 – 1/4mm) sand.	
540	SC	**CLAYEY SAND** – Lt. brown, low to medium plasticity, strong reaction w/ HCl. Sand (60 - 80%): v. fine to v. crs-grained (1/16 – 2mm), angular to sub-rounded. Silt & clay (20 - 40%).	
550			

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 4 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
550	SC	**CLAYEY SAND** – Same as @ 540': Lt. brown, low to medium plasticity, strong reaction w/ HCl. Sand (60 - 80%): v. fine to v. crs-grained (1/16 – 2mm), angular to sub-rounded. Silt & clay (20 - 40%).	
560			
570			
580			
590	CL	**SANDY CLAY** –Lt. brown, medium plasticity, v. strong reaction w/ HCl. Clay & silt (60%). Sand (40%): v. fine to coarse-grained (1/16 – 1mm), sub-angular.	
600			
610	SC	**CLAYEY SAND** – Same as @ 540 - 590' except addition of gravel (<5%): v. fine to fine-grained (2 – 8mm), sub-angular to sub-rounded.	
620			
630			
640	CL	**SILTY CLAY** – Lt. brown, medium plasticity, strong reaction w/ HCl. Clay & silt (85%). Sand (15%): v. fine to fine-grained (1/16 – 1/4mm).	
650			
660			
670			
680			
690			
700	SC	**CLAYEY SAND** – Lt. brown, low reaction w/ HCl. Sand (80%): v. fine to v. coarse-grained (1/16 – 2mm), angular to sub-rounded. Silt & clay (20%).	
710			
720	CL	**SILTY CLAY / CLAY** – Lt. brown, medium to high plasticity, v. strong reaction w/ HCl. Clay & silt (85 - 95%). Sand (5 - 15%): v. fine to fine-grained (1/16 – 1/4mm).	
730			
740			
750			

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 5 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
750	CL	**SILTY CLAY / CLAY** – Same as @ 720 - 750': Lt. brown, medium to high plasticity, v. strong reaction w/ HCl. Clay & silt (85 - 95%). Sand (5 - 15%): v. fine to fine-grained (1/16 – 1/4mm).	
760			
770			
780			
790			
800			
810			
820			
830			
840			
850			
860			
870			
880			
890			
900			
910			
920			
930	CL	**SILTY CLAY w/ SAND** – Lt. brown, low plasticity, v. strong reaction w/ HCl. Clay & silt (70 - 80%). Sand (20 - 25%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular. Gravel (5%): v. fine to fine-grained (2 – 8mm), sub-angular to sub-rounded.	
940			
950			

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 6 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
950 960 970 980 990	CL	**SILTY CLAY w/ SAND** – Same as at 930 – 950': Lt. brown, low plasticity, v. strong reaction w/ HCl. Clay & silt (70 - 80%). Sand (20 - 25%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular. Gravel (5%): v. fine to fine-grained (2 – 8mm), sub-angular to sub-rounded.	
1000 1010 1020	SC	**CLAYEY SAND w/ GRAVEL** – Lt. brown, poorly sorted, strong reaction w/ HCl. Sand (50%): v. fine to v. coarse-grained (1/16 – 2mm), angular to sub-rounded. Silt & clay (30%). Gravel (20%): v. fine to medium-grained (2 – 16mm), sub-angular to sub-rounded.	
1030	CL	**CLAY** – Lt. brown, medium plasticity, strong reaction w/ HCl.	
1040	SC	**CLAYEY SAND w/ GRAVEL** – Same as @ 990 – 1020'	
1050	CL	**SILTY CLAY** – Lt. brown, low to medium plasticity, strong reaction w/ HCl. Some v. fine to fine-grained (1/16 – 1/4mm) sand.	
1060	SC	**CLAYEY SAND** – Lt. brn, poorly sorted. Sand (60%): v. fine to v. crs-grained (1/16–2mm), sub-angular. Silt & clay (30%). Gravel (10%): v. fine-grned (2-4mm), sub-ang. to sub-rnded.	
1070 1080 1090 1100 1110	GC	**CLAYEY SANDY GRAVEL** – Lt. brown to lt. gray, poorly sorted. Gravel (60%) is v. fine to medium-grained (2 – 12mm), sub-angular to sub-rounded gray diorite, red & dark aphanitic rocks, quartz & feldspar. Sand (20 - 30%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular to sub-rounded. Silt & clay (10 - 20%).	
1120 1130 1140 1150	GP	**SANDY GRAVEL** – Lt. gray to reddish brown, poorly sorted. Gravel (50 - 60%) is v. fine to coarse-grained (2 – 32mm), angular to sub-rounded gray diorite, red & dark aphanitic rocks, quartz & feldspar. Sand (40 - 50%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular to sub-rounded. Some silt & clay. ↓	

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 7 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
1150	GP	**SANDY GRAVEL** – Same as @ 1110 – 1150': Lt. gray to reddish brown, poorly sorted. Gravel (50 - 60%) is v. fine to coarse-grained (2 – 32mm), angular to sub-rounded gray diorite, red & dark aphanitic rocks, quartz & feldspar. Sand (40 - 50%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular to sub-rounded. Some silt & clay.	
1160			
1170			
1180			
1190			
1200			
1210			
1220			
1230			
1240			
1250			
1260			
1270			
1280			
1290			
1300			
1310			
1320			
1330			
1340			
1350			

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF WELL

WELL NO. Buena Vista Well #1 (North) SHEET 8 OF 8

Depth BGS (Feet)	USC Symbol	DESCRIPTION	DETAILS AND/OR DRILLING REMARKS
1350	GP	**SANDY GRAVEL** – Same as @ 1110 – 1350': Lt. gray to reddish brown, poorly sorted. Gravel (50 - 60%) is v. fine to coarse-grained (2 – 32mm), angular to sub-rounded gray diorite, red & dark aphanitic rocks, quartz & feldspar. Sand (40 - 50%): v. fine to v. coarse-grained (1/16 – 2mm), sub-angular to sub-rounded. Some silt & clay.	
1360			
1370			
1380			
1390			
1400			
1410			
1420			
1430			
1440			
1450			
1460			
1470			
1480			
1490			
1500			
1510			
1520		Total Depth of Borehole	T.D. borehole at 1,520 feet bls on 08/21/07.
1530			
1540			
1550			

Notes:

APPENDIX D

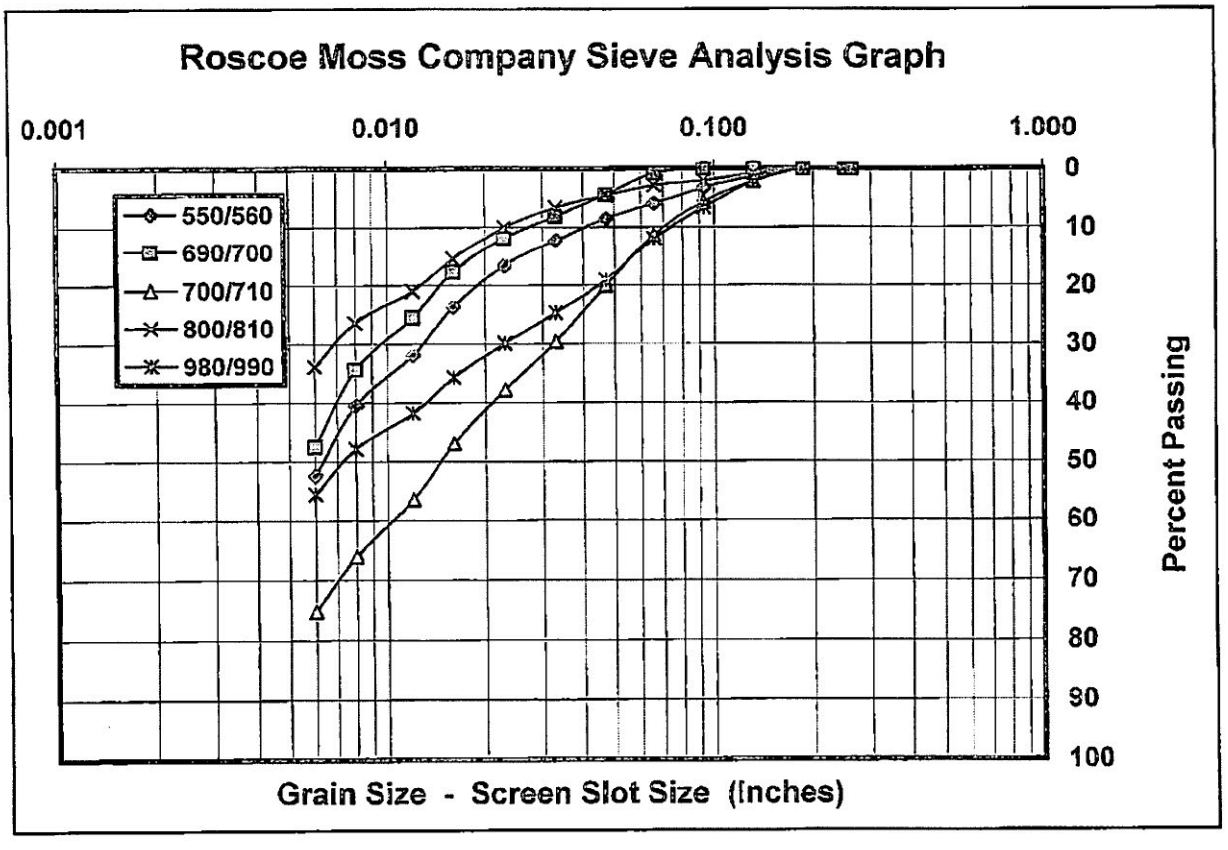
APPENDIX D

BUENA VISTA WELL #1 SIEVE ANALYSES

Roscoe Moss Company Sieve Analysis Report

Date: 29-Aug-07
Client: SOUTHWEST GROUND-WATER
Project: BUENA VISTA- NORTH

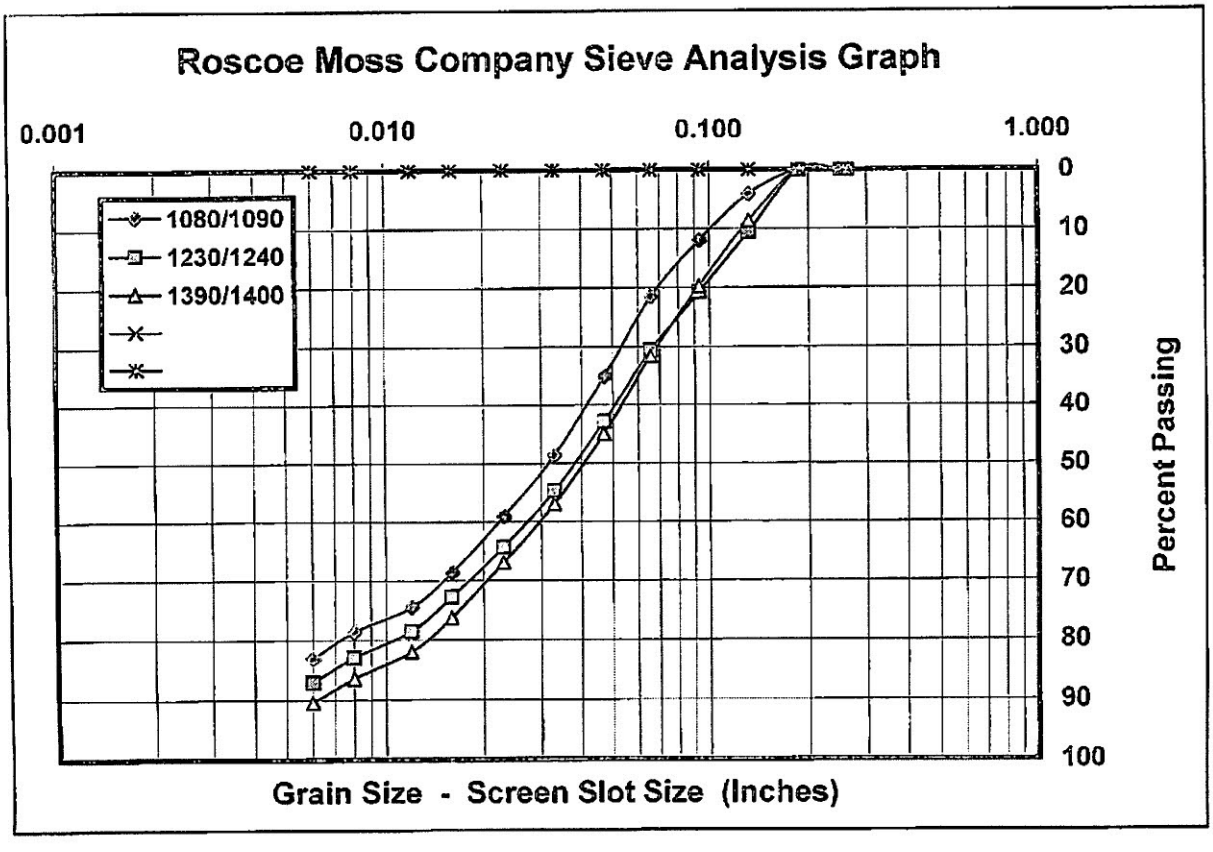
Sieve	Grain Size Inches	mm	Samples 550/560 cum wt	%ret	690/700 cum wt	0 %ret	700/710 cum wt	0 %ret	800/810 cum wt	0 %ret	980/990 cum wt	%ret
3	0.263	6.6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1/4 inch	0.25	6.35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.187	4.7498	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.132	3.3528	4.0	1.3	0.0	0.0	5.0	2.2	2.0	0.8	8.0	2.2
8	0.093	2.3622	10.0	3.3	0.0	0.0	13.0	5.7	5.0	2.1	24.0	6.6
12	0.066	1.6764	18.0	6.0	2.0	0.8	26.0	11.3	7.0	2.9	43.0	11.9
16	0.047	1.1938	26.0	8.6	11.0	4.5	46.0	20.0	11.0	4.6	69.0	19.1
20	0.033	0.8382	37.0	12.3	20.0	8.2	68.0	29.6	16.0	6.7	89.0	24.7
30	0.023	0.5842	50.0	16.6	29.0	11.9	87.0	37.8	24.0	10.0	108.0	29.9
40	0.016	0.4064	71.0	23.6	43.0	17.6	108.0	47.0	37.0	15.5	129.0	35.7
50	0.012	0.3048	96.0	31.9	62.0	25.4	130.0	56.5	50.0	20.9	151.0	41.8
70	0.008	0.2032	122.0	40.5	84.0	34.4	152.0	66.1	63.0	26.4	173.0	47.9
100	0.006	0.1524	158.0	52.5	116.0	47.5	173.0	75.2	81.0	33.9	201.0	55.7
Pan	0	0	301.0	100.0	244.0	100.0	230.0	100.0	239.0	100.0	361.0	100.0



Roscoe Moss Company Sieve Analysis Report

Date: 29-Aug-07
Client: SOUTHWEST GROUND-WATER
Project: BUENA VISTA- NORTH

Sieve	Grain Size Inches	mm	Samples 1080/1090 cum wt	%ret	1230/1240 cum wt	0 %ret	1390/1400 cum wt	0 %ret	0 cum wt	0 %ret	0 cum wt	%ret
3	0.263	6.6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#####	0.0	#####
1/4 inch	0.25	6.35	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#####	0.0	#####
4	0.187	4.7498	0.0	0.0	0.0	0.0	0.0	0.0	0.0	#####	0.0	#####
6	0.132	3.3528	17.0	4.2	31.0	10.5	41.0	8.7	0.0	#####	0.0	#####
8	0.093	2.3622	49.0	12.0	61.0	20.7	93.0	19.7	0.0	#####	0.0	#####
12	0.066	1.6764	88.0	21.5	90.0	30.6	149.0	31.6	0.0	#####	0.0	#####
16	0.047	1.1938	144.0	35.2	126.0	42.9	212.0	44.9	0.0	#####	0.0	#####
20	0.033	0.8382	199.0	48.7	161.0	54.8	269.0	57.0	0.0	#####	0.0	#####
30	0.023	0.5842	242.0	59.2	189.0	64.3	316.0	66.9	0.0	#####	0.0	#####
40	0.016	0.4064	281.0	68.7	214.0	72.8	360.0	76.3	0.0	#####	0.0	#####
50	0.012	0.3048	305.0	74.6	231.0	78.6	387.0	82.0	0.0	#####	0.0	#####
70	0.008	0.2032	322.0	78.7	244.0	83.0	408.0	86.4	0.0	#####	0.0	#####
100	0.006	0.1524	340.0	83.1	256.0	87.1	427.0	90.5	0.0	#####	0.0	#####
Pan	0	0	409.0	100.0	294.0	100.0	472.0	100.0	0.0	#####	0.0	#####



APPENDIX E

Southwest Exploration Services, LLC
borehole geophysics & video services

Deviation Plot: Bulls-Eye View

Survey Calculation Method : *Minimum Curvature*

Reference : *Mag. North*
Mag Declination : *11.5 Deg*

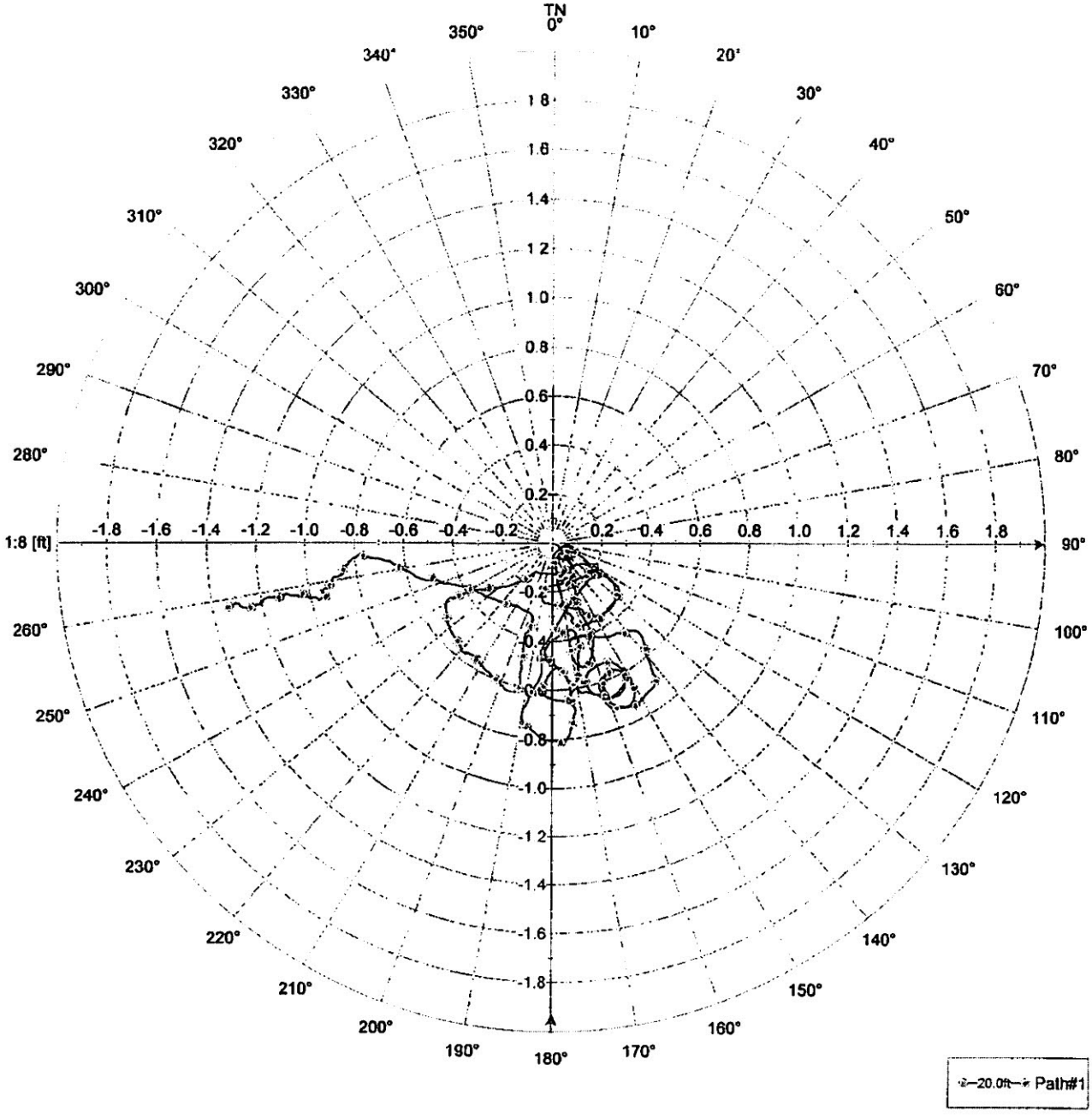
WELL #	*BUENA VISTA RANCH WELL #1*	**DATE**	*8-21-07*
CLIENT	*SOUTHWEST GROUNDWATER*		
FIELD/SITE	*SURPRISE*		
COUNTY	*MARICOPA*	**STATE**	
OPERATOR	*Dave Jacovitch*	**WITNESS**	
Field Note:	*1 Ft Stations - Continuous*		

FINAL LOCATION

CLOSURE DISTANCE	1.33 FT
BEARING	258.6 Deg
TVD	1517.88 FT

Cased hole survey *No*
Tool Zero Reference *Ground Level*
Tool Model *2DVA-1000*

Centralized *Yes = 16"*
Elevation:
Serial No: *SWEXP-1*



Southwest Exploration Services, LLC
borehole geophysics & video services

Deviation Plot: Closure View

Survey Calculation Method : *Minimum Curvature*

Reference : *Mag. North*
Mag Declination : *11.5 Deg*

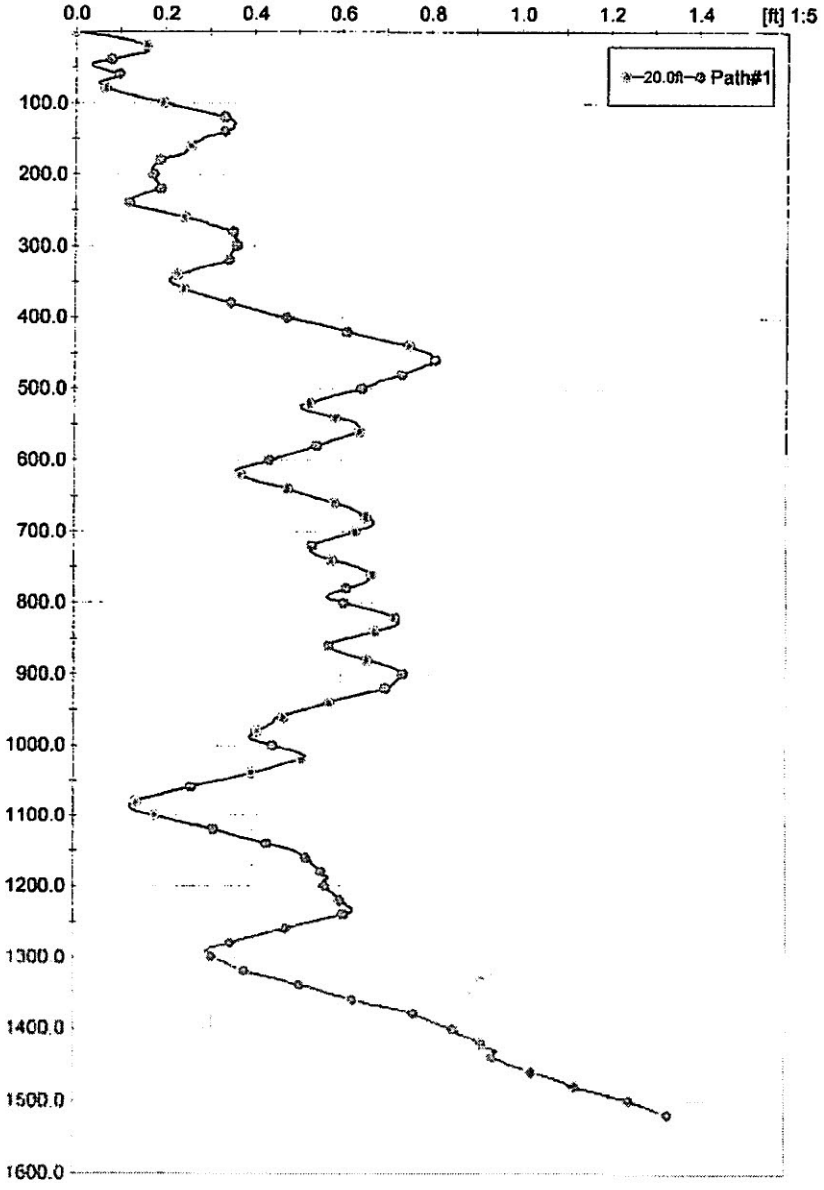
WELL #	*BUENA VISTA RANCH WELL #1*	**DATE**	*8-21-07*
CLIENT	*SOUTHWEST GROUND WATER CON.*		
FIELD/SITE	*SURPRISE*		
COUNTY	*MARICOPA*	**STATE**	*AZ*
OPERATOR	*Dave Jacovitch*	**WITNESS**	*Client*
Field Note:	*1 Ft Survey stations-Continuous*		

FINAL LOCATION

CLOSURE DISTANCE	1.33 FT
BEARING	258.6 DEG
TVD	1517.88 FT

Cased hole survey *No*
Tool Zero Reference *Ground Level*
Tool Model *2GDA-1000*

Centralized *Yes = 16"*
Elevation:
Serial No: SWEXP-1



APPENDIX F

APPENDIX F

BUENA VISTA WELL #1 PIPE TALLY & WELL CASING CERTIFICATION

Southwest Ground-water Consultants, Inc.

