0000122520

Transcript Exhibit(s)

W-04264A-04-0438

SW-04265A-04-0439

W-01445A-04-0753

Part 3 of 3 (See barcode 0000122518 for Part 1)
(See barcode 0000122519 for Part 2)

Arizona Corporation Commission
DOCKETED
AUG 19 2005
DOCKETED BY

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Marta T. Hetzer
Administrator/Owner

Suite Three
2627 North Third Street
Phoenix, AZ 85004-1126
(602) 274-9944
FAX: (602) 277-4264

To: Docket Control

Re: Woodruff Water Company W-04264A-04-0438; et al.
Volumes I through VII Concluded
May 23 through August 4, 2005

STATUS OF ORIGINAL EXHIBITS

FILED WITH DOCKET CONTROL
08-19-2005

STAFF

1, 3, 4, and 5.

ARIZONA WATER COMPANY

1A, 1B, 2 through 9, 9A, 9B, 10, 11, 12, 12A, 12B, 12C, 13 through 19, 20A, 20B, and 23 through 26.

WOODRUFF WATER COMPANY

1, 1B, 2 through 15, 21, 23, 26A, 31 through 45, 47A, 51B, 53A, 53B, 54, 55, 56C, 56D, 56E, 57, 60, 80, 81, 83, and 84.

EXHIBIT NUMBERS NOT UTILIZED
Numbers skipped or exhibit not used

STAFF

2

ARIZONA WATER COMPANY

1, 20, 21, and 22.

WOODRUFF WATER COMPANY

22, 23A, 23B, 24, 25, 27, 28, 30, 46, 48, 49, 50, 51, 52, 53, 56, 56A, 56B, 58, 59, 61 through 74, 77, 78, 79, 82, 85, and 86.

ORIGINAL EXHIBITS RETURNED TO PARTIES

STAFF

2	Not utilized

ARIZONA WATER COMPANY

20	Not utilized
21	Not utilized

WOODRUFF WATER COMPANY

16 through 20	Not moved by design or oversight
22	Not utilized
23C	Not moved by design or oversight
24 and 25	Not utilized
26	Not moved by design or oversight
27 and 28	Not utilized
29	Not moved by design or oversight
30 and 46	Not utilized
47	Not moved by design or oversight
48 through 50	Not utilized
51A	Not moved by design or oversight
52	Not utilized
75 and 76	Not admitted by a ruling
87	Not moved by design or oversight

Copy to:

Marc Stern, ALJ (letter only)
Staff (Tim Sabo, Esq.)
WWC (Snell & Wilmer, Jeffrey Crockett, Esq.)
WWC (Sacks Tierney, Marvin S. Cohen, Esq., letter only)
AWC (Bryan Cave, Steven A. Hirsch, Esq.)

Russ

AUG - 5 2004

ARIZONA DEPARTMENT OF WATER RESOURCES

Hydrology Division
500 North Third Street, Phoenix, Arizona 85004
Telephone 602 417-2448
Fax 602 417-2425

JANET NAPOLITANO
Governor

HERB GUENTHER
Director

August 2, 2004

Mr. Karl Polen
Pivotal Group
2555 E. Camelback Rd., Suite 700
Phoenix, Arizona 85016

RE: Sandia – also known as Sundance Farms
Application for Physical Availability Demonstration #20-401356

Dear Mr. Polen:

The Department has completed review of the report entitled *Hydrologeologic Investigation, Sundance Farms, Pinal County*, by Southwest Ground-water Consultants, Inc., April 1, 2004 and analysis of available hydrologic information. The study area consists of about 3,180 acres in Sections 13, 14, 23, 24 and 25, T5S, R7E, G&S R B&M in Pinal County within the Maricopa-Stanfield sub-basin of the Pinal Active Management Area.

In accordance with A.A.C. R12-15-702(C), we have determined that sufficient groundwater is physically available to meet the projected demand of approximately 8,159 acre-feet per year for 100 years under A.A.C. R12-15-703(B) for assured water supply purposes in the subject area. However, groundwater wells in the study area have fluoride concentrations that exceed the Arizona Drinking Water Standard of 4.0 mg/L. It is the Department's conclusion that the estimated one hundred year depth-to-water should not exceed 1100 feet below land surface, the maximum depth allowed by A.A.C. R12-15-703(B).

The results of the Department's hydrologic review fulfill the requirements of R12-15-702(C) and can be cited in applications for Certificates of Assured Water Supply or for Analysis of Assured Water Supply. These applications have certain additional requirements based on the assured water supply criteria referenced in A.R.S. 45-576 and Rule R12-15-701 et. seq. For further information on these requirements, please contact the Office of Assured and Adequate Water Supply at (602) 417-2465. **If the Department finds that the groundwater supply is not available because the assumptions and information used in determining the physical availability under the current criteria prove incorrect, the Department will modify the availability of groundwater accordingly.**

The Department's determination is an appealable agency action. In order to appeal this decision, you must request an appeal within thirty (30) days from receipt of this letter. I have enclosed a summary of the appeals process and an appeal form should you wish to pursue this option.

If you have any questions regarding the physical availability review, please contact me at (602) 417-2448.

Sincerely,

Frank Putman
Acting Assistant Director

FP/KM/rd
202451

cc: Mr. Stephen D. Noel, Southwest Ground-water Consultants, Inc.
Mr. Doug Dunham, Office of Assured & Adequate Water Supply

WWC-12
Admitted

OFFICIAL RECORDS OF
PINAL COUNTY RECORDER
LAURA DEAN-LYTLE

When recorded mail to:

Clerk of the Board
P.O. Box 827
Florence, Arizona 85232

DATE/TIME: 10/01/04 1627
FEE: $0.00
PAGES: 11
FEE NUMBER: 2004-078362

Creation Of The Woodruff Water Company Water Franchise

WHEREAS, Woodruff Water Company, an Arizona Corporation, duly authorized to conduct business in the State of Arizona, has filed and presented to the Board of Supervisors of the County of Pinal, State of Arizona, its application for a new public utility franchise for the purpose of constructing, operating and maintaining water lines and related appurtenances along, under and across the public streets, alleys and highways, except federal and state highways, within the unincorporated area of Pinal County, Arizona, as described in Exhibit "A" attached hereto (hereinafter "Application").

WHEREAS, upon filing of the Application for the public utility franchise, the Board of Supervisors of Pinal County ordered a public notice of its intent to consider the granting of the public utility franchise to be published in a newspaper of general circulation, in Pinal County, Arizona, stating the time and place for consideration of the Application was set for 9:30 a.m. on August 25, 2004, at the Pinal County Board of Supervisors' Hearing Room, Administration Building No. 1, Florence, Arizona.

WHEREAS, said Application having come on regularly for hearing at 9:30 a.m. on August 25, 2004; and it appearing from the affidavit of the publishers of the Florence Reminder and Blade Tribune, and the Casa Grande Dispatch, that due and regular notice of said time and place set for the consideration of such action has been published for at least once a week for three consecutive weeks prior to said hearing date, to-wit: in the issues of the Florence Reminder and Blade Tribune, published on August 5, 2004, August 12, 2004, and August 19, 2004; and the matter being called for hearing at 9:30 a.m., and an opportunity having been given to all interested parties to be heard.

WHEREAS, the Board of Supervisors of Pinal County has the power to create a water franchise under Arizona Revised Statute §40-283, as well as other applicable sections.

NOW, THEREFORE,

Section 1: DEFINITIONS

The following terms used in this franchise shall have the following meanings:

A. County: Pinal County, Arizona.

B. Board: Board of Supervisors of Pinal County, Arizona.

C. Grantor: Pinal County, by and through its Board of Supervisors.

D. Grantee: Woodruff Water Company, an Arizona Corporation, its successors and assigns.

WWC-13
Admitted

E. Grantee's Facilities: Water structures, equipment, lines, plants and related appurtenances.

Section 2: GRANT

A. Grantor, on August 25, 2004, hereby grants to Grantee, for a period of twenty-five years, this new public utility franchise (hereinafter "Franchise") for the purpose of constructing, operating and maintaining water lines and related appurtenances along, under and across public streets, alleys and highways, and other rights of way, except federal and state highways, under the terms and conditions set forth herein within the unincorporated area of Pinal County, Arizona, as described in the Application (hereinafter "Franchise Area").

B. Nonexclusive Franchise.

(1) The Franchise granted hereby shall not be exclusive and shall not restrict in any manner the right of County in the exercise of any regulatory power which it now has or which may hereafter be authorized or permitted by the laws of the State of Arizona. Nothing herein shall be construed to prevent County from granting other like or similar franchises to any other person, firm or corporation. County retains and shall ever be considered as having and retaining the right and power to allow and to grant to any other person, firm, corporation or other companies, franchise rights and privileges to be exercised in and upon its public streets, alleys, highways, rights of way and public places, and such of the same and parts thereof as County may deem best or choose to allow, permit, give or grant.

(2) Nothing herein shall be construed to prevent County and its proper authorities from constructing and installing water lines, sewers, gutters, or improvements to its public highways, streets and alleys, and for that purpose, to require Grantee at Grantee's own expense to remove Grantee's Facilities to conform thereto and facilitate the same.

C. Reservation of Rights.

(1) County reserves the right to alter and amend the Franchise at any time and in any manner necessary for the safety or welfare of the public or to protect the public interests, and County reserves the right to impose at any time restrictions and limitations upon the use of the public streets, alleys, rights of way and highways as County deems best for the public safety or welfare.

(2) County expressly reserves the right, after thirty (30) days written notice to Grantee, to modify, amend, alter, change or eliminate any of the provisions of the Franchise which may become obsolete or impractical; and to impose such additional conditions upon Grantee as may be just and reasonable, such conditions to be those deemed necessary for the purpose of insuring adequate service to the public; provided however, County shall not modify, amend, alter, change or eliminate any of said provisions until after thirty (30) days and a public hearing, if such is legally required or requested by Grantee.

Section 3: RENEWAL/SUBSEQUENT APPLICATION/REMOVAL OF SYSTEM

A. The Franchise herein granted shall expire on August 25, 2029; and upon its termination, Grantee shall cease to exercise under the terms of the Franchise the privileges herein granted. In the event Grantee desires a renewal of the Franchise herein granted, or a new franchise for a subsequent period, Grantee shall apply to and open negotiations with County for that purpose at least six (6)

months before the expiration of the Franchise herein granted; but nothing herein shall be construed to bind County to grant such renewal or subsequent franchise.

B. Upon termination of the Franchise, Grantee shall remove Grantee's Facilities from the streets, alleys, ways, highways, rights of way and bridges within the Franchise Area and shall restore the areas to their original condition. If such removal is not completed within six (6) months of such termination, County may deem any property not removed as having been abandoned.

Section 4: REGULATION

Grantee shall be subject to reasonable regulations for the maintenance by Grantee of such portion of the public streets, alleys, rights of way and highways altered, damaged or destroyed by Grantee, its agents, employees or contractors, in exercising the privileges granted by the Franchise, including, but not limited to provisions for repair as set forth in Section 9(B) herein.

Section 5: CONSTRUCTION, INSTALLATION AND REPAIRS

A. Before beginning any construction for installation of Grantee's Facilities, Grantee shall submit a plan of proposed construction to the Pinal County Engineer and shall not commence any construction until the plan of construction is approved by the County Engineer or his designate.

B. All work performed by Grantee, its agents, employees or contractors, under the Franchise shall be done in the manner prescribed by County and subject to the supervision of County, and in strict compliance with all laws, ordinances, rules and regulations of federal, state and local governments.

C. No construction, reconstruction, repair, or relocation under the Franchise shall be commenced until written permits have been obtained from the proper County officials. In any permit so issued, such officials may impose such conditions and regulations as a condition of the granting of the same as are necessary for the purpose of protecting any structures, highways, streets, or rights of way and for the proper restoration of such structures, highways, streets or rights of way, for the protection of the public and the continuity of pedestrian and vehicular traffic.

D. No construction under the Franchise by Grantee shall impose upon County the duty to maintain any public street, alley, highway or right of way unless County accepts said public street, alley, highway or right of way into the county maintenance system as provided by law.

Section 6: INSPECTION

County shall, if it deems it necessary, have the right to inspect the construction, operation and maintenance of Grantee's Facilities to insure the proper performance of the terms of the Franchise granted herein.

Section 7: SUFFICIENCY, LOCATION AND MAINTENANCE

All of Grantee's Facilities shall be in all respects adequate, efficient, substantial and permanent in design and workmanship, and shall be so located, erected and maintained in good order and repair so as not to interfere with the use, enjoyment or safety of the public streets, alleys, highways or rights of way.

Section 8: EXPANSION

Grantee may from time to time, during the term of the Franchise make such enlargements and extensions of its wastewater system as are necessary to adequately provide for the requirements of County and the inhabitants of the Franchise Area; provided that nothing herein shall compel Grantee to expand or enlarge its system beyond the economic and operating limits thereof. Such enlargements and extensions shall be made in accordance with County rules and regulations.

Section 9: RELOCATION; REPAIR

A. During the term of the Franchise, if County or any qualified authority having jurisdiction in the Franchise Area alters, repairs, improves, or changes the grade of, any public street, alley, highway, or right of way in the Franchise Area, then and in such event, Grantee, at its own expense, shall promptly make such changes in the location, structure or alignment of its water lines and related appurtenances as the County Engineer or his/her designee may deem necessary as provided in Section 9(B).

B. Within sixty (60) days after receiving written notice from County of needed changes or corrections in Grantee's Facilities, and upon the failure of Grantee to make such changes or corrections as set forth in Section 9(A) or to correct any damage to any public street, alley, highway or right-of-way within the Franchise Area caused directly or indirectly by Grantee, its agents, employees or contractors, County shall have the right to make, or cause such changes or corrections to be made at the expense of Grantee. In the event that any changes, corrections or repairs are deemed an emergency by County, Grantee, upon receipt of notice of such an emergency, shall makes such changes, corrections or repairs deemed necessary by County to provide for health and safety concerns. In the event that Grantee does not make the necessary changes, corrections or repairs within a reasonable period of time, County may make, or cause such changes, corrections or repairs to be made at the expense of Grantee. Any expenses incurred for such changes, corrections or repairs shall be due and payable within thirty (30) days of written demand by County to Grantee.

Section 10: LIABILITY

A. If any public street, highway, alley, way, bridge, sidewalk, public place, or other public facility should be disturbed, altered, damaged or destroyed by Grantee, its agents, employees or contractors, in the construction, design, installation, operation and maintenance of Grantee's Facilities under the Franchise, the same shall be promptly repaired, reconstructed, replaced or restored by Grantee, without cost to County, as provided in Section 9(B), in as good condition as before Grantee's entry and to the satisfaction of County.

B. Grantee shall be responsible to every owner of property which shall be injured by the work of construction, installation, operation or maintenance of Grantee's Facilities under the Franchise, all physical damage which shall be done to such injured property through any act or omission of Grantee, its agents, employees or contractors, arising out of said construction, installation, operation or maintenance.

C. It is a condition of the Franchise that County shall not and does not by reason of the Franchise assume any liability of the Grantee whatsoever for injury to persons or damage to property.

Section 11: INDEMNIFICATION

Grantee by its acceptance of the Franchise agrees that throughout the entire term of this Franchise, Grantee, at its sole cost and expense, shall indemnify, defend, save and hold harmless Pinal County,

its elected officers, employees and agents from any and all lawsuits, judgments and claims for injury, death and damage to persons and property, both real and personal, caused in whole or in part by the construction, design, installation, operation or maintenance of Grantees Facilities by Grantee, its agents, employees or contractors, within the Franchise Area. Indemnified expenses shall include, but not be limited to, litigation and arbitration expenses, and attorneys' fees.

Section 12: ACCEPTANCE BY GRANTEE / EFFECTIVE DATE FRANCHISE

The Franchise shall be accepted by Grantee by written instrument in the form attached hereto as Exhibit "B" (hereinafter "Acceptance"), executed and acknowledged by it as a deed is required to be, and filed with the Clerk of the Pinal County Board of Supervisors within thirty (30) days after the date this Franchise is approved by County. This Franchise shall be effective upon delivery of the Acceptance to the Clerk of the Pinal County Board of Supervisors in the form required and within the time specified above.

Section 13: LIMITS ON GRANTEE'S RECOURSE

A. Grantee by its acceptance of the Franchise acknowledges such acceptance relies upon Grantee's own investigation and understanding of the power and authority of the County to grant this Franchise. Grantee by its acceptance of the Franchise accepts the validity of the terms and conditions of the Franchise in their entirety and agrees it will not, at any time, proceed against County in any claim or proceeding challenging any term or provision of the Franchise as unreasonable, arbitrary or void, or that County did not have the authority to impose such term or condition.

B. Grantee by accepting the Franchise acknowledges that it has not been induced to accept the same by any promise, verbal or written, by or on behalf of County or by any third person regarding any term or condition of the Franchise not expressed therein. Grantee by its acceptance of the Franchise further pledges that no promise or inducement, oral or written, has been made to any employee or official of County regarding receipt of the Franchise.

C. Grantee by its acceptance of the Franchise further acknowledges that it has carefully read the terms and conditions of the Franchise and accepts without reservation the obligations imposed by the terms and conditions herein.

D. The Board's decision concerning its selection and awarding of the Franchise shall be final.

Section 14: FAILURE TO ENFORCE FRANCHISE

Grantee shall not be excused from complying with any of the terms and conditions of the Franchise by any failure of County, upon any one or more occasions, to insist upon the Grantee's performance or to seek Grantee's compliance with any one or more of such terms or conditions.

Section 15: COMPLIANCE WITH THE LAW

Grantee shall at all times, conduct its business under the Franchise in accordance with all federal, state and local laws, rules and regulations, as amended, including any future amendments thereto as may, from time to time, be adopted.

Section 16: INTERPRETATION/GOVERNING LAW

The interpretation and performance of the Franchise and of the general terms and conditions shall be in accordance with and governed by the laws of the State of Arizona.

Section 17: VENUE

Exclusive venue for any legal action to enforce the provisions, terms and conditions of the Franchise shall be the Superior Court of the State of Arizona in and for the County of Pinal, Florence, Arizona.

Section 18: SEVERABILITY

If any section, provision, term or covenant or any portion of any section, provision, term or covenant of the Franchise is determined to be illegal, invalid or unconstitutional, by any court of competent jurisdiction or by any state or federal regulatory agency having jurisdiction thereof, such determination shall have no effect on any remaining portion of such section, provision, term or covenant or the remaining sections, provisions, terms or covenants of the Franchise, all of which shall remain in full force and effect for the term of the Franchise or any renewal or renewals thereof.

Section 19: FORFEITURE

A. If Grantee fails to comply with any of the provisions of this Franchise or defaults in any of its obligations hereunder, except for causes beyond the reasonable control of Grantee; and shall fail within thirty (30) days after written notice from County to commence, and within a reasonable time and not longer than sixty (60) days, complete the correction of such default or noncompliance, County shall have the right to revoke this Franchise and all rights of Grantee hereunder. In the event Grantee makes a general assignment or general arrangement for the benefit of creditors; or a trustee or receiver is appointed to take possession of substantially all of Grantee's Facilities within the Franchise Area or of Grantee's interest in this Franchise, where possession is not restored to Grantee within thirty (30) days; or Grantee's Facilities within the Franchise Area are subject to an attachment, execution or other seizure of substantially all of the Grantee's Facilities within the Franchise Area or this Franchise, where such seizure is not discharged within thirty (30) days, County may declare this Franchise, and any expansion hereto, forfeited and terminated.