PIPE TALLY

Project Name:	Buena Vista Well #1	**Project Number:**	B.1401
Well No.:	55-213204	**Date:**	9/13/2007
Location:	B(4-3) 10 AAA	**Pipe Tally for:**	Buena Vista Well #1 (North)
Total Depth:	1,480 Feet bls	**Information Source:**	Roscoe Moss Casing Schedule

Type of Connections: [X] Welded [ ] T + C [ ] Flush Thread [ ] Other

Pipe #	Length (feet)	Length Sum (feet)	BOP* Depth (feet bls)	Pipe Type	Pipe #	Length (feet)	Length Sum (feet)	BOP* Depth (feet bls)	Pipe Type
1	40	40	1480	20' blk+20' scr	30	40	1190	330	blank
2	40	80	1440	screen	31	40	1230	290	blank
3	40	120	1400	screen	32	40	1270	250	blank
4	40	160	1360	screen	33	40	1310	210	blank
5	40	200	1320	screen	34	40	1350	170	blank
6	40	240	1280	screen	35	40	1390	130	blank
7	40	280	1240	screen	36	40	1430	90	blank
8	40	320	1200	screen	37	40	1470	50	blank
9	40	360	1160	screen	38	20	1490	10	blank
10	40	400	1120	screen				-10	initial stickup
11	40	440	1080	screen		-8	1482		cut off
12	40	480	1040	screen				-2	final stickup
13	40	520	1000	screen					
14	40	560	960	screen					
15	40	600	920	screen					
16	40	640	880	screen					
17	40	680	840	screen					
18	40	720	800	screen					
19	40	760	760	screen					
20	40	800	720	screen					
21	40	840	680	5' scr+35' blk					
22	40	880	640	15' blk+25' scr					
23	40	920	600	screen					
24	30	950	560	screen+collar					
25	40	990	530	blank					
26	40	1030	490	blank					
27	40	1070	450	blank					
28	40	1110	410	blank					
29	40	1150	370	blank					

SUMMARY OF TALLY

Total length of casing/screen tallied (feet):	1490
Length of casing cut off after landing (ft):	8
Stickup measured height (feet):	2
Bottom of casing (feet bls):	1480
Screened Intervals (feet bls):	530-625', 675-1460'
Total length of screen (feet):	880
Total length of blank casing (feet):	610

Notes:

* BOP = Bottom of pipe

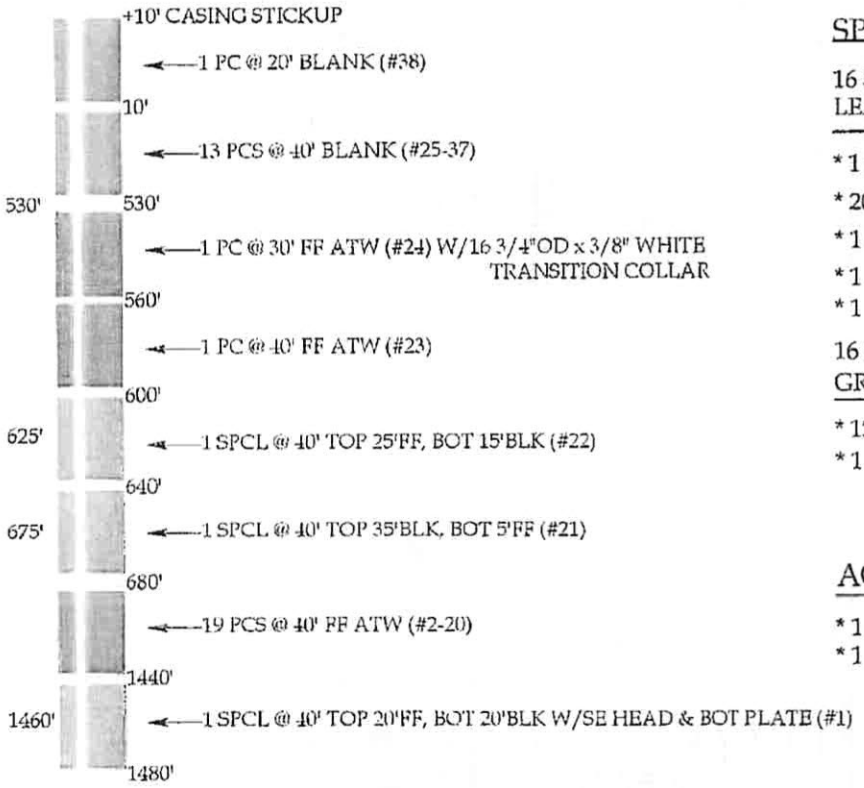
Screen is 16 5/8-inch (OD) louvered "Ful Flo" HSLA steel casing (0.312-inch wall thickness, 0.060-inch slot).

Blank casing at the bottom and between the screened intervals is 16 5/8-inch (OD) HSLA steel (0.312-inch wall thickness).

Blank casing above the screen is 16 3/4-inch (OD) HSLA steel (0.375-inch wall thickness).

CASING SCHEDULE

ARIZONA BEEMAN - BUENA VISTA RANCH WELL #1



BLUE SECTION : PERFORATED CASING
RED SECTION: BLANK SPIRAL WELDED CASING
GREEN SECTION: SPECIAL CASING / ACCESSORIES

SPECIFICATIONS

16 5/8"OD x 5/16" HSLA (0.060"FF, 12 ROWS) W/COLLARS & 4-1" LUGS
LEAVE 18" OF BLANK UNDER LUGS & GRIND

* 1 SPCL @ 40' TOP 20'FF, BOT 20'BLK W/SE HEAD & BOT PLATE (#1)
* 20 PCS @ 40' FF ATW (#2-20, 23)
* 1 SPCL @ 40' TOP 35'BLK, BOT 5'FF (#21)
* 1 SPCL @ 40' TOP 25'FF, BOT 15'BLK (#22)
* 1 PC @ 30' FF ATW (#24) W/16 3/4"OD x 3/8" WHITE TRANSITION COLLAR

16 3/4"OD x 3/8" HSLA BLANK W/COLLARS & 4-1" LUGS
GRIND 18" OF SEAM UNDER LUGS

* 13 PCS @ 40' BLANK (#25-37)
* 1 PC @ 20' BLANK (#38)

ACCESSORIES

* 1 ONLY - 16 5/8"OD x 5/16" HSLA BOTTOM PLATE ATTD TO PC #1
* 1 ONLY - 16" STEEL SE HEAD ATTD TO PC #1

ROSCOE MOSS COMPANY
PREPARED BY SO

BV #1

Telephone (323) 263-4111
Facsimile (323) 263-4497

P.O. Box 31004
Los Angeles, California 90031

ROSCOE MOSS COMPANY

4360 Worth Street
LOS ANGELES, CALIFORNIA 90063

June 30, 2007

Mr. Ryan Newman
Arizona Beeman
1341 E. Old West Highway
Apache Junction, AZ 85219

Surface Csg

Ref: Buena Vista Well No. 1

Dear Ryan,
Enclosed you will find the California Steel Industries Certified Test Reports for the Steel Coils used to produce the following casing for the above project:

Casing & Screen	Heat Numbers
30"OD x 3/8" NC BLANK	JN1421

If we can be of further assistance, please do not hesitate to call.

Sincerely,
Roscoe Moss Company

Steven Quintero
Production Coordinator

California Steel Industries
14000 San Bernardino Ave.
Fontana, California 92335

CERTIFIED TEST REPORT

CUSTOMER ORDER	MO NUMBER	SHIPPING DATE	CAR NUMBER	TALLY NUMBER
11214-00	01-5576-05	06/13/07	9b68486 ms	HS 250668880 1/

BILL TO	SHIP TO
ROSCOE MOSS MANUFACTURING CO. SUBS OF ROSCOE MOSS COMPANY BOX 31064/LINCOLN HEIGHTS STA LOS ANGELES CA 90031	WAL WAL WAL WAL CA

TEST REPORTS TO SHOW WEIGHTS. FRT COLLECT, F/B TO CHARGE TO. MARK ALL DOCUMENTS PART #01-37-375-2.

END USE	SPIRAL WELD PIPE
PROD	H.R. BAND - DIRECT SHIP (NON SKIN PASS) - PRIME
SPEC	PQ-SUITABLE TO MEET ASTM-A-139-96-GR.B-MIN.20CU-FULLY KILLED-FINE GRAIN PRACTICE

WA 1 INSPECTION MILL

DESCRIPTION	COILS, PIECES OR BUNDLES	HEAT NUMBER
.3650 x 37.0000 x COIL MIN ME	1 1	JN1421 JN1422
TOTAL WEIGHT: 37,200 LBS		

I CERTIFY THE FOLLOWING TEST INFORMATION TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

Sr. Chemist - Laboratory Services

MECHANICAL PROPERTIES / CHEMICAL ANALYSIS 10:54:57 06/13/07 MM

HEAT OR LOT NUMBER	SLAB NUMBER	LOC	YIELD KSI	TENSILE STRENGTH KSI	ELONGATION % 8"	ELONGATION % 2"	BEND TEST	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Cb	Ti	N
JN1421		BT	51.3	70.8		38		15	.90	012	004	196	22	01	02	00	038	002	000	000	004
		BT	45.9	69.5		41															
JN1422		BT	46.7	66.3		44		15	94	014	003	195	23	01	02	02	002	002	003	000	004
		BT	46.6	71.6		42															

Material is RoHS compliant

CSI PTL002L 070201

Telephone: (323) 263 4[illegible]
Facsimile: (323) 263 4497

P.O. Box 31064
Los Angeles, California 90031

ROSCOE MOSS COMPANY

4360 WORTH STREET
LOS ANGELES, CALIFORNIA 90063

August 7, 2007

Mr. Ryan Newman
Arizona Beeman
1341 E. Old West Highway
Apache Junction, AZ 85219

Ref: Buena Vista Well #3

Dear Ryan,
Enclosed you will find the California Steel Industries Certified Test Reports for the Steel Coils used to produce the following casing for the above project.

Casing & Screen	Heat Numbers
16 5/8"OD x 5/16" BLANK & PERFORATED HSLA SPIRAL WELDED CASING	508007
16 ¾"OD x 3/8" BLANK HSLA SPIRAL WELDED CASING	508006

If we can be of further assistance, please do not hesitate to call.

Sincerely,
Roscoe Moss Company

Steven Quintero
Production Coordinator

California Steel Industries
14000 San Bernardino Ave.
Fontana, California 92335
Ph (909) 350-6300

CERTIFIED TEST REPORT

CUSTOMER PO NUMBER	BOL NUMBER	SHIPPING DATE	CAR NUMBER	TEST NUMBER
110.18-00	06-6096-01	07/26/06	9d13991 r	HS 250594014 1

SOLD TO	ROSCOE MOSS MANUFACTURING CO. SUBS OF ROSCOE MOSS COMPANY BOX 31064 LINCOLN HEIGHTS STA LOS ANGELES CA 90031	SHIP TO	WAL WAL WAL WAL CA

TEST REPORTS TO SHOW WEIGHTS. FRT COLLECT. F/B TO CHARGE TO. MARK ALL DOCUMENTS PART #01 24 312-A

END USE	SPIRAL WELD PIPE
PROD	H.R. SHEET PROCESSED COIL (SF) - PRIME
SPEC	ASTM-A-606-01-HSLAS-TYPE 4-APPLICABLE PARTS-FULLY KILLED-FINE GRAIN PRACTICE

TEST 1	ORIGINAL MILL

DESCRIPTION	COILS PIECES OF MATL	HEAT NUMBER
.3030 x 24.0000 x COIL	1	508010
MEW SF	2	508007
TOTAL WEIGHT: 47,673 LBS		

I CERTIFY THE FOLLOWING TEST INFORMATION TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

CHIEF - LABORATORY SERVICES

MECHANICAL PROPERTIES — CHEMICAL ANALYSIS — 08:58:19 07/26/06 C C

HEATS LOT NUMBER	SLAB NUMBER	TEST DIR	YIELD KSI	TENSILE STRENGTH KSI	% ELONGATION 8"	% ELONGATION 2"	BEND TEST		C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Cb	Ti	As	N	Sn
508010		A	51.5	71.7		36			.17	.67	.009	.006	.017	.29	.23	.36	.01	.039	.030	.001	.000	.002	.004	.003
									Material is RoHS compliant															
									Material is RoHS compliant															
508007		A	55.1	73.9		36			.17	.69	.007	.007	.051	.25	.22	.16	.06	.034	.036	.002	.000	.000	.003	.002
									Material is 30-5 compliant															
		A	54.1	73.1		37			Material is 8048 compliant															

California Steel Industries
14000 San Bernardino Ave.
Fontana, California 92335
Ph (909) 350-6300

CERTIFIED TEST REPORT

CUSTOMER ORDER	MO NUMBER	SHIPPING DATE	CAR NUMBER	TALLY NUMBER
11077-00	01-9963-03	11/07/06	9d28080 k	HS 250620974 1/

BILL TO	SHIP TO
ROSCOE MOSS MANUFACTURING CO. SUBS OF ROSCOE MOSS COMPANY BOX 31064/LINCOLN HEIGHTS STA LOS ANGELES CA 90031	WAL WAL WAL WAL CA

TEST REPORTS TO SHOW WEIGHTS. FRT COLLECT, F/B TO CHARGE TO. MARK ALL DOCUMENTS PART # 01-24-375-3.

END USE: SPIRAL WELD PIPE

PROD: H.R. SHEET PROCESSED COIL (SE) - PRIME

SPEC: ASTM-A-606-01-HSLAS-TYPE 4-APPLICABLE PARTS-FULLY KILLED-FINE GRA IN PRACTICE

T/R 1 INSPECTION MILL

DESCRIPTION	COILS PIECES OR BUNDLES	HEAT NUMBER
3650 x 24.0000 x COIL MIN SE	3	508036
TOTAL WEIGHT: 47,390 LBS		

I CERTIFY THE FOLLOWING TEST INFORMATION TO BE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

Curtis D. Jenkins

CHIEF - LABORATORY SERVICES

MECHANICAL PROPERTIES / CHEMICAL ANALYSIS 11:50:05 11/07/06 SD

HEAT OR LOT NUMBER	SLAB NUMBER	LOC	YIELD KSI	TENSILE STRENGTH KSI	% ELONGATION 8"	% ELONGATION 2"	BEND TEST	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al	V	Cb	Ti	N
508036		A	61.5	82.0		29		11	91	011	005	444	30	25	38	01	032	400	000	000	005
		A	58.5	83.0		36															

Material is ROHS compliant

CFR-001 PTLL022, 060712

ENTERED
NOV - 1 2007
MO

Arizona Department of Water Resources
Information Management Section
3550 N. Central Ave. γ Phoenix, Arizona 85012
(602) 771-8627 γ (800) 352-8488
www.water.az.gov

Well Driller Report and Well Log

- Review instructions prior to completing form
- This report should be prepared by the driller in detail and filed with the Department within 30 days following completion of the well.

RECEIVED
OCT 31 2007
INFO MGMT

FILE NUMBER	B(4-3)10AAA
WELL REGISTRATION NUMBER	55 - 213204
PERMIT NUMBER (IF ISSUED)	

** PLEASE PRINT CLEARLY **

SECTION 1. REGISTRY INFORMATION

Well Owner

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL: FRI SURPRISE 358 LLC

MAILING ADDRESS: 8700 E. VIA DE VENTURA

CITY / STATE / ZIP CODE: SCOTTSDALE AZ 85258

CONTACT PERSON NAME AND TITLE:

TELEPHONE NUMBER:

FAX:

Location of Well

WELL LOCATION ADDRESS (IF ANY):

TOWNSHIP (N/S)	RANGE (E/W)	SECTION	160 ACRE	40 ACRE	10 ACRE
4N	3W	10	NE ¼	NE ¼	NE ¼

LATITUDE: ° ' "N

LONGITUDE: ° ' "W

LAND SURFACE ELEVATION AT WELL: Feet Above Sea Level

METHOD OF LATITUDE / LONGITUDE (CHECK ONE): ☐ Hand-Held ☐ USGS Quad Map ☐ Conventional Survey ☐ GPS: ☐ Survey-Grade

COUNTY ASSESSOR'S PARCEL ID NUMBER

BOOK: MAP: PARCEL:

COUNTY WHERE WELL IS LOCATED: MARICOPA

SECTION 2. DRILLING AUTHORIZATION

Drilling Firm

NAME: AZ Bremen Drilling

DWR LICENSE NUMBER: 360

TELEPHONE NUMBER: 480-983-2542

FAX: 480-983-4816

SECTION 3. WELL CONSTRUCTION DETAILS

DATE WELL CONSTRUCTION STARTED: 7-10-07

DATE WELL CONSTRUCTION COMPLETED: 9-22-07

IF FLOWING WELL, METHOD OF FLOW REGULATION: ☐ Valve ☐ Other:

Drill Method

CHECK ONE

- ☐ Air Rotary
- ☐ Bored or Augered
- ☐ Cable Tool
- ☐ Dual Rotary
- ☐ Mud Rotary
- ☒ Reverse Circulation
- ☐ Driven
- ☐ Jetted
- ☐ Air Percussion / Odex Tubing
- ☐ Other *(please specify)*:

Method of Well Development

CHECK ONE

- ☒ Airlift/Swab
- ☐ Bail
- ☐ Surge Block
- ☐ Surge Pump
- ☐ Other *(please specify)*:

Water Level Information

STATIC WATER LEVEL: Feet Below Land Surface

DATE MEASURED:

Method of Sealing at Reduction Points

CHECK ONE

- ☒ None
- ☐ Packed
- ☐ Swedged
- ☐ Welded
- ☐ Other *(please specify)*:

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 213204

SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILT) (attach additional page if needed)

Borehole			Installed Casing													
DEPTH FROM SURFACE		BOREHOLE DIAMETER (inches)	DEPTH FROM SURFACE		OUTER DIAMETER (inches)	MATERIAL TYPE (T)				PERFORATION TYPE (T)						SLOT SIZE IF ANY (Inches)
FROM (feet)	TO (feet)		FROM (feet)	TO (feet)		STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP	SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE	
0	39	36	+1	39	30	X				X						
39	1509	24	+2	530	16 3/4	X				X						
			530	625	16 5/8	X						X				.060
			625	675	16 5/8	X				X						
			675	1460	16 5/8	X						X				.060
			1460	1480	16 5/8	X				X						
					w/Bullnose Plug											

Installed Annular Material											
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)								FILTER PACK		
						BENTONITE						
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	SAND	GRAVEL	SIZE
0	39			X								
0	481			X								
481	489									X		#60
489	501						X					
501	508									X		#60
508	631										X	6-9 CSSI
631	639									X		#60
639	661						X					
661	670									X		#60
670	1504										X	6-9 CSSI

DEPTH OF BORING	DEPTH OF COMPLETED WELL
1522 Feet Below Land Surface	1480 Feet Below Land Surface

X

Well Driller Report and Well Log

WELL REGISTRATION NUMBER
55 - 213204

SECTION 5. GEOLOGIC LOG OF WELL

DEPTH FROM SURFACE FROM (feet)	TO (feet)	Description Describe material, grain size, color, etc.	Check (✓) every interval where water was encountered (if known)
0	90	GRAVELY SAND	
90	120	CLAYEY SAND	
120	130	SANDY GRAVEL	
130	140	CLAY BROWN	
140	200	GRAVELY SAND	
200	410	CLAYEY SAND w/ gravels	
410	440	Silty Clay	
440	460	CLAY SAND	
460	470	SANDY CLAY	
470	700	Silty SANDY CLAY	
700	720	CLAY BROWN SMALL SANDS	
720	930	Silty Clay	
930	990	Silty Clay w/ SAND	
990	1110	Clayey SAND w/ gravels	
1110	1522	SANDY gravel	

APPENDIX G

APPENDIX G

BUENA VISTA WELL #1 FIELD RECORDS: WELL DEVELOPMENT AND TESTING

Well Rig Development Record

Southwest Ground-water Consultants, Inc.

Date: 9/15 - 9/21/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE & SAG

Pump Agency:	Arizona Beeman Drilling	Static Water Level:	Approx. 324 feet bls
Foreman:	Alberto & Mo	Measure Point:	
Method of Evacuation:	Airlift & Swab 3X every 15 minutes	Stick Up (feet):	
Bailer/pump size, capacity, make:		Line Correction (feet):	

Time	Depth Interval (ft, bls)	Temp. (° F)	pH	Specific Cond. (µs/cm)	TDS (ppt)	Turbidity*	Solids (Imhoff cone)	Remarks
Information recorded by Arizona Beeman Drilling personnel								
								9/15/2007
13:00 - 22:00	1480 - 1453			Start airlift development: bottom to top. 750 CFM compressor. AL @ 560'				
								9/16/2007
22:00 - 1:30	1421 - 1389							750 CFM compressor
	1359 - 1327							
10:00 - 22:00	1327 - 1200							750 CFM compressor
								9/17/2007
22:00 - 10:00	1200 -1073							750 CFM compressor
10:00 - ?	1073 - 946							750 CFM compressor
								9/18/2007
22:00 - 10:00	915 - 821							750 CFM compressor
10:00 - 22:00	821 - 695							750 CFM compressor
								9/19/2007
22:00 - 10:00	695 - 569							750 CFM compressor
10:00 - 15:30	569 - 535							750 CFM compressor (90 PSI)
15:30 - 22:00	535 - 569				Start airlift development: top to bottom. 750 CFM compressor			
Information recorded by SGC field personnel								
17:00	530 - 537							DRE onsite. Swabbing 3X every 15 min
								Blue Detroit diesel compressor
								Add 1 joint
	537 - 569							
								Add 1 joint
18:15	569 - 600							Ingersoll Rand 400 CFM compressor
21:00	569 - 600					dark	0.7 - 1.0	dark colored water + sand
23:30	569 - 600					dark	1.0	dark colored water + sand
								9/20/2007
2:00	569 - 600					clear	1.0	sand
6:30	569 - 600					clear	1.0	sand
7:45								Add 1 joint
8:30	600 - 632							
9:30	600 - 632	80.1	8.30	0.34	0.17	clear	0.3	sand
10:30								Add 2 joints
11:00	664 - 695							AL @ 540'
12:00								**Trip to bottom**

Notes:

* = clear, milky, low, medium, high
DTW = Depth to Water

µs/cm = microsiemens/centimeters
ppt = parts per thousand

(R)=Rossum Sand Cone

Time	Depth Interval (ft, bls)	Temp. (° F)	pH	Specific Cond. (µs/cm)	TDS (ppt)	Turbidity*	Solids (Imhoff cone)	Remarks
14:00								SAG onsite. DTW ≈ 240'
14:30								AL @ 600'
14:55	1480 - 1453							Air on. Ingersoll Rand 400 CFM compressor
15:05	1480 - 1453	80.8	8.03	0.325	0.163	med	3.0	Set kelly near deck
15:15	1480 - 1453							Surge 3X ends
15:35	1480 - 1453					med	3.0	Surge 3X ends
15:40	1480 - 1453					low	1.5	
15:50	1480 - 1453					med	3.0	Surge 3X ends
15:55	1480 - 1453					low	2.0	
16:15	1480 - 1453					med	2.5	Surge 3X ends
16:25	1480 - 1453	82.0	8.07	0.300	0.150	milky		
16:35	1480 - 1453					med	2.0	Surge 3X ends
16:55	1480 - 1453					low	1.5	Surge 3X ends
17:10	1480 - 1453					low	1.7	Surge 3X ends
17:30	1460					low	1.6	Surge 3X ends
17:35	1460	80.6	8.11	0.245	0.122	milky	1.5	Set kelly @ 20' AD
17:50	1460	81.0	8.20	0.240	0.120	clear	trace	
18:05	1460	80.2	8.16	0.240	0.120	clear	trace	
18:20	1460	80.1	8.15	0.239	0.119	clear	trace	
18:30	1460							Pull joint #45
18:50								Surge 3X , set kelly @ 10' AD
18:55		80.6	8.12	0.240	0.120	clear	trace	
19:05								Set kelly @ 30' AD
19:15		81.3	8.20	0.238	0.119	clear	trace	
19:30	1450							Pull joint #44. Set kelly at deck
19:35		81.0	8.16	0.238	0.119	clear	trace	
19:45								Set kelly @ 20' AD
19:50		80.8	8.15	0.240	0.120	clear	trace	
20:00								Set kelly @ top
20:05		80.6	8.20	0.242	0.121	clear	trace	
20:20	1440							Pull joint #43
20:30		81.0	8.17	0.242	0.121	clear	trace	Set kelly @ 10' AD
								2 compressors (≈ 800 CMF)
20:45		80.6	8.31	0.247	0.124	clear	trace	Set kelly @ 30' AD
20:55		80.8	8.30	0.246	0.123	clear	trace	
21:05	1430							Pull joint #42
21:10		80.6	8.33	0.260	0.130	low	0.5	Set kelly at deck
21:20		81.1	8.25	0.248	0.124	clear	trace	
21:50		81.7	8.21	0.242	0.121	clear	trace	Set kelly @ 40' AD
22:00	1420							Pull joint #41
22:10		81.5	8.24	0.240	0.120	clear	trace	Set kelly @ 10' AD
22:30						clear	trace	Set kelly @ 30' AD
22:45	1410							Pull joint #40
22:55		80.6	8.23	0.242	0.121	clear	trace	Set kelly at deck
23:10						clear	trace	Set kelly @ 20' AD
23:25						clear	trace	Set kelly @ top
23:40	1400							Pull joint #39
								9/21/2007
0:50								DRE onsite
1:00	1389 - 1359	85.3	8.28	0.320	0.160	clear	trace	Q ≈ 125 gpm
								Pull 1 joint
1:50	1359 - 1327	84.9	8.29	0.320	0.160	clear	trace	Q ≈ 125 gpm
								Pull 1 joint
2:35	1327 - 1296	85.6	8.32	0.320	0.160	clear	none	Q ≈ 125 gpm
								Pull 1 joint

Notes:

* = clear, milky, low, medium, high
DTW = Depth to Water

µs/cm = microsiemens/centimeters
ppt = parts per thousand

(R)=Rossum Sand Cone

Time	Depth Interval (ft, bls)	Temp. (° F)	pH	Specific Cond. (µs/cm)	TDS (ppt)	Turbidity*	Solids (Imhoff cone)	Remarks
3:20	1296 - 1264	85.3	8.30	0.320	0.160	clear	none	Q ≈ 125 gpm
								Pull 1 joint
3:55	1264 - 1232	85.6	8.31	0.310	0.150	clear	none	Q ≈ 125 gpm
								Pull 1 joint
4:35	1232 - 1200	85.3	8.31	0.300	0.150	clear	none	Q ≈ 125 gpm
								Pull 1 joint
5:15	1200 - 1168	85.1	8.32	0.300	0.150	clear	none	Q ≈ 125 gpm
								Pull 1 joint
5:50	1168 - 1137	84.9	8.31	0.310	0.150	clear	trace	Q ≈ 125 gpm
								Pull 1 joint
6:30	1137 - 1105	85.3	8.31	0.310	0.150	clear	none	Q ≈ 125 gpm
								Pull 1 joint
7:08	1105 - 1073	78.8	8.30	0.300	0.160	clear	trace	Q ≈ 100 gpm
								Pull 1 joint
8:10	1073 - 1041	82.0	8.31	0.310	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
8:40	1041 - 1009	82.4	8.31	0.310	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
9:30	1009 - 978	82.8	8.33	0.310	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
10:30	978 - 946	83.5	8.33	0.320	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
11:00	946 - 915	85.3	8.34	0.340	0.170	clear	none	Q ≈ 125 gpm
								Pull 1 joint
11:38	915 - 883	84.2	8.32	0.340	0.170	clear	none	Q ≈ 100 gpm
								Pull 1 joint
12:00	883 - 852	84.9	8.33	0.340	0.170	clear	none	Q ≈ 100 gpm
								Pull 1 joint
12:30	852 - 821	84.2	8.32	0.340	0.170	clear	none	Q ≈ 100 gpm
								Pull 1 joint
12:55	821 - 790	84.0	8.30	0.320	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
13:20	790 - 758	83.8	8.32	0.340	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
13:40	758 - 726	83.5	8.32	0.320	0.160	clear	none	Q ≈ 100 gpm
								Pull 1 joint
14:20	726 - 695	84.0	8.34	0.320	0.160	slt. color	none	Q ≈ 125 gpm
								Pull 1 joint
15:00	695 - 664	85.3	8.36	0.330	0.160	slt. color	none	Q ≈ 100 gpm. Pull 40 feet AL
								Pull 2 joints
16:30	632 - 600	Swab up				slt.color-clear	0.5	0.9 for 1st 2min, then trace sand
								Pull 1 joint
	600 - 569	Swab up				slt.color-clear	0.5	0.5 for 1st 2min, then trace sand
								Pull 1 joint
	569 - 537	Swab up				slt.color-clear	0.5	0.5 for 1st 2min, then trace sand
								Pull 1 joint
	537 - 530	Swab up				slt.color-clear	0.5	0.5 for 1st 2min, then trace sand
	530 - 537	Swab down				slt.color-clear	0.5	0.5 for 1st 2min, then trace sand
								Add 1 joint
	537 - 569	Swab down				slt.color-clear	0.5	0.5 for 1st 2min, then trace sand
								Add 1 joint
18:30	569 - 600	Swab down				slt.color-clear	0.5	0.5 for 1st 2min, then trace sand
END OF RIG DEVELOPMENT								

Notes:

* = clear, milky, low, medium, high
DTW = Depth to Water

µs/cm = microsiemens/centimeters
ppt = parts per thousand

(R)=Rossum Sand Cone

Well Pump Development Record

Southwest Ground-water Consultants, Inc.

Date: 10/31 - 11/2/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	The Weber Group	Static Water Level (feet bls):	324.00
Foreman:	Omar	Measure Point:	Top of sounding tube
Method of Evacuation:	Pump and Surge	Stick Up (feet):	0
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Line Correction (feet):	300

Time	DTW (feet, bls)	Temp. (° F)	pH	Specific Cond. (µS/cm)	TDS (ppt)	Turbidity*	Solids (Rossum cone)	Q Flowmeter (gpm)	Remarks
13:20	324.00								10"x8" orifice. SWL per Omar
13:30	324.00					v. cloudy			**Pump on. 10/31/07**
14:30	361.00								5" ≈ 674 gpm
14:45						v. milky			air
15:30	362.48						trace		5" ≈ 674 gpm
									Surge 3X
15:50	361.00								
16:00	361.60								
16:10	361.70						none		
									Surge 3X. ↑ Q
16:30	375.38					v. cloudy		1000	11" ≈ 999 gpm
16:40	376.30							1000	11" ≈ 999 gpm
16:50	376.38						none	1000	11" ≈ 999 gpm
									Surge 3X
17:10	370.60							900 ?	13 - 15" ≈ 1086 - 1167 gpm
17:20	370.65							900 ?	14 - 15" ≈ 1086 - 1167 gpm
17:30						v. milky	none		Lot of air
17:50									**Pump off**
End of Pump Development - Day 1									
9:52	324.00								**Pump on. 11/2/07**
10:02	394.00							1400 ?	19.5" ≈ 1331 gpm
10:12						v. milky			Lot of air
10:22	396.30						none	1450 ?	20" ≈ 1348 gpm
									Surge 3X
10:40	389.00							1300	18.5" ≈ 1296 gpm
10:50	389.67							1300	18.5" ≈ 1296 gpm
11:00	389.80						none	1300	18.5" ≈ 1296 gpm
									Surge 3X. ↑ Q
11:30	419.15							1900 ?	35" ≈ 1783 gpm
11:40									35.5" ≈ 1795 gpm
11:50	421.00					less milky	none	1950 ?	Lot of air
									Surge 3X. ↑ Q
12:30	418.90						none	1950 ?	36" ≈ 1808 gpm
									Surge 3X. ↑ Q
12:50	438.60							2350 ?	55" ≈ 2235 gpm
13:05									**Pump off. Engine hot.**
End of Pump Development - Day 2									

Maximum GPM of the efficiency curve on the pump is 2,000 to 2,200 GPM.

Notes:
* = clear, milky, low, medium, high
DTW = Depth to Water

µS/cm = microsiemens/centimeter
ppt = parts per thousand

(R) = Rossum Sand Cone

Well Evacuation Record - Step Test

Southwest Ground-water Consultants, Inc.

Date: 11/06 - 11/07/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	The Weber Group	Static Water Level (feet bls):	325.60
Foreman:	Omar	Measure Point:	Top of sounding tube
Method of Evacuation:	Pump - Step Test	Stick Up (feet):	0
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Line Correction (feet):	0

Time	Sounder Reading (feet bls)	Temp. (°F)	pH	Specific Cond. (µS/cm)	TDS (ppm)	Turbidity*	Solids** (Rossum cone)	Remarks
11:30	325.60							**Pump on 11/6/07 - Step 1. Q ≈ 1,044 gpm**
11:45	368.34	80.6	7.95	230	110	clear	none	Sample 1 @ 15 min.
								some air
12:30	371.59	81.1	7.90	190	90	clear	none	Sample 2 @ 60 min.
								some air
13:30	372.80	83.1	7.95	340	170	clear	none	Sample 3 @ 120 min.
								some air
15:30	373.31	83.1	8.01	330	160	clear	none	Sample 4 @ 240 min.
								some air
15:31								**Step 2. Q ≈ 1,261 gpm**
15:45	384.06	82.2	8.02	320	160	clear	none	Sample 5 @ 15 min.
								some air
16:30	384.70	82.2	8.04	330	150	clear	none	Sample 6 @ 60 min.
								some air
17:30	384.95	81.0	8.07	320	160	clear	none	Sample 7 @ 120 min.
								some air
19:30	385.70	80.6	8.08	260	130	clear	none	Sample 8 @ 240 min.
								some air
19:31								**Step 3. Q ≈ 1,551 gpm**
19:45	400.77	80.1	8.07	330	160	clear	none	Sample 9 @ 15 min.
								some air
20:30	401.46	80.1	8.09	320	160	clear	none	Sample 10 @ 60 min.
								some air
21:30	401.69	79.2	8.10	310	150	clear	none	Sample 11 @ 120 min.
								some air
23:30	402.95	77.9	8.13	310	150	clear	none	Sample 12 @ 240 min.
								some air
23:31								**Step 4. Q ≈ 1,845 gpm**
23:45	417.65	78.6	8.08	300	150	clear	none	Sample 13 @ 15 min.
								some air
0:30	418.10	77.4	8.08	300	150	clear	none	Sample 14 @ 60 min.
								some air. **11/7/07**

Notes:

* = clear, milky, low, medium, high µS/cm = microSiemens/centimeter (R)=Rossum Sand Cone

DTW = Depth to Water ppm = parts per million

Time	Sounder Reading (feet bls)	Temp. (°F)	pH	Specific Cond. (µS/cm)	TDS (ppm)	Turbidity*	Solids** (Rossum cone)	Remarks
1:30	418.33	77.4	8.07	320	150	clear	none	Sample 15 @ 120 min.
								some air
3:30	419.35	78.4	8.08	320	160	clear	none	Sample 16 @ 240 min.
								some air
3:31								**Step 5. Q ≈ 2,224 gpm**
3:45	440.02	78.6	8.07	320	160	clear	none	Sample 17 @ 15 min.
								some air
4:30	441.37	78.6	8.06	310	160	clear	none	Sample 18 @ 60 min.
								some air
5:30	441.75	78.4	8.07	310	160	clear	none	Sample 19 @ 120 min.
								some air
7:30	442.20	78.8	8.07	310	160	clear	none	Sample 20 @ 240 min.
								some air. **Pump off**
END OF STEP TEST								

Notes:

* = clear, milky, low, medium, high
DTW = Depth to Water

µS/cm = microSiemens/centimeter
ppm = parts per million

(R)=Rossum Sand Cone

Step Test Record

Southwest Ground-water Consultants, Inc.

Date: 11/06 - 11/07/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	The Weber Group	Static Water Level:	325.60 feet bls
Foreman:	Omar	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Stick Up:	0 feet
Average Q:	Five, 4-hour steps @ 1044, 1261, 1551, 1845, and 2224 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
11:30	0	325.60	325.60	0	0			**Pump on. Step 1**
11:31	1				1,022			Tot.=15,865,000 g
11:32	2				1,022			**11/6/2007**
11:33	3	365.40	365.40	39.80	1,022	25.678	0.039	10"x8" orifice
11:34	4	365.77	365.77	40.17	1,022	25.442	0.039	11.5" ≈ 1,022 gpm
11:35	5	366.07	366.07	40.47	1,022	25.253	0.040	
11:36	6	366.40	366.40	40.80	1,022	25.049	0.040	
11:37	7	366.74	366.74	41.14	1,022	24.842	0.040	
11:38	8	367.70	367.70	42.10	1,022	24.276	0.041	
11:39	9	367.50	367.50	41.90	1,022	24.391	0.041	
11:40	10	367.63	367.63	42.03	1,033	24.578	0.041	11.75" ≈ 1,033 gpm
11:45	15	368.34	368.34	42.74	1,033	24.169	0.041	Sample1 at 15 min
11:50	20	369.00	369.00	43.40	1,033	23.802	0.042	
11:55	25	369.59	369.59	43.99	1,033	23.483	0.043	
12:00	30	370.03	370.03	44.43	1,044	23.498	0.043	12" ≈ 1,044 gpm
12:10	40	370.63	370.63	45.03	1,044	23.185	0.043	
12:20	50	371.20	371.20	45.60	1,044	22.895	0.044	
12:30	60	371.59	371.59	45.99	1,044	22.701	0.044	Sample2 at 60 min
12:50	80	372.08	372.08	46.48	1,044	22.461	0.045	
13:10	100	372.49	372.49	46.89	1,044	22.265	0.045	12" ≈ 1,044 gpm
13:30	120	372.80	372.80	47.20	1,044	22.119	0.045	Sample3 at 120 min
13:50	140	372.53	372.53	46.93	1,044	22.246	0.045	
14:10	160	372.80	372.80	47.20	1,044	22.119	0.045	
14:30	180	372.80	372.80	47.20	1,044	22.119	0.045	12" ≈ 1,044 gpm
14:50	200	373.00	373.00	47.40	1,044	22.025	0.045	Sample4 at 240min
15:30	240	373.31	373.31	47.71	1,044	21.882	0.046	Tot.=16,119,000 gal
15:31	241				1,261			**Step 2**
15:32	242				1,261			17.5" ≈ 1,261 gpm
15:33	243	383.12	383.12	57.52	1,261	21.923	0.046	
15:34	244	383.32	383.32	57.72	1,261	21.847	0.046	
15:35	245	383.60	383.60	58.00	1,261	21.741	0.046	
15:36	246	383.62	383.62	58.02	1,261	21.734	0.046	
15:37	247	383.70	383.70	58.10	1,261	21.704	0.046	

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
15:38	248	383.82	383.82	58.22	1,261	21.659	0.046	
15:39	249	383.90	383.90	58.30	1,261	21.630	0.046	
15:40	250	383.88	383.88	58.28	1,261	21.637	0.046	17.5" ≈ 1,261 gpm
15:45	255	384.06	384.06	58.46	1,261	21.570	0.046	Sample5 at 255 min
15:50	260	384.31	384.31	58.71	1,261	21.478	0.047	17.5" ≈ 1,261 gpm
15:55	265	384.50	384.50	58.90	1,261	21.409	0.047	
16:00	270	384.58	384.58	58.98	1,261	21.380	0.047	
16:10	280	384.63	384.63	59.03	1,261	21.362	0.047	
16:20	290	384.67	384.67	59.07	1,261	21.348	0.047	Sample6 at 300 min
16:30	300	384.70	384.70	59.10	1,261	21.337	0.047	17.5" ≈ 1,261 gpm
16:50	320	384.74	384.74	59.14	1,261	21.322	0.047	
17:10	340	384.80	384.80	59.20	1,261	21.301	0.047	Sample7 at 360 min
17:30	360	384.95	384.95	59.35	1,261	21.247	0.047	17.5" ≈ 1,261 gpm
17:50	380	385.10	385.10	59.50	1,261	21.193	0.047	
18:10	400	385.22	385.22	59.62	1,261	21.151	0.047	
18:30	420	385.32	385.32	59.72	1,261	21.115	0.047	
18:50	440	385.40	385.40	59.80	1,261	21.087	0.047	Sample8 at 480 min
19:30	480	385.70	385.70	60.10	1,261	20.982	0.048	Tot.=16,431,000 gal
19:31	481				1,551			**Step 3**
19:32	482				1,551			26.5" ≈ 1,551 gpm
19:33	483	399.20	399.20	73.60	1,551	21.073	0.047	
19:34	484	399.50	399.50	73.90	1,551	20.988	0.048	
19:35	485	399.80	399.80	74.20	1,551	20.903	0.048	
19:36	486	399.90	399.90	74.30	1,551	20.875	0.048	
19:37	487	399.92	399.92	74.32	1,551	20.869	0.048	
19:38	488	400.05	400.05	74.45	1,551	20.833	0.048	
19:39	489	400.24	400.24	74.64	1,551	20.780	0.048	
19:40	490	400.38	400.38	74.78	1,551	20.741	0.048	26.5" ≈ 1,551 gpm
19:45	495	400.77	400.77	75.17	1,551	20.633	0.048	Sample9 at 495 min
19:50	500	401.16	401.16	75.56	1,551	20.527	0.049	26.5" ≈ 1,551 gpm
19:55	505	401.26	401.26	75.66	1,551	20.500	0.049	
20:00	510	401.34	401.34	75.74	1,551	20.478	0.049	
20:10	520	401.39	401.39	75.79	1,551	20.464	0.049	
20:20	530	401.44	401.44	75.84	1,551	20.451	0.049	
20:30	540	401.46	401.46	75.86	1,551	20.446	0.049	Sample10at 540 min
20:50	560	401.47	401.47	75.87	1,551	20.443	0.049	
21:10	580	401.43	401.43	75.83	1,551	20.454	0.049	
21:30	600	401.69	401.69	76.09	1,551	20.384	0.049	Sample11at 600 min
21:50	620	401.93	401.93	76.33	1,551	20.320	0.049	
22:10	640	402.12	402.12	76.52	1,551	20.269	0.049	
22:30	660	402.38	402.38	76.78	1,551	20.201	0.050	26.5" ≈ 1,551 gpm
22:50	680	402.62	402.62	77.02	1,551	20.138	0.050	Sample12at 720 min
23:30	720	402.95	402.95	77.35	1,551	20.052	0.050	Tot.=16,816,000 gal
23:31	721				1,845			**Step 4**
23:32	722				1,845			37.5" ≈ 1,845 gpm
23:33	723	416.50	416.50	90.90	1,845	20.297	0.049	
23:34	724	416.59	416.59	90.99	1,845	20.277	0.049	

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
23:35	725	416.70	416.70	91.10	1,845	20.252	0.049	
23:36	726	416.74	416.74	91.14	1,845	20.244	0.049	
23:37	727	416.90	416.90	91.30	1,845	20.208	0.049	
23:38	728	417.00	417.00	91.40	1,845	20.186	0.050	
23:39	729	417.07	417.07	91.47	1,845	20.171	0.050	
23:40	730	417.20	417.20	91.60	1,845	20.142	0.050	37.5" ≈ 1,845 gpm
23:45	735	417.65	417.65	92.05	1,845	20.043	0.050	Sample13at 735 min
23:50	740	417.72	417.72	92.12	1,845	20.028	0.050	
23:55	745	417.80	417.80	92.20	1,845	20.011	0.050	
0:00	750	417.84	417.84	92.24	1,845	20.002	0.050	**11/7/2007**
0:10	760	417.93	417.93	92.33	1,845	19.983	0.050	
0:20	770	417.98	417.98	92.38	1,845	19.972	0.050	Sample14at 780 min
0:30	780	418.10	418.10	92.50	1,845	19.946	0.050	37.5" ≈ 1,845 gpm
0:50	800	418.18	418.18	92.58	1,845	19.929	0.050	
1:10	820	418.26	418.26	92.66	1,845	19.912	0.050	Sample15at 840 min
1:30	840	418.33	418.33	92.73	1,845	19.896	0.050	37.5" ≈ 1,845 gpm
1:50	860	418.48	418.48	92.88	1,845	19.864	0.050	
2:10	880	418.64	418.64	93.04	1,845	19.830	0.050	
2:30	900	418.83	418.83	93.23	1,845	19.790	0.051	
2:50	920	419.03	419.03	93.43	1,845	19.747	0.051	Sample16at 960 min
3:30	960	419.35	419.35	93.75	1,845	19.680	0.051	Tot.=17,273,000 gal
3:31	961				2,224			**Step 5**
3:32	962				2,224			54.5" ≈ 2,224 gpm
3:33	963				2,224			
3:34	964	438.05	438.05	112.45	2,224	19.778	0.051	
3:35	965	438.80	438.80	113.20	2,224	19.647	0.051	
3:36	966	439.00	439.00	113.40	2,224	19.612	0.051	
3:37	967	439.30	439.30	113.70	2,224	19.560	0.051	
3:38	968	439.50	439.50	113.90	2,224	19.526	0.051	
3:39	969	439.50	439.50	113.90	2,224	19.526	0.051	
3:40	970	439.68	439.68	114.08	2,224	19.495	0.051	54.5" ≈ 2,224 gpm
3:45	975	440.02	440.02	114.42	2,224	19.437	0.051	Sample17at 975 min
3:50	980	440.37	440.37	114.77	2,224	19.378	0.052	
3:55	985	440.70	440.70	115.10	2,224	19.322	0.052	
4:00	990	440.93	440.93	115.33	2,224	19.284	0.052	54.5" ≈ 2,224 gpm
4:10	1000	441.10	441.10	115.50	2,224	19.255	0.052	
4:20	1010	441.23	441.23	115.63	2,224	19.234	0.052	
4:30	1020	441.37	441.37	115.77	2,224	19.211	0.052	Sample18at 1020 min
4:50	1040	441.48	441.48	115.88	2,224	19.192	0.052	
5:10	1060	441.61	441.61	116.01	2,224	19.171	0.052	
5:30	1080	441.75	441.75	116.15	2,224	19.148	0.052	Sample19at 1080 min
5:50	1100	441.85	441.85	116.25	2,224	19.131	0.052	
6:10	1120	441.94	441.94	116.34	2,224	19.116	0.052	
6:30	1140	442.03	442.03	116.43	2,224	19.102	0.052	54.5" ≈ 2,224 gpm
6:50	1160	442.18	442.18	116.58	2,224	19.077	0.052	Sample20at 1200 min
7:30	1200	442.20	442.20	116.60	2,224	19.074	0.052	**Pump off**
								Tot.=17,828,000 gal
END OF STEP TEST								

Note: Maximum GPM of the efficiency curve on the pump is 2,000 to 2,200 GPM.

Well Evacuation Record - Constant Rate Test

Southwest Ground-water Consultants, Inc.

Date: 11/08 - 11/10/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE & SAG

Pump Agency:	The Weber Group	Static Water Level (feet bls):	327.00
Foreman:	Joe / Nathan / John	Measure Point:	Top of sounding tube
Method of Evacuation:	Pump - Constant Rate Test Average Q ≈ 1,536 gpm	Stick Up (feet):	1.25
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Line Correction (feet):	300

Time	Water Level (feet bls)	Temp. (°F)	pH	Specific Cond. (µs/cm)	TDS (ppm)	Turbidity*	Solids** (Rossum cone)	Remarks
								11/8/2007
11:00	327.00							**SWL - Pump on**
11:05								Sample 1 @ 5 min
11:15								Sample 2 @ 15 min
11:30								Sample 3 @ 30 min
11:45								Sample 4 @ 45 min
12:00	394.33	84.2	7.80	237	119	clear	trace	Sample 5 @ 60 min
13:00	396.38	82.9	7.75	231	115	clear		Sample 6 @ 120 min
14:00	397.13							Sample 7 @ 180 min
15:00	397.58	80.6	7.71	233	116	clear		Sample8 @ 240min & NS
								DRE onsite - Diff. meter
17:00	398.05	81.1	8.05	300	150	clear	none	Sample 9 @ 360 min
19:00	400.15							Sample 10 @ 480 min
21:00	400.85	80.8	8.06	300	150	clear	none	Sample 11 @ 600 min
								11/9/2007
0:20	401.78	81.0	8.06	300	150	clear	none	
3:40	402.61	81.1	8.06	290	140	clear	none	
7:00	403.43	80.8	8.06	290	140	clear	trace	
11:00	403.3							Sample 12 @ 1440 min
								SAG onsite - Diff. meter
12:00	403.4	81.1	8.01	230	150	clear	none	
17:00	403.45	81.5	8.01	231	150	clear	none	
								DRE onsite - Diff. meter
23:40	403.92	81.3	8.04	300	150	clear	none	
								11/10/2007
6:20	405.08	81.1	8.04	290	140	clear	none	
10:50	404.00	81.1	8.04	300	150	clear	none	
11:00	404.00							**Pump off**
END OF CONSTANT RATE TEST								

Notes:

* = clear, milky, low, medium, high
DTW = Depth to Water

µs/cm = microsiemens/centimeter
ppm = parts per million

(R)=Rossum Sand Cone

Constant Rate Test Record

Southwest Ground-water Consultants, Inc.