B. Nothing herein contained shall limit or restrict any other legal rights that County may possess arising from such violations.

Section 20: REVOCATION OF FRANCHISE

The Franchise may after due notice and hearing, be revoked by County for any of the following reasons:

A. For false or misleading statements in, or material omissions from the application for and the hearing on the granting of the Franchise.

B. For any transfer or assignment of the Franchise or control thereof without County's written consent.

C. For failure to comply with any of the terms and conditions of the Franchise.

Section 21: ASSIGNMENT/TRANSFER

Grantee shall not assign or transfer any interest in the Franchise without the prior written consent of Grantor. Grantor shall not unreasonably withhold its consent to a proposed transfer.

Section 22: NOTICE

Notices required under the Franchise shall be delivered or sent by certified mail, postage prepaid to:

Grantor:

Clerk of the Pinal County Board of Supervisors
P.O. Box 827
31 N. Pinal
Florence, Arizona 85232

Grantee:

Woodruff Water Company
2555 E. Camelback Road, Suite 700
Phoenix, Arizona 85016

The delivery or mailing of such notice shall be equivalent to direct personal notice and shall be deemed to have been given at the time of delivery. Either party may change its address under this section by written notice to the other party.

Section 23: REMEDIES

Rights and remedies reserved to the parties by the Franchise are cumulative and shall be in addition to and not in derogation of any other rights or remedies which the parties may have with respect to the subject matter of the Franchise and a waiver thereof at any time shall not affect any other reservation of rights or remedies.

Section 24: RIGHT OF INTERVENTION

County hereby reserves to itself, and Grantee hereby grants to County, the right to intervene in any suit, action or proceeding involving any provision in the Franchise.

Section 25: BOOKS AND RECORDS

Grantee shall maintain books and records that identify all of Grantee's underground facilities by type and location within the Franchise Area. Grantee shall make such books and records available to County upon County's request and without cost to County.

Section 26: AD VALOREM TAXES

Grantee shall pay its ad valorem taxes before they become delinquent.

IN WITNESS WHEREOF, the Board of Supervisors of Pinal County, Arizona, by its Chairman and its Clerk, thereunto duly authorized, has hereunto set its hand and caused its official seal to be affixed on August 25, 2004.

THE SEAL OF PINAL COUNTY ARIZONA 18

PINAL COUNTY BOARD OF SUPERVISORS

Lionel D. Ruiz, Chairman

ATTEST:

Sheri Cluff, Deputy Clerk of the Board

APPROVED AS TO FORM:

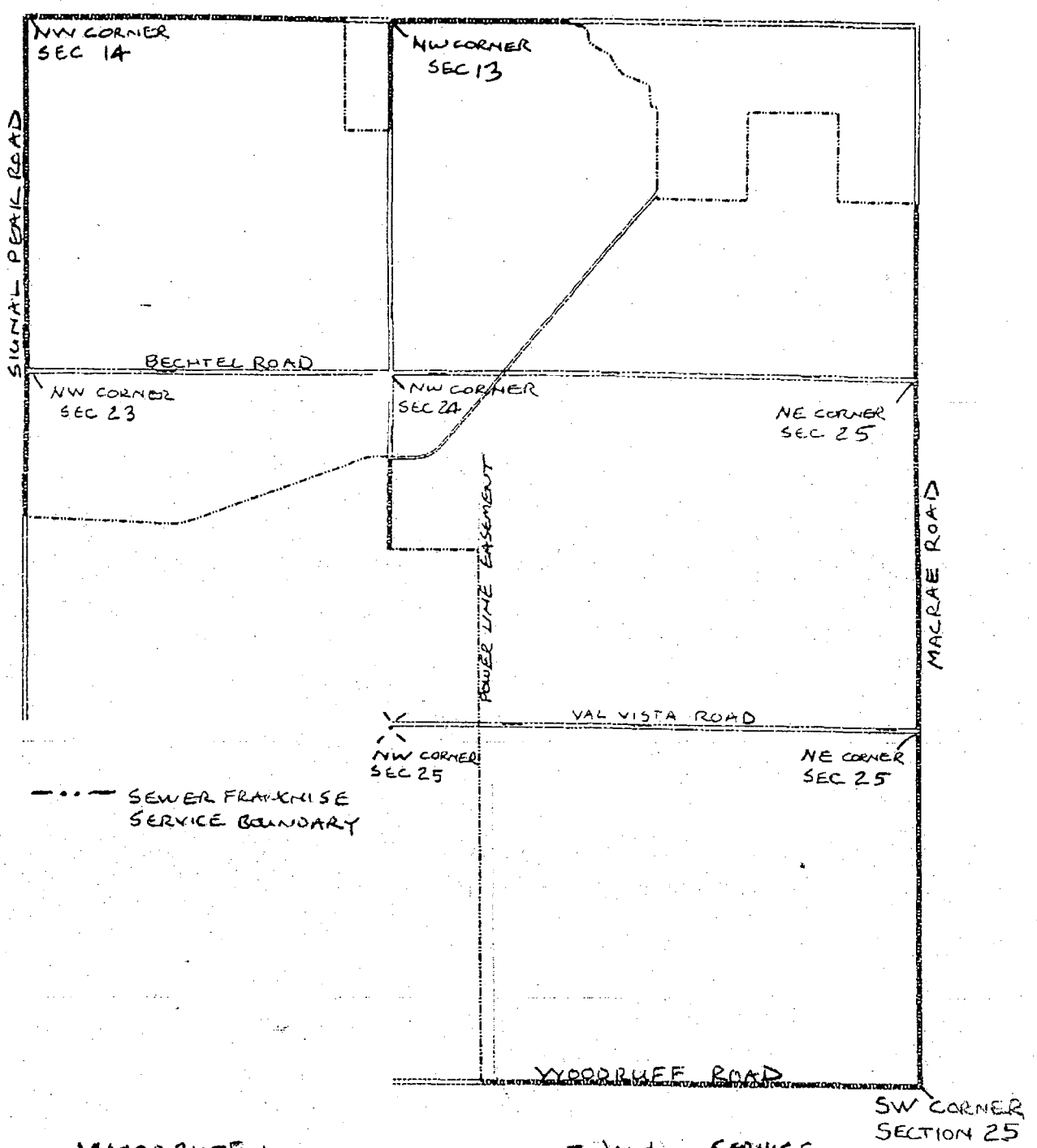
ROBERT CARTER OLSON
PINAL COUNTY ATTORNEY

Rick Husk, Deputy County Attorney

ATTACHMENT "A"

PINAL COUNTY
WEST OF COOLIDGE

SECTIONS 13, 14, 23, 24, 25
TOWNSHIP 5 SOUTH
RANGE 7 EAST



WOODRUFF WATER COMPANY - Water SERVICE FRANCHISE AREA

Exhibit B

ACCEPTANCE OF FRANCHISE

To: Board of Supervisors Pinal County, Arizona

Grantee, Woodruff Water Company, an Arizona Corporation, does hereby accept the August 25, 2004, grant of a new public utility franchise from Pinal County, Arizona, (hereinafter "Franchise"), to construct, operate, and maintain water lines and related fixtures along, under and across present and future public streets, alleys and highways, except state highways, within the unincorporated area of Pinal County, Arizona, as stated in its application for a new public utility franchise.

Grantee unconditionally accepts the Franchise and covenants to faithfully comply with, abide by, to observe and perform all the provisions, terms and conditions of the Franchise. Grantee accepts such provisions, terms and conditions and expressly waives any and all objections to the reasonableness or legality of any provisions of the same or any part thereof, or as to the legal right or authority of Pinal County to impose the same.

Grantee declares that the statements and recitals in this Franchise are correct, and Grantee declares it has made and does make the agreement, statements and admissions in this Franchise recited to have been or to be made by Grantee.

Dated this 20th day of September, 2004.

Woodruff Water Company

By: _____

Title: Vice President

STATE OF ARIZONA)
) ss.
County of Maricopa)

The foregoing instrument was acknowledged before me this 20th day of Sept., 2004, by KARL POLEN, VICE PRES. of Woodruff Utility Company, an Arizona Corporation, and being authorized to do so, executed the foregoing instrument on behalf of the company for the purposes therein stated.

Sharon K. Riley
Notary Public

Notary Public State of Arizona
Maricopa County
Sharon Kay Riley
Expires October 19, 2007

My Commission Expires:
10/19/2007

i:\attycivl\franchis\Woodruff Water Franchise

OFFICIAL RECORDS OF
PINAL COUNTY RECORDER
LAURA DEAN-LYTLE

DATE/TIME: 10/01/04 1627
FEE: $0.00
PAGES: 12
FEE NUMBER: 2004-078363

When recorded mail to:

Clerk of the Board
P.O. Box 827
Florence, Arizona 85232

Creation Of The Woodruff Utility Company Wastewater Franchise

WHEREAS, Woodruff Utility Company, an Arizona Corporation, duly authorized to conduct business in the State of Arizona, has filed and presented to the Board of Supervisors of the County of Pinal, State of Arizona, its application for a new public utility franchise for the purpose of constructing, operating and maintaining wastewater lines and related appurtenances along, under and across the public streets, alleys and highways, except federal and state highways, within the unincorporated area of Pinal County, Arizona, as described in Exhibit "A" attached hereto (hereinafter "Application").

WHEREAS, upon filing of the Application for the public utility franchise, the Board of Supervisors of Pinal County ordered a public notice of its intent to consider the granting of the public utility franchise to be published in a newspaper of general circulation, in Pinal County, Arizona, stating the time and place for consideration of the Application was set for 9:30 a.m. on August 25, 2004, at the Pinal County Board of Supervisors' Hearing Room, Administration Building No. 1, Florence, Arizona.

WHEREAS, said Application having come before this Board for hearing at 9:30 a.m. on August 25, 2004; and it appearing from the affidavit of the publishers of the Florence Reminder and Blade Tribune, and the Casa Grande Dispatch, that due and regular notice of said time and place set for the consideration of such action has been published for at least once a week for three consecutive weeks prior to said hearing date, to-wit: in the issues of the Florence Reminder and Blade Tribune and the Casa Grande Dispatch published on August 5, 2004, August 12, 2004, and August 19, 2004; and the matter being called for hearing at 9:30 a.m., and an opportunity having been given to all interested parties to be heard.

WHEREAS, the Board of Supervisors of Pinal County has the power to create a wastewater franchise under Arizona Revised Statute §40-283, as well as other applicable sections.

NOW, THEREFORE,

Section 1: DEFINITIONS

The following terms used in this franchise shall have the following meanings:

A. County: Pinal County, Arizona.

B. Board: Board of Supervisors of Pinal County, Arizona.

C. Grantor: Pinal County, by and through its Board of Supervisors.

WWC-14
Admitted

D. Grantee: Woodruff Utility Company, an Arizona Corporation, its successors and assigns.

E. Grantee's Facilities: Wastewater structures, equipment, lines, plants and related appurtenances.

Section 2: GRANT

A. Grantor, on August 25, 2004, hereby grants to Grantee, for a period of twenty-five years, this new public utility franchise (hereinafter "Franchise") for the purpose of constructing, operating and maintaining wastewater lines and related appurtenances along, under and across public streets, alleys and highways, and other rights of way, except federal and state highways, under the terms and conditions set forth herein within the unincorporated area of Pinal County, Arizona, as described in the Application (hereinafter "Franchise Area").

B. Nonexclusive Franchise.

(1) The Franchise granted hereby shall not be exclusive and shall not restrict in any manner the right of County in the exercise of any regulatory power which it now has or which may hereafter be authorized or permitted by the laws of the State of Arizona. Nothing herein shall be construed to prevent County from granting other like or similar franchises to any other person, firm or corporation. County retains and shall ever be considered as having and retaining the right and power to allow and to grant to any other person, firm, corporation or other companies, franchise rights and privileges to be exercised in and upon its public streets, alleys, highways, rights of way and public places, and such of the same and parts thereof as County may deem best or choose to allow, permit, give or grant.

(2) Nothing herein shall be construed to prevent County and its proper authorities from constructing and installing water lines, sewers, gutters, or improvements to its public highways, streets and alleys, and for that purpose, to require Grantee at Grantee's own expense to remove Grantee's Facilities to conform thereto and facilitate the same.

C. Reservation of Rights.

(1) County reserves the right to alter and amend the Franchise at any time and in any manner necessary for the safety or welfare of the public or to protect the public interests, and County reserves the right to impose at any time restrictions and limitations upon the use of the public streets, alleys, rights of way and highways as County deems best for the public safety or welfare.

(2) County expressly reserves the right, after thirty (30) days written notice to Grantee, to modify, amend, alter, change or eliminate any of the provisions of the Franchise which may become obsolete or impractical; and to impose such additional conditions upon Grantee as may be just and reasonable, such conditions to be those deemed necessary for the purpose of insuring adequate service to the public; provided however, County shall not modify, amend, alter, change or eliminate any of said provisions until after thirty (30) days and a public hearing, if such is legally required or requested by Grantee.

Section 3: RENEWAL/SUBSEQUENT APPLICATION/REMOVAL OF SYSTEM

A. The Franchise herein granted shall expire on August 25, 2029; and upon its termination, Grantee shall cease to exercise under the terms of the Franchise the privileges herein granted. In the event Grantee desires a renewal of the Franchise herein granted, or a new franchise for a subsequent period, Grantee shall apply to and open negotiations with County for that purpose at least six (6) months before the expiration of the Franchise herein granted; but nothing herein shall be construed to bind County to grant such renewal or subsequent franchise.

B. Upon termination of the Franchise, Grantee shall remove Grantee's Facilities from the streets, alleys, ways, highways, rights of way and bridges within the Franchise Area and shall restore the areas to their original condition. If such removal is not completed within six (6) months of such termination, County may deem any property not removed as having been abandoned.

Section 4: REGULATION

Grantee shall be subject to reasonable regulations for the maintenance by Grantee of such portion of the public streets, alleys, rights of way and highways altered, damaged or destroyed by Grantee, its agents, employees or contractors, in exercising the privileges granted by the Franchise, including, but not limited to provisions for repair as set forth in Section 9(B) herein.

Section 5: CONSTRUCTION, INSTALLATION AND REPAIRS

A. Before beginning any construction for installation of Grantee's Facilities, Grantee shall submit a plan of proposed construction to the Pinal County Engineer and shall not commence any construction until the plan of construction is approved by the County Engineer or his designate.

B. All work performed by Grantee, its agents, employees or contractors, under the Franchise shall be done in the manner prescribed by County and subject to the supervision of County, and in strict compliance with all laws, ordinances, rules and regulations of federal, state and local governments.

C. No construction, reconstruction, repair, or relocation under the Franchise shall be commenced until written permits have been obtained from the proper County officials. In any permit so issued, such officials may impose such conditions and regulations as a condition of the granting of the same as are necessary for the purpose of protecting any structures, highways, streets, or rights of way and for the proper restoration of such structures, highways, streets, or rights of way, for the protection of the public and the continuity of pedestrian and vehicular traffic.

D. No construction under the Franchise by Grantee shall impose upon County the duty to maintain any public street, alley, highway or right of way unless County accepts said public street, alley, highway or right of way into the county maintenance system as provided by law.

Section 6: INSPECTION

County shall, if it deems it necessary, have the right to inspect the construction, operation and maintenance of Grantee's Facilities to insure the proper performance of the terms of the Franchise granted herein.

Section 7: SUFFICIENCY, LOCATION AND MAINTENANCE

All of Grantee's Facilities shall be in all respects adequate, efficient, substantial and permanent in design and workmanship, and shall be so located, erected and maintained in good order and repair

so as not to interfere with the use, enjoyment or safety of the public streets, alleys, highways or rights of way.

Section 8: EXPANSION

Grantee may from time to time, during the term of the Franchise make such enlargements and extensions of its wastewater system as are necessary to adequately provide for the requirements of County and the inhabitants of the Franchise Area; provided that nothing herein shall compel Grantee to expand or enlarge its system beyond the economic and operating limits thereof. Such enlargements and extensions shall be made in accordance with County rules and regulations.

Section 9: RELOCATION; REPAIR

A. During the term of the Franchise, if County or any qualified authority having jurisdiction in the Franchise Area alters, repairs, improves, or changes the grade of, any public street, alley, highway, or right of way in the Franchise Area, then and in such event, Grantee, at its own expense, shall promptly make such changes in the location, structure or alignment of its wastewater lines and related appurtenances as the County Engineer or his/her designee may deem necessary as provided in Section 9(B).

B. Within sixty (60) days after receiving written notice from County of needed changes or corrections in Grantee's Facilities, and upon the failure of Grantee to make such changes or corrections as set forth in Section 9(A) or to correct any damage to any public street, alley, highway or right-of-way within the Franchise Area caused directly or indirectly by Grantee, its agents, employees or contractors, County shall have the right to make, or cause such changes or corrections to be made at the expense of Grantee. In the event that any changes, corrections or repairs are deemed an emergency by County, Grantee, upon receipt of notice of such an emergency, shall makes such changes, corrections or repairs deemed necessary by County to provide for health and safety concerns. In the event that Grantee does not make the necessary changes, corrections or repairs within a reasonable period of time, County may make, or cause such changes, corrections or repairs to be made at the expense of Grantee. Any expenses incurred for such changes, corrections or repairs shall be due and payable within thirty (30) days of written demand by County to Grantee.

Section 10: LIABILITY

A. If any public street, highway, alley, way, bridge, sidewalk, public place, or other public facility should be disturbed, altered, damaged or destroyed by Grantee, its agents, employees or contractors, in the construction, design, installation, operation and maintenance of Grantee's Facilities under the Franchise, the same shall be promptly repaired, reconstructed, replaced or restored by Grantee, without cost to County, as provided in Section 9(B), in as good condition as before Grantee's entry and to the satisfaction of County.

B. Grantee shall be responsible to every owner of property which shall be injured by the work of construction, installation, operation or maintenance of Grantee's Facilities under the Franchise, all physical damage which shall be done to such injured property through any act or omission of Grantee, its agents, employees or contractors, arising out of said construction, installation, operation or maintenance.

C. It is a condition of the Franchise that County shall not and does not by reason of the Franchise assume any liability of the Grantee whatsoever for injury to persons or damage to property.

Section 11: INDEMNIFICATION

Grantee by its acceptance of the Franchise agrees that throughout the entire term of this Franchise, Grantee, at its sole cost and expense, shall indemnify, defend, save and hold harmless Pinal County, its elected officers, employees and agents from any and all lawsuits, judgments and claims for injury, death and damage to persons and property, both real and personal, caused in whole or in part by the construction, design, installation, operation or maintenance of Grantees Facilities by Grantee, its agents, employees or contractors, within the Franchise Area. Indemnified expenses shall include, but not be limited to, litigation and arbitration expenses, and attorneys' fees.

Section 12: ACCEPTANCE BY GRANTEE / EFFECTIVE DATE FRANCHISE

The Franchise shall be accepted by Grantee by written instrument in the form attached hereto as Exhibit "B" (hereinafter "Acceptance"), executed and acknowledged by it as a deed is required to be, and filed with the Clerk of the Pinal County Board of Supervisors within thirty (30) days after the date this Franchise is approved by County. This Franchise shall be effective upon delivery of the Acceptance to the Clerk of the Pinal County Board of Supervisors in the form required and within the time specified above.