Date: 11/08 - 11/10/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE & SAG

Pump Agency:	The Weber Group	Static Water Level:	327.00 feet bls
Foreman:	Joe / Nathan / John	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Stick Up:	1.25 feet
Average Q:	Average Q ≈ 1,536 gpm	Line Correction:	300 feet

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
11:00	0		327.00	0	0			**Pump on. 11/8/07**
11:01	1				1,507			Tot.=17,830,000 g
11:02	2				1,507			10"x 8" orifice
11:03	3				1,507			25" ≈ 1507 gpm
11:04	4	668.17	366.92	39.92	1,507	37.751	0.0265	
11:05	5	668.42	367.17	40.17	1,507	37.516	0.0267	
11:06	6				1,522			25.5" ≈ 1,522 gpm
11:07	7	690.58	389.33	62.33	1,536	24.643	0.0406	26"≈1536 gpm. ↓ valve
11:08	8	693.42	392.17	65.17	1,500	23.017	0.0434	
11:09	9	692.63	391.38	64.38	1,461	22.693	0.0441	23.5"≈1461 gpm. ↑ valve
11:10	10	694.00	392.75	65.75	1,536	23.361	0.0428	26"≈1536 gpm. ↓ valve
11:15	15	692.75	391.50	64.50	1,491	23.116	0.0433	24.5"≈1491gpm. ↑ valve
11:20	20	692.67	391.42	64.42	1,507	23.393	0.0427	25" ≈ 1507 gpm
11:30	30	694.25	393.00	66.00	1,507	22.833	0.0438	
11:45	45	695.42	394.17	67.17	1,507	22.436	0.0446	
11:50	50	695.50	394.25	67.25	1,507	22.409	0.0446	
12:00	60	695.58	394.33	67.33	1,507	22.382	0.0447	
12:10	70	696.21	394.96	67.96	1,507	22.175	0.0451	
12:20	80	696.13	394.88	67.88	1,507	22.201	0.0450	↑ valve to keep 25"
12:30	90	696.75	395.50	68.50	1,507	22.000	0.0455	
12:40	100	697.04	395.79	68.79	1,507	21.907	0.0456	
13:00	120	697.63	396.38	69.38	1,507	21.721	0.0460	↑ valve to keep 25"
14:00	180	698.38	397.13	70.13	1,507	21.489	0.0465	
14:20	200	698.41	397.16	70.16	1,507	21.479	0.0466	
15:00	240	698.83	397.58	70.58	1,507	21.352	0.0468	New Source Sample
16:00	300	699.04	397.79	70.79	1,507	21.288	0.0470	↑ valve to keep 25"
17:00	360	699.30	398.05	71.05	1,507	21.210	0.0471	
17:40	400	699.68	398.43	71.43	1,507	21.098	0.0474	
19:00	480	701.40	400.15	73.15	1,507	20.602	0.0485	25" ≈ 1507 gpm
19:20	500	701.54	400.29	73.29	1,507	20.562	0.0486	
21:00	600	702.10	400.85	73.85	1,522	20.609	0.0485	25.5" ≈ 1,522 gpm
22:40	700	702.65	401.40	74.40	1,522	20.457	0.0489	
0:20	800	703.03	401.78	74.78	1,536	20.540	0.0487	26"≈1536 gpm. **11/9/07**
2:00	900	703.40	402.15	75.15	1,536	20.439	0.0489	26" ≈ 1536 gpm
3:40	1000	703.86	402.61	75.61	1,536	20.315	0.0492	
5:20	1100	704.30	403.05	76.05	1,536	20.197	0.0495	
7:00	1200	704.68	403.43	76.43	1,551	20.293	0.0493	26.5" ≈ 1,551 gpm
10:20	1400	704.58	403.28	76.28	1,536	20.136	0.0497	New sounder. LC=301.3

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
13:40	1600	704.80	403.50	76.50	1,536	20.078	0.0498	26" ≈ 1536 gpm
17:00	1800	704.75	403.45	76.45	1,536	20.092	0.0498	26" ≈ 1536 gpm
20:20	2000	705.00	403.70	76.70	1,536	20.026	0.0499	
23:40	2200	705.22	403.92	76.92	1,536	19.969	0.0501	**11/10/2007**
3:00	2400	705.91	404.61	77.61	1,536	19.791	0.0505	
6:20	2600	706.38	**405.08**	**78.08**	1,551	19.864	0.0503	26.5" ≈ 1,551 gpm
9:40	2800	705.70	404.40	77.40	1,536	19.845	0.0504	26" ≈ 1536 gpm
11:00	2880	705.30	404.00	77.00	1,522	19.766	0.0506	25.5" ≈ 1,522 gpm
								Tot.=22,397,000 g
END OF CONSTANT RATE TEST								

78.08 Max. Ddn
405.08 Max. PWL

Constant Rate Test Recovery Record

Southwest Ground-water Consultants, Inc.

Date: 11/10 - 11/12/2007

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	Weber	Static Water Level:	327.00 feet bls
Foreman:	Joe / Nathan / John	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Stick Up:	1.3 feet
Average Q:	Average Q ≈ 1,536 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start (t)	Time Since Pump Stop (t')	Ratio t/t'	Sounder Reading	Water Level	Resid. Draw Down (s')	Remarks
	minutes	minutes		feet	feet	feet	
11:00	2880	0		405.10	403.80	76.80	**Pump off. 11/10/07**
11:01	2881	1	2881	316.75	315.45	-11.55	
11:02	2882	2	1441	320.20	318.90	-8.10	
11:03	2883	3	961	343.90	342.60	15.60	
11:04	2884	4	721	343.80	342.50	15.50	
11:05	2885	5	577	343.30	342.00	15.00	
11:06	2886	6	481	342.82	341.52	14.52	
11:07	2887	7	412	342.50	341.20	14.20	
11:08	2888	8	361	342.12	340.82	13.82	
11:09	2889	9	321	341.83	340.53	13.53	
11:10	2890	10	289	341.58	340.28	13.28	
11:20	2900	20	145	340.03	338.73	11.73	
11:30	2910	30	97	338.54	337.24	10.24	
11:40	2920	40	73	337.86	336.56	9.56	
11:50	2930	50	59	337.20	335.90	8.90	
12:00	2940	60	49	336.83	335.53	8.53	89% recovery
12:10	2950	70	42	336.50	335.20	8.20	
12:20	2960	80	37	336.20	334.90	7.90	
12:30	2970	90	33	335.92	334.62	7.62	
12:40	2980	100	30	335.65	334.35	7.35	90% recovery
12:50	2990	110	27	335.40	334.10	7.10	
13:00	3000	120	25	335.22	333.92	6.92	
13:10	3010	130	23	335.05	333.75	6.75	91% recovery
							11/11/2007
11:00	4320	1440	3	329.79	328.49	1.49	98% recovery
							11/12/2007
11:00	5760	2880	2	328.80	327.50	0.50	99% recovery
END OF RECOVERY TEST							

APPENDIX H

APPENDIX H

BUENA VISTA WELL #1 SPINNER LOGGING RESULTS

APPENDIX I

APPENDIX I

BUENA VISTA WELL #1 WELL VIDEO SURVEY

WeberGroup L.C.

Well Video Log

16825 S. Weber Drive, Chandler, AZ 85226-4112 * 480-961-1141 * Fax 480-961-0290
18403 W. McDowell Road, Goodyear, AZ 85338-5613 * 623-853-9901 * Fax 623-853-9902
2838 W. Ruthrauff Road, Tucson, AZ 85705-1860 * 520-887-2170 * Fax 520-408-0832

Date: 2-13-08

Customer: Arizona Beeman Drilling Job #: 7235

Location: Take loop 303 north to Bell Road west to 219th ave. north to CAP Canal and dirt road meet,

Follow the canal fence back south ¼ mile to well. Well #: Buena Vista #1

City: Surprise County: Maricopa State: Arizona

Case Size: 16" ID Liner Size: N/A

Drilling Method Rotary Orig. Depth 1480' Current Depth 1479' S.W.L. 325'

Reference by: Fred T. P. O. #:

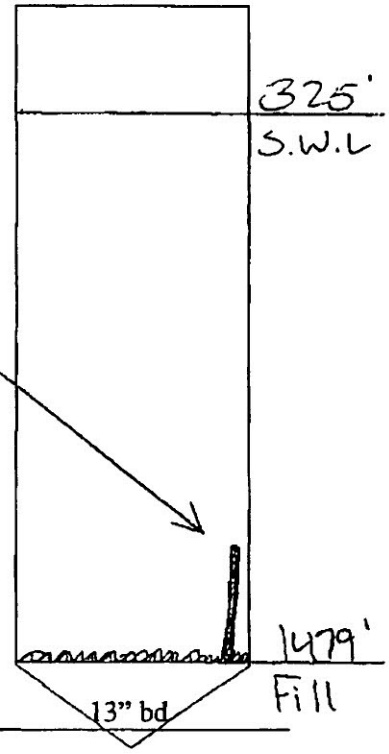
Type of Perforation: Louvers from 531' to 625', Blank casing Type Drive N/A

625' to 675', Louvers from 675' to 1460'

Blank casing 1460' to 1479'.

Results: There is about a 1' of oil on top of the water.
The water was dirty from 325' to 420', cloudy from 420' to 490' & cloudy again from 1200' to fill.
There was minor build up on the casing from 460' to 1460'.
There was a piece of debris or airline from 1472' into the fill.
The perforations appeared mostly open w/ light fluff from 531' to 625', mostly open w/ fluff from 675' to 715', partially open w/ fluff 715' to 805', mostly open w/ fluff 805' to 920', partially open w/ fluff 920' to 1240' & mostly open w/ fluff 1240' to 1460'.
There were no visible defects.

GPS Elev. 1470'
N 33* 42' 39.3"
W 112* 32' 53.6"



Signed: Nathan Rewlcs Bottom 1480' 13" bd

C:\Documents and Settings\Marianne\My Documents\well reports\azbeemanbuenavista#1.doc

APPENDIX J

APPENDIX J

BUENA VISTA WELL #1 GYROSCOPIC DIRECTIONAL SURVEY (COMPLETED WELL)

Southwest Exploration Services, LLC
borehole geophysics & video services

GYRO - Deviation Plot: Bulls-Eye View

Survey Calculation Method : *Minimum Curvature*

Gyro Reference : *True North*
Mag Declination : *11.5 Deg*

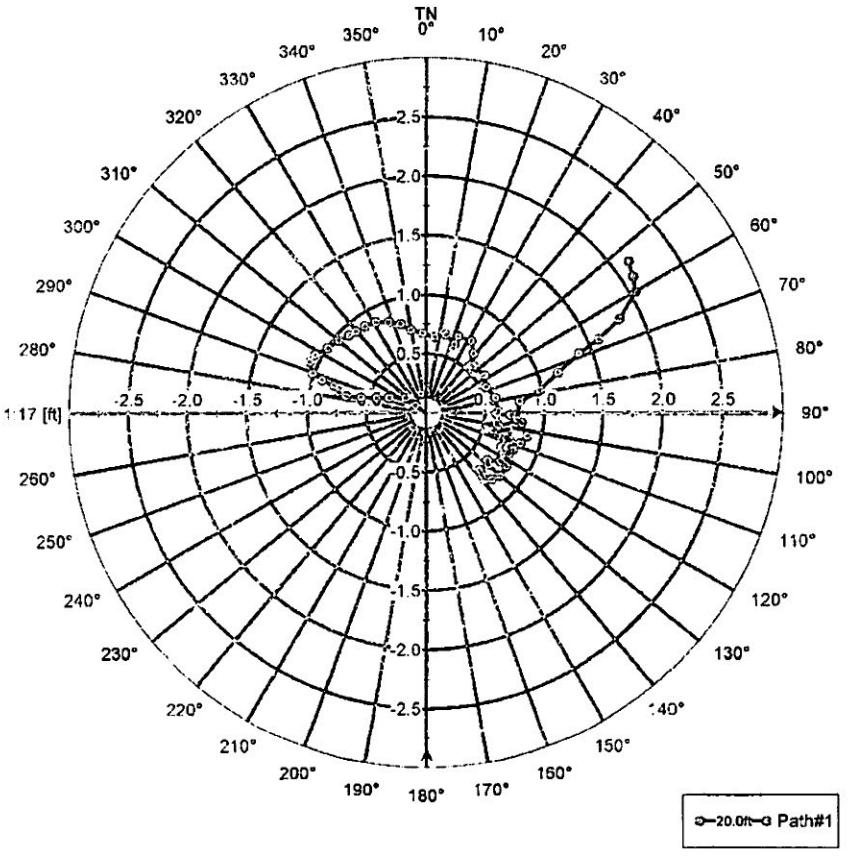
WELL #	*BUENA VISTA #1*	**DATE**	*2-29-08*
CLIENT	*SOUTHWEST GROUND-WATER CONSULT.*		
FIELD/SITE	*SURPRISE*		
COUNTY	*MARICOPA*	**STATE**	*ARIZONA*
OPERATOR	*E. TURNER*	**WITNESS**	*NONE*
Field Note:	*20 FT STATIONS*		

FINAL LOCATION

CLOSURE DISTANCE	2.14 FT
BEARING	53.34 DEG
TVD	1459.97 FT

Cased hole survey *YES*
Tool Zero Reference *Ground Level*
Tool Model *WELLNAV*

Centralized *Yes = 16'*
Elevation:
Serial No: *SWEXP-1*



Southwest Exploration Services, LLC
borehole geophysics & video services

GYRO - Deviation Plot: Closure View

Survey Calculation Method : *Minimum Curvature*

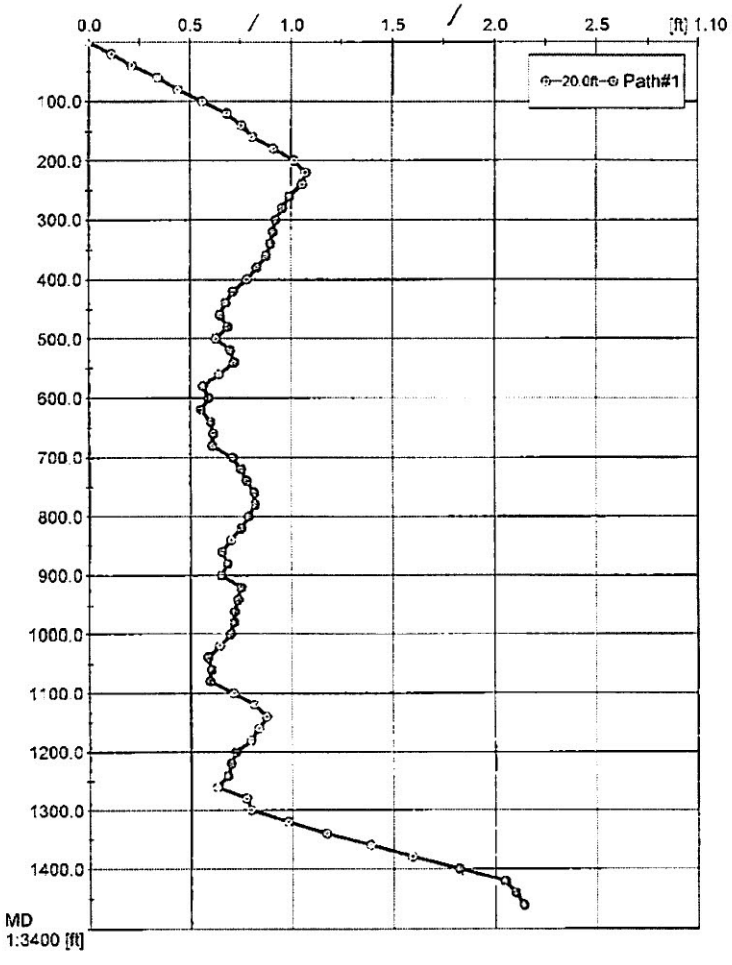
Gyro Reference : *True North*
Mag Declination : *11.5 Deg*

WELL #	*BUENA VISTA #1*	DATE	*2-29-08*
CLIENT	*SOUTHWEST GROUND-WATER CONSULT.*		
FIELD/SITE	*SURPRISE*		
COUNTY	*MARICOPA*	STATE	*ARIZONA*
OPERATOR	*E. TURNER*	WITNESS	*NONE*
Field Note:	*20 FT STATIONS*		

FINAL LOCATION

CLOSURE DISTANCE	2.14 FT
BEARING	53.34 DEG
TVD	1459.97 FT

Cased hole survey	*Yes*	Centralized	*Yes = 16"*
Tool Zero Reference	*Ground Level*	Elevation:	
Tool Model	*Weinav. SRG 301040-1*	Serial No:	SWEXP-1



APPENDIX K

APPENDIX K

BUENA VISTA WELL #1 VARIANCE REQUESTS FOR PUMPING RATE AND WELL EFFICIENCY REQUIREMENTS

Southwest Ground-water Consultants, Inc.

November 29, 2007

Ms. Nancy Eberlein
City of Surprise
Water Services Department
12425 West Bell Road, Suite D100
Surprise, Arizona 85374-9002

SUBJECT: VARIANCE REQUEST OF CITY OF SURPRISE PUMP RATE AND WELL EFFICIENCY REQUIREMENTS FOR BUENA VISTA WELL #1 AND BUENA VISTA WELL #2

Dear Ms. Eberlein:

Southwest Ground-water Consultants, Inc. (SGC) hereby requests variances from the City of Surprise (COS) standards for maximum pumping rate and minimum well efficiency requirements for Buena Vista well #1 (BV#1, 55-213204) and Buena Vista well #2 (BV#2, 55-214510). A location map for the BV wells is provided as Figure 1 in Attachment I.

The Buena Vista wells were installed by Arizona Beeman Drilling for the West Deer Valley Water Group per the City of Surprise (COS) Technical Specifications (revised September 8, 2006) and the SGC approved addendum. Aquifer test data and well efficiency are summarized in Attachment II, and As-built diagrams for both wells are presented in Attachment III.

Both wells meet COS water quality standards.

BUENA VISTA WELL #1

BV#1 is located in the NE ¼ of the NE ¼ of the NE ¼ of Section 10, Township 4 North, Range 3 West of the Gila and Salt River Baseline and Meridian. BV#1 was completed to a depth of 1,480 feet below land surface (ft bls) in November 2007. The perforated intervals are from 530 to 625 ft bls and from 675 to 1,460 ft bls (Figure 13).

Aquifer Tests

A 20-hour step aquifer test (5 4-hour steps) was conducted at BV#1 from November 6 to November 7, 2007 (Figure 2 and Table 1, Attachment II). The static water level was 325.60 ft bls prior to the start of the test. A summary of the step-test results are presented in the following chart.

3033 N. 44th Street, Suite 120
Phoenix, Arizona 85013
(602) 955-5547 Fax (602) 955-7585

Phoenix, Arizona
Prescott, Arizona

Step	Average Discharge Rate (gpm)	Drawdown at End of Step (feet)	Specific Capacity (gpm/ft)
1	1,044	47.71	21.9
2	1,261	60.10	21.0
3	1,551	77.35	20.1
4	1,845	93.75	19.7
5	2,224	116.6	19.1

Following the step-test, a 48-hour constant rate aquifer test was conducted at BV#1 from November 8 to November 10, 2007 (Figure 3 and Table 2, Attachment II). The static water level was 327.00 ft bls prior to the start of the test. The average discharge rate during the test was 1,536 gpm and the maximum drawdown was 78.08 ft bls (pumping water level of 405.08 ft bls) resulting in a specific capacity of 19.7 gpm/ft. Once the pumping test was completed, recovery measurements were collected (Figure 4 and Table 2, Attachment II).

Transmissivity values for the underlying aquifer were calculated to be approximately 64,000 gallons per day per foot (gpd/ft) and 70,000 gpd/ft using the Cooper-Jacob method and the Theis recovery method, respectively. The Theis recovery method is subject to inherently fewer sources of error and is believed to more accurately represent aquifer properties. Therefore, SGC feels that 70,000 gpd/ft is more representative of the underlying aquifer.

BV#1 Well Efficiency

Determination of well efficiency should be based on the theoretical specific capacity of a well which is a function of the transmissivity of the aquifer. Ideally, this requires test data from a fully penetrating test well and an observation well (Mogg, 1968). The November 8, 2007 aquifer test performed at BV#1 did not meet these criteria.

When evaluating well efficiency, it is important to remember that conventional well hydraulic theory assumes that laminar flow conditions exist in the aquifer during pumping. However, turbulent flow occurring in and/or near the well and in the formation can affect the assumptions upon which well hydraulic equations are based. Nevertheless, given that the well efficiency is equal to the actual 1-day specific capacity (SC) divided by the theoretical specific capacity (Driscoll, 1989), then the efficiency of BV#1 during the constant rate test was 47%. This number was calculated as follows:

$$\text{Well Efficiency}^{*} = \frac{SC_{\text{actual}}}{SC_{\text{theoretical}}} = \frac{20}{43} \times 100 = 47\,\%$$

where:

$$SC_{\text{actual}} = \frac{Q}{s} = \frac{1{,}536}{76.28} = 20 \text{ gpm/ft} \qquad \text{(Test Data)}$$

$$SC_{\text{theoretical}} = \frac{Q}{s} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{64{,}000}{264 \log \frac{0.3(64{,}000)(1)}{(0.75)^2 (0.086)}} = 43 \text{ gpm/ft} \qquad \text{(Jacob's Equation)}$$

and:

$Q = discharge\ rate = 1{,}536$ gallons per minute (gpm)

$s = drawdown = 76.28$ feet

$r = well\ radius = 0.75$ feet

$t = time = 1$ day

$T = transmissivity = 64{,}000$ gpd/ft

$S = Specific Yield = 0.086$

reference:

* J.L. Mogg (1968) "Step Drawdown Test Needs Critical Review." *The Johnson Drillers' Journal*, July-August, Johnson Division, UOP, Inc., St. Paul, MN.

Fletcher Driscoll, Groundwater and Wells, 2nd Edition (1989) p558.

The head loss due to laminar flow of the well was also evaluated based on data collected during the step test using a method described by Bierschenk (1964). The formation loss coefficient, B, and the well loss coefficient, C, were determined based on a linear regression analysis of the specific drawdown versus discharge. The remaining coefficients were used to calculate the percentage of laminar flow at pump rates of 1,500 gpm (83.0%), 1,750 gpm (80.7%), 1,900 gpm (79.4%), and 2,100 gpm (77.7%) (Figure 5, Attachment II).

Well Spacing Analysis

The maximum pump rate for well BV#1 was determined according to ADWR well spacing rules, which requires that the nearest Well of Record (as defined by ADWR Rule R12-15-1301) not be impacted by more than ten feet of drawdown in a five-year period. Aquifer parameters used in the analysis include transmissivity (T), specific yield (Sy) and

saturated thickness (b). These values were derived from the constant rate test, the Salt River Valley (SRV) Model of ground-water flow (Corell and Corkhill, 1994), and the difference between the static water level elevation and the bottom elevation of the lowermost perforations, respectively. Three image well boundaries have been included in the analysis (Figure 6, Attachment II). The parameters for this well are summarized in the chart below.

Parameter	Unit
Transmissivity	70,000 gpd/ft
Specific Yield	0.086
Saturated Thickness	1,133 ft

The aquifer impact was estimated using THWELLS v 4.01 multi-Theis analysis software (van der Heijde, 1996), which uses the Theis non-equilibrium equation (1935). THWELLS calculates drawdown over a grid of specified data points. Using the unconfined aquifer option, the calculated drawdown at each well was corrected using the method described by Jacob (1946).

The drawdown grid after 5 years of pumping was calculated assuming that the proposed well continuously pumps at the rate of 2,822.8 acre-feet per year (1,750 gallons per minute) (Figure 7, Attachment II). However, the well will be operated only 80% of the time. This equates to a pumping rate of 2,188 gpm (1,750 ÷ 0.8).

Based on the results presented above, SGC recommends that BV#1 be equipped with a permanent pump capable of producing 2,100 gpm. Based on a pumping rate of 2,188 gpm, the specific capacity measured during the constant rate test (19.7 gpm/ft), and the static water level of 327.00 ft bls, the maximum drawdown would be equal to 111.1 ft bls, which is equivalent to a pumping water level of 438.1 ft bls. However, for continuity with BV#2, the recommended pumping rate is 1,900 gpm resulting in a pumping water level of 417 feet.

BUENA VISTA WELL 2

Buena Vista well 2 (ADWR Registration No. 55-214510) is located in the NW ¼ of the SW ¼ of the NW ¼ of Section 11, Township 4 North, Range 3 West of the Gila and Salt River Baseline and Meridian. BV#2 was completed to a depth of 1,480 ft bls in October 2007. The perforated intervals are from 550 to 600 ft bls, from 650 to 1,070 ft bls, and from 1,100 to 1,460 ft bls.

Aquifer Tests

A 20-hour step aquifer test (5 4-hour steps) was conducted at BV#2 from October 1 to October 2, 2007 (Figure 8 and Table 3, Attachment II). The static water level was 316.05

ft bls prior to the start of the test. A summary of the step-test results are presented in the following chart.

Step	Average Discharge Rate (gpm)	Drawdown at End of Step (feet)	Specific Capacity (gpm/ft)
1	1,100	53.53	20.5
2	1,500	76.19	19.7
3	1,900	99.28	19.1
4	2,300	124.88	18.4
5	2,700	148.15	18.2

Following the step-test, a 48-hour constant rate aquifer test was conducted at BV#2 from November 8 to November 10, 2007 (Figure 9 and Table 4, Attachment II). The static water level was 318.42 ft bls prior to the start of the test. The average discharge rate during the test was 1,500 gpm and the maximum drawdown was 78.30 ft bls (pumping water level of 396.72 ft bls), resulting in a specific capacity of 19.2 gpm/ft. Once the pumping test was completed, recovery measurements were collected (Figure 10 and Table 4, Attachment II).

Transmissivity values for the underlying aquifer were calculated to be approximately 61,000 gpd/ft and 55,000 gpd/ft using the Cooper-Jacob method and the Theis recovery method, respectively. The Theis recovery method is subject to inherently fewer sources of error and is believed to more accurately represent aquifer properties. Therefore, SGC feels that 55,000 gpd/ft is more representative of the underlying aquifer.

Well Efficiency

The well efficiency of BV#2 was calculated using the same method and assumptions described for BV#1. The well efficiency during the constant rate test of October 3, 2007, was calculated to be 46% using the Cooper-Jacob method. This number was calculated as follows:

$$\text{Well Efficiency}^{*} = \frac{SC_{\text{actual}}}{SC_{\text{theoretical}}} = \frac{19}{41} \times 100 = 46\,\%$$

where:

$$SC_{\text{actual}} = \frac{Q}{s} = \frac{1{,}500}{76.98} = 19 \text{ gpm/ft} \qquad \text{(Test Data)}$$

$$SC_{\text{theoretical}} = \frac{Q}{s} = \frac{T}{264 \log \frac{0.3Tt}{r^2 S}} = \frac{61{,}000}{264 \log \frac{0.3(61{,}000)(1)}{(0.75)^2 (0.086)}} = 41 \text{ gpm/ft} \qquad \text{(Jacob's Equation)}$$

and:

$Q = \textit{discharge rate} = 1{,}500$ gallons per minute (gpm)

$s = \textit{drawdown} = 76.98$ feet

$r = \textit{well radius} = 0.75$ feet

$t = \textit{time} = 1$ day .

$T = \textit{transmissivity} = 61{,}000$ gpd/ft

$S = \textit{Specific Yield} = 0.086$

reference:

* J.L. Mogg (1968) "Step Drawdown Test Needs Critical Review." *The Johnson Drillers' Journal*, July-August, Johnson Division, UOP, Inc., St. Paul, MN.

Fletcher Driscoll, Groundwater and Wells, 2nd Edition (1989) p558.

Using the Bierschenk (1964) method, the percentage of laminar flow for pump rates of 1,500 gpm, 1,575 gpm, and 1,900 gpm were calculated to be 86.4%, 85.8%, and 83.4%, respectively (Figure 11, Attachment II).

Well Spacing Analysis

The maximum pump rate for well BV#2 was determined according to ADWR well spacing rules, which requires that the nearest Well of Record (as defined by ADWR Rule R12-15-1301) not be impacted by more than ten feet of drawdown in a five-year period. Aquifer parameters used in the analysis include transmissivity (T), specific yield (Sy) and saturated thickness (b). These values were derived from the constant rate test, the Salt River Valley (SRV) Model of ground-water flow (Corell and Corkhill, 1994), and the difference between the static water level elevation and the bottom elevation of the

lowermost perforations, respectively. Three image well boundaries have been included in the analysis (Figure 6, Attachment II). The parameters for this well are summarized in the chart below.

Parameter	Unit
Transmissivity	55,000 gpd/ft
Specific Yield	0.086
Saturated Thickness	1,142 ft

The aquifer impact was estimated using THWELLS v 4.01 multi-Theis analysis software (van der Heijde, 1996), which uses the Theis nonequilibrium equation (1935). THWELLS calculates drawdown over a grid of specified data points. Using the unconfined aquifer option, the calculated drawdown at each well was corrected using the method described by Jacob (1946).

The drawdown grid after 5 years of pumping was calculated assuming that the proposed well continuously pumps at the rate of 2,540.5 acre-feet per year (1,575 gallons per minute) (Figure 12, Attachment II). However, the well will be operated only 80% of the time. This equates to a pumping rate of 1,967 gpm (1,575 ÷ 0.8).

Based on the results presented above, SGC recommends that BV#2 be supplied with a permanent pump capable of producing 1,900 gpm. Based on a pumping rate of 1,967 gpm, the specific capacity measured during the constant rate test (19.2 gpm/ft), and the static water level of 318.42 ft bls, the maximum drawdown would be equal to 102.4 ft bls, which is equivalent to a pumping water level of 420.82 ft bls.

VARIANCES REQUESTED

On behalf of the West Deer Valley Water Group, SGC requests that the City of Surprise grant variances from the COS standards for maximum pumping rate and minimum well efficiency requirements for Buena Vista wells BV#1 and BV#2 based on the information provided. SGC believes that both wells were constructed and developed to their greatest potential and in compliance with the standards and review of the COS and the standards of the drilling industry. The variance requests are:

Well	COS Well Performance Standard (gpm)	Variance Request (gpm)	COS Well Efficiency Standard (%)	Variance Request (%)	
BV#1	1500	1900	85	47*	79**
BV#2	1500	1900	85	46*	83**

* Based on constant rate test using the Cooper-Jacob method.
** Based on percentage of laminar flow using the Bierschenk (1964) method.

Please call if you have any questions, or require any additional information.

Sincerely,

Southwest Ground-water Consultants, Inc.

Stephen D. Noel, P.G.
President

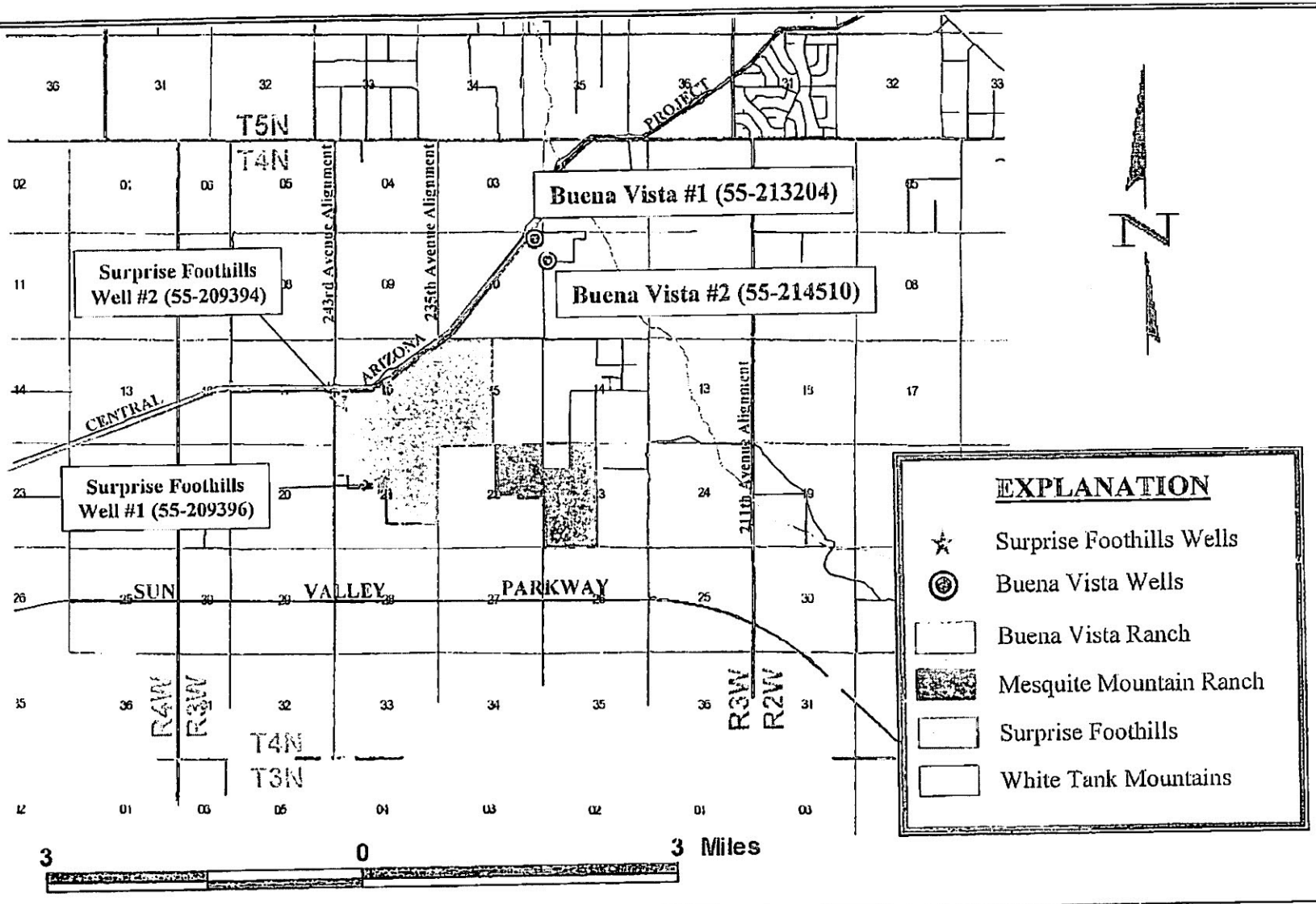
Attachments: Attachment I:
Figure 1 - Well Location Map
Attachment II:
Table 1 – Step Test Record, Buena Vista Well #1
Table 2 – Constant Rate test and Recovery Records, Buena Vista Well #1
Table 3 – Step Test Record, Buena Vista Well #2
Table 4 – Constant Rate test and Recovery Records, Buena Vista Well #2
Figure 2 – BV#1 Step Test
Figure 3 – BV#1 Constant Rate Test
Figure 4 – BV#1 Recovery Test
Figure 5 – BV#1 Headloss Plot
Figure 6 – Buena Vista Wells Well Spacing Image Well Boundaries
Figure 7 – BV#1 Well Spacing Analysis
Figure 8 – BV#2 Step Test
Figure 9 – BV#2 Constant Rate Test
Figure 10 – BV#2 Recovery Test
Figure 11– BV#2 Headloss Plot
Figure 12 – BV#2 Well Spacing Analysis
Attachment III:
Figure 13 – BV#1 As-built Diagram
Figure 14 – BV#1 As-built Diagram

c: Ms. Leah Grogan, Taylor Woodrow
Mr. Brandon Squire, P.E., Kimley-Horn and Associates, Inc.

IMMEDIATE

ATTACHMENT I

Figure 1 – Well Location Map



Southwest Ground-water Consultants, Inc.

April 25, 2007 Project B.1401

BUENA VISTA WELL LOCATIONS

Maricopa County, Arizona

Figure 1

ATTACHMENT II

Table 1 – BV#1 Step Test Record
Table 2 – BV#1 Constant Rate Test and Recovery Test Records
Table 3 – BV#2 Step Test Record
Table 4 – BV#2 Constant Rate Test and Recovery Test Records

Figure 2 – BV#1 Step Test Data Plot
Figure 3 – BV#1 Constant Rate Test Data Plot
Figure 4 – BV#1 Constant Rate Recovery Test Data Plot
Figure 5 – BV#1 Head Loss Due to Laminar Flow
Figure 6 – Buena Vista Well Spacing Setup
Figure 7 – BV#1 Well Spacing Analysis
Figure 8 – BV#2 Step Test Data Plot
Figure 9 – BV#2 Constant Rate Test Data Plot
Figure 10 – BV#2 Constant Rate Recovery Test Data Plot
Figure 11 – BV#2 Head Loss Due to Laminar Flow
Figure 12 – BV#2 Well Spacing Analysis

TABLE 1

STEP TEST RECORD
BUENA VISTA WELL #1

Step Test Record

Southwest Ground-water Consultants, Inc.

Date: 11/06 - 11/07/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	The Weber Group	Static Water Level:	325.60 feet bls
Foreman:	Omar	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Stick Up:	0 feet
Average Q:	Five, 4-hour steps @ 1044, 1261, 1551, 1845, and 2224 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
11:30	0	325.60	325.60	0	0			**Pump on. Step 1**
11:31	1				1,022			Tot.=15,865,000 g
11:32	2				1,022			**11/6/2007**
11:33	3	365.40	365.40	39.80	1,022	25.678	0.039	10"x8" orifice
11:34	4	365.77	365.77	40.17	1,022	25.442	0.039	11.5" ≈ 1,022 gpm
11:35	5	366.07	366.07	40.47	1,022	25.253	0.040	
11:36	6	366.40	366.40	40.80	1,022	25.049	0.040	
11:37	7	366.74	366.74	41.14	1,022	24.842	0.040	
11:38	8	367.70	367.70	42.10	1,022	24.276	0.041	
11:39	9	367.50	367.50	41.90	1,022	24.391	0.041	
11:40	10	367.63	367.63	42.03	1,033	24.578	0.041	11.75" ≈ 1,033 gpm
11:45	15	368.34	368.34	42.74	1,033	24.169	0.041	Sample1 at 15 min
11:50	20	369.00	369.00	43.40	1,033	23.802	0.042	
11:55	25	369.59	369.59	43.99	1,033	23.483	0.043	
12:00	30	370.03	370.03	44.43	1,044	23.498	0.043	12" ≈ 1,044 gpm
12:10	40	370.63	370.63	45.03	1,044	23.185	0.043	
12:20	50	371.20	371.20	45.60	1,044	22.895	0.044	
12:30	60	371.59	371.59	45.99	1,044	22.701	0.044	Sample2 at 60 min
12:50	80	372.08	372.08	46.48	1,044	22.461	0.045	
13:10	100	372.49	372.49	46.89	1,044	22.265	0.045	12" ≈ 1,044 gpm
13:30	120	372.80	372.80	47.20	1,044	22.119	0.045	Sample3 at 120 min
13:50	140	372.53	372.53	46.93	1,044	22.246	0.045	
14:10	160	372.80	372.80	47.20	1,044	22.119	0.045	
14:30	180	372.80	372.80	47.20	1,044	22.119	0.045	12" ≈ 1,044 gpm
14:50	200	373.00	373.00	47.40	1,044	22.025	0.045	Sample4 at 240min
15:30	240	373.31	373.31	47.71	1,044	21.882	0.046	Tot.=16,119,000 gal
15:31	241				1,261			**Step 2**
15:32	242				1,261			17.5" ≈ 1,261 gpm
15:33	243	383.12	383.12	57.52	1,261	21.923	0.046	
15:34	244	383.32	383.32	57.72	1,261	21.847	0.046	
15:35	245	383.60	383.60	58.00	1,261	21.741	0.046	
15:36	246	383.62	383.62	58.02	1,261	21.734	0.046	
15:37	247	383.70	383.70	58.10	1,261	21.704	0.046	

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
15:38	248	383.82	383.82	58.22	1,261	21.659	0.046	
15:39	249	383.90	383.90	58.30	1,261	21.630	0.046	
15:40	250	383.88	383.88	58.28	1,261	21.637	0.046	17.5" ≈ 1,261 gpm
15:45	255	384.06	384.06	58.46	1,261	21.570	0.046	Sample5 at 255 min
15:50	260	384.31	384.31	58.71	1,261	21.478	0.047	17.5" ≈ 1,261 gpm
15:55	265	384.50	384.50	58.90	1,261	21.409	0.047	
16:00	270	384.58	384.58	58.98	1,261	21.380	0.047	
16:10	280	384.63	384.63	59.03	1,261	21.362	0.047	
16:20	290	384.67	384.67	59.07	1,261	21.348	0.047	Sample6 at 300 min
16:30	300	384.70	384.70	59.10	1,261	21.337	0.047	17.5" = 1,261 gpm
16:50	320	384.74	384.74	59.14	1,261	21.322	0.047	
17:10	340	384.80	384.80	59.20	1,261	21.301	0.047	Sample7 at 360 min
17:30	360	384.95	384.95	59.35	1,261	21.247	0.047	17.5" ≈ 1,261 gpm
17:50	380	385.10	385.10	59.50	1,261	21.193	0.047	
18:10	400	385.22	385.22	59.62	1,261	21.151	0.047	
18:30	420	385.32	385.32	59.72	1,261	21.115	0.047	
18:50	440	385.40	385.40	59.80	1,261	21.087	0.047	Sample8 at 480 min
19:30	480	385.70	385.70	60.10	1,261	20.982	0.048	Tot.=16,431,000 gal
19:31	481				1,551			**Step 3**
19:32	482				1,551			26.5" ≈ 1,551 gpm
19:33	483	399.20	399.20	73.60	1,551	21.073	0.047	
19:34	484	399.50	399.50	73.90	1,551	20.988	0.048	
19:35	485	399.80	399.80	74.20	1,551	20.903	0.048	
19:36	486	399.90	399.90	74.30	1,551	20.875	0.048	
19:37	487	399.92	399.92	74.32	1,551	20.869	0.048	
19:38	488	400.05	400.05	74.45	1,551	20.833	0.048	
19:39	489	400.24	400.24	74.64	1,551	20.780	0.048	
19:40	490	400.38	400.38	74.78	1,551	20.741	0.048	26.5" ≈ 1,551 gpm
19:45	495	400.77	400.77	75.17	1,551	20.633	0.048	Sample9 at 495 min
19:50	500	401.16	401.16	75.56	1,551	20.527	0.049	26.5" ≈ 1,551 gpm
19:55	505	401.26	401.26	75.66	1,551	20.500	0.049	
20:00	510	401.34	401.34	75.74	1,551	20.478	0.049	
20:10	520	401.39	401.39	75.79	1,551	20.464	0.049	
20:20	530	401.44	401.44	75.84	1,551	20.451	0.049	
20:30	540	401.46	401.46	75.86	1,551	20.446	0.049	Sample10 at 540 min
20:50	560	401.47	401.47	75.87	1,551	20.443	0.049	
21:10	580	401.43	401.43	75.83	1,551	20.454	0.049	
21:30	600	401.69	401.69	76.09	1,551	20.384	0.049	Sample11 at 600 min
21:50	620	401.93	401.93	76.33	1,551	20.320	0.049	
22:10	640	402.12	402.12	76.52	1,551	20.269	0.049	
22:30	660	402.38	402.38	76.78	1,551	20.201	0.050	26.5" ≈ 1,551 gpm
22:50	680	402.62	402.62	77.02	1,551	20.138	0.050	Sample12 at 720 min
23:30	720	402.95	402.95	77.35	1,551	20.052	0.050	Tot.=16,816,000 gal
23:31	721				1,845			**Step 4**
23:32	722				1,845			37.5" ≈ 1,845 gpm
23:33	723	416.50	416.50	90.90	1,845	20.297	0.049	
23:34	724	416.59	416.59	90.99	1,845	20.277	0.049	

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
23:35	725	416.70	416.70	91.10	1,845	20.252	0.049	
23:36	726	416.74	416.74	91.14	1,845	20.244	0.049	
23:37	727	416.90	416.90	91.30	1,845	20.208	0.049	
23:38	728	417.00	417.00	91.40	1,845	20.186	0.050	
23:39	729	417.07	417.07	91.47	1,845	20.171	0.050	
23:40	730	417.20	417.20	91.60	1,845	20.142	0.050	37.5" ≈ 1,845 gpm
23:45	735	417.65	417.65	92.05	1,845	20.043	0.050	Sample 13at 735 min
23:50	740	417.72	417.72	92.12	1,845	20.028	0.050	
23:55	745	417.80	417.80	92.20	1,845	20.011	0.050	
0:00	750	417.84	417.84	92.24	1,845	20.002	0.050	**11/7/2007**
0:10	760	417.93	417.93	92.33	1,845	19.983	0.050	
0:20	770	417.98	417.98	92.38	1,845	19.972	0.050	Sample14 at 780 min
0:30	780	418.10	418.10	92.50	1,845	19.946	0.050	37.5" ≈ 1,845 gpm
0:50	800	418.18	418.18	92.58	1,845	19.929	0.050	
1:10	820	418.26	418.26	92.66	1,845	19.912	0.050	Sample15 at 840 min
1:30	840	418.33	418.33	92.73	1,845	19.896	0.050	37.5" ≈ 1,845 gpm
1:50	860	418.48	418.48	92.88	1,845	19.864	0.050	
2:10	880	418.64	418.64	93.04	1,845	19.830	0.050	
2:30	900	418.83	418.83	93.23	1,845	19.790	0.051	
2:50	920	419.03	419.03	93.43	1,845	19.747	0.051	Sample16 at 960 min
3:30	960	419.35	419.35	93.75	1,845	19.680	0.051	Tot.=17,273,000 gal
3:31	961				2,224			**Step 5**
3:32	962				2,224			54.5" ≈ 2,224 gpm
3:33	963				2,224			
3:34	964	438.05	438.05	112.45	2,224	19.778	0.051	
3:35	965	438.80	438.80	113.20	2,224	19.647	0.051	
3:36	966	439.00	439.00	113.40	2,224	19.612	0.051	
3:37	967	439.30	439.30	113.70	2,224	19.560	0.051	
3:38	968	439.50	439.50	113.90	2,224	19.526	0.051	
3:39	969	439.50	439.50	113.90	2,224	19.526	0.051	
3:40	970	439.68	439.68	114.08	2,224	19.495	0.051	54.5" ≈ 2,224 gpm
3:45	975	440.02	440.02	114.42	2,224	19.437	0.051	Sample17 at 975 min
3:50	980	440.37	440.37	114.77	2,224	19.378	0.052	
3:55	985	440.70	440.70	115.10	2,224	19.322	0.052	
4:00	990	440.93	440.93	115.33	2,224	19.284	0.052	54.5" ≈ 2,224 gpm
4:10	1000	441.10	441.10	115.50	2,224	19.255	0.052	
4:20	1010	441.23	441.23	115.63	2,224	19.234	0.052	
4:30	1020	441.37	441.37	115.77	2,224	19.211	0.052	Sample18 at 1020 min
4:50	1040	441.48	441.48	115.88	2,224	19.192	0.052	
5:10	1060	441.61	441.61	116.01	2,224	19.171	0.052	
5:30	1080	441.75	441.75	116.15	2,224	19.148	0.052	Sample19 at 1080 min
5:50	1100	441.85	441.85	116.25	2,224	19.131	0.052	
6:10	1120	441.94	441.94	116.34	2,224	19.116	0.052	
6:30	1140	442.03	442.03	116.43	2,224	19.102	0.052	54.5" ≈ 2,224 gpm
6:50	1160	442.18	442.18	116.58	2,224	19.077	0.052	Sample20 at 1200 min
7:30	1200	442.20	442.20	116.60	2,224	19.074	0.052	**Pump off**
								Tot.=17,828,000 gal
END OF STEP TEST								

Note: Maximum GPM of the efficiency curve on the pump is 2,000 to 2,200 GPM.

TABLE 2

CONSTANT RATE TEST AND RECOVERY RECORDS
BUENA VISTA WELL #1

Constant Rate Test Record

Southwest Ground-water Consultants, Inc.

Date: 11/08 - 11/10/07

Well Number: 55-213204 **Job Title:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE & SAG

Pump Agency:	The Weber Group	Static Water Level:	327.00 feet bls
Foreman:	Joe / Nathan / John	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Stick Up:	1.25 feet
Average Q:	Average Q ≈ 1,536 gpm	Line Correction:	300 feet

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
11:00	0		327.00	0	0			**Pump on. 11/8/07**
11:01	1				1,507			Tot.=17,830,000 g
11:02	2				1,507			10"x 8" orifice
11:03	3				1,507			25" ≈ 1507 gpm
11:04	4	668.17	366.92	39.92	1,507	37.751	0.0265	
11:05	5	668.42	367.17	40.17	1,507	37.516	0.0267	
11:06	6				1,522			25.5" ≈ 1,522 gpm
11:07	7	690.58	389.33	62.33	1,536	24.643	0.0406	26"≈1536 gpm. ↓ valve
11:08	8	693.42	392.17	65.17	1,500	23.017	0.0434	
11:09	9	692.63	391.38	64.38	1,461	22.693	0.0441	23.5"≈1461 gpm. ↑ valve
11:10	10	694.00	392.75	65.75	1,536	23.361	0.0428	26"≈1536 gpm. ↓ valve
11:15	15	692.75	391.50	64.50	1,491	23.116	0.0433	24.5"≈1491gpm. ↑ valve
11:20	20	692.67	391.42	64.42	1,507	23.393	0.0427	25" ≈ 1507 gpm
11:30	30	694.25	393.00	66.00	1,507	22.833	0.0438	
11:45	45	695.42	394.17	67.17	1,507	22.436	0.0446	
11:50	50	695.50	394.25	67.25	1,507	22.409	0.0446	
12:00	60	695.58	394.33	67.33	1,507	22.382	0.0447	
12:10	70	696.21	394.96	67.96	1,507	22.175	0.0451	
12:20	80	696.13	394.88	67.88	1,507	22.201	0.0450	↑ valve to keep 25"
12:30	90	696.75	395.50	68.50	1,507	22.000	0.0455	
12:40	100	697.04	395.79	68.79	1,507	21.907	0.0456	
13:00	120	697.63	396.38	69.38	1,507	21.721	0.0460	↑ valve to keep 25"
14:00	180	698.38	397.13	70.13	1,507	21.489	0.0465	
14:20	200	698.41	397.16	70.16	1,507	21.479	0.0466	
15:00	240	698.83	397.58	70.58	1,507	21.352	0.0468	New Source Sample
16:00	300	699.04	397.79	70.79	1,507	21.288	0.0470	↑ valve to keep 25"
17:00	360	699.30	398.05	71.05	1,507	21.210	0.0471	
17:40	400	699.68	398.43	71.43	1,507	21.098	0.0474	
19:00	480	701.40	400.15	73.15	1,507	20.602	0.0485	25" ≈ 1507 gpm
19:20	500	701.54	400.29	73.29	1,507	20.562	0.0486	
21:00	600	702.10	400.85	73.85	1,522	20.609	0.0485	25.5" ≈ 1,522 gpm
22:40	700	702.65	401.40	74.40	1,522	20.457	0.0489	
0:20	800	703.03	401.78	74.78	1,536	20.540	0.0487	26"≈1536 gpm. **11/9/07**
2:00	900	703.40	402.15	75.15	1,536	20.439	0.0489	26" ≈ 1536 gpm
3:40	1000	703.86	402.61	75.61	1,536	20.315	0.0492	
5:20	1100	704.30	403.05	76.05	1,536	20.197	0.0495	
7:00	1200	704.68	403.43	76.43	1,551	20.293	0.0493	26.5" ≈ 1,551 gpm
10:20	1400	704.58	403.28	76.28	1,536	20.136	0.0497	New sounder. LC=301.3

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
13:40	1600	704.80	403.50	76.50	1,536	20.078	0.0498	26" = 1536 gpm
17:00	1800	704.75	403.45	76.45	1,536	20.092	0.0498	26" = 1536 gpm
20:20	2000	705.00	403.70	76.70	1,536	20.026	0.0499	
23:40	2200	705.22	403.92	76.92	1,536	19.969	0.0501	**11/10/2007**
3:00	2400	705.91	404.61	77.61	1,536	19.791	0.0505	
6:20	2600	706.38	405.08	78.08	1,551	19.864	0.0503	26.5" = 1,551 gpm
9:40	2800	705.70	404.40	77.40	1,536	19.845	0.0504	26" = 1536 gpm
11:00	2880	705.30	404.00	77.00	1,522	19.766	0.0506	25.5" = 1,522 gpm
								Tot.=22,397,000 g
END OF CONSTANT RATE TEST								

78.08 Max. Ddn
405.08 Max. PWL

Constant Rate Test Recovery Record

Southwest Ground-water Consultants, Inc.