Section 13: LIMITS ON GRANTEE'S RECOURSE

A. Grantee by its acceptance of the Franchise acknowledges such acceptance relies upon Grantee's own investigation and understanding of the power and authority of the County to grant this Franchise. Grantee by its acceptance of the Franchise accepts the validity of the terms and conditions of the Franchise in their entirety and agrees it will not, at any time, proceed against County in any claim or proceeding challenging any term or provision of the Franchise as unreasonable, arbitrary or void, or that County did not have the authority to impose such term or condition.

B. Grantee by accepting the Franchise acknowledges that it has not been induced to accept the same by any promise, verbal or written, by or on behalf of County or by any third person regarding any term or condition of the Franchise not expressed therein. Grantee by its acceptance of the Franchise further pledges that no promise or inducement, oral or written, has been made to any employee or official of County regarding receipt of the Franchise.

C. Grantee by its acceptance of the Franchise further acknowledges that it has carefully read the terms and conditions of the Franchise and accepts without reservation the obligations imposed by the terms and conditions herein.

D. The Board's decision concerning its selection and awarding of the Franchise shall be final.

Section 14: FAILURE TO ENFORCE FRANCHISE

Grantee shall not be excused from complying with any of the terms and conditions of the Franchise by any failure of County, upon any one or more occasions, to insist upon the Grantee's performance or to seek Grantee's compliance with any one or more of such terms or conditions.

Section 15: COMPLIANCE WITH THE LAW

Grantee shall at all times, conduct its business under the Franchise in accordance with all federal, state and local laws, rules and regulations, as amended, including any future amendments thereto as may, from time to time, be adopted.

Section 16: INTERPRETATION/GOVERNING LAW

The interpretation and performance of the Franchise and of the general terms and conditions shall be in accordance with and governed by the laws of the State of Arizona.

Section 17: VENUE

Exclusive venue for any legal action to enforce the provisions, terms and conditions of the Franchise shall be the Superior Court of the State of Arizona in and for the County of Pinal, Florence, Arizona.

Section 18:- SEVERABILITY

If any section, provision, term or covenant or any portion of any section, provision, term or covenant of the Franchise is determined to be illegal, invalid or unconstitutional, by any court of competent jurisdiction or by any state or federal regulatory agency having jurisdiction thereof, such determination shall have no effect on any remaining portion of such section, provision, term or covenant or the remaining sections, provisions, terms or covenants of the Franchise, all of which shall remain in full force and effect for the term of the Franchise or any renewal or renewals thereof.

Section 19: FORFEITURE

A. If Grantee fails to comply with any of the provisions of this Franchise or defaults in any of its obligations hereunder, except for causes beyond the reasonable control of Grantee; and shall fail within thirty (30) days after written notice from County to commence, and within a reasonable time and not longer than sixty (60) days, complete the correction of such default or noncompliance, County shall have the right to revoke this Franchise and all rights of Grantee hereunder. In the event Grantee makes a general assignment or general arrangement for the benefit of creditors; or a trustee or receiver is appointed to take possession of substantially all of Grantee's Facilities within the Franchise Area or of Grantee's interest in this Franchise, where possession is not restored to Grantee within thirty (30) days; or Grantee's Facilities within the Franchise Area are subject to an attachment, execution or other seizure of substantially all of the Grantee's Facilities within the Franchise Area or this Franchise, where such seizure is not discharged within thirty (30) days, County may declare this Franchise, and any expansion hereto, forfeited and terminated.

B. Nothing herein contained shall limit or restrict any other legal rights that County may possess arising from such violations.

Section 20: REVOCATION OF FRANCHISE

The Franchise may after due notice and hearing, be revoked by County for any of the following reasons:

A. For false or misleading statements in, or material omissions from the application for and the hearing on the granting of the Franchise.

B. For any transfer or assignment of the Franchise or control thereof without County's written consent.

C. For failure to comply with any of the terms and conditions of the Franchise.

Section 21: ASSIGNMENT/TRANSFER

Grantee shall not assign or transfer any interest in the Franchise without the prior written consent of Grantor. Grantor shall not unreasonably withhold its consent to a proposed transfer.

Section 22: NOTICE

Notices required under the Franchise shall be delivered or sent by certified mail, postage prepaid to:

Grantor:

Clerk of the-Pinal County Board of Supervisors
P.O. Box 827
31 N. Pinal
Florence, Arizona 85232

Grantee:

Woodruff Utility Company
2555 E. Camelback Road, Suite 700
Phoenix, Arizona 85016

The delivery or mailing of such notice shall be equivalent to direct personal notice and shall be deemed to have been given at the time of delivery. Either party may change its address under this section by written notice to the other party.

Section 23: REMEDIES

Rights and remedies reserved to the parties by the Franchise are cumulative and shall be in addition to and not in derogation of any other rights or remedies which the parties may have with respect to the subject matter of the Franchise and a waiver thereof at any time shall not affect any other reservation of rights or remedies.

Section 24: RIGHT OF INTERVENTION

County hereby reserves to itself, and Grantee hereby grants to County, the right to intervene in any suit, action or proceeding involving any provision in the Franchise.

Section 25: BOOKS AND RECORDS

Grantee shall maintain books and records that identify all of Grantee's underground facilities by type and location within the Franchise Area. Grantee shall make such books and records available to County upon County's request and without cost to County.

Section 26: AD VALOREM TAXES

Grantee shall pay its ad valorem taxes before they become delinquent.

IN WITNESS WHEREOF, the Board of Supervisors of Pinal County, Arizona, by its Chairman and its Clerk, thereunto duly authorized, has hereunto set its hand and caused its official seal to be affixed on August 25, 2004.

PINAL COUNTY BOARD OF SUPERVISORS

Lionel D. Ruiz, Chairman

ATTEST:

Sheri Cluff, Deputy Clerk of the Board

APPROVED AS TO FORM:

ROBERT CARTER OLSON
PINAL COUNTY ATTORNEY

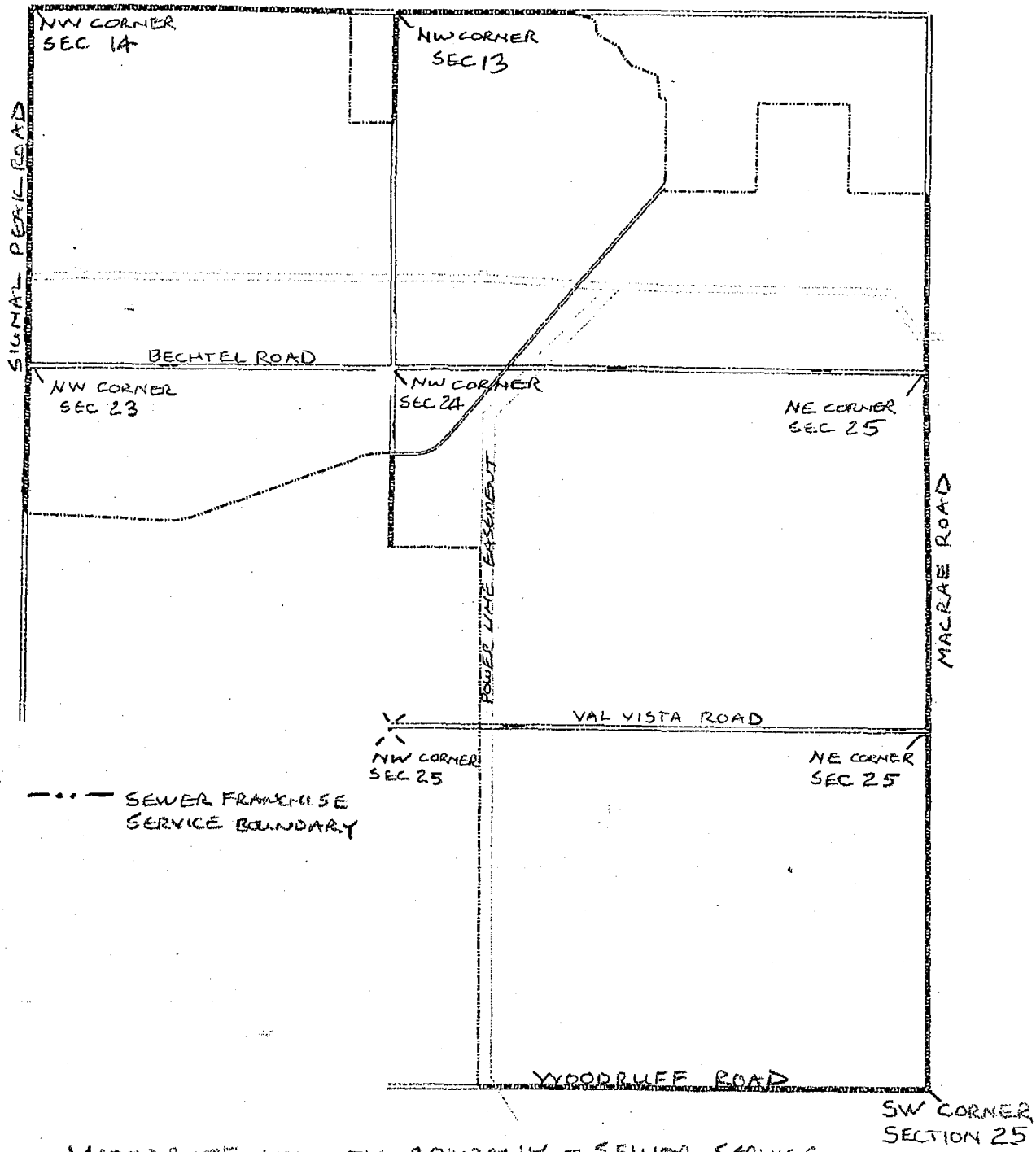
Rick Husk, Deputy County Attorney

WOODRUFF UTILITY CO.

ATTACHMENT A

PINAL COUNTY
WEST OF COOLIDGE

SECTIONS 13, 14, 23, 24, 25
TOWNSHIP 5 SOUTH
RANGE 7 EAST



WOODRUFF UTILITY COMPANY - SEWER SERVICE FRANCHISE ARE

Exhibit B

ACCEPTANCE OF FRANCHISE

To: Board of Supervisors Pinal County, Arizona

Grantee, Woodruff Utility Company, an Arizona Corporation, does hereby accept the August 25, 2004, grant of a new public utility franchise from Pinal County, Arizona, (hereinafter "Franchise"), to construct, operate, and maintain wastewater lines and related fixtures along, under and across present and future public streets, alleys and highways, except state highways, within the unincorporated area of Pinal County, Arizona, as stated in its application for a new public utility franchise.

Grantee unconditionally accepts the Franchise and covenants to faithfully comply with, abide by, to observe and perform all the provisions, terms and conditions of the Franchise. Grantee accepts such provisions, terms and conditions and expressly waives any and all objections to the reasonableness or legality of any provisions of the same or any part thereof, or as to the legal right or authority of Pinal County to impose the same.

Grantee declares that the statements and recitals in this Franchise are correct, and Grantee declares it has made and does make the agreement, statements and admissions in this Franchise recited to have been or to be made by Grantee.

Dated this 20th day of September, 2004.

Woodruff Utility Company

By: [signature]

Title: Vice President

STATE OF ARIZONA)
) ss.
County of Maricopa)

The foregoing instrument was acknowledged before me this 20th day of Sept., 2004, by KARL POLEN, VICE PRES. of Woodruff Utility Company, an Arizona Corporation, and being authorized to do so, executed the foregoing instrument on behalf of the company for the purposes therein stated.

[signature]
Notary Public

Notary Public State of Arizona
Maricopa County
Sharon Kay Riley
Expires October 19, 2007

My Commission Expires:
10/19/2007

i:\attycivl\franchis\Woodruff Utility Wastewater Franchise

Central Arizona Association of Governments
208 Amendment

for

Sandia Water Reclamation Plant
Woodruff Utility Company
2004

Revision 2 September 30, 2004

Submitted By:
LJ Farrington Engineers, Inc.
4005 East Gable Circle
Mesa, Arizona 85206
480-218-5559

Sandia
the sweet life

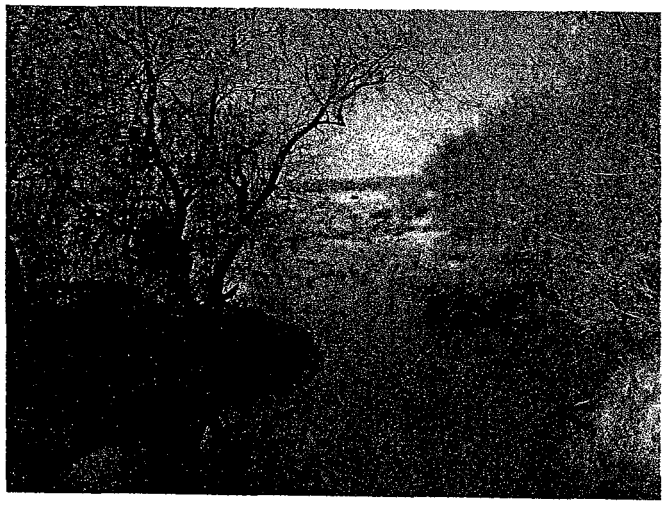
WWC-15
Admitted

Central Arizona Association of Governments

208 Amendment

for

Sandia Water Reclamation Plant
Woodruff Utility Company
2004



Revision 2 September 30, 2004

Registered Professional Engineer (Civil)
Certificate No.
25308
LISA J.
FARRINGTON
Date Signed 9-30-04
ARIZONA, U.S.A.

Submitted by:
LJ Farrington Engineers, Inc.
4005 East Gable Circle
Mesa, Arizona 85206
480.218.5559

CAAG 208 AMENDMENT

Woodruff Utility Company
Sandia Water Reclamation Plant
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Attachment B	CC&N Application
Attachment C	Support Letters
Attachment D	Metes & Bounds Legal Description
Attachment E	Basis of Design Report
Attachment F	Meeting Notes with ADEQ
Attachment G	Woodruff Utility Co. - Financials

Woodruff Utility Company
Woodruff Water Reclamation Plant
CAAG 208 WATER QUALITY MANAGEMENT PLAN AMENDMENT

OVERVIEW

This amendment to the CAAG (Central Arizona Association of Governments) 208 plan will address the 3.00 mgd Woodruff Water Reclamation Plant (WRP) for the Sandia Development currently in the planning stages. The development is located in Pinal County, southeast of the State Hwy 87, west of the City of Coolidge, and immediately south of the Gila River Indian Community (GRIC). The development area is to be annexed into the City of Coolidge. It is bordered by Signal Peak Road and MacRae Road on the west and east, respectively, and by the Gila River Indian Community and Woodruff Road on the north and south, respectively. The development comprises 3178 acres, and will be a planned community, with a golf course, parks, schools, and commercial areas.

The location of the development is shown on **Figure 1**. The Woodruff Utility Company will apply for a special use permit, allowing the company to provide wastewater service. The Utility Company has applied for the Certificate of Convenience and Necessity (CC&N) as required by the Arizona Corporation Commission to provide funding for the system (submitted on June 8, 2004). The Special Use Permit (submitted to the City of Coolidge) will be included in **Attachment A**. The CC&N application is included in **Attachment B.**

Although Woodruff Utility Company and the Sandia Development are not the DMA (designated management area), the City of Coolidge is the DMA and is currently annexing the Sandia development land into the city limits. The City of Coolidge is aware of this project, and supports the plan for wastewater treatment (**Attachment C**).

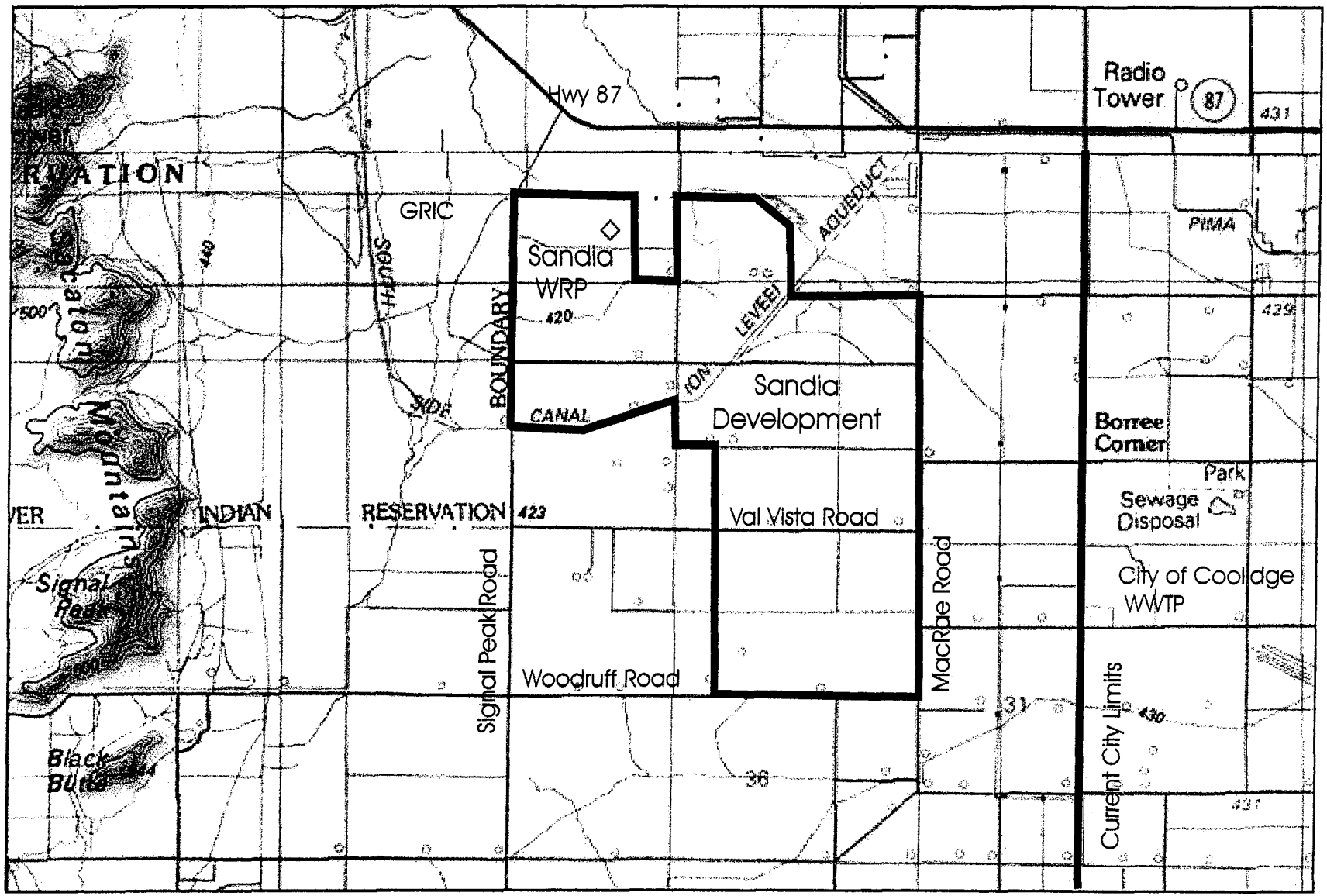
BACKGROUND AND SUMMARY

At build out, the Sandia community will consist of 9,500 dwelling units (du), divided into three "villages". There will be schools, commercial development, parks and open space, and a golf course. The community will be developed at an estimated rate of 600 homes/year beginning in the year 2006. The first year growth rate is estimated at 300 homes.