Date: 11/10 - 11/12/2007

Well Number: 55-213204 **Job Titlo:** Buena Vista Well #1 (North)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	Weber	Static Water Level:	327.00 feet bls
Foreman:	Joe / Nathan / John	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	8-stage inline turbine shaft pump (Model No. 7235). Pump intake at 640 feet bls.	Stick Up:	1.3 feet
Average Q:	Average Q ≈ 1,536 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start (t)	Time Since Pump Stop (t')	Ratio t/t'	Sounder Reading	Water Level	Resid. Draw Down (s')	Remarks
	minutes	minutes		feet	feet	feet	
11:00	2880	0		405.10	403.80	76.80	**Pump off. 11/10/07**
11:01	2881	1	2881	316.75	315.45	-11.55	
11:02	2882	2	1441	320.20	318.90	-8.10	
11:03	2883	3	961	343.90	342.60	15.60	
11:04	2884	4	721	343.80	342.50	15.50	
11:05	2885	5	577	343.30	342.00	15.00	
11:06	2886	6	481	342.82	341.52	14.52	
11:07	2887	7	412	342.50	341.20	14.20	
11:08	2888	8	361	342.12	340.82	13.82	
11:09	2889	9	321	341.83	340.53	13.53	
11:10	2890	10	289	341.58	340.28	13.28	
11:20	2900	20	145	340.03	338.73	11.73	
11:30	2910	30	97	338.54	337.24	10.24	
11:40	2920	40	73	337.86	336.56	9.56	
11:50	2930	50	59	337.20	335.90	8.90	
12:00	2940	60	49	336.83	335.53	8.53	89% recovery
12:10	2950	70	42	336.50	335.20	8.20	
12:20	2960	80	37	336.20	334.90	7.90	
12:30	2970	90	33	335.92	334.62	7.62	
12:40	2980	100	30	335.65	334.35	7.35	90% recovery
12:50	2990	110	27	335.40	334.10	7.10	
13:00	3000	120	25	335.22	333.92	6.92	91% recovery
13:10	3010	130	23	335.05	333.75	6.75	
							11/11/2007
11:00	4320	1440	3	329.79	328.49	1.49	98% recovery
							11/12/2007
11:00	5760	2880	2	328.80	327.50	0.50	99% recovery
END OF RECOVERY TEST							

TABLE 3

STEP TEST RECORD
BUENA VISTA WELL #2

Step Test Record

Southwest Ground-water Consultants, Inc.

Date: 10/01 - 10/02/07

Well Number: 55-214510 **Job Title:** Buena Vista Well #2 (South)

Job Number: B1401 **Reported By:** GRE, SAG & KG

Pump Agency:	The Weber Group	Static Water Level:	316.05 feet bls
Foreman:	Butch	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	14RM 8-stage inline turbine shaft pump. Pump intake at 650 feet bls.	Stick Up:	0 feet
Average Q:	Five, 4-hour steps @ 1100, 1500, 1900, 2300, and 2700 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
11:30	0	316.05	316.05	0	0			**Pump on. Step 1**
11:31	1	355.26	355.26	39.21	1,100	28.054	0.036	Tot.=8,092,000 g
11:32	2	356.28	356.28	40.23	1,100	27.343	0.037	**10/1/2007**
11:33	3	358.87	358.87	42.82	1,100	25.689	0.039	10"x8" orifice
11:34	4	359.49	359.49	43.44	1,100	25.322	0.039	
11:35	5	359.73	359.73	43.68	1,100	25.183	0.040	
11:36	6	360.35	360.35	44.30	1,100	24.831	0.040	
11:37	7	360.50	360.50	44.45	1,100	24.747	0.040	
11:38	8	360.90	360.90	44.85	1,100	24.526	0.041	
11:39	9	361.21	361.21	45.16	1,100	24.358	0.041	
11:40	10	361.42	361.42	45.37	1,100	24.245	0.041	
11:50	20	362.88	362.88	46.83	1,100	23.489	0.043	
12:00	30	363.65	363.65	47.60	1,100	23.109	0.043	
12:10	40	364.05	364.05	48.00	1,100	22.917	0.044	12.5" ≈ 1,065 gpm
12:20	50	365.52	365.52	49.47	1,100	22.236	0.045	
12:30	60	366.18	366.18	50.13	1,100	21.943	0.046	
12:50	80	366.94	366.94	50.89	1,100	21.615	0.046	
13:10	100	367.32	367.32	51.27	1,100	21.455	0.047	
13:30	120	367.55	367.55	51.50	1,100	21.359	0.047	13.25" ≈ 1,097 gpm
13:50	140	367.91	367.91	51.86	1,100	21.211	0.047	
14:10	160	368.00	368.00	51.95	1,100	21.174	0.047	13.25" ≈ 1,097 gpm
14:50	200	368.30	368.30	52.25	1,100	21.053	0.048	
15:30	240	369.58	369.58	53.53	1,100	20.549	0.049	Tot.=8,363,000 g
15:31	241	384.37	384.37	68.32	1,500	21.956	0.046	Step 2
15:32	242	385.08	385.08	69.03	1,500	21.730	0.046	
15:33	243	385.82	385.82	69.77	1,500	21.499	0.047	
15:34	244	385.64	385.64	69.59	1,500	21.555	0.046	
15:35	245	388.74	388.74	72.69	1,500	20.636	0.048	↑Q
15:36	246	389.12	389.12	73.07	1,500	20.528	0.049	
15:37	247	387.84	387.84	71.79	1,500	20.894	0.048	
15:38	248	388.40	388.40	72.35	1,500	20.733	0.048	

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
15:39	249	388.59	388.59	72.54	1,500	20.678	0.048	
15:40	250	388.60	388.60	72.55	1,500	20.675	0.048	25.25" ≈ 1,515 gpm
15:50	260	389.12	389.12	73.07	1,500	20.528	0.049	
16:00	270	389.20	389.20	73.15	1,500	20.506	0.049	
16:10	280	389.71	389.71	73.66	1,500	20.364	0.049	
16:20	290				1,500			
16:30	300	391.18	391.18	75.13	1,500	19.965	0.050	↑ valve to keep 25.25"
16:40	310	390.80	390.80	74.75	1,500	20.067	0.050	
16:50	320				1,500			↓ valve to keep 25.25"
17:00	330	390.71	390.71	74.66	1,500	20.091	0.050	
17:10	340	391.17	391.17	75.12	1,500	19.968	0.050	↑ valve to keep 25.25"
17:30	360	391.68	391.68	75.63	1,500	19.833	0.050	
18:50	440	392.20	392.20	76.15	1,500	19.698	0.051	
19:30	480	392.24	392.24	76.19	1,500	19.688	0.051	Tot. =8,733,000 g
19:31	481				1,900			**Step 3**
19:32	482				1,900			
19:33	483				1,900			
19:34	484				1,900			
19:35	485	411.80	411.80	95.75	1,900	19.843	0.050	40.5" ≈ 1,918 gpm
19:36	486	412.18	412.18	96.13	1,900	19.765	0.051	
19:37	487	412.28	412.28	96.23	1,900	19.744	0.051	
19:38	488	412.39	412.39	96.34	1,900	19.722	0.051	
19:39	489	412.50	412.50	96.45	1,900	19.699	0.051	
19:40	490	412.55	412.55	96.50	1,900	19.689	0.051	
19:50	500	412.84	412.84	96.79	1,900	19.630	0.051	
20:00	510	413.39	413.39	97.34	1,900	19.519	0.051	
20:10	520	413.49	413.49	97.44	1,900	19.499	0.051	
20:20	530	413.60	413.60	97.55	1,900	19.477	0.051	
20:30	540	413.82	413.82	97.77	1,900	19.433	0.051	
20:50	560	414.08	414.08	98.03	1,900	19.382	0.052	
21:10	580	414.38	414.38	98.33	1,900	19.323	0.052	
21:30	600	414.43	414.43	98.38	1,900	19.313	0.052	
21:50	620	414.51	414.51	98.46	1,900	19.297	0.052	
22:10	640	414.60	414.60	98.55	1,900	19.280	0.052	
22:50	680	414.80	414.80	98.75	1,900	19.241	0.052	
23:30	720	415.33	415.33	99.28	1,900	19.138	0.052	Tot.=9,208,000 gal
23:31	721				2,300			**Step 4**
23:32	722				2,300			58.5" ≈ 2,305 gpm
23:33	723				2,300			
23:34	724	437.18	437.18	121.13	2,300	18.988	0.053	
23:35	725	437.75	437.75	121.70	2,300	18.899	0.053	↓ valve to keep 58.5"
23:36	726	436.60	436.60	120.55	2,300	19.079	0.052	
23:37	727	436.63	436.63	120.58	2,300	19.074	0.052	
23:38	728	436.66	436.66	120.61	2,300	19.070	0.052	
23:39	729	436.77	436.77	120.72	2,300	19.052	0.052	
23:40	730	436.98	436.98	120.93	2,300	19.019	0.053	
23:50	740	437.35	437.35	121.30	2,300	18.961	0.053	
0:00	750	437.30	437.30	121.25	2,300	18.969	0.053	↑ valve to keep 58.5"
0:10	760	438.24	438.24	122.19	2,300	18.823	0.053	**10/2/2007**

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
0:20	770	438.20	438.20	122.15	2,300	18.829	0.053	↑ valve to keep 58.5"
0:30	780	438.83	438.83	122.78	2,300	18.733	0.053	
0:50	800	439.32	439.32	123.27	2,300	18.658	0.054	
1:10	820				2,300			
1:30	840	439.48	439.48	123.43	2,300	18.634	0.054	
1:50	860	439.61	439.61	123.56	2,300	18.614	0.054	
2:10	880				2,300			
2:50	920	440.78	440.78	124.73	2,300	18.440	0.054	58.5" ≈ 2,305 gpm
3:30	960	440.93	440.93	124.88	2,300	18.418	0.054	
3:31	961	458.84	458.84	142.79	2,700	18.909	0.053	Flowmeter=2,800 gpm
3:32	962	459.71	459.71	143.66	2,700	18.794	0.053	
3:33	963	459.97	459.97	143.92	2,700	18.760	0.053	
3:34	964	460.21	460.21	144.16	2,700	18.729	0.053	
3:35	965	460.53	460.53	144.48	2,700	18.688	0.054	
3:36	966	460.64	460.64	144.59	2,700	18.673	0.054	
3:37	967	460.67	460.67	144.62	2,700	18.670	0.054	79" head (off chart)
3:38	968	460.50	460.50	144.45	2,700	18.692	0.054	
3:39	969	465.90	465.90	149.85	2,700	18.018	0.056	↑ valve to keep 79"
3:40	970				2,700			
3:50	980	462.13	462.13	146.08	2,700	18.483	0.054	79" head (off chart)
4:00	990	461.94	461.94	145.89	2,700	18.507	0.054	
4:10	1000	462.51	462.51	146.46	2,700	18.435	0.054	
4:20	1010	462.56	462.56	146.51	2,700	18.429	0.054	↑ valve to keep 79"
4:30	1020	462.61	462.61	146.56	2,700	18.422	0.054	
4:50	1040	462.80	462.80	146.75	2,700	18.399	0.054	↑ valve to keep 79"
5:10	1060	463.28	463.28	147.23	2,700	18.339	0.055	
5:30	1080	463.61	463.61	147.56	2,700	18.298	0.055	↑ valve to keep 79"
5:50	1100	463.76	463.76	147.71	2,700	18.279	0.055	
6:10	1120	463.90	463.90	147.85	2,700	18.262	0.055	↑ valve to keep 79"
6:50	1160	464.32	464.32	148.27	2,700	18.210	0.055	
7:30	1200	464.20	464.20	148.15	2,700	18.225	0.055	**Pump off**
END OF STEP TEST								

Note: Maximum GPM of the efficiency curve on the pump is 2,000 to 2,200 GPM.
Orifice is too small for discharge rates exceeding 2,500 gpm.

TABLE 4

CONSTANT RATE TEST AND RECOVERY RECORDS
BUENA VISTA WELL #2

Constant Rate Test Record

Southwest Ground-water Consultants, Inc.

Date: 10/3 - 10/5/07

Well Number: 55-214510 **Job Title:** Buena Vista Well #2 (South)

Job Number: B1401 **Reported By:** GRE, SAG & KG

Pump Agency:	The Weber Group	Static Water Level:	318.42 feet bls
Foreman:	Butch	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	14RM 8-stage inline turbine shaft pump. Pump intake at 650 feet bls.	Stick Up:	0 feet
Average Q:	Approx. 1,500 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
7:30	0	318.42	318.42	0	0			Pump on. 10/3/07
7:31	1	359.56	359.56	41.14	1,500	36.461	0.0274	Tot.=10,462,000 g
7:32	2	376.39	376.39	57.97	1,500	25.875	0.0386	10"x 8" orifice
7:33	3	378.16	378.16	59.74	1,500	25.109	0.0398	
7:34	4	379.40	379.40	60.98	1,500	24.598	0.0407	
7:35	5	378.90	378.90	60.48	1,500	24.802	0.0403	
7:36	6	379.72	379.72	61.30	1,500	24.470	0.0409	
7:37	7	379.92	379.92	61.50	1,500	24.390	0.0410	
7:38	8	380.17	380.17	61.75	1,500	24.291	0.0412	
7:39	9	380.60	380.60	62.18	1,500	24.124	0.0415	
7:40	10	380.86	380.86	62.44	1,500	24.023	0.0416	
7:45	15	382.09	382.09	63.67	1,500	23.559	0.0424	
7:50	20	382.98	382.98	64.56	1,500	23.234	0.0430	
7:55	25	383.53	383.53	65.11	1,500	23.038	0.0434	
8:00	30	384.10	384.10	65.68	1,500	22.838	0.0438	Tot.=10,511,000 g
8:10	40	384.85	384.85	66.43	1,500	22.580	0.0443	25" ≈ 1,507 gpm
8:20	50	385.45	385.45	67.03	1,500	22.378	0.0447	
8:30	60	385.92	385.92	67.50	1,500	22.222	0.0450	
8:40	70	386.29	386.29	67.87	1,500	22.101	0.0452	25" ≈ 1,507 gpm
8:50	80	387.49	387.49	69.07	1,500	21.717	0.0460	
9:00	90	387.67	387.67	69.25	1,500	21.661	0.0462	
9:10	100	387.85	387.85	69.43	1,500	21.604	0.0463	
9:20	110	387.97	387.97	69.55	1,500	21.567	0.0464	
9:30	120	388.10	388.10	69.68	1,500	21.527	0.0465	
9:50	140	388.30	388.30	69.88	1,500	21.465	0.0466	25" ≈ 1,507 gpm
10:10	160	388.40	388.40	69.98	1,500	21.435	0.0467	
10:30	180	388.42	388.42	70.00	1,500	21.429	0.0467	Tot.=10,742,000 g
10:50	200	389.40	389.40	70.98	1,500	21.133	0.0473	
11:10	220	390.30	390.30	71.88	1,500	20.868	0.0479	↑Q
11:30	240	390.50	390.50	72.08	1,500	20.810	0.0481	New Source Sample #1
11:50	260				1,500			
12:10	280	390.23	390.23	71.81	1,500	20.888	0.0479	25" ≈ 1,507 gpm
12:30	300	390.55	390.55	72.13	1,500	20.796	0.0481	
14:10	400	391.05	391.05	72.63	1,500	20.653	0.0484	
15:30	480	391.30	391.30	72.88	1,500	20.582	0.0486	
15:50	500	391.49	391.49	73.07	1,500	20.528	0.0487	
17:30	600	392.34	392.34	73.92	1,500	20.292	0.0493	25" ≈ 1,507 gpm
19:10	700	393.09	393.09	74.67	1,500	20.088	0.0498	

Clock Time	Time Since Pump Start	Sounder Reading	Water Level	Draw Down (s)	Dis-Charge (Q)	Specific Capacity	Specific Draw Down	Remarks
	minutes	feet	feet	feet	gpm	gpm/ft	ft/gpm	
20:50	800	393.69	393.69	75.27	1,500	19.928	0.0502	
22:30	900	394.12	394.12	75.70	1,500	19.815	0.0505	↓ valve to keep Q
0:10	1000	394.40	394.40	75.98	1,500	19.742	0.0507	25.25" ≈ 1,515 gpm
3:30	1200	394.90	394.90	76.48	1,500	19.613	0.0510	**10/4/2007**
6:50	1400	395.31	395.31	76.89	1,500	19.508	0.0513	25.25" ≈ 1,515 gpm
7:30	1440	395.40	395.40	76.98	1,500	19.486	0.0513	
10:10	1600	395.53	395.53	77.11	1,500	19.453	0.0514	25.25" ≈ 1,515 gpm
13:30	1800	395.50	395.50	77.08	1,500	19.460	0.0514	Tot.=13,294,000 g
16:50	2000	395.47	395.47	77.05	1,500	19.468	0.0514	25" ≈ 1,507 gpm
20:10	2200	396.05	396.05	77.63	1,500	19.322	0.0518	
23:30	2400	396.35	396.35	77.93	1,500	19.248	0.0520	
2:50	2600	396.55	396.55	78.13	1,500	19.199	0.0521	**10/5/2007**
6:10	2800	396.72	**396.72**	**78.30**	1,500	19.157	0.0522	
7:30	2880	396.70	396.70	78.28	1,500	19.162	0.0522	New Source Sample #2
								Pump off
								Tot.=14,994,000 g
END OF CONSTANT RATE TEST								

78.30 Max. Ddn
396.72 Max. PWL

Constant Rate Test Recovery Record

Southwest Ground-water Consultants, Inc.

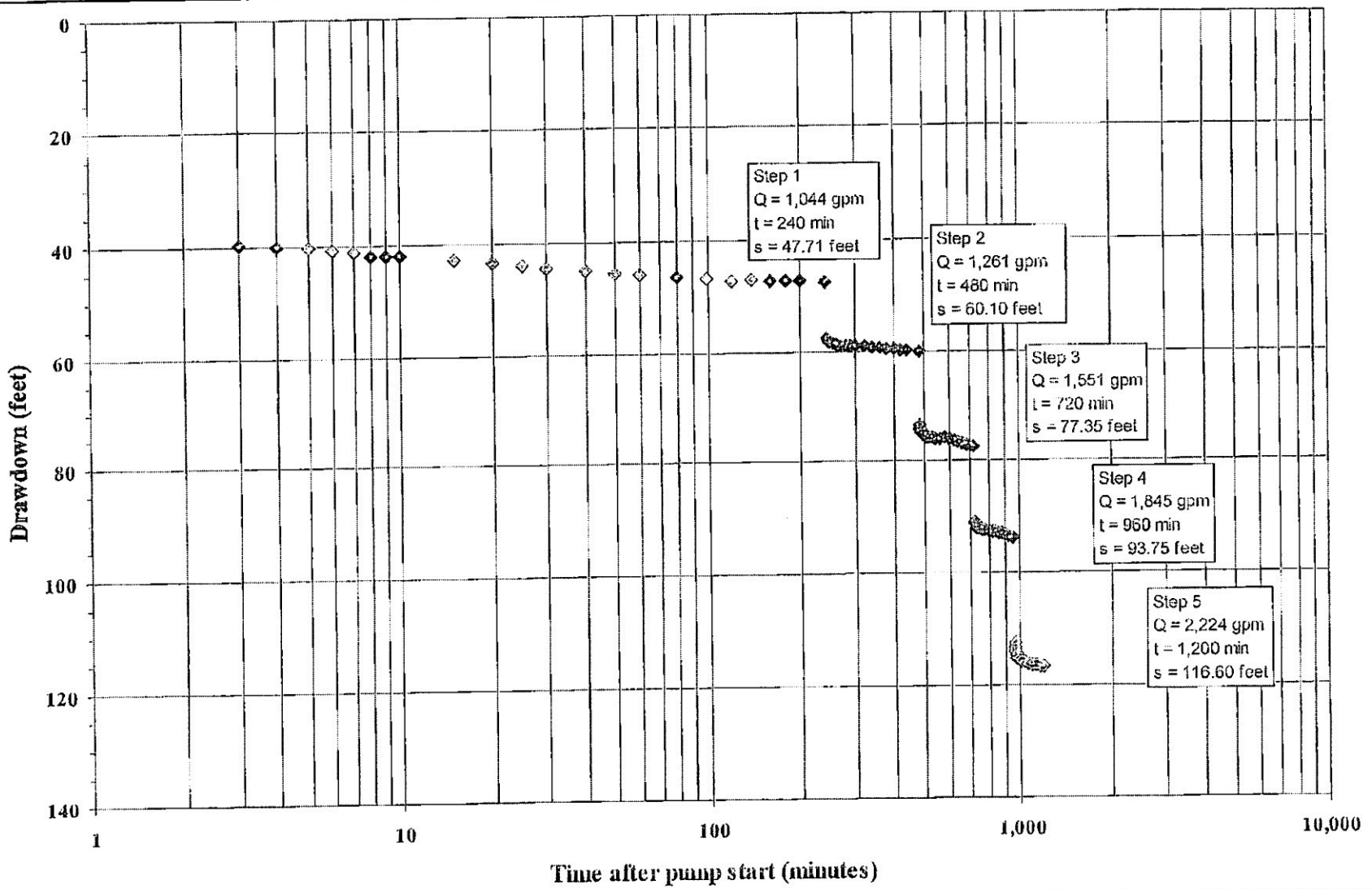
Date: 10/5 - 10/6/2007

Well Number: 55-214510 **Job Title:** Buena Vista Well #2 (South)

Job Number: B1401 **Reported By:** DRE

Pump Agency:	Weber	Static Water Level:	318.42 feet bls
Foreman:	Butch Sledge	Measure Point:	Top of sounding tube
Bailer/pump size, capacity, make:	14RM 8-stage inline turbine shaft pump. Pump intake at 650 feet bls.	Stick Up:	0 feet
Average Q:	Approx. 1,500 gpm	Line Correction:	0 feet

Clock Time	Time Since Pump Start (t)	Time Since Pump Stop (t')	Ratio t/t'	Sounder Reading	Water Level	Resid. Draw Down (s')	Remarks
	minutes	minutes		feet	feet	feet	
7:30	2880	0		396.70	396.70	78.28	**Pump off**
7:31	2881	1	2881	333.60	333.60	15.18	
7:32	2882	2	1441	335.81	335.81	17.39	
7:33	2883	3	961	336.03	336.03	17.61	
7:34	2884	4	721	335.75	335.75	17.33	
7:35	2885	5	577	335.06	335.06	16.64	
7:36	2886	6	481	334.63	334.63	16.21	
7:37	2887	7	412	334.32	334.32	15.90	
7:38	2888	8	361	333.84	333.84	15.42	
7:39	2889	9	321	333.61	333.61	15.19	
7:40	2890	10	289	333.34	333.34	14.92	
7:50	2900	20	145	331.33	331.33	12.91	
8:00	2910	30	97	330.22	330.22	11.80	
8:10	2920	40	73	329.39	329.39	10.97	
8:20	2930	50	59	328.82	328.82	10.40	
8:30	2940	60	49	328.33	328.33	9.91	87% recovery
8:40	2950	70	42	327.90	327.90	9.48	
8:50	2960	80	37	327.55	327.55	9.13	
9:00	2970	90	33	327.20	327.20	8.78	
9:10	2980	100	30	326.95	326.95	8.53	89% recovery
							10/6/2007
9:30	4440	1560	3	319.37	319.37	0.95	99% recovery
END OF RECOVERY TEST							