The Woodruff Utility Company will construct the wastewater treatment plant on the northern boundary of the development, the low point for sewer collection system. The effluent from the treatment plant will be rated for the A+ reuse category (as defined by the Arizona Department of Environmental Quality) and suitable for golf course, open access and parks irrigation. In addition the excess effluent will be recharged using rapid percolation basins. A discharge to a nearby dry wash will also be incorporated into the overall effluent management plan for the treatment plant.

When growth in Sandia nears the initial phase capacity of the treatment plant, the plant will be expanded in two additional phases until the build out of the community.

WOODRUFF UTILITY COMPANY
SANDIA WATER RECLAMATION PLANT



Farrington Engineers, Inc.

Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

Figure 1
Location Map

PLAN AREA

The Sandia development is located west of the intersection of State Highway 87 and MacRae Road and south of the GRIC. It is located in Sections 13,14, 23, 24, and 25, Township 5 South, Range 7 East. The property has historically been agricultural and currently remains under cultivation. There is a functioning dairy to the east of the WRP site. **Figure 1** shows the location map of the community, in relation to surrounding communities, and the City of Coolidge.

At build-out, the development will include 9,500 single family dwelling units, encompassing approximately 3178 acres. It is planned that approximately 13 percent of the gross acreage will be earmarked for parks and open space. There are plans for several schools. One golf course is scheduled as part of Village 3, the retirement community. **Figure 2** shows the overall site plan of the development. The metes and bounds legal description is included in **Attachment D**.

It is currently anticipated that the Woodruff Utility Company will only serve the development and will not incorporate any other areas or sanitary districts. The Woodruff Water Company will provide potable (drinking) water to the development. Two separate well systems will be utilized, one for potable water (higher quality, deep well system), and an irrigation well system (lower quality, shallow well system). SCIP or ED2 will provide the electrical service. The nearest town is Coolidge, approximately two miles to the east. Other residences in the area utilize septic systems for wastewater treatment. Other subdivisions that may be planned for surrounding areas, but not part of the Sandia development, will not be served by the Woodruff Utility facility.

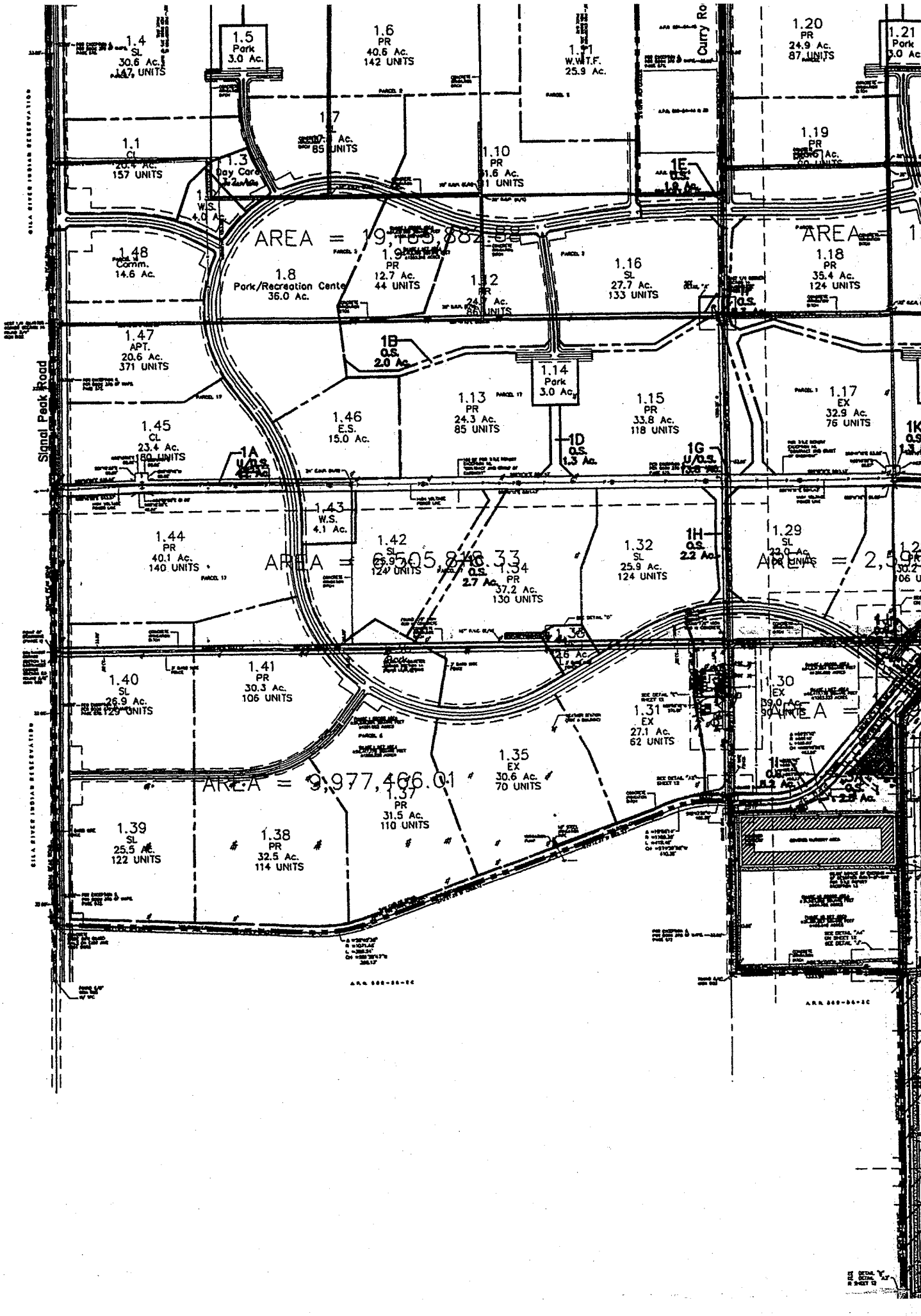
PROJECTED POPULATION AND WASTEWATER FLOWS

Wastewater flow projections are based on a projected occupancy density of 2.5 people per single family dwelling unit. The average daily flow is assumed to be 250 gpd per dwelling unit.

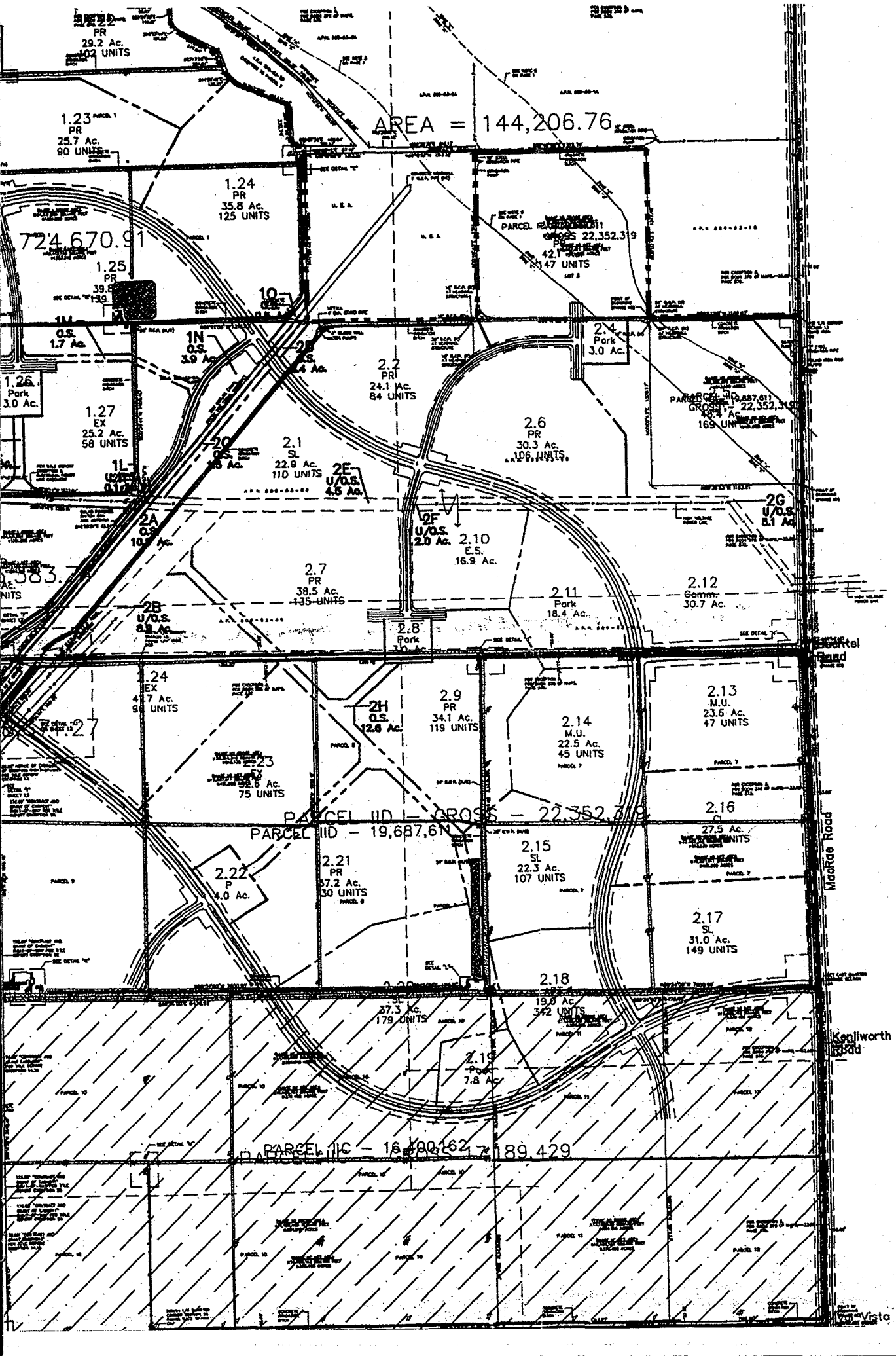
Commercial flow is estimated at 1000 gpd/acre, and schools are estimated at 15,000 gpd per school. There are no other state or private lands anticipated to be annexed and to be served by the wastewater system. The wastewater flow projections for the development are shown in **Table 1**.

Table 1: Population and Wastewater Generation

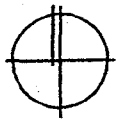
Year	Population homes/year	WW flow, gpd	Commercial		Schools		Annual average, mgd	Max month, mgd	Peak day, mgd
			acres	gpd	number	gpd			
2006	300	75,000	0	0	0	0	0.08	0.09	0.15
2007	900	225,000	5	5,000	0	0	0.23	0.28	0.46
2008	1500	375,000	10	10,000	1	15,000	0.40	0.48	0.80
2009	2100	525,000	15	15,000	1	15,000	0.56	0.67	1.11
2010	2700	675,000	20	20,000	1	15,000	0.71	0.85	1.42
2011	3300	825,000	25	25,000	1	15,000	0.87	1.04	1.73
2012	3900	975,000	30	30,000	1	15,000	1.04	1.24	2.07
2013	4500	1,125,000	35	35,000	2	30,000	1.19	1.43	2.38
2014	5100	1,275,000	40	40,000	2	30,000	1.35	1.61	2.69
2015	5700	1,425,000	40	40,000	2	30,000	1.50	1.79	2.99



1.4 SL 30.6 Ac. 147 UNITS
1.5 Park 3.0 Ac.
1.6 PR 40.6 Ac. 142 UNITS
1.11 W.W.T.F. 25.9 Ac.
Curry Ro
1.20 PR 24.9 Ac. 87 UNITS
1.21 Park 3.0 Ac
1.1 CL 20.4 Ac. 157 UNITS
1.3 Day Care
1.7 SL 85 UNITS
1.10 PR 1.6 Ac. 11 UNITS
1.19 PR
1E O.S. 1.9 Ac.
W.S. 4.0 Ac.
AREA = 19,165,882.88
1.48 Comm. 14.6 Ac.
1.8 Park/Recreation Cente 36.0 Ac.
1.9 PR 12.7 Ac. 44 UNITS
1.12 PR 24.7 Ac. 86 UNITS
1.16 SL 27.7 Ac. 133 UNITS
1.18 PR 35.4 Ac. 124 UNITS
1.47 APT. 20.6 Ac. 371 UNITS
1B O.S. 2.0 Ac.
1.14 Park 3.0 Ac.
1.13 PR 24.3 Ac. 85 UNITS
1.15 PR 33.8 Ac. 118 UNITS
1.17 EX 32.9 Ac. 76 UNITS
1.45 CL 23.4 Ac. 180 UNITS
1.46 E.S. 15.0 Ac.
1A U/O.S.
1D O.S. 1.3 Ac.
1G U/O.S.
Signal Peak Road
1.43 W.S. 4.1 Ac.
1.44 PR 40.1 Ac. 140 UNITS
1.42 SL 25.9 Ac. 124 UNITS
AREA = 6,505,818.33
1.34 PR 37.2 Ac. 130 UNITS
1.32 SL 25.9 Ac. 124 UNITS
1H O.S. 2.2 Ac.
1.29 SL 22.0 Ac. 106 UNITS
1.40 SL 26.9 Ac. 129 UNITS
1.41 PR 30.3 Ac. 106 UNITS
1.30 EX 39.0 Ac. 90 UNITS
1.31 EX 27.1 Ac. 62 UNITS
1.35 EX 30.6 Ac. 70 UNITS
AREA = 9,977,466.01
1.37 PR 31.5 Ac. 110 UNITS
1.39 SL 25.5 Ac. 122 UNITS
1.38 PR 32.5 Ac. 114 UNITS



AREA = 144,206.76
1.23
PR
25.7 Ac.
90 UNITS
1.24
PR
35.8 Ac.
125 UNITS
724,670.91
1.25
PR
1M
O.S.
1.7 Ac.
1N
O.S.
3.9 Ac.
1.26
Park
3.0 Ac.
1.27
EX
25.2 Ac.
58 UNITS
2.1
SL
22.9 Ac.
110 UNITS
2E
U/O.S.
4.5 Ac.
2.2
PR
24.1 Ac.
84 UNITS
2.4
Park
3.0 Ac.
2.6
PR
30.3 Ac.
106 UNITS
2G
U/O.S.
5.1 Ac.
2F
U/O.S.
2.0 Ac.
2.10
E.S.
16.9 Ac.
2.7
PR
38.5 Ac.
135 UNITS
2.11
Park
18.4 Ac.
2.12
Comm.
30.7 Ac.
2B
U/O.S.
2.8
Park
2.24
EX
2H
O.S.
12.6 Ac.
2.9
PR
34.1 Ac.
119 UNITS
2.13
M.U.
23.6 Ac.
47 UNITS
2.14
M.U.
22.5 Ac.
45 UNITS
2.23
EX
75 UNITS
PARCEL IID – GROSS – 22,352,319
PARCEL IID – 19,687,611
2.16
CL
27.5 Ac.
2.15
SL
22.3 Ac.
107 UNITS
2.22
P
4.0 Ac.
2.21
PR
37.2 Ac.
30 UNITS
2.17
SL
31.0 Ac.
149 UNITS
2.18
19.0 Ac.
342 UNITS
37.3 Ac.
179 UNITS
2.19
Park
7.8 Ac.
PARCEL IIC – 16,400,162
PARCEL IIC – GROSS – 17,189,429
MacRae Road
Kenilworth Road
Vista



Date: May 28, 2004

GREBY | PICKETT
landscape architecture | community design

Farrington

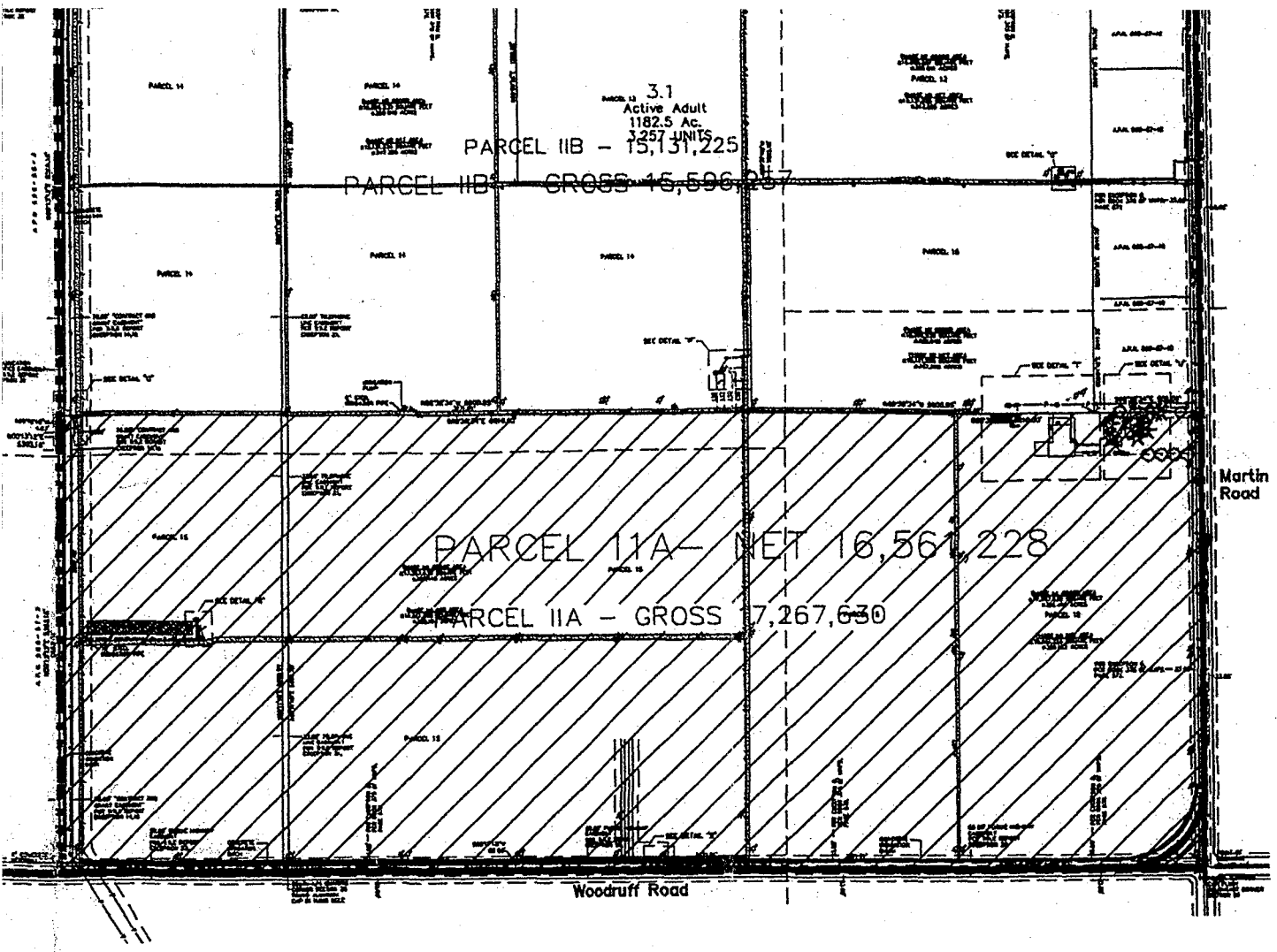


FIGURE 2

SANDIA DEVELOPMENT PLAN

Table 1: Population and Wastewater Generation									
			Commercial		Schools				
2016	6300	1,575,000	40	40,000	2	30,000	1.65	1.97	3.29
2017	6900	1,725,000	40	40,000	2	30,000	1.80	2.15	3.59
2018	7500	1,875,000	40	40,000	2	30,000	1.95	2.33	3.89
2019	8100	2,025,000	40	40,000	2	30,000	2.10	2.51	4.19
2020	8700	2,175,000	40	40,000	2	30,000	2.25	2.69	4.49
2021	9300	2,325,000	40	40,000	2	30,000	2.40	2.87	4.79
2022	9500	2,375,000	40	40,000	2	30,000	2.45	2.93	4.89
								1.2 x Q	2 x Q

PROPOSED WASTEWATER TREATMENT PLANT

Although the community will be developed in several phases, from a technical and economical standpoint, the wastewater treatment plant will be constructed in three phases. **Table 2** outlines the three phases of construction for the facility.