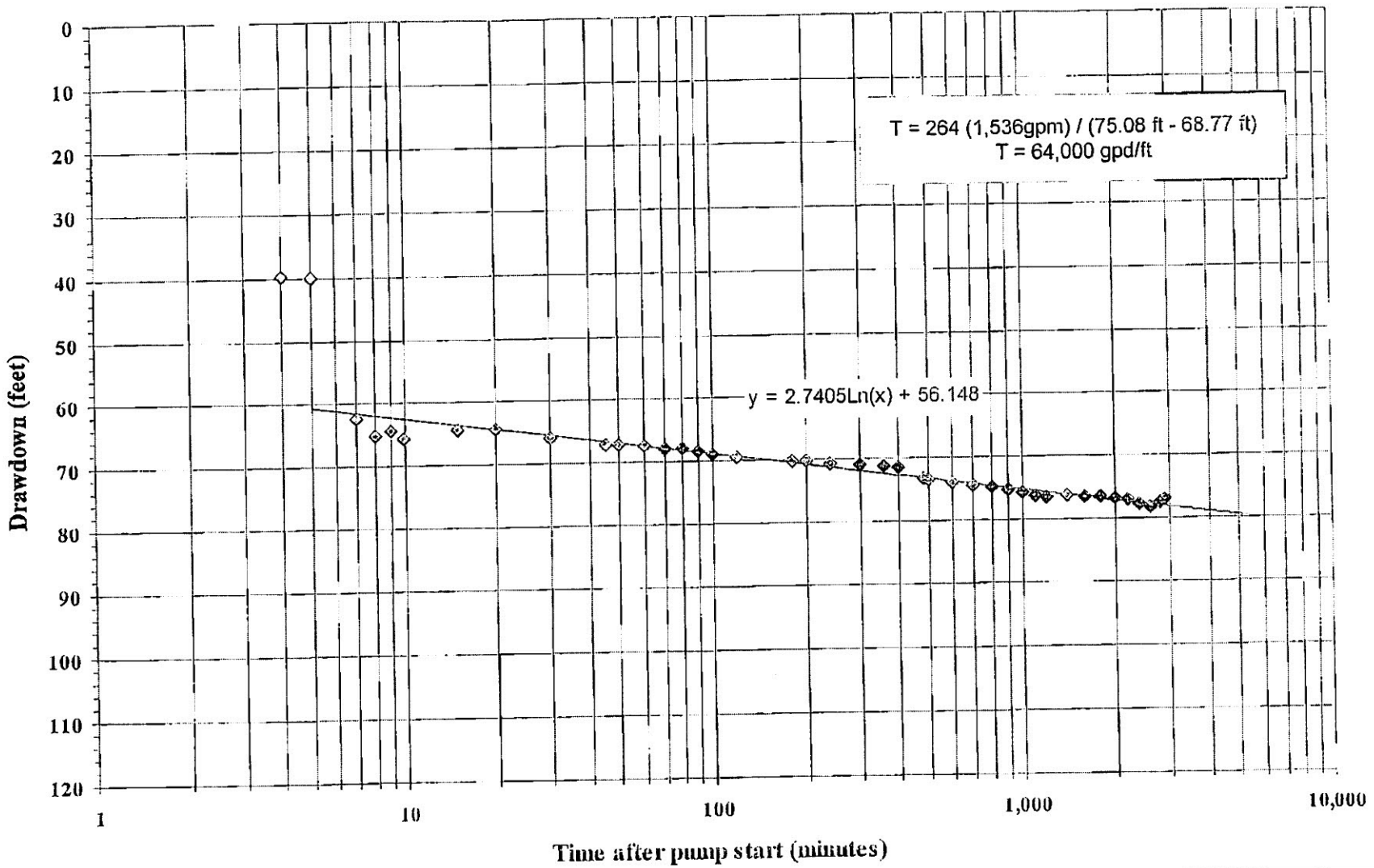
Southwest Ground-water Consultants, Inc.

November 19, 2007 Project B.1401

BUENA VISTA WELL #1
STEP RATE TEST, NOVEMBER 6 - 7, 2007
DRAWDOWN VS. TIME

City of Surprise, Maricopa County, Arizona

Figure 2



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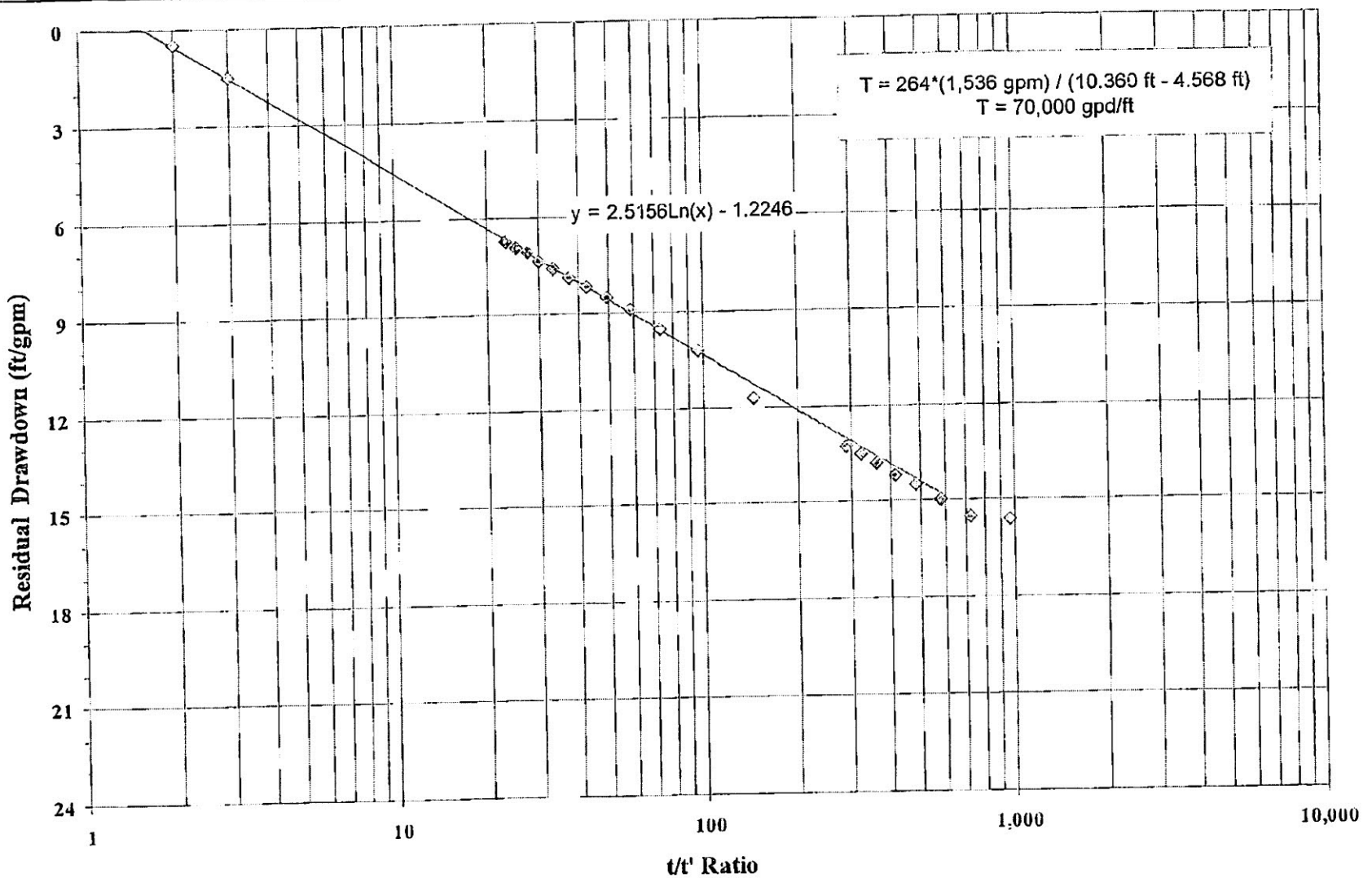
BUENA VISTA WELL #1
CONSTANT RATE TEST, NOVEMBER 8 - 10, 2007
DRAWDOWN VS. TIME
City of Surprise, Maricopa County, Arizona

Figure 3



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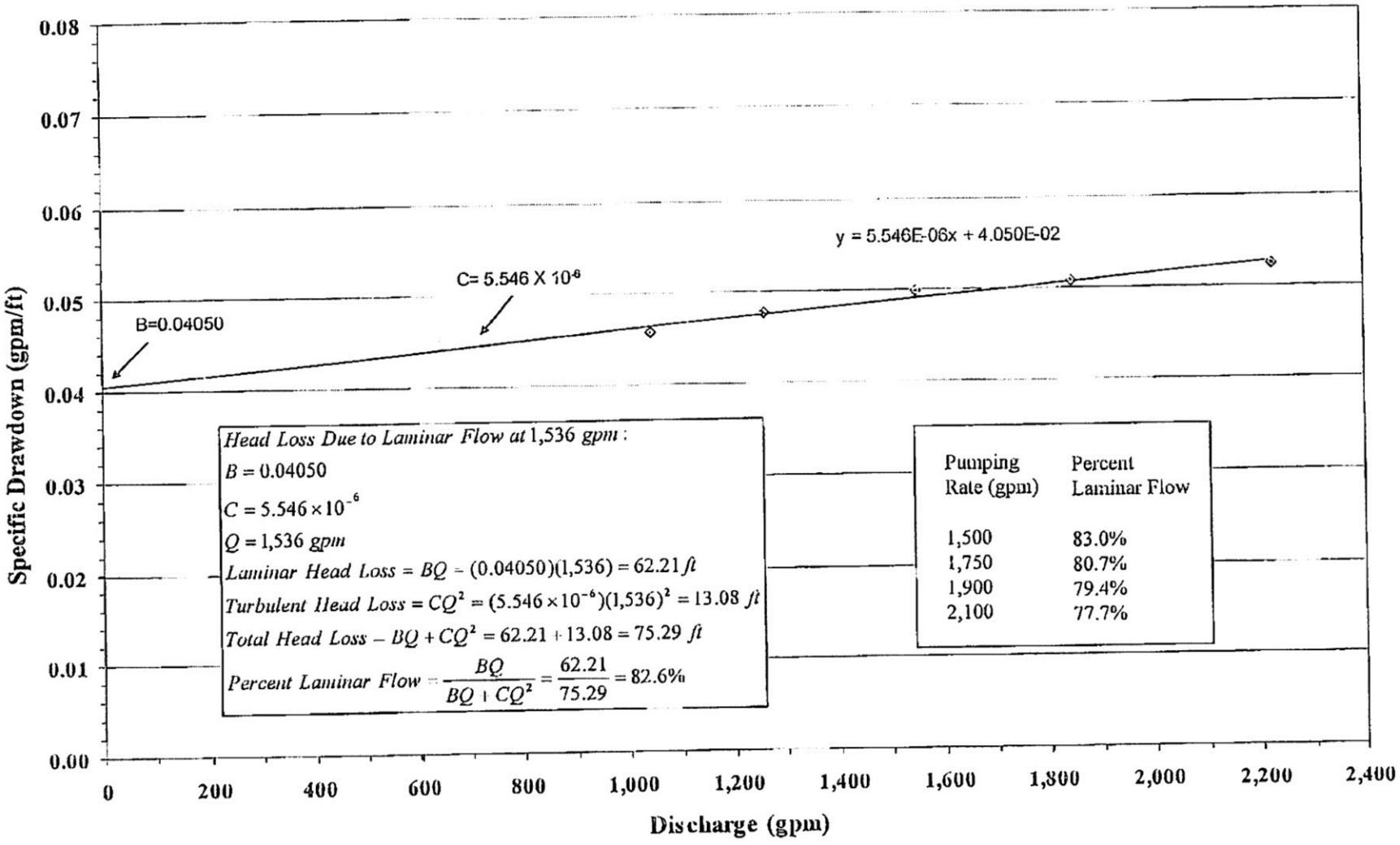
BUENA VISTA WELL #1
CONSTANT RATE RECOVERY TEST, NOV. 10 - 12, 2007
RESIDUAL DRAWDOWN VS. T/T' RATIO

City of Surprise, Maricopa County, Arizona

Figure 4



Head Loss Due to Laminar Flow at 1,536 *gpm* :

$B = 0.04050$

$C = 5.546 \times 10^{-6}$

$Q = 1{,}536\ gpm$

$Laminar\ Head\ Loss = BQ = (0.04050)(1{,}536) = 62.21\ ft$

$Turbulent\ Head\ Loss = CQ^2 = (5.546 \times 10^{-6})(1{,}536)^2 = 13.08\ ft$

$Total\ Head\ Loss = BQ + CQ^2 = 62.21 + 13.08 = 75.29\ ft$

$Percent\ Laminar\ Flow = \frac{BQ}{BQ + CQ^2} = \frac{62.21}{75.29} = 82.6\%$

Pumping Rate (gpm)	Percent Laminar Flow
1,500	83.0%
1,750	80.7%
1,900	79.4%
2,100	77.7%

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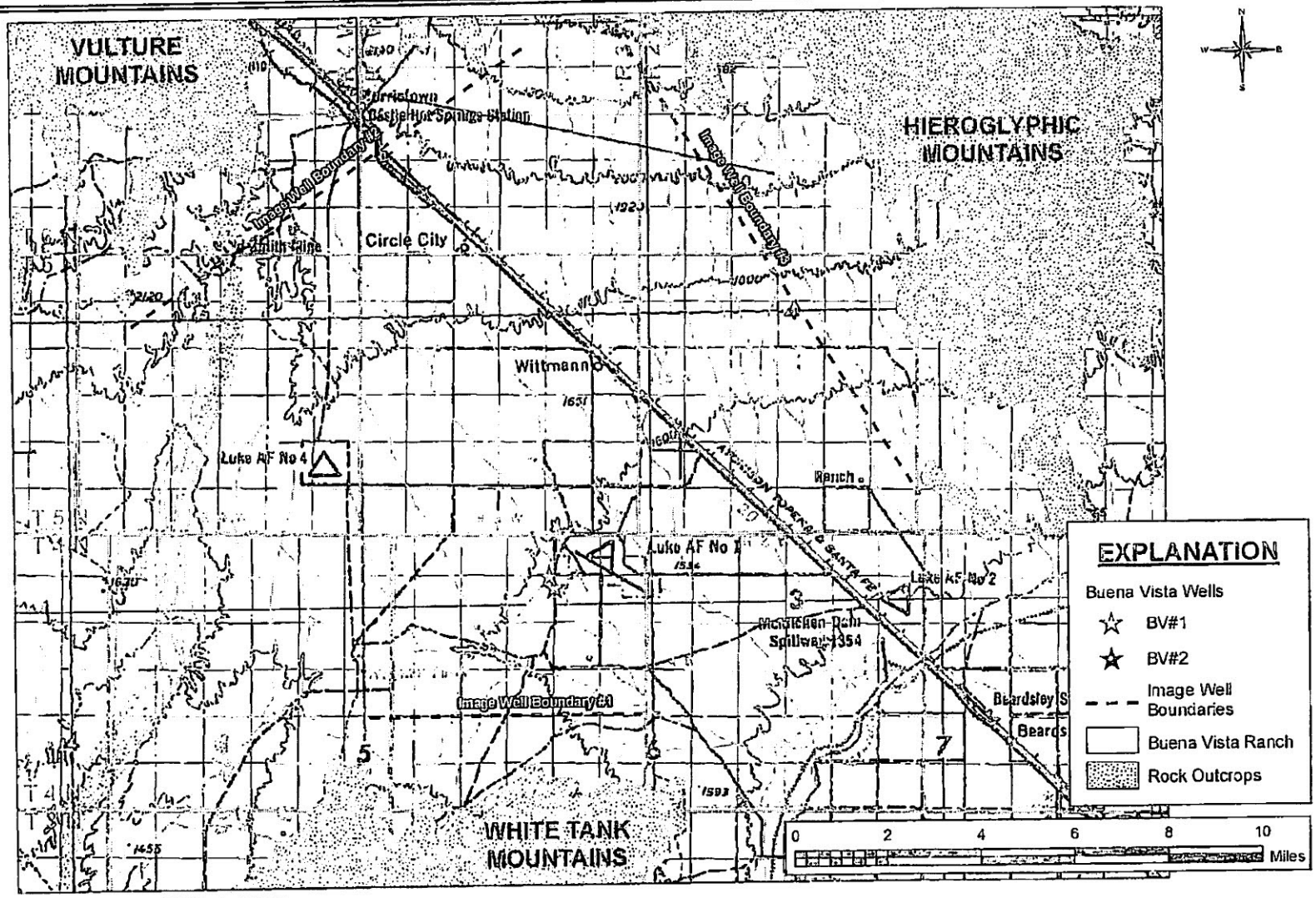
BUENA VISTA WELL #1
HEAD LOSS DUE TO LAMINAR FLOW
SPECIFIC DRAWDOWN VS. DISCHARGE

City of Surprise, Maricopa County, Arizona

Figure 5



Base Map: ADWR GIS Data (2001)
Well Data: ADWR 55 Wells CD (2007)

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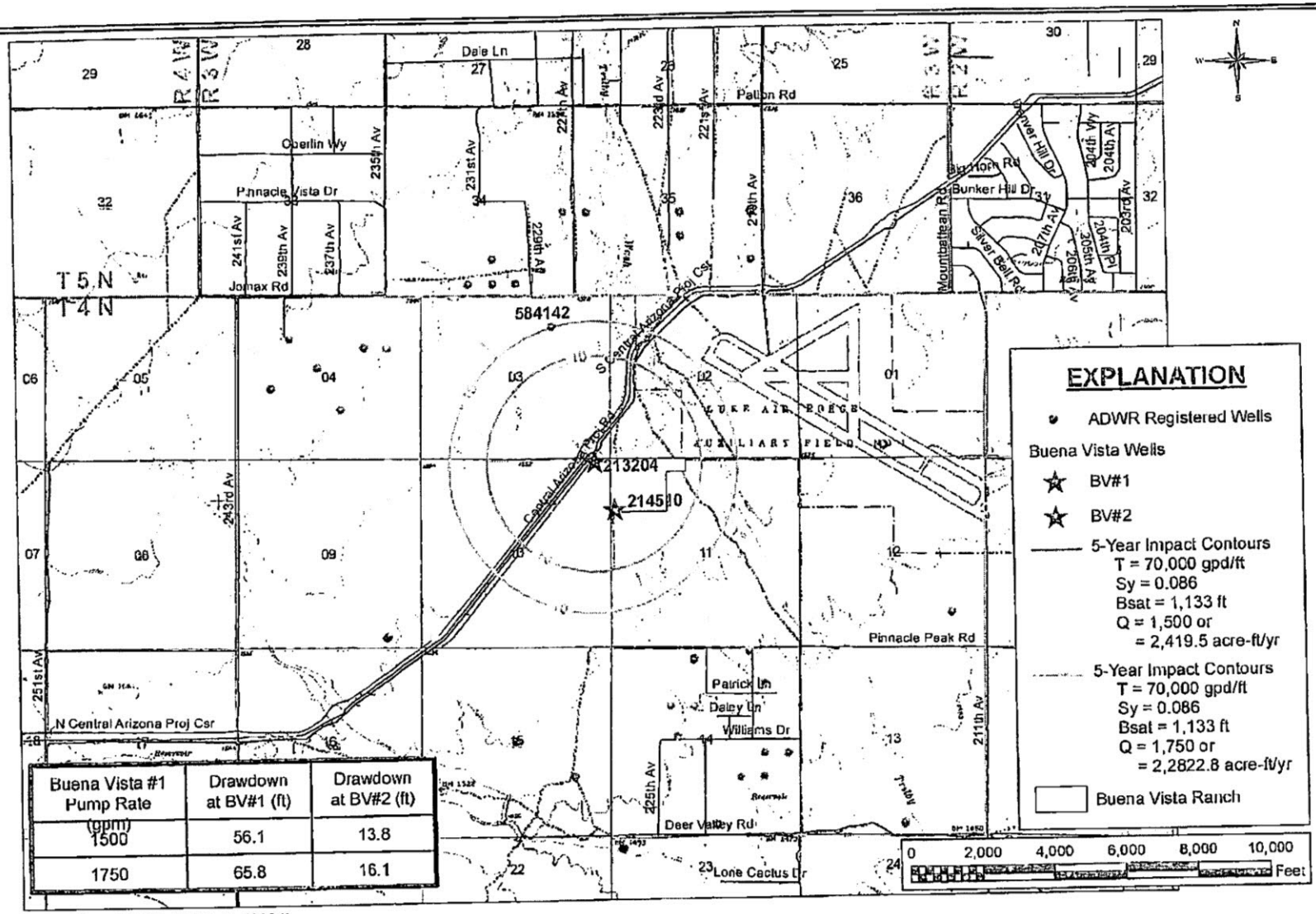
BUENA VISTA WELLS WELL SPACING SETUP

Maricopa County, Arizona

Figure 6



Buena Vista #1 Pump Rate (gpm)	Drawdown at BV#1 (ft)	Drawdown at BV#2 (ft)
1500	56.1	13.8
1750	65.8	16.1

Base Map: ADWR GIS Data (2001)
Well Data: ADWR 55 Wells CD (2007)

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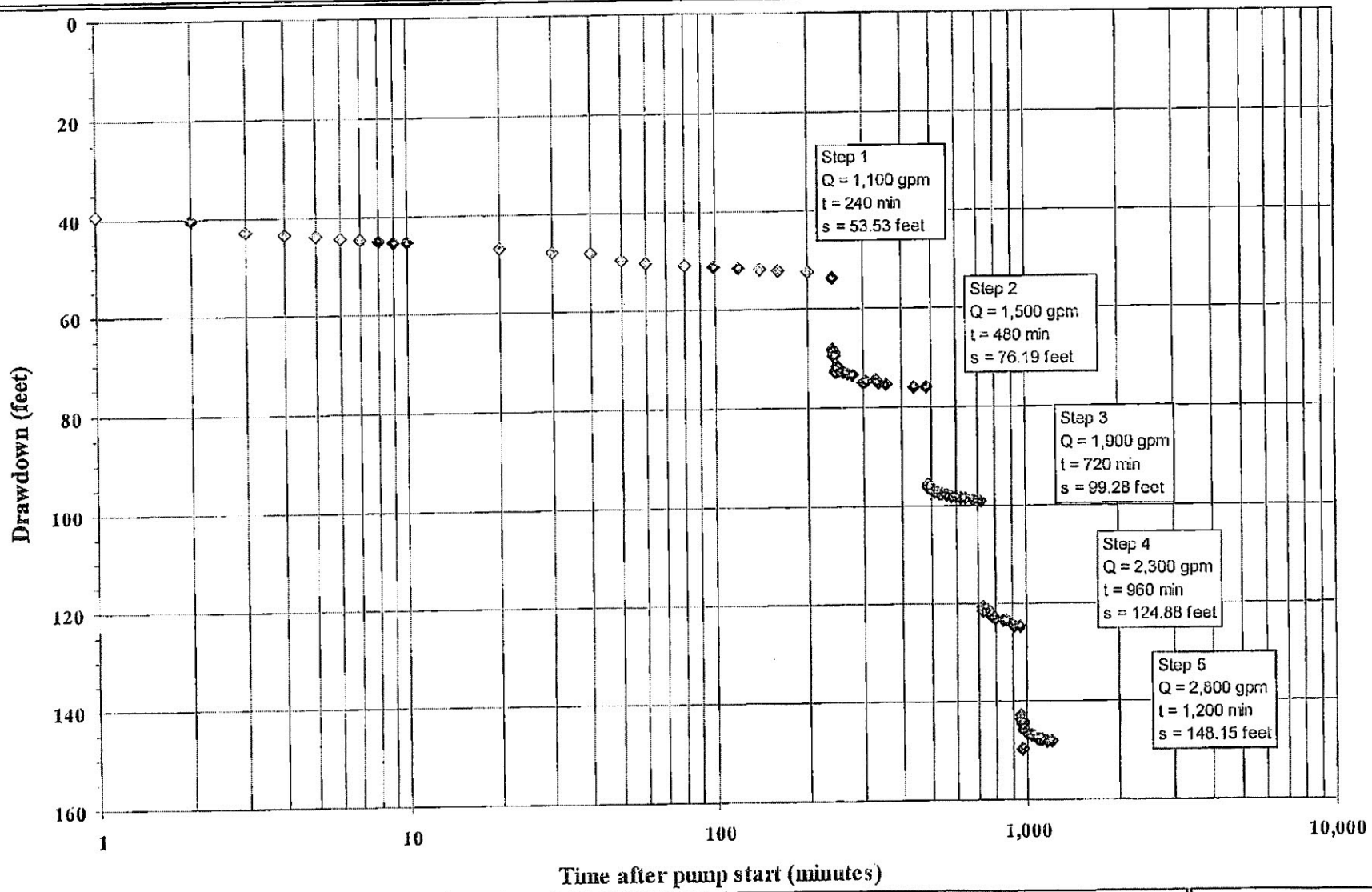
BUENA VISTA WELL #1 (55-213204)
WELL SPACING ANALYSIS