Table 2: Phases of Wastewater Treatment Plant				
Phase	Year Phase Completed	Annual Average Q (mgd)	Maximum Month 1.2Q (mgd)	Peak Hour 2.0 Q (mgd)
1	2006	0.87	1.00	1.73
2	2011	1.65	2.00	3.29
3	2016	2.45	3.00	4.89
			Design capacity of plant	

The Arizona Department of Environmental Quality (ADEQ) regulates effluent quality and treatment plants through its Aquifer Protection Program. In addition, since the effluent will be used for irrigation, ADEQ sets forth rules for the reuse of wastewater. ADEQ has also assumed primacy over the Pollutant Discharge Elimination System, which regulates effluent discharges into surface waters of the United States.

The plant processes are designed such that the highest quality of effluent for a reasonable cost can be obtained. It is planned to produce an effluent of A+ category, which, according to the ADEQ reuse regulations has the following limitations:

- Total nitrogen less than 10 mg/L
- Biochemical oxygen demand (BOD) and suspended solids (SS) less than 10 mg/L
- Turbidity = 2 NTU
- Coliform = non-detect
- A pH range of 6.5 – 9.0

ADEQ also defines noise and odor controls in conjunction with the facility setback. The setback is defined as the distance between a plant process structure (filter, clarifier, etc.) and the nearest adjacent property line. The setback for a facility of this size is 350 feet, with noise and odor controls. The process structures will be contained, and the foul air scrubbed before release into the environment. Noise and odor control equipment will be added when impending development advances to a setback of less than 1000 feet.

The WRP will consist of the following processes:

- Influent screening (grit removal will be added at Phase 2)
- Influent pump station
- Biological activated sludge with nitrogen removal, using sequential batch reactor technology
- Filtration
- Ultraviolet disinfection
- Effluent pump station
- Solids handling facilities for the treatment and disposal of sludge
- Odor control

The processes, site layout, electrical distribution system and hydraulic profile will be master planned for three phases of 1.00 mgd each. This CAAG 208 Amendment addresses the full 3.00 mgd build-out capacity facility.

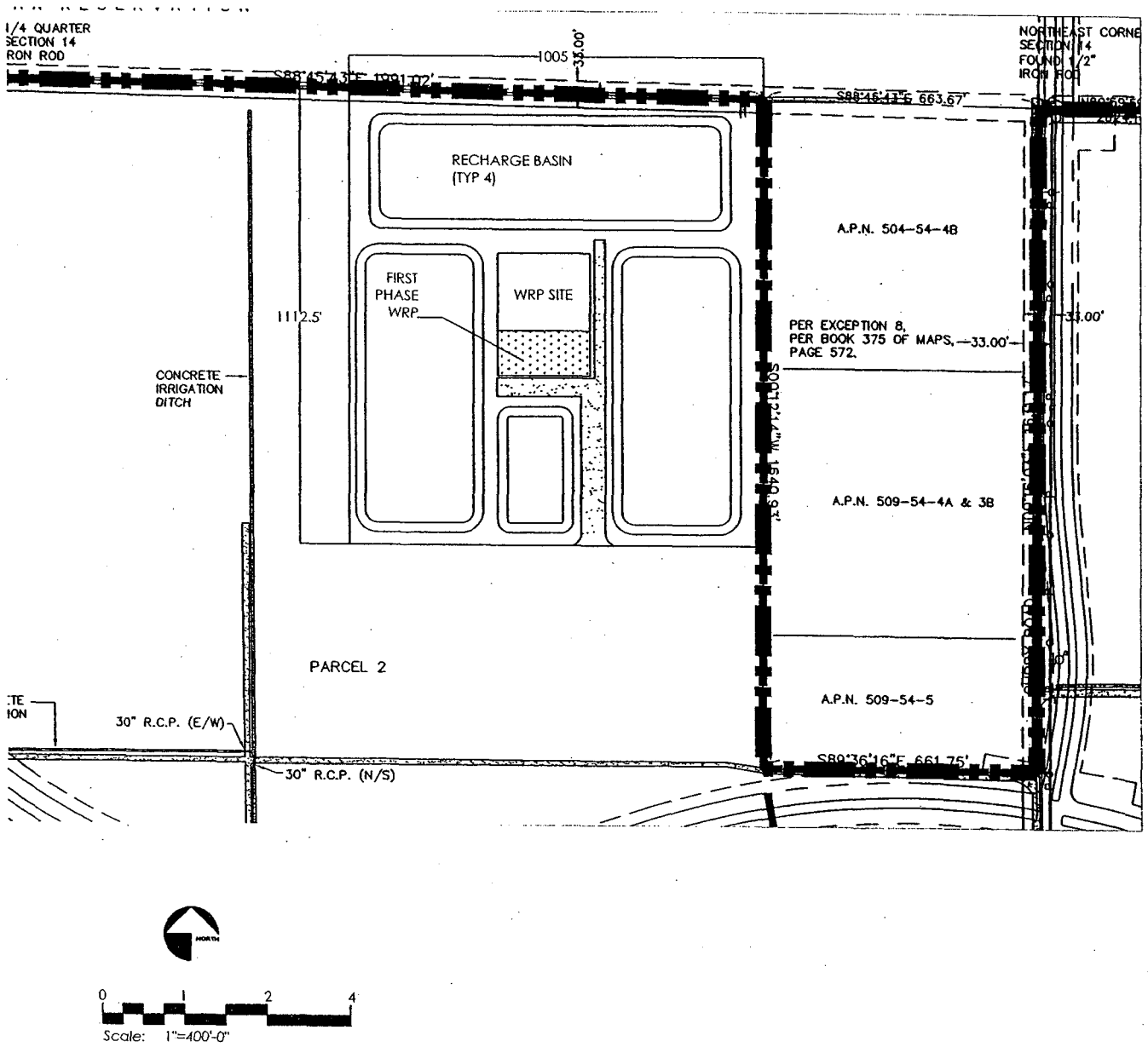
The site plan for the facility is shown on **Figure 3**, the process layout is shown on **Figure 4**, and the process flow diagram is shown on **Figure 5**. The Basis of Design Report is included in **Attachment E**.

The construction of the wastewater treatment plant is necessary to meet the needs of the Sandia development. While the Sandia development is currently being annexed into the City of Coolidge, the City currently treats sewage with a lagoon system (location shown on Figure 3) that does not currently have the capacity to address the Sandia development wastewater and the development schedule. This plant is upgradient from the Sandia development, and would require an extensive pumping system to convey Sandia-generated wastewater to that area. It is more environmentally and economically feasible to construct a new WRP to serve the Sandia system. This would also allow the City of Coolidge to deal with immediate growth in its service area, and not be concerned about the timing and cost of adding Sandia.

EFFLUENT MANAGEMENT

The primary use of the effluent will be for reuse as irrigation on the community golf courses and open spaces. During the winter months, the supply of effluent from the WRP will exceed the irrigation demand. The effluent will then be recharged, using rapid infiltration basins, located near the WRP, as shown on **Figure 3**. Per the Arizona Department of Environmental Quality (ADEQ) Reclaimed Wastewater Reuse Regulations, the golf courses are required to notify their customers that reclaimed water (the effluent) is being used for irrigation on golf courses and ponds. Information regarding use of the reclaimed water will be printed on the scorecard and on signs posted at the lakes. The proposed locations for the golf courses, recreational areas, schools, and decorative lakes are shown on **Figure 2**.

The effluent may also be discharged to a nearby wash as an intermittent discharge. This will occur as a contingency if all other means of effluent management fail. The location of this wash



Farrington Engineers, Inc.

FIGURE 3
OVERALL SITE PLAN

WOODRUFF UTILITY COMPANY
SANDIA WATER RECLAMATION PLANT

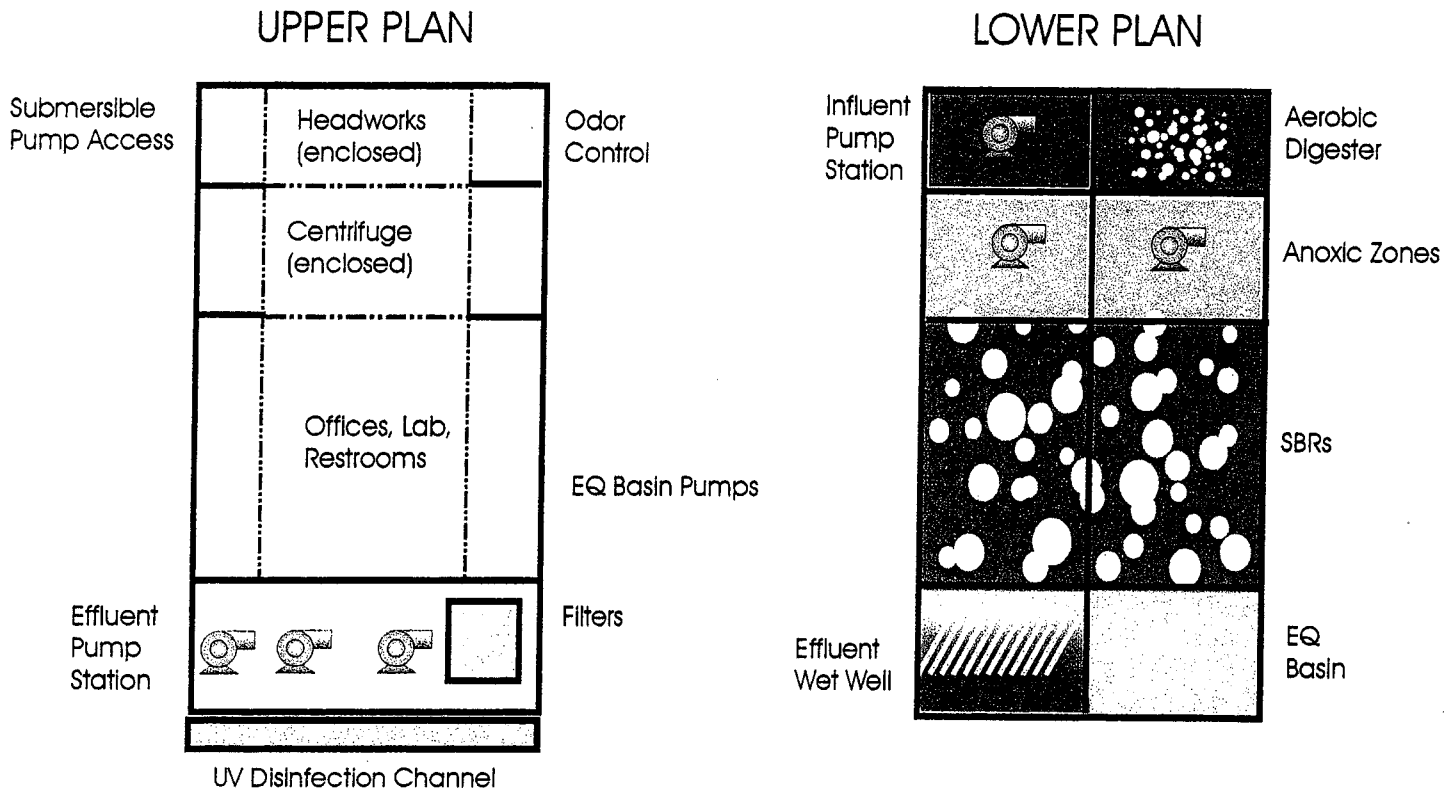


Figure 4
Process Layout

Farrington Engineers, Inc.

WOODRUFF UTILITY COMPANY
SANDIA WATER RECLAMATION PLANT

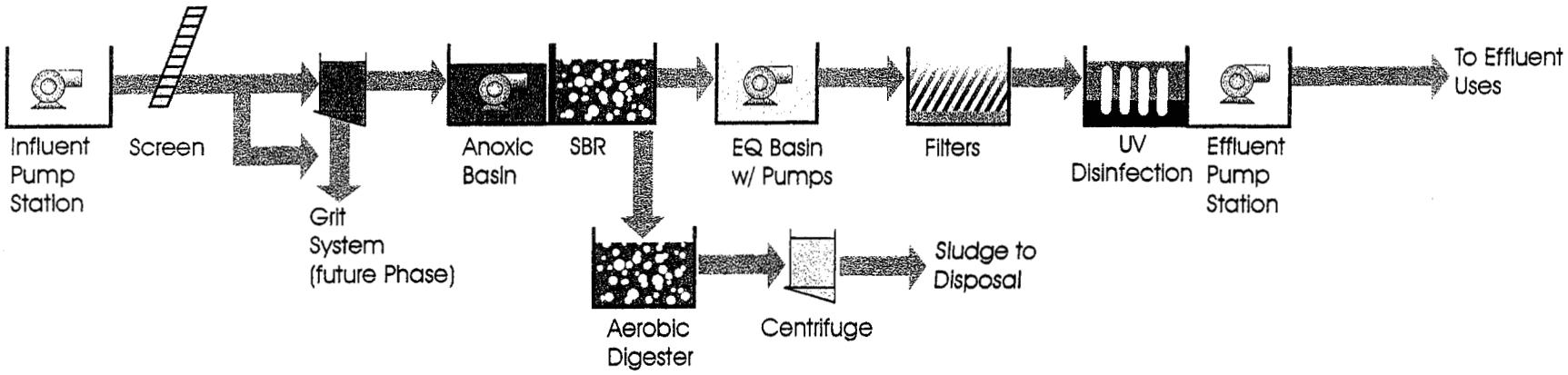


Figure 5
Process Flow Diagram

Farrington Engineers, Inc.

is shown on **Figure 2**.The wash is tributary to the Gila River. and passes through the Gila River Indian Community.

REQUIRED PERMITS

There are several permits required for the construction of the Woodruff WRP. A telephone conversation was held with ADEQ on June 21, 2004 (Meeting notes in **Attachment F**). The following permits will need to be issued by the involved agencies:

Table 3: Required Permits

Permit Required	*Agency*
Aquifer Protection Permit	ADEQ
AZPDES	ADEQ
Underground Storage Permit & Water Storage Facility	ADWR
Air Quality	Pinal County
208 Amendment	CAAG

An individual Aquifer Protection Permit (APP) is required from ADEQ for all wastewater treatment plants. The APP is required to ascertain that the aquifer in the vicinity of the WRP is not contaminated with the wastewater or other pollutants. A facility with steel or concrete basins will not contaminate the groundwater since no leakage is expected. The APP also requires monitoring of flow and effluent quality, and reviews the other effluent disposal permits (such as the AZPDES permit).

The WRP will meet all requirements. ADEQ also reviews the engineering design report, and the other required permits for compliance with BADCT standards (Best Available Demonstrated Control Technology). An Operation and Maintenance (O&M) Manual for the facility is also required.

The reuse of the effluent is governed by the ADEQ Reclaimed Wastewater Regulations. The Reuse Permit is issued by ADEQ for all projects that use effluent for irrigation. Any lakes that receive effluent will be lined to prevent seepage. No run-off of effluent is permitted, and it is recommended to irrigate in evening hours, to mitigate human contact.

If water credits for effluent recharge are needed, then a Water Storage Facility and Underground Storage Permits will be required. Both permits are administered by the Arizona Department of Water Resources (ADWR).

Dewatered sludge will be disposed of in a Pinal County landfill. There are five existing landfills in the area, including one at Casa Grande and one near Coolidge/Eloy. There are also plans for at least two more to serve the growing Coolidge and Florence areas. Prior to disposal of sludge, an agreement will be in place.

A Pinal County Air Quality Permit will also be required. The Air Quality Permit involves an inventory of the fuel-burning equipment at the plant, and other potential sources of air pollution such as volatile organic chemicals (VOCs) that may be released from the wastewater. From the inventory a determination is made as to the pounds of air pollutants per year that can be expected from the WRP. Carbon monoxide, nitrogen oxides, and particulate matter are usually the main pollutants of concern. If the loading of any of the pollutants of concern is near the limits

set by Pinal County, then monitoring of emissions from the plant must be done.

The Woodruff Utility Company will apply with ADEQ and ADWR for all applicable permits mentioned in this section.

There are no pretreatment requirements associated with the Woodruff WRP, as the development has no planned industrial users. Consequently since the majority of the wastewater is of domestic origin, there are no specific pollutants or water quality problems expected in the influent. There are no non-point sources to be associated with the facility. Although nitrate is most likely present in the upper aquifer due to historical agricultural use of the planning area, the nitrate will not affect the treatment plant operations. The decorative lakes will be lined, so no seepage will occur (either in or out of the ponds). When the effluent is recharged, the effluent nitrate levels will be less than 10 mg/L and will not cause degradation of the aquifer. Discharge of the effluent into the nearby dry wash will be intermittent and will percolate into the ground quickly, with no ponding expected. The discharge will be similar to an ephemeral stream flow, and will not adversely affect the ecology of the area.

In accordance with Section 208 of the Clean Water Act, an Area-Wide Water Quality Management Plan was prepared by the Central Arizona Association of Governments (CAAG). The Water Quality Management Plan has continually been updated through several Plan Amendments and updates. This document will serve as the 208 Water Quality Plan Amendment for the Woodruff Utility Company. The CAAG is a designated area-wide water quality management planning agency for Pinal and Gila counties.

No stormwater from off-site sources will be permitted on the WRP site. Berming and grading will allow the off-site stormwater to be diverted around the WRP site. On-site stormwater will be retained in on-site retention basins. The development will keep stormwater contained within its borders. Stormwater will be directly to several storm water retention basins, located throughout the development.

CONSTRUCTION

The Woodruff Utility Company will be responsible for managing the construction, operation and maintenance of the facilities throughout the life of the project. The design will be completed in 2004. The company intends to commence construction in 2005 and complete construction by year 2006. For these future phases, actual timing is dependent on home sales. In addition, approximately 12 months is allotted for the design/construction of those phases. A licensed contractor in the State of Arizona will build the WRP.

Pinal County ordinance recommends that the contractor exercise "precautions to reasonable control dust". No permit is required. Construction storm water is typically handled via the USEPA's General Storm Water Permit, as defined in 40 CFR Parts 122 and 123. The contractor will contain the stormwater on-site, and there will be no adverse effects at the site.

There is sufficient land area on the WRP site for all three phases of construction. Therefore, the new phases (2 and 3) can be constructed with little or no impact on the existing WRP (phase 1).

ENVIRONMENTAL IMPACTS/BENEFITS

The Woodruff WRP would sit on an approximately 25-acre site in the northwest corner of the Sandia development. The required 350-foot setbacks will be maintained and are not included in the 25 acres (but rather, in addition to that site land). Odor control on all potential odor-producing structures will be installed when setback from impending development is less than 1000 feet. Noise from motors will be contained and other acoustical measures will be in place. The recharge basins are not required to be inside the setback, per ADEQ regulations. Operational measures will be outlined in the Operations and Maintenance Manual to mitigate potential odors and provide vector control, if a problem arises.

No hazardous chemicals will be stored on site. Chemicals that may be used, such as polymer for sludge thickening, would not represent a fire or explosion hazard, and would not risk groundwater contamination. During construction, the contractor is required to provided containment for any hazardous materials, such as motor oil or gasoline.

The construction of the proposed water reclamation plant will be positive for the businesses in the community. The construction of the treatment plant will provide wastewater service to the planned development of the Sandia community and eliminate the need for individual septic tank and leach field systems.

The use of the effluent for irrigation is a beneficial reuse for the community, as it saves and protects groundwater supplies. The effluent in the golf course lakes and the development of open space and green public areas will provide an aesthetic benefit for the community. Recharging the effluent will also provide a substantial benefit, not only to the reduce the use of potable water for irrigation purposes, but also to add high quality water to the upper aquifer, which is likely already high in nitrates. The low nitrate effluent will improve the existing groundwater.

There is no water-based recreation associated with this project. The buffer area around the WRP will be used for the recharge basins.

FINANCIAL INFORMATION

Woodruff Utility Company will be financed through equity contributions and not long term debt. The financing information is included in **Attachment G**.

Woodruff Utility Company's rates to own, operate and maintain the WRP system, including the recharge areas, are established by the Arizona Corporation Commission. Woodruff Utility Company has staff and has retained legal counsel that is experienced and competent in the rate making process. The Company will file timely rate applications to cover the costs of operating and maintaining the WRP. The Company will comply with all of the requirements to amend the Central Arizona Association of Governments 208 Plan. The Company will commence with the process of constructing the Woodruff WRP. The WRP will commence operation once the Company has obtained approval from ADEQ. The golf course and other open spaces (the reuse sites) will be owned by the developer or the Sandia Homeowners Association.

The preliminary engineer's estimate of probable construction costs for each phase is shown in **Table 4**. As the detailed design of each phase is completed, the costs may be reduced or increased accordingly.

Table 4: Preliminary Engineer's Estimate of Probable Construction Costs

Phase	Construction Cost Estimate
Phase 1	$6,750,000
Phase 2	$4,700,000
Phase 3	$6,250,000

Costs include contingencies, but not engineering and permitting fees.

208 AMENDMENT CHECKLIST

CHECKLIST ITEM:		PAGE NO.
Authority		
1.	Proposed Designated Management Agency (DMA) shall self-certify that if has the authorities required by Section 208(c)(2) of the Clean Water Act to implement the plan for its proposed planning and service area. The City of Coolidge is the DMA and is in the process of annexing the Sandia Development area. The City supports (Attachment C) the Woodruff Utility Company in implementing the WW plan and service for the Sandia Development. The CC&N application in Attachment B.	1
20-Year Needs		
2.	Describe the existing WWT facilities: There are currently no WWT facilities to serve the development. The City of Coolidge plant does not have adequate capacity in its lagoon system at this time.	4
3.	Show WWT certified and service areas for private, utilities and sanitary district boundaries, if appropriate: Figure 2 shows the overall development. The WWT facilities will service only the development.	1 Figures 1 & 2
4.	Provide POPTAC population estimates over 20-year period: Table 1 describes the population projections through the build-out for the community. POPTAC figures are not available.	2
5.	Provide wastewater flows over 20-year planning period: Table 1 describes the wastewater flows associated with population projections through the build-out for the community.	2
6.	Illustrate WWTP planning and service areas: A map, shown on Figure 2, outlines the Sandia development. The wastewater treatment plant only serves the development.	1 Figure 2
7.	Describe the type and capacity of the recommended WWTP: The proposed Woodruff WRP will be built to a capacity of 3.0 mgd. The wastewater treatment plant will consist of the following processes: screening, influent pump station, activated sludge with nitrogen removal, filtration, ultraviolet disinfection, and effluent pumping. Sludge will be treated and dewatered in a centrifuge, and hauled to a licensed landfill. Effluent will be used for irrigation, recharge and discharge to a nearby wash.	3,4
8.	Identify water quality problems, consider alternative control measures, and recommend solution for implementation: The raw wastewater will be treated in a facility designed to produce effluent of excellent quality (A+ reuse	3,4 plus Attachment E

CHECKLIST ITEM:		PAGE NO.
	standards as defined by ADEQ). The effluent quality will meet or exceed all limitations outlined in the required permits. Attachment E outlines the Basis of Design Report for the facility.	
9.	If private WWT utilities with certificated areas are within the proposed regional service area, define who serves what area and when: There are no existing or planned private wastewater treatment utilities of the capacity in the service area. Outside the service area are private septic systems, and the City of Coolidge WWTP	2,4
10.	Describe method of effluent disposal and reuse sites: The effluent will be used for irrigation of the development's turf areas and lake fills . When effluent exceeds irrigation uses, water shall be recharged in on-site percolation basins. As a contingency back-up, discharge to the nearby wash (tributary to the Gila River) will be incorporated.	4, 5
11.	If Sanitary Districts are within a proposed planning or service area, describe who serves the Sanitary Districts and when: There are no existing or planned sanitary districts within the service area.	4
12.	Describe ownership of land proposed for plant sites and reuse areas: The WRP site, including the effluent basins, is owned and will be operated by the Woodruff Utility Company, and the developer (or Sandia Homeowners Association) will own the reuse sites.	7
13.	Address time frame in development of treatment works: Construction of the first phase of the WWTP is expected to commence in the year 2005 and be completed upon opening of the development in the first quarter of 2006. Phase 2 will start in 2010 and be completed in 2011, while Phase 3 will start in 2015, and end in 2016. The time frames depend on development population growth.	2
14.	Address financial constraints in the development of the treatment works: The Woodruff Utility Company will use equity to finance the construction of the WRP.	7
15.	Describe how discharges will comply with EPA municipal and industrial storm water discharge regulations: The effluent discharge will comply with current AZPDES regulations for the nearby wash, a tributary to the Gila River (eventually). The primary effluent uses are reuse and recharge. Stormwater on the WRP site will be contained on-site in retention basins. The development does not have combined sewers.	5, 6
16.	Describe how open areas and recreational opportunities will result from improved water quality and how those will be used: The landscaped areas, lakes and golf course will be aesthetically pleasing to the residents, and the irrigation and recharge with effluent are beneficial reuses.	6,7

CHECKLIST ITEM:		PAGE NO.
17.	Describe potential use of lands associated with treatment works and increased access to water based recreation, if applicable: There is no water-based recreation associated with this project. The "setback" area around the WRP will be used for recharge basins.	7
Regulations		
18.	Describe types of permits needed, including NPDES, APP, and reuse: The Woodruff Utility Company will acquire the APP, AZPDES, Air Quality and Underground Storage Permits. The Contractor will obtain the construction related permits, including stormwater, and any Pinal County dust control.	5, 6
19.	Describe restrictions on NPDES permits, if needed, for discharge and sludge disposal: The Woodruff Utility Company will comply with the AZPDES restrictions on sludge. Dewatered sludge will be disposed of in a licensed landfill in Pinal County.	4, 5, 6
20.	Provide documentation of communication with ADEQ permitting Section 30-60 days prior to public hearing regarding the need for specific permits: Meeting notes with ADEQ included in Attachment D.	4, Attachment D
21.	Describe pretreatment requirements and method of adherence to requirements Section 208 (b)(2) (D) CWA: As the development has no industrial users, there are no pretreatment requirements.	5
22.	Identify, if appropriate, specific pollutants that will be produced from excavations and procedures that will protect ground and surface water quality: There are no expected pollutants produced from the excavation of the soil. The Contractor will not wash equipment, or store or change oil on the premises. The Contractor must reasonably control dust.	6
23.	Describe alternatives and recommendations in the disposition of sludge generated: Although the treatment capacity exists to treat sludge generated by the activated sludge process to a EPA Part 503 Class B requirement, the Woodruff Utility Company has elected to dispose of the dewatered sludge in a landfill.	5
24.	Define any non-point issues related to the proposed facility and outline procedures to control them: There will be no non-point sources. Storm water from 100-year storm events will be contained on site in storm water retention ponds.	5, 6
25.	Describe process to handle all mining runoff, orphan sites and underground pollutants: There are no mining activities involved with this project.	N/A
26.	If mining related, define where collection of pollutants has occurred, and what procedures are going to be initiated to contain contaminated areas: There are no mining activities involved with this project.	N/A
27.	If mining related, define what specialized procedures will be initiated fro orphan sites, if applicable: There are no mining activities involved with this project.	N/A

CHECKLIST ITEM:	PAGE NO.
Construction	
28. Define construction priorities and time schedules for initiation and completion: Final design plans and specifications will be submitted to ADEQ in 2004. The Company intends to allow the Contractor to commence construction in 2005 and complete the WWTP by year 2006.	6
29. Identify agencies who will construct, operate and maintain the facilities and otherwise carry out the plan Woodruff Utility Company will be responsible for managing the construction, operation, and maintenance of the facilities throughout the life of the project. A licensed contractor in the State of Arizona will be contracted to construct the WWTP.	7
30. Identify construction activity related sources of pollution and set forth procedures and methods to control, to the extent feasible, such sources: The Contractor will adhere to Pinal County ordinance which states that dust will be reasonably controlled. No permit is required.	6
Financing	
31. If plan proposes to take over certificated private utility, describe how: The applicant, Woodruff Utility Company, will be the certificated private utility associated with this project.	1
32. Describe any significant measure necessary to carry out the plant, e.g., institutional, financial, economic, etc.: The Woodruff Utility Company will use equity to fund the construction of the WRP.	7
33. Describe proposed methods of community financing: The financing will consist of equity from the Company. The financials are included in Attachment G.	7
34. Provide financial information to assure DMA has financial capability to operate and maintain wastewater system over its useful life: Woodruff Utility Company is not a DMA.	N/A
35. Provide a time line outlining period of time necessary for carrying out plan implementation: The Woodruff Utility Company will comply with all of the requirements to amend the Central Arizona Association of Governments 208 Plan. Once the design is complete and CAAG 208 approved, the Company will commence with the process of constructing the wastewater treatment plant. The proposed WWTP will commence operation once the company has received the APP as issued by ADEQ. See Table 2 for phasing.	6, Table 2
36. Provide financial information indicating method and measures necessary to achieve project financing: The Company will use equity to fund the expansion of the WWTP. Attachment G shows the financials.	7
Implementability	
37. Describe impacts on existing wastewater facilities: There are currently no existing wastewater facilities in the development. The City of	1, 2,4 Attachment C

CHECKLIST ITEM:		PAGE NO.
	Coolidge is in the process of annexing the Sandia development and is in full support of the Woodruff Utility's plan for wastewater service of the development area.	
38.	Describe how and when existing package plants will be connected to a regional system Not applicable; there are no package plants associated with the regional system.	4
39.	Describe impact on communities and businesses affected by the plan: The construction of the wastewater treatment plant will provide wastewater service to the entire planned development of the Sandia community.	4
40.	If a municipal wastewater system is proposed, describe how wastewater treatment service will be provided until the municipal system is completed: No homes can be occupied until after completion of the wastewater treatment plant.	4
Public Participation		
41.	Submit a copy of mailing list used to notify the public of public hearing: CAAG to handle public notification.	N/A
42.	List location where documents are available for review at least 30 days before public hearing: CAAG to handle public notification.	N/A
43.	Submit copy of public notice of public hearing as well as an official affidavit of publication from area newspaper (Clearly show announcement appeared in newspaper at least 45 days before the hearing): CAAG to handle public notification.	N/A
44.	Submit affidavit of publication for official newspaper publication: CAAG to handle public notification.	N/A
45.	Submit responsiveness summary for public hearing: CAAG to handle public notification.	N/A

ATTACHMENT A
Special Use Permit

ATTACHMENT B
CC&N Application

ARIZONA CORPORATION COMMISSION

APPLICATION FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY

WATER AND/OR SEWER

A. The name, address and telephone number of the Applicant (Company) is:

Woodruff Utility Company, Inc.

2555 E. Camelback Road, Suite 700

Phoenix, AZ 85016 Telephone: 602-956-7200

B. If doing business (d.b.a.) under a name other than the Applicant (Company) name listed above, specify:

N/A

C. List the name, address and telephone number of the management contact:

Karl Polen, Jr.

2555 E. Camelback Road, Suite 700

Phoenix, AZ 85016 Telephone: 602-956-7200

D. List the name, address and telephone number of the attorney for the Applicant:

Norman James C/O Fennemore Craig

3003 N Central Ave., Suite 2600

Phoenix, AZ 85012 602-916-5000

E. List the name, address and telephone number of the operator certified by the Arizona Department of Environmental Quality:

To be late filed - October 2006

F. List the name, address and telephone number of the on-site manager of the utility:

To be late filed, October 2006

G. The Applicant is a:

X Corporation: X "C", ____ "S", ____ Non-Profit X Arizona, ____ Foreign	____Partnership ____Limited, ____ General ____ Arizona, ____ Foreign
____ Sole Proprietorship	____ Limited Liability Company (LLC)
____ Other (Specify)	

H. If Applicant is a corporation:

1. List names of Officers and Directors:

Officers	Directors
Karl Polen, Jr.	Karl Polen, Jr.

X 2. Attach a copy of the corporation's "Certificate of Good Standing" issued by the Corporation's Division of the Arizona Corporation Commission. - Attachment "F"

X 3. Attach a copy of the Articles of Incorporation. Attachment "G"

X 4. Attach a copy of the corporation's By-Laws. To be late filed - Attachment "H"

N/A 5. If a for-profit corporation, indicate the number of shares of stock authorized for issue:

6. If stock has been issued, indicate the number of shares issued and date of issue:

100,000 shares, April 2004

H. If the Applicant is a partnership:

1. List the names of the general partners:

N/A

2. List the name, address and telephone number of the managing partners:

N/A

3. Attach a copy of the Partnership's Articles of Partnership.

- If the Applicant is a foreign limited partnership, provide a copy of the Partnership's "Certificate of Registration" filed with the Arizona Secretary of State.

J. If the Applicant is a sole proprietor, list the name, address and telephone number of the proprietor:

N/A

K. If the Applicant is a Limited Liability Company:

1. List the names of managers:

L. List the names and addresses of any other public utility interest, which the applicant may have:

Woodruff Water Company, Inc. - New CCN Application in Process

x M. Attach a description of the area requested using **CADASTRAL** (quarter section description) or **Metes and Bounds** survey. References to parcels and dockets will not be accepted. Attachment "B-1

x N. Attach a detailed map using the form provided as Attachment "B". Shade and outline the area requested. Also, indicate any other utility within the general area using different colors.
No other Utilities within the general area

x O. Attach financial information in a format similar to Attachment "C".

P. Explain the method of financing utility facilities. Refer to the instructions, item no. 7. (Use additional sheets if necessary):

Equity

Q. Estimated starting and completion dates of construction of utility facilities:

Starting date October 2005 Completion November 2006

x R. Attach proposed Tariffs using either the water or sewer format of Attachment "D", unless the Utilities Division, prior to the filing of this application, approves another form.

S. Attach the following permits:

x 1. The franchise from either the City or County for the area requested. Attachment " I " To be late Filed - Nov 2004

2. The Arizona Department of Environmental Quality (or its designee's) approval to construct facilities. Attachment " J " To be Late Filed - October 2005

3. The Arizona State Land Department approval. (If you are including any State land in your requested area this approval is needed.) N/A

4. Any U.S. Forest Service approval. (If you are including any U.S. Forest Service land in your requested area this approval is needed.) N/A

5. (WATER ONLY) If the area requested is within an Active Management Area, attach a copy of the utility's Designation of an Assured Water Supply, or the developer's Certificate of Assured Water Supply issued by the Arizona Department of Water Resources, whichever applies.
   - If the area requested is outside an Active Management Area, attach the developer's Adequacy Statement issued by the Arizona Department of Water Resources, if applied for by the developer.
   - If the area requested is outside an Active Management Area and the developer does not obtain an Adequacy Statement, provide sufficient detail to prove that adequate water exists to provide water to the area requested.

x 6. Provide a copy of your estimated property taxes. This may be obtained by contacting the Arizona Department of Revenue, Division of Property Valuation and Equalization. You must provide them with a five (5) year projection of the original cost of the plant, depreciation expense, the location of the property and the school district. Attachment " K "

T. Provide the following information:

1. Indicate the estimated number of customers, by class, to be served in each of the first five years of operation:

Residential:

First Year 300 Second Year 900 Third Year 1500 Fourth Year 2100

Fifth Year 2700

Commercial:

First Year 0 Second Year 5 Third Year 11 Fourth Year 16

Fifth Year 21

Industrial:

First Year 0 Second Year 0 Third Year 0 Fourth Year 0

Fifth Year 0

Irrigation:

First Year 1 Second Year 1 Third Year 1 Fourth Year 1
Fifth Year 1

2. Indicate the projected annual water consumption or sewerage treatment, in gallons, for each of the customer classes for each of the first five years of operation:

Residential:

First Year 10,800,000 Second Year 43,200,000 Third Year 86,400,000 Fourth Year 129,600,000

Fifth Year 172,800,000

Commercial:

First Year 0 Second Year 912,500 Third Year 4,537,500 Fourth Year 8,162,500

Fifth Year 9,987,500

Industrial:

First Year 0 Second Year 0 Third Year 0 Fourth Year 0

Fifth Year 0

Irrigation:

First Year 10,800 Second Year 45,025 Third Year 95,475 Fourth Year 145,925

Fifth Year 192,775

3. Indicate the total estimated annual operating revenue for each of the first five years of operation:

Residential:

First Year 102,600 Second Year 392,400 Third Year 766,800

Fourth Year 1,141,200 Fifth Year 1,515,600

Commercial:

First Year 0 Second Year 1,860 Third Year 7,536

Fourth Year 13,092 Fifth Year 16,212

Industrial:

First Year 0 Second Year 0 Third Year 0

Fourth Year 0 Fifth Year 0

Irrigation:

First Year 10,003 Second Year 41,453 Third Year 87,901

Fourth Year 134,348 Fifth Year 177,481

4. Indicate the total estimated annual operating expenses for each of the first five years of operation:

Residential:

First Year 249,751 Second Year 448,046 Third Year 645,658

Fourth Year 988,151 Fifth Year 1,249,321

Commercial:

First Year 0 Second Year 9,464 Third Year 33,908

Fourth Year 62,236 Fifth Year 72,208

Industrial:

First Year 0 Second Year 0 Third Year 0

Fourth Year 0 Fifth Year 0

Irrigation:

First Year 0 Second Year 0 Third Year 0

Fourth Year 0 Fifth Year 0

5. Attach an itemized list of the major components of the water or sewer system (see Attachment C-3).

6. Indicate the total estimated cost to construct utility facilities:

$14,668,280

(Signature of Authorized Representative)

Karl Polen

(Type or Print Name Here)

Vice President

(Title)

SUBSCRIBED AND SWORN to before me this 8th day of June, 2004

Jackie A. Reed

NOTARY PUBLIC

My Commission Expires 6-15-07

OFFICIAL SEAL
JACKIE A. REED
NOTARY PUBLIC - ARIZONA
MARICOPA COUNTY
My Comm. Expires June 15, 2007

ATTACHMENT C
Support Letters

City of Coolidge

130 W. Central Avenue
Coolidge, Arizona 85228
(520) 723-5361
TDD: (520) 723-4653 / Fax: (520) 723-7910

September 21, 2004

Central Arizona Association of Governments (CAAG)
271 Main Street
Superior, AZ 85273

Attention: Robert Wilson

Re: Sandia, Woodruff Utility Company Waste Water Treatment Facility

Dear Mr. Wilson:

Please be advised that I am aware of the Woodruff Utility Company's Sandia Project and their CAAG 208 Amendment for the Waste Water Treatment Facility necessary to serve the Sandia project. I agree with their request for a 208 Amendment.