Maricopa County, Arizona

Figure 7



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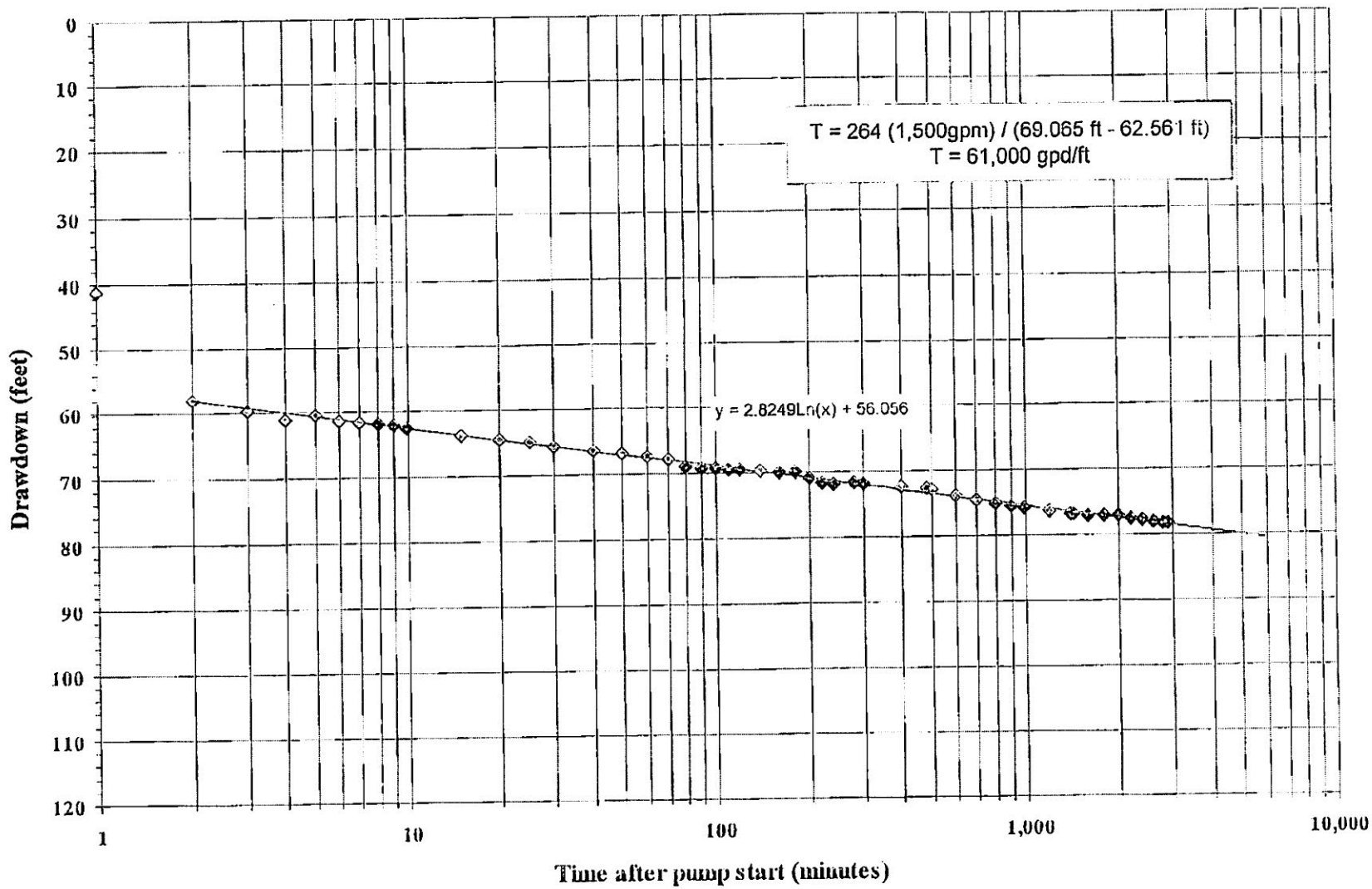
BUENA VISTA WELL #2
STEP RATE TEST, OCTOBER 1 - 2, 2007
DRAWDOWN VS. TIME

City of Surprise, Maricopa County, Arizona

Figure 8



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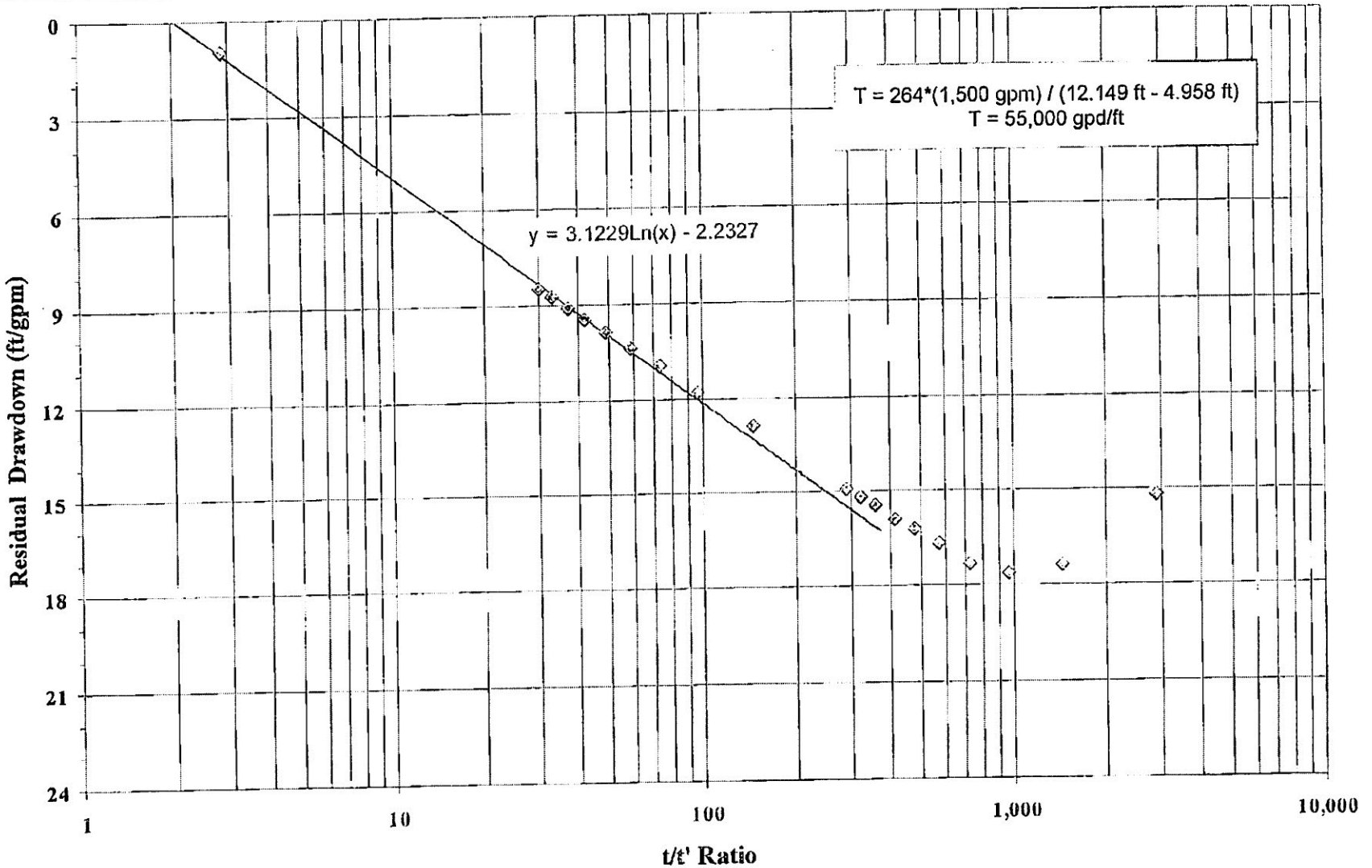
BUENA VISTA WELL #2
CONSTANT RATE TEST, OCTOBER 3 - 5, 2007
DRAWDOWN VS. TIME
City of Surprise, Maricopa County, Arizona

Figure 9



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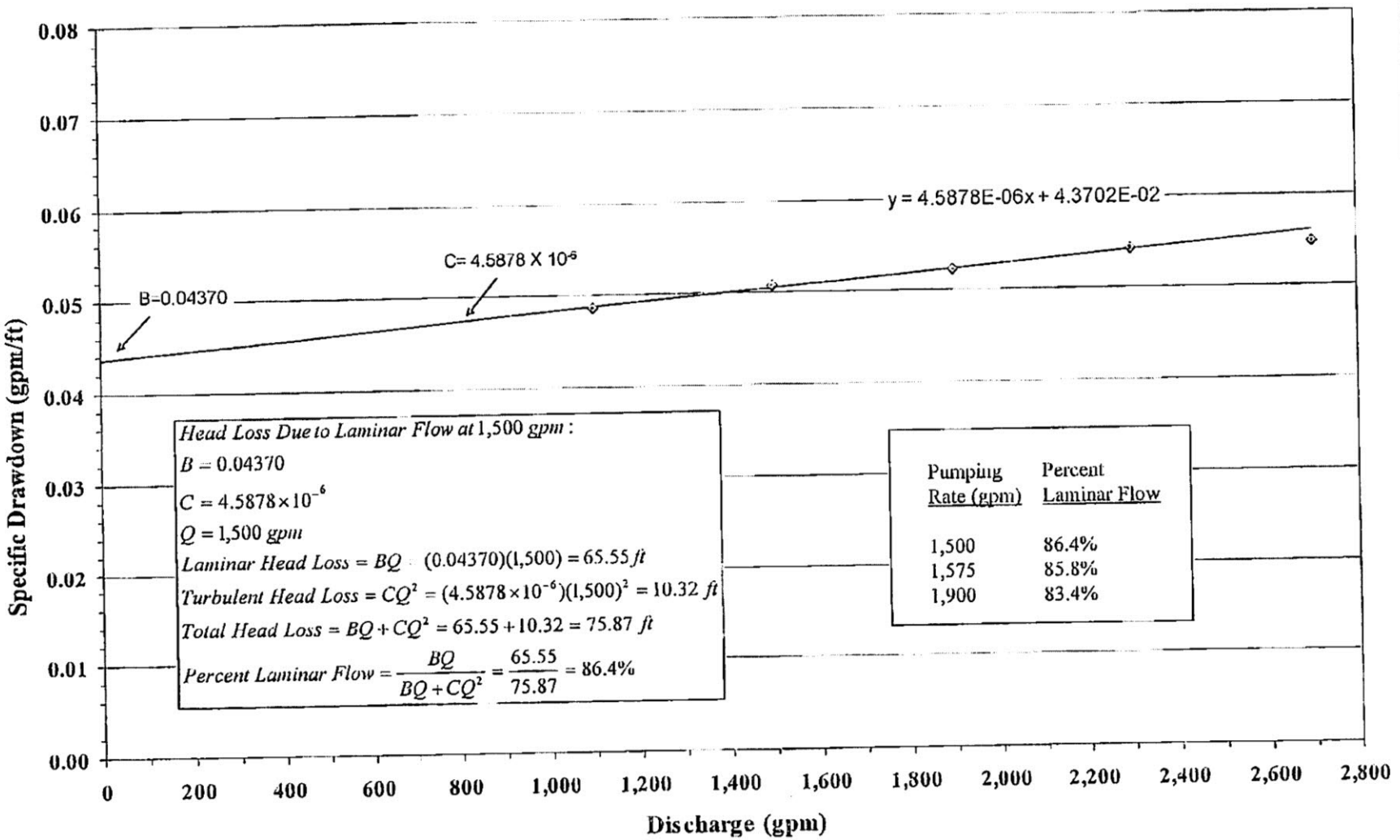
BUENA VISTA WELL #2
CONSTANT RATE RECOVERY TEST, OCT. 5 - 6, 2007
RESIDUAL DRAWDOWN VS. T/T' RATIO

City of Surprise, Maricopa County, Arizona

Figure 10



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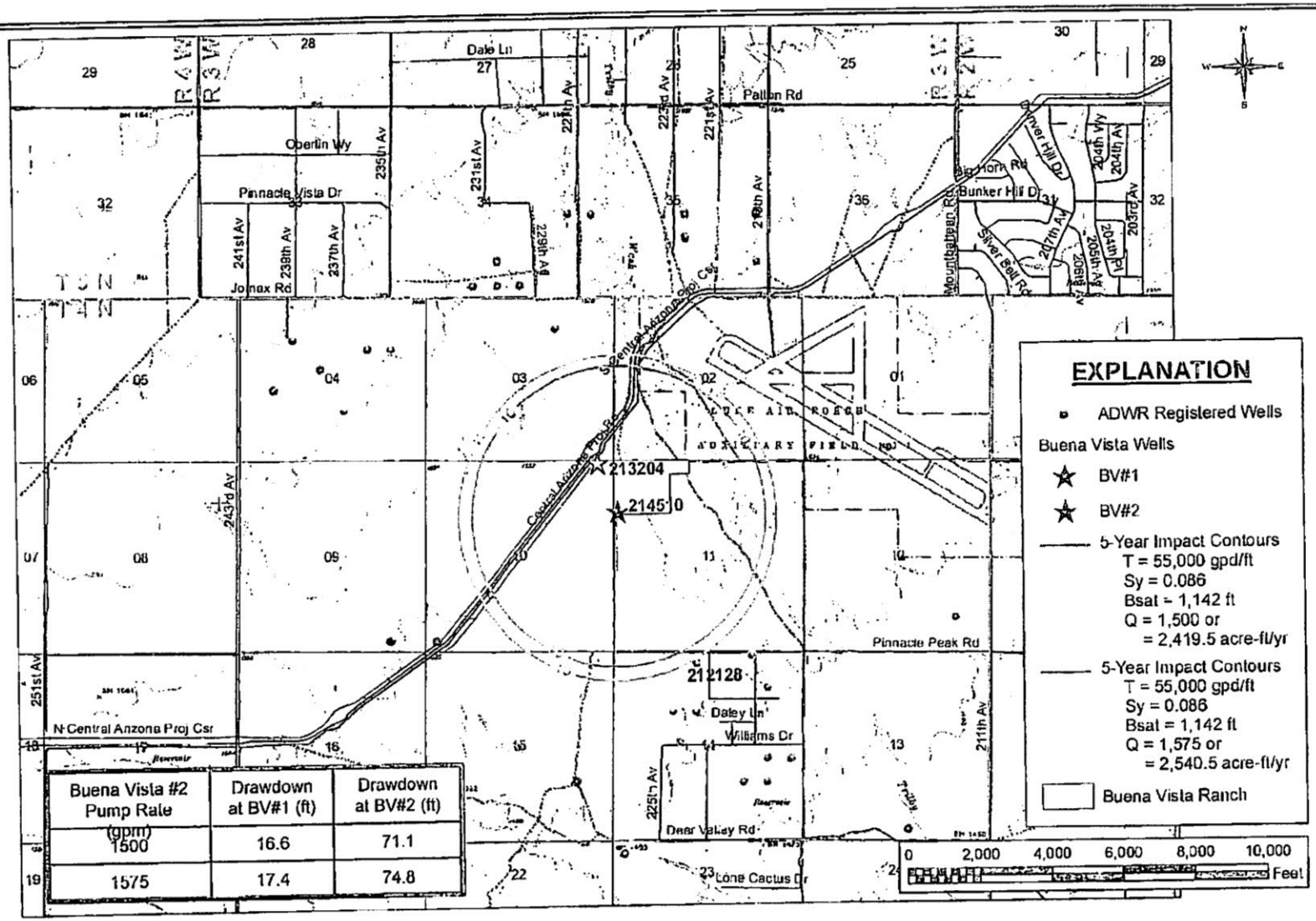
BUENA VISTA WELL #2
HEAD LOSS DUE TO LAMINAR FLOW
SPECIFIC DRAWDOWN VS. DISCHARGE

City of Surprise, Maricopa County, Arizona

Figure 11



Buena Vista #2 Pump Rate (gpm)	Drawdown at BV#1 (ft)	Drawdown at BV#2 (ft)
1500	16.6	71.1
1575	17.4	74.8

Base Map: ADWR GIS Data (2001)
Well Data: ADWR 55 Wells CD (2007)

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November 29, 2007 Project B.1401

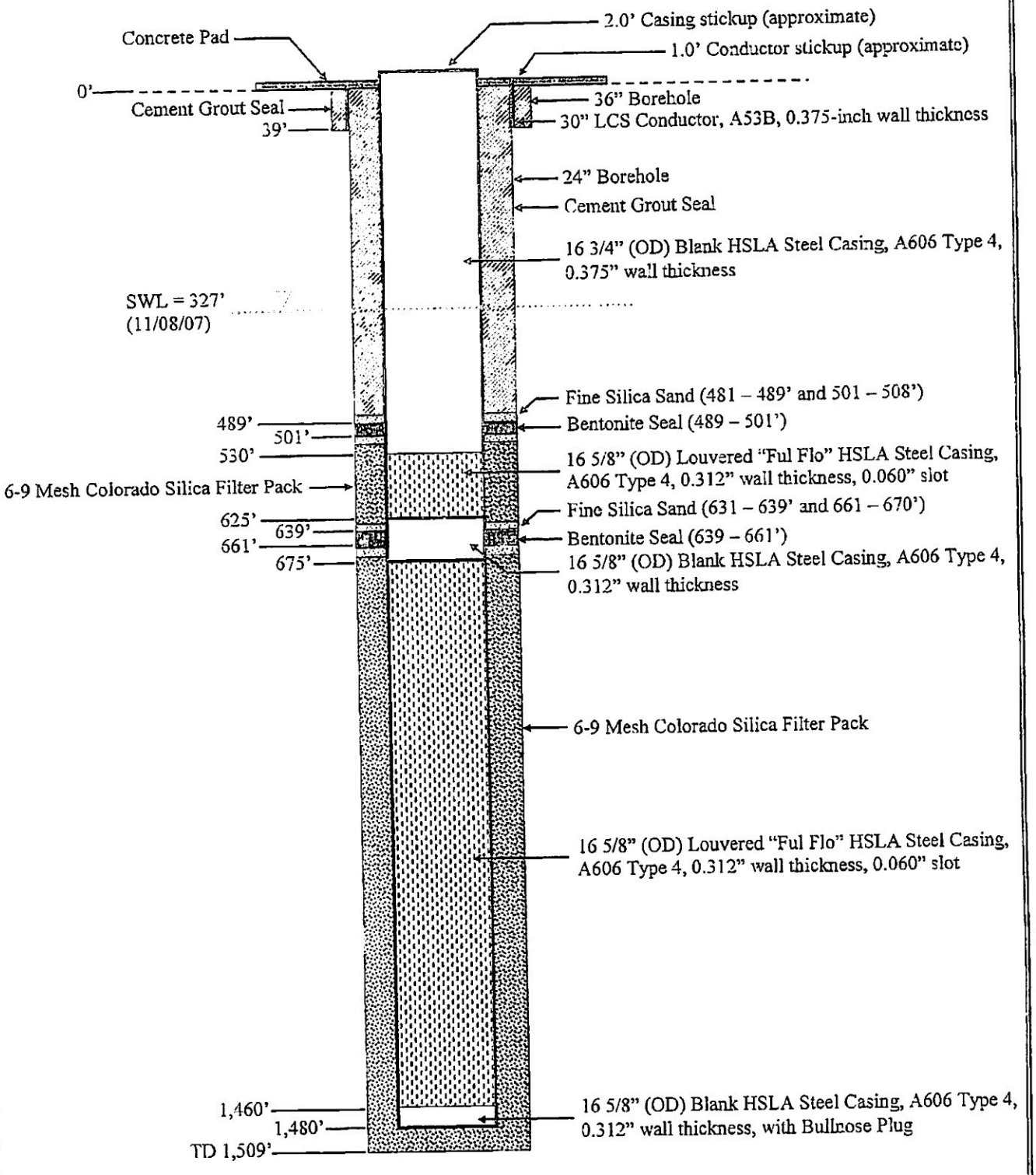
BUENA VISTA WELL #2 (55-214510) WELL SPACING ANALYSIS

Maricopa County, Arizona

Figure 12

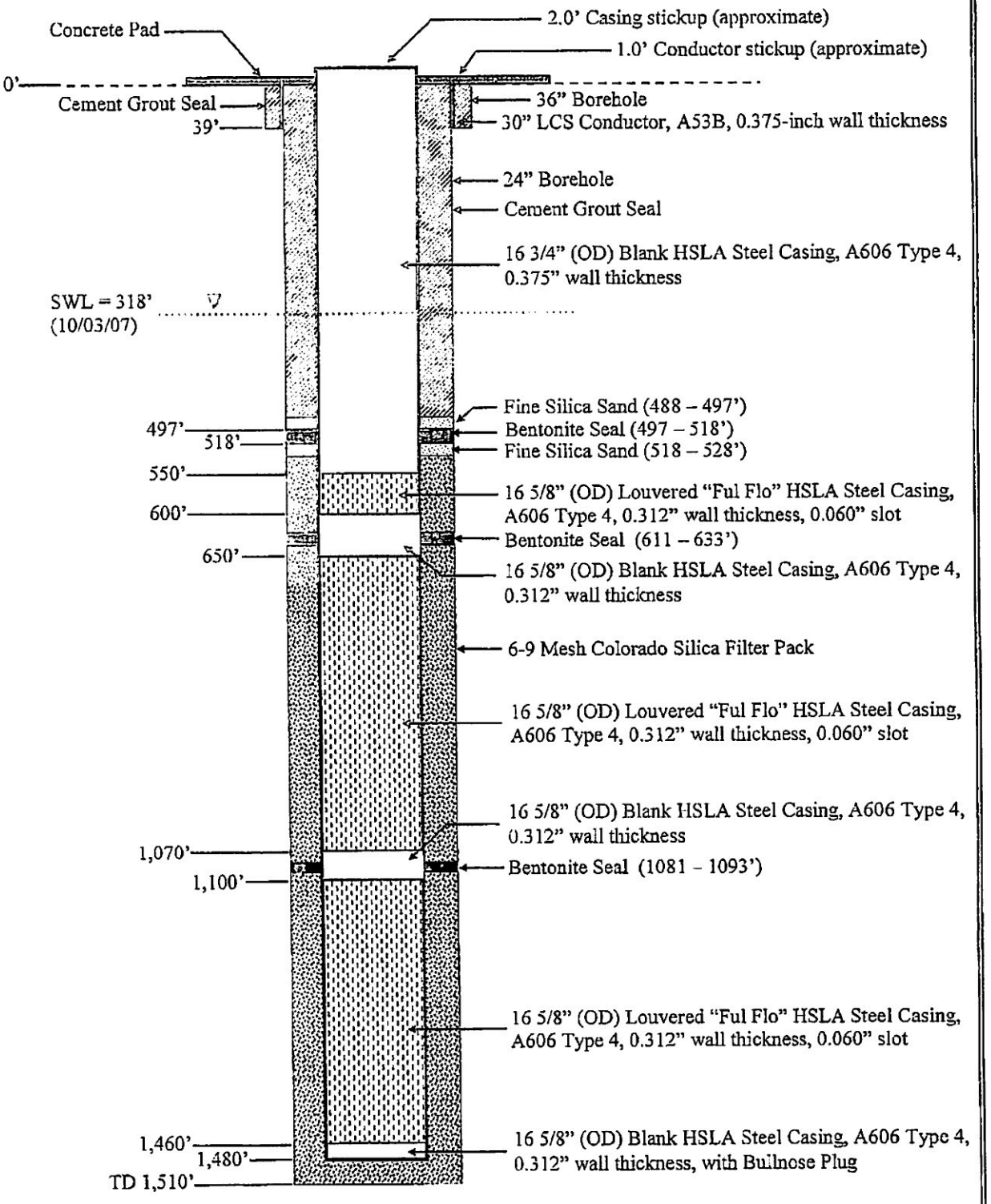
ATTACHMENT III

Figure 13 – BV#1 As-Built Diagram
Figure 14 – BV#2 As-Built Diagram



- Drawing Not to Scale. Casing Centralizers Every 80 feet.

Southwest Ground-water Consultants, Inc.	**AS-BUILT DIAGRAM** **BUENA VISTA WELL #1** **B(4-3) 10 AAA #55-213204**	**Figure 13**
November 19, 2007 Project B.1401	**Maricopa County, Arizona**	



- Drawing Not to Scale. Casing Centralizers Every 80 feet.

Southwest Ground-water Consultants, Inc. **October 18, 2007 Project B.1401**	**AS-BUILT DIAGRAM** **BUENA VISTA WELL #2** **B(4-3) 11 BCB #55-214510** **Maricopa County, Arizona**	**Figure 14**