In addition, the applicant has given Kennedy/Jenks Consultants a courtesy copy of the CAAG 208 Amendment to insure there is no conflict with the City of Coolidge CAAG 208 Amendment which is also being processed (see enclosed comments from Kennedy/Jenks).

If you have any questions, please call me at 520-723-5361.

Sincerely,

Robert F. Flatley

Robert F. Flatley
City Manager

RFF/e

Enclosure

Cc: Lisa Farrington, LAR Farrington Engineers
Russ Shasky, Pivotal Group

SEP 2 0 200

JIMMIE B. KERR
RES: 836-8317

TELEPHONES:
FLORENCE 868-6211
CASA GRANDE 836-0003
FAX 836-3876

PINAL COUNTY DISTRICT 3

SUPERVISOR

POST OFFICE BOX 827 - FLORENCE, ARIZONA 85232
OR
820 E. COTTONWOOD LANE - CASA GRANDE, ARIZONA 85222

September 16, 2004

Central Arizona Association of Governments (C.A.A.G.)
Attention: Robert Wilson
271 Main Street
Superior, AZ 85273

RE: Sandia, Woodruff Utility Company Waste Water Treatment Facility

Dear Mr. Wilson:

Please be advised that we have met with representatives of the Sandia project and Woodruff Utility Company regarding their CAAG 208 Amendment for the Waste Water Treatment Facility necessary to serve the Sandia project.

Recently, the Board of Supervisors approved Woodruff Utility Company's request for a Sewer Franchise.

In addition, the applicant has given Kennedy Jenks Consultants a courtesy copy of the CAAG 208 Amendment to insure there is no conflict with the City of Coolidge CAAG 208 Amendment which is also being processed.

Should you have any questions, please call me.

Best regards,

Jimmie B. Kerr

Jimmie B. Kerr
Pinal County Board of Supervisor, District 3

CC: Lisa Farrington, LR Farrington Engineers
Russ Shasky, Pivotal Group

PIVOTAL
GROUP

September 16, 2004

Central Arizona Association of Governments (C.A.A.G.)
Attention: Robert Wilson
271 Main Street
Superior, AZ 85273

RE: Sandia, Woodruff Utility Company Waste Water Treatment Facility

Dear Mr. Wilson:

Please be advised that we have met with representatives of the Sandia project and Woodruff Utility Company regarding their CAAG 208 Amendment for the Waste Water Treatment Facility necessary to serve the Sandia project.

The applicant has informed the City of Coolidge Manager Robert Flatley and Pinal County Supervisor Jimmy Kerr. In addition, the applicant has given Kennedy Jenks Consultants a courtesy copy of the CAAG 208 Amendment to insure there is no conflict with the City of Coolidge CAAG 208 Amendment which is also being processed.

Should you have any questions, please call me.

Best regards,

Russ Shasky
Executive Vice President, Land Development

CC: Lisa Farrington, LR Farrington Engineers

The Esplanade • Suite 700
2555 East Camelback Road
Phoenix, Arizona 85016
(602) 956-7200 • FAX (602) 956-2313
pivotalgroup.com

Kennedy/Jenks Consultants

Engineers & Scientists

3101 North Central Avenue
Suite 1470
Phoenix, Arizona 85012
602-274-0886
FAX 602-274-0764

20 September 2004

Mr. Robert Flatley
City Manager
City of Coolidge
130 W. Central Ave.
Coolidge, AZ 85228

Subject: Sandia Water Reclamation Pant
Project Name: Coolidge WWTP & Permitting
K/J Project Number: 047814.00

Dear Mr. Flatley:

In general, Kennedy/Jenks agrees with the concept of the proposed Sandia Water Reclamation Plant. We offer the following comments on the 208 CAAG submittal date of June 21, 2004:

1. Need to add to the text that Sandia will be annexed into Coolidge.
2. Grit removal is included in the basis of Design Report but not in the text. We recommend having grit removal since two SBR tanks will not allow manual removal grit from SBR tanks, however three tanks would allow manual removal.
3. Has the hydrogeology study been carried out to demonstrate viability of surface recharge basins for 3.0 mgd flow? Although setbacks from recharge basins are not required by ADEQ, such basins have experienced odor generation.
4. CAAG has required odor control in the first phase of construction, even though 1,000 ft. setback meets ADEQ regulations. It is recommended to include odor control in first phase.
5. Please review current condition of wash accepting discharge. It may be graded flat and discharge could result in ponding water and the promotion of vectors.

If you have any questions, please do not hesitate to call. Thank you.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

Fred E. Goldman

Fred E. Goldman, Ph.D., P.E.
Principal

p:\2004\047814city of coolidgewwtp-permits\correspondence\ltrre-sandia.doc

ATTACHMENT D
Metes & Bounds Legal Description

ATTACHMENT B-1

Legal Description
Property Located in Sections 13, 14, 23, 24, and 25,
Township 5 South, Range 7 East,
of the Gila and Salt River Base and Meridian
May, 13, 2004

The following legal description has been prepared based on the ALTA Surveys prepared by WRG Design, Inc., for the Sandia properties. This legal description is a composite legal description for both of the above described properties and sets for the total combined gross area of both properties.

A parcel of land located in Sections 13, 14, 23, 24, and 25 Township 5 South, Range 7 East, of the Gila and Salt River Base and Meridian, Pinal County, Arizona, more particularly described as follows.

Beginning at a 5/8" iron rod monumenting the southwest corner of Section 14; thence N 00°31'43" E 2642.66 feet along the West line of Section 14, to a 3/4" iron rod monumenting the West quarter corner of said Section 14; Thence continuing along said West line N 00°00'36" W 2635.33 feet to a 3/4" iron rod monumenting the northwest corner of said Section 14; Thence N 89°52'59" E 2631.86 feet along the North line of said Section 14, to a 3/4" iron rod monumenting the North quarter corner of Section 14; Thence continuing along said North line S 88°45'43" E 1991.02 feet, to a point at the northeast corner of the West half of the northeast quarter of the northeast quarter, Section 14; Thence S 00°12'14" W 1640.93 feet to the southwest corner of the North 5 acres of the East half of the southeast quarter of the northeast quarter, Section 14; thence S 89°36'16" E 661.75 feet along the South line of North 5 acres of the East half of the southeast quarter of the northeast quarter, Section 14, to a point on the East line of said Section 14; Thence N 00°16'03" E 1631.17 feet along said East line, to the northeast corner of said Section 14; Thence N 89°59'59" E 2624.14 feet along the North line of Section 13, to a G.L.O. brass cap monument at the North quarter corner of said Section 13; Thence S 82°35'33" E 398.40 feet, to a point; Thence S 74°19'38" E 104.24 feet, to a point; Thence S 61°20'53" E 82.69 feet, to a point; Thence S 53°04'34" E 514.00 feet, to a point; Thence S 49°01'16" E 382.30 feet, to a point; Thence S 44°04'05" E 146.45 feet, to a point; Thence S 41°57'17" E 658.86 feet, to a point; Thence S 89°32'32" E 815.13 feet, to a point on the West line of Government Lot 2;

ATTACHMENT B-1

Thence S 00°06'43" W 37.10 feet, to the southwest corner of said Lot 2 and coincident with the northwest corner of Government Lot 5; Thence S 89°49'58" E 1312.70 feet along the North line of Lot 5, to the northeast corner thereof; Thence S 00°07'43" W 1317.49 feet along the East line of Lot 5 to the southeast corner thereof and coincident with the northwest corner of Government lot 7; Thence S 89°41'56" E 1158.92 feet along the North line of Lot 7, to an iron rod at the East quarter corner of Section 13; Thence S 00°05'12" E 2654.10 feet along the East line of Section 13, to the southeast corner thereof; Thence S 00° 05'12" E 441.54 feet along the East line of Section 24, to a point; Thence continuing along said East line S 01°20'51" E 2206.52 feet, to the East quarter corner of said Section 24; Thence continuing along said East line S 01°20'51" E 447.15 feet, to a point; Thence continuing along said East line S 00°13'24" W 2200.06 feet, to a half inch iron rod at the southeast corner of said Section 24; Thence N 89°37'03" W 601.05 feet along the South line of said Section 24 and the North line of Section 25, to a point; Thence S 00°04'16" E 2644.39 to a point on the South line of the North half of Section 25; Thence
S 89°38'34" E 609.06 feet, to the southeast corner of said North half, Section 25; Thence S 00°14'41" E 2644.19 feet along the East line of said South half, Section 25, to an aluminum cap monument marking the southeast corner thereof; Thence N 89°42'47" W 5206.93 feet along the South line of said Section 25, to an aluminum cap in hand hole monumenting the South quarter corner of said Section 25; Thence continuing along said South line N 89°44'11" W 1324.50 feet to a point at the southwest corner of the East half of the southwest quarter of said Section 25; Thence N 00°13'12" E 5303.16 feet along the West line of said East half of the southwest and northwest quarter, Section 25, to a point on the North line of said Section 25 and coincident with the South line of said Section 24; thence N 00°12'38" E 2649.12 feet along said West line, to a point on the North line of the South half of said Section 24; Thence N 89°34'00" W 1323.99 feet along said North line, to a 5/8" iron rod monumenting the West quarter corner of said Section 24; Thence N 00°31'10" E 1347.44 feet along the West line of said Section 24, to a point on the southerly top of bank of the Southside Canal Aqueduct; Thence S 89°52'59" E 331.11 feet along said southerly top of bank, to the beginning of a 580.10 foot radius non-tangent curve to the left; Thence along said curve and continuing along said top of bank 509.80 feet through a central angle of 50°21'10" and a long chord of which bears N 65°49'56" E 493.55 feet, to a point; Thence continuing along said southerly top of bank N 40°07'06" E 1423.14 feet, to a point on the North line of said Section 24;

ATTACHMENT B-1

Thence N 89°52'59" W 0.29 feet along said North line, to a point; Thence continuing along said southerly top of bank N 40°00'29" E 1796.47 feet, to a point; Thence continuing along said southerly top of bank N 40°05'37" E 1633.45 feet to a point on the North line of the South half of Section 13; Thence S 89°41'56" E 1355.63 feet along said North line, to the southwest corner of said Lot 5; Thence N 00°06'43" E 1314.42 feet along the West line of said Lot 5, to the northwest corner thereof; Thence N 89°49'58" W 1313.35 feet, to a point on the East line of the northeast quarter of said Section 13; Thence S 00°05'42" W 1190.33 feet along said East line to a point on the northerly top of bank of the Southside Canal Aqueduct; Thence S 39°53'42" W 157.06 feet along said top of bank, to a point on the south line of the northeast quarter, Section 13; Thence N 89°41'56" W 1212.44 feet along said South line, to a point on the West line of the southeast quarter, Section 13; Thence
S 00°04'41" W 1458.40 feet along said West line, to a point on the northerly top of bank of the Southside Canal Aqueduct; Thence S 39°59'32" W 1532.07 feet along said northerly top of bank, to a point; Thence continuing along said northerly top of bank S 39°58'10" W 1395.05 feet, to the beginning of a 559.16 foot radius non-tangent curve to the right; Thence along said curve and continuing along said northerly top of bank 499.62 feet through a central angle of 51°11'42" and a long chord of which bears S 67°22'31" W 483.17 feet to a point; Thence continuing along said northerly top of bank S 89°43'30" W 496.20 feet, to the beginning of a 1185.35 foot radius non-tangent curve to the left; Thence along said curve and continuing along said northerly top of bank 412.46 through a central angle of 19°56'14" and a long chord of which bears S 74°39'56" W 410.39 feet, to a point; Thence continuing along said northerly top of bank S 70°12'37" W 882.53 feet, to a point; Thence continuing along said northerly top of bank S 70°21'29" W 1569.12 feet, to the beginning of a 1071.48 foot radius non-tangent curve to the right; Thence along said curve and continuing along said northerly top of bank 388.24 feet through a central angle of 20°45'38" and a long chord of which bears S 81°29'47" W 386.12 feet, to a point; Thence continuing along said northerly top of bank N 87°21'43" W 942.22 feet, to a point; Thence continuing along said northerly top of bank N 87°19'51" W 1107.10 feet, to a point on the West line of said Section 23; Thence N 00°43'28" E 2178.88 feet along said West line, to the **Point of Beginning**.

ATTACHMENT B-1

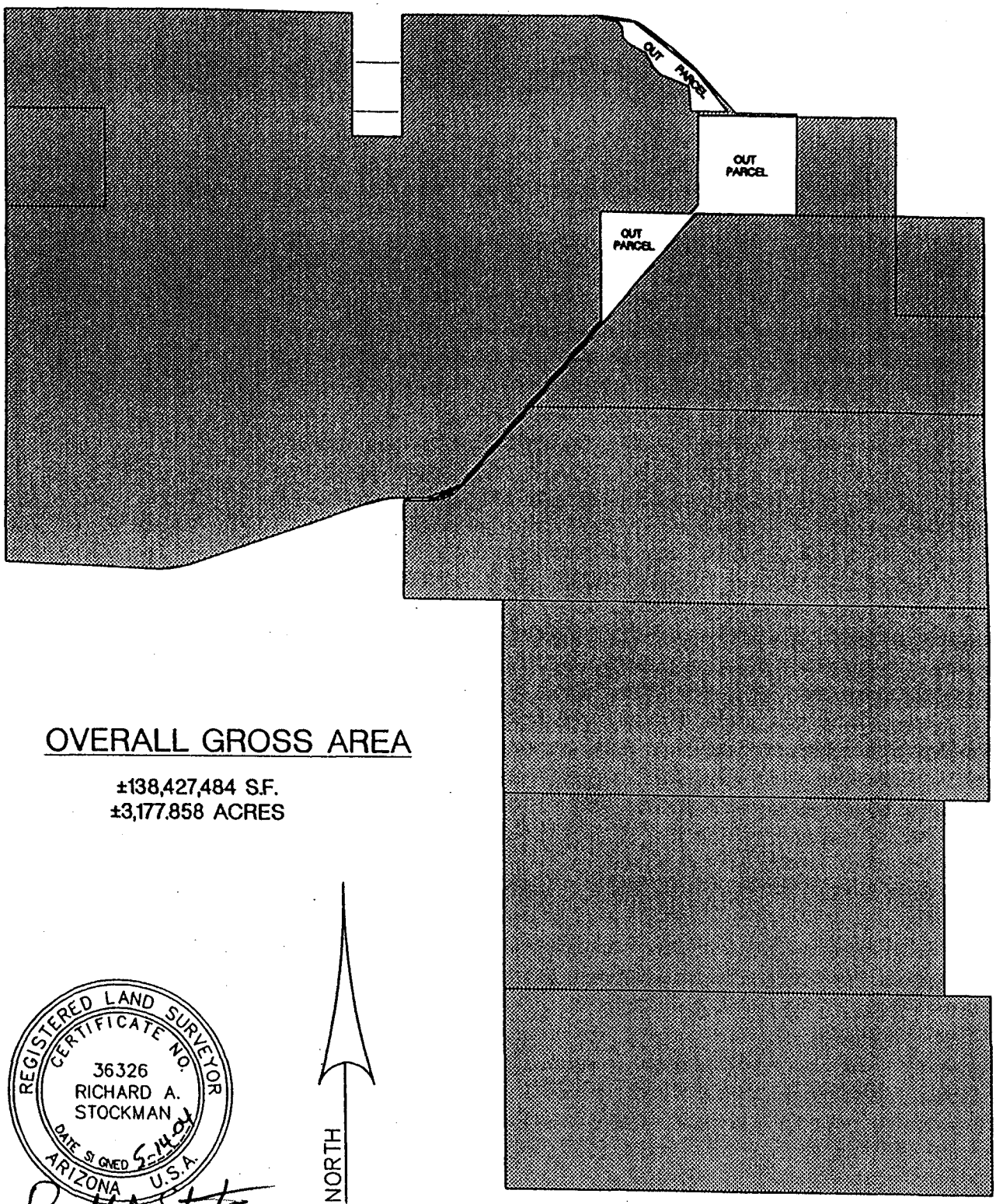
Excepting there a parcel of land located in the northeast quarter of Section 13, Township 5 South, Range 7 East, of the Gila and Salt River Base and Meridian, Pinal County, Arizona, more particularly described as follows:

Commencing at a G.L.O. brass cap monument at the North quarter corner of Section 13; Thence S 00°04'41" W 31.14 feet along the West line of the northeast quarter said Section 13, to the **Point of Beginning**; Thence S 78°02'45" E 230.09 feet, to a point; Thence S 44°12'32" E 95.61 feet, to a point; Thence S 03°24'38" E 144.61 feet, to a point; thence S 46°23'44" E 101.26 feet, to a point; Thence S 61°31'23" E 274.04 feet, to a point; Thence S 27°17'20" E 204.04 feet, to a point; thence S 44°20'46" E 135.27 feet, to a point; Thence S 67°42'29" E 410.63 feet, to a point; Thence S 04°59'49" E 330.74 feet, to a point; Thence S 89°37'30" E 489.84 feet, to a point; Thence N 37°58'54" W 659.97 feet, to a point; Thence N 51°54'29" W 1063.14 feet, to a point; Thence N 83°35'27" W 461.27 feet, to the **Point of Beginning**.

The above described properties total gross area is 138,427,484 square feet or 3,177.858 acres, more or less.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
36326
RICHARD A
STOCKMAN
Date Signed 5-14-04
ARIZONA, U.S.A.

ATTACHMENT B-1



OVERALL GROSS AREA

±138,427,484 S.F.
±3,177.858 ACRES

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
36326
RICHARD A.
STOCKMAN
DATE SIGNED 5-14-04
ARIZONA U.S.A.

Richard A. Stockman

W R G DESIGN INC.
4806 N. 22nd Street, Suite 150 Phoenix, AZ 85016
Tel. 602.977.8000 Fax. 602.977.8099
PLANNERS • ENGINEERS • LANDSCAPE ARCHITECTS • SURVEYORS

EXHIBIT
SANDIA PROPERTIES

PIVOTAL GROUP
COOLIDGE, ARIZONA

PROJECT NO.	4033374.00
DATE:	04/09/04
BY:	DCW
SCALE:	1"=2000'
SHEET NO.	1 OF 1

ATTACHMENT E
Basis of Design Report

BASIS OF DESIGN REPORT
SANDIA WATER RECLAMATION PLANT

WOODRUFF UTILITY COMPANY

DRAFT

MAY 14, 2004

LJ Farrington Engineers, Inc.

4005 East Gable Circle

Mesa, Arizona 85206

480-218-5559

BASIS OF DESIGN

SANDIA WATER RECLAMATION PLANT

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BASIS OF DESIGN

SANDIA WATER RECLAMATION PLANT

INTRODUCTION

The Sandia development is located in Pinal County, south of State Highway 87 and immediately south of the Gila River Indian Community. The development encompasses approximately 3,300 acres, and will be a planned residential community, with open space, parks, schools, commercial and mixed-use sites. At build out, the Sandia community will consist of approximately 9,500 dwelling units (du).

The community will be developed at an estimated rate of 300 homes in year one, and 600 homes/year thereafter.

The Woodruff Utility Company, the wastewater utility for the development, will construct and operate the wastewater treatment plant on the northern boundary of the development, the low point for sewer collection system. The effluent from the treatment plant will be rated for the A+ reuse category (as defined by the Arizona Department of Environmental Quality) and suitable for open access and parks irrigation. The excess effluent will be recharged using rapid percolation basins or aquifer storage and recovery wells, or discharged to the wash at the northern edge of the property.

When growth in Sandia nears the initial phase capacity of treatment plant, the plant will be expanded to in two additional phases until the build out of the community.

There is no regional wastewater treatment available to the development. The City of Coolidge has a lagoon wastewater treatment plant located approximately three miles to the south, but it is at its hydraulic capacity, and the schedule for new construction does not match that schedule defined for the Sandia development. The wastewater would require several pumping stations in order to convey the flow from the far northwest of the property to the City's system.

The purpose of this technical memorandum is to present the basis of design for the three phases of the water reclamation plant (WRP), with additional consideration for first phase low flows.

WASTEWATER GENERATION PROJECTIONS

Wastewater flow projections are based on an average daily flow rate of 250 gallons per single-family dwelling unit. Commercial flow is estimated at half the water

consumption rate. There are no other state or private lands anticipated to be annexed and to be served by the wastewater system. The wastewater flow projections for the development are shown in Table 1.

Table 1: Wastewater Flow Projections

Year	Dwelling Units (250 gpd/du)	Residential Wastewater Contribution Flow (gpd)	Commercial Wastewater Contribution, including schools Flow (gpd)	Projected Wastewater Flow Annual Average (mgd)
1	300	75,000	0	0.08
2	900	225,000	5,000	0.23
3	1500	375,000	25,000	0.40
4	2100	525,000	30,000	0.56
5	2700	675,000	35,000	0.71
6	3300	825,000	40,000	0.87
7	3900	975,000	60,000	1.04
8	4500	1,125,000	65,000	1.19
9	5100	1,275,000	70,000	1.35
10	5700	1,425,000	70,000	1.50
11	6300	1,575,000	70,000	1.65
12	6900	1,725,000	70,000	1.80
13	7500	1,825,000	70,000	1.95
14	8100	2,025,000	70,000	2.10
15	8700	2,175,000	70,000	2.25

Table 1: Wastewater Flow Projections

Year	Dwelling Units (250 gpd/du)	Residential Wastewater Contribution Flow (gpd)	Commercial Wastewater Contribution, including schools Flow (gpd)	Projected Wastewater Flow Annual Average (mgd)
16	9300	2,325,000	70,000	2.40
17	9500	2,375,000	70,000	2.45

PHASING

It is assumed that the planning, design and construction of each phase of WRP will have a duration of 18 months. This sets a planned phasing schedule for the WRP expansions. It is also based on the desire to have no more than three expansion modules for the WRP.

The process design peaking factor of 1.2 is based on engineering rule of thumb. The hydraulic peaking factor is based on other communities in Arizona, including Anthem, located in north Phoenix.

The phases of the plant will be as outlined in Table 2:

Table 2: Phasing and Capacity of WRP

Phase	Annual Average, mgd (Q)	Maximum Month, mgd (process design = 1.2Q)	Peak Hour, mgd (hydraulic design = 2Q)
Phase 1	0.87	1.04	1.73
Phase 2	1.65	1.97	3.29
Phase 3	2.45	2.93	4.89

The maximum month flow rate will be used for process design

WASTEWATER CHARACTERISTICS

INFLUENT CHARACTERISTICS

The quality of wastewater was assumed to have the following characteristics:

Table 3: Influent wastewater characteristics

Item	Unit	Value
Biochemical Oxygen Demand	-mg/L	250
Suspended Solids	-mg/L	250
TKN	-mg/L	40
Ammonia	-mg/L	25
Temperature	Deg C	20 /32 (winter/summer)
Alkalinity	-mg/L	200

The raw wastewater composition is estimated using values for medium-strength domestic wastewater from Metcalf & Eddy, Inc, Wastewater Engineering. Alkalinity is based on values from other WWTPs in Arizona that treat primarily domestic waste, including the Sun Lakes WRP.

The plant process is designed based on max-month average daily flows. The process structures are designed based on hydraulic peak flows into the system. Organic loadings are based on the concentration of the constituent at the max-month flow.

EFFLUENT CHARACTERISTICS

The effluent from the WRP will be reused for irrigation and the excess recharged via on-site percolation basins, or discharged to the San Carlos Wash. The effluent will meet the A+ category as defined by the Arizona Department of Environmental Quality (ADEQ) reuse rules. The effluent must meet current regulations for Aquifer Water Quality Standards, and the Best Available Demonstrated Control Technology (BADCT). For discharge to the Wash, an AZPDES permit must be obtained.

Table 4 outlines the required effluent limitations:

Table 4: Effluent Requirements

Constituent	Unit	Limit	Applicable Rule
BOD_5/SS	-mg/L	10/10 (30 day average/seven-day average) for each	BADCT
Total N as N	-mg/L	Less than 10 (five-month rolling geometric mean)	BADCT
Coliform	CFU/100 mL	Non-detect/2.2 (seven sample median/single sample maximum)	Reuse
Turbidity	NTU	2 / 5 (seven sample median/single sample maximum	Reuse

WASTEWATER TREATMENT PROCESSES

INTRODUCTION

The plant treatment scheme consists of the following processes:

- Influent Pump Station
- Screening
- Grit Removal
- Metering (Influent and effluent)
- Anoxic/Aerobic Biological Treatment (for BOD and nitrogen reduction)
- Filtration
- Ultraviolet Disinfection
- Aerobic Digestion
- Sludge Dewatering
- Effluent Pump Station

These processes are discussed in detail below. Consideration is given to expansion capabilities of the structures, and redundancy requirements by regulations and the plant operational staff.

INFLUENT PUMP STATION

The development's sewers will be designed such that most drainage to the plant will be by gravity. Therefore the influent sewer will be approximately 20 feet deep. An influent pump station, using submersible pumps, will be installed to lift the raw wastewater up to the plant.

The influent pump station consists of two submersible solids-handling non-clog pumps. The wet well is initially designed for phase 2 flows, with a concrete knockout wall to accommodate future Phase 3. For phase 2, one additional pump will be added, and in the future phase 3, new pumps, with additional capacity to handle the influent flows, will be installed.

The pumps pump to the biological treatment basins. In future phases (2 and 3), the flow must be split between the basins. A splitter basin will be constructed in phase 2 to address this need.

HEADWORKS SCREEN

A mechanical screen, with dewatering auger, is proposed for the headworks. The screen is a continuous system, with 1/4-inch sieve openings.

One screen is installed in this phase. If the screen is out of service, the wastewater can still flow through the channel to the grit system. In phase 3, the second channel will be equipped with another screen. This will serve to handle all phases (hydraulic flows), while still maintaining redundancy.

GRIT CHAMBER

The grit chamber proposed is a vortex, gravity grit system. It is low maintenance and efficient at removing grit while keeping organics in the solution. One grit chamber is sufficient for phase 2 peak flows, with another chamber necessary for phase 3.

The grit is removed by pumps from the bottom of the grit chamber, and sent to a classifier for dewatering and washing. The grit is then deposited in a dumpster for disposal.

METERING

The influent flow is metered using a Flo-Dar Marsh- McBirney raw wastewater flow meter, suitable for reading accurate flows within a sewer. The flow meter will be installed in a manhole upstream of the influent pump station. It is sized for build-out flows. The influent flow will be recorded and used by the operators as a guide when reviewing process efficiency, and for planning future phase capacities of the plant.

BIOLOGICAL TREATMENT

Sequential Batch Reactors (SBRs) were reviewed for the main process for the Sandia WRP. SBRs have an advantage over conventional systems in that the biological treatment and sedimentation take place in the same tank. The flow switches between two or more SBRs in a batch cycle. SBRs can handle peak flows as easily as minimum flows, adjusting its cycle times using a computer based instrumentation system for opening and closing valves.

The main disadvantage of an SBR is the decant rate; that is, the rate at which the effluent is discharged from the system. The decant cycle is typically 30 – 60 minutes, and therefore a large volume of water must be removed from the SBR during that period so that the fill cycle can begin. This then requires that the downstream processes be designed for the decant flow rate, or an equalization basin installed to minimize the size of the filters and UV disinfection.

For this evaluation, an equalization basin is included in the design.

There are several different manufacturers who provide SBR design and construction for Arizona. Three of these were evaluated for this project:

- US Filter/Jet Tech - supplier for the Sun Lakes WRP at the Sun Lakes Development just south of Chandler, Arizona.

- AquaTec, Inc. - supplier for the Rancho El Dorado WRP at the Rancho El Dorado Development near Maricopa, Arizona.

- PERC/PACE Engineering - supplier for the Sundance WRP at the Hancock Homes Development, in Buckeye, Arizona.

EVALUATION OF SBR SYSTEMS

For this evaluation, the three facilities defined above were visited to assess construction integrity, equipment type and quality, treatment performance and ease of operation. Of the three plants, only Sun Lakes WRP has been operating more than five years (since 1995).

All three plants are meeting their effluent requirements (A+). The equipment integrity appears to be intact, although there have been some problems, as yet unresolved, with the AquaTec submersible aerators in Rancho El Dorado. The Sun Lakes facility has had problems with impeller degradation on the jet motive pumps; however for the Woodruff Utility WRP, submersible pumps will be used. PERC uses equipment that is considered in the industry to be top-of-the-line, including Flygt pumps and Kaiser blowers. There appears to be high quality materials used throughout.

Generally, the US Filter (now Siemens) Jet Tech system and the AquaTec system can each provide equipment and process information separately from any construction, in other words, they will bid their equipment to a contractor, similar to a typical

design-bid-build scenario. AquaTec also will engage in a design-build scenario, as the company has its own contractor's license and will act as construction manager in a design-build situation.

Both Jet Tech and AquaTec will guarantee their processes and equipment.

PERC will offer its equipment/process only in a design-build type environment. They prefer to design and provide the entire plant, in order to provide the equipment quality and guarantee process quality to the owner. However, they will work with a specific local contractor, if the owner desires, to provide the concrete, mechanical and electrical installation.

The three SBR systems are compared in Table 5:

Table 5: Comparison of SBR Systems

	Jet Tech	AquaTec	PERC
SBR Experience in Arizona	Y	Y	Y
Can provide process design & guarantee	Y	Y	Y
Can meet A+ regulations with filters and disinfection	Y	Y	Y
Number of SBRs			
Phase 1	2	2	2
Phase 2	4	4	4
Phase 3	6	6	6
Type of aeration	Single jet header, with blowers	Submersible aerator/mixers (patented), with blowers	Double jet header, with blowers
Separate anoxic basin?	N	N	Y
Required capacity to operate, gpd	100,000	100,000	5,000 (using separate anoxic basins as SBRs)
Compact footprint & common wall construction	Y	Y	Y

Table 5: Comparison of SBR Systems

	Jet Tech	AquaTec	PERC
Blower horsepower, first phase only	60 hp ea, 2 total	100 hp ea, 3 total	75 hp ea, 2 total
SBR Pump/Mixer hp, first phase only	40 hp ea, 2 total	25 hp ea, 4 total	25 hp ea, 2 total
Pumps required from headworks to filters	Motive pumps EQ pumps	EQ pumps WAS pumps	Anoxic pumps EQ pumps
Scum removal from SBRs	N	N	Y (back to anoxic basin)

CHEMICAL FEED SYSTEM

Virus removal is required under the A+ reuse classification. To ensure virus removal, and maintain low turbidities, a chemical feed system will be included. The system will have the ability to feed at the filters.

The chemical system will consist of a polymer blender system, which is a small package system with its own self-containment. The metering pump shall be capable of dosing up to 5 mg/L of chemical to the selected feed points.

During the first year of operation, if no virus is detected, then a request will be made to ADEQ to discontinue virus testing.

FILTRATION

Filtration is required for A+ effluent. A rotating disc filter provides excellent filtration and turbidity removal, relatively small footprint and low head, and consistent operation. The disc filter is proven in Arizona as capable of reliably reducing the turbidity to less than 2 NTU.

DISINFECTION

Ultraviolet disinfection provides the coliform reduction of the wastewater. Low intensity, high output lamps are used. These lamps have a self-cleaning system for ease of maintenance. One channel is initially provided for the phase 1 flows. In phase 2, baffles will be removed from the phase 1 channel and additional lamps added. Phase 3 will add another channel.

The effluent flow rate is measured over a v-notch weir and is sent to the effluent pump station.

EFFLUENT PUMP STATION

The effluent pump station consists of two vertical turbine pumps. The wet well is initially designed for phase 3 flows. For phase 2, one additional pump will be added, and in the future phase 3, one more pump will be installed.

AEROBIC DIGESTION

Aerobic digestion of the waste activated sludge (WAS) is provided to further stabilize the sludge prior to dewatering. The waste activated sludge will be removed from the clarifier and stored in the digester. The solids will be aerated. The air from the digester can also be turned off, and the sludge allowed to settle. Supernatant can be decanted off to the anoxic zone, thus increasing the storage capacity of the digester.

Sludge pumps pump the sludge from the aerobic digesters to the centrifuge.

DEWATERING

A centrifuge provides the dewatering of the sludge for acceptance and disposal at a landfill. Polymer addition is required for efficient centrifuge operation. The centrifuge is elevated such that the dewatered sludge can drop into a container for removal and transport to the landfill. No conveyors are required.

The centrate, or water squeezed from the sludge by the centrifuge, is returned to the influent pump station by gravity.

Phase 1 has one centrifuge that will be sufficient for phase 2. A second centrifuge will be added in phase 3.

MISCELLANEOUS FACILITIES

There are several support systems that will be provided at the WRP.

ODOR AND NOISE CONTROL

The setback is defined by ADEQ in R18-9-201.I. For a plant greater than 1.0 mgd, with full noise, odor and aesthetic control, the required setback is 350 feet. Full noise, odor and aesthetic controls are defined in R18-9-201.I.1.

Noise control for the blowers, the loudest pieces of equipment, will be provided. The blowers will be installed inside a building. This will allow the sound to be shielded from the neighbors. The blowers will also have acoustical enclosures. The pumps are submersible and will not be noisy. The standby generator will be exercised once per month, during the day. It has sound attenuation.

Odor control is provided. The influent pump station, headworks (screen and grit chamber), SBRs and aerobic digester are covered and treated for odors. One package system is planned for phase 1 and 2, with another unit added for phase 3. The screens and solids area are enclosed in a building, and the foul air is scrubbed.

Aesthetically a 6'-0" masonry wall is constructed all around the site. No berming, landscaping, concrete curb and gutters, are included in the costs.

PLANT WATER SYSTEM

Plant water is supplied by the potable water system serving the development. Plant water, with the appropriate backflow prevention and vacuum breakers, provides washdown water.

ELECTRICAL

SCIP or ED2 is providing the electrical service to the plant. Using a diesel-powered standby generator, the entire plant is capable of running during a power utility failure. The generator has an integral diesel fuel tank, double-contained for safety, and is enclosed for noise control.

SAMPLING AND METERING

The influent and effluent of the WRP is sampled using a composite refrigerated sampler. Influent flow is measured using Flo-Dar flow meter in a manhole upstream of the influent pump station. Effluent will be measured using a v-notch weir and level sensor in the UV channel.

The small Operations Building is planned to include a small lab for process control testing.

INSTRUMENTATION AND CONTROL

Generally the plant will operate automatically, and will required operator attention at a minimum of once per day. All equipment must be checked for proper operation.

During an alarm condition or power failure, the key alarm signals will be sent to an automatic dialer to contact the operator. The operator must attend the facility. There are provisions for future signal connections to a scada-type system.

BASIS OF DESIGN

INFLUENT PUMP STATION

Influent Pumps	Phase 1	Phase 2	Phase 3
Type	Submersible, non-clog, centrifugal		
Manufacturer	Flygt		
Number	2	3	4

Influent Pumps	Phase 1	Phase 2	Phase 3
Capacity, each, gpm	2000	2000	2000
Discharge head, ft	35		
Motor horsepower, hp	15		
Wet well dimensions, gals	7,500	15,000	22,500
Width x Length x Working Depth, ft	15 x 15 x5	20 x 20 x 5	20 x 20 x 7

SCREEN

Screen	Phase 1	Phase 2	Phase 3
Manufacturer	Hycor, WesTech		
Number	1	1	2
Channel width, ft	2	2	2
Height of removal, ft	8	8	8
Screen opening, inch	¼		
Number of compactors required	1	1	2
Compactor capacity, gpm	500	500	500
Screenings produced per week, cy	10	20	40

GRIT CHAMBER

Grit Chamber	Phase 1	Phase 2	Phase 3
Manufacturer	Smith & Loveless, Fluidyne		

Grit Chamber	Phase 1	Phase 2	Phase 3
Type	vortex		
Number required	1	1	2
Diameter, ft	N/A	8	8
Capacity, mgd	4	4	4
Grit Classifier required	1	1	1
Grit Classifier capacity, each, gpm	250	250	250

BIOLOGICAL TREATMENT

SBR	Phase 1	Phase 2	Phase 3
	per basin	per basin	per basin
Anoxic Zone	2	2	2
SBR basins	2	2 + 2	4 + 2

CHEMICAL FACILITIES

Chemical System	Phase 1	Phase 2	Phase 3
Type	One package polymer blending system		
Dosage rate, mg/L Peak dosage at annual average	5	5 (note: system may not be required if virus removal is achieved)	5 (note: system may not be required if virus removal is achieved)

FILTRATION

Disc Filters	Phase 1	Phase 2	Phase 3
Type	Disc		
Number required	1	2	3
Number of disks per unit	6	6	6
Filtration area, sf	323	646	1029
Filtration rate, gpm/sf at average flow	3.3	3.3	3.3

UV DISINFECTION

High output, low pressure	Phase 1	Phase 2	Phase 3
Type	Low pressure, high output		
Number of channels	1	1	2
Number of lamps (40 lamps per module)	320	640	980
Number of modules	8	16	24

EFFLUENT PUMP STATION

Effluent pumps	Phase 1	Phase 2	Phase 3
Type	Vertical turbine		
Manufacturer	Peabody Flo-way or equal		

Effluent pumps	Phase 1	Phase 2	Phase 3
Number required	2	3	4
Capacity, each, gpm	2000	2000	2000

AEROBIC DIGESTION

Aerobic digestion	Phase 1	Phase 2	Phase 3
Number required	1	1	2
Sludge Flow out, gpd	9000	18000	25100

CENTRIFUGE

Centrifuge	Phase 1	Phase 2	Phase 3
Sludge flow to centrifuge, gpd	9000	18000	25100
Centrifuge operation, gpm	90	90	90
Hours of operation/day 5 days per week	2	4	6
Number required	1	1	2

SITE PLAN AND DIAGRAMS

Figure 1 is the compact upper and lower plans of the process units. Figure 2 shows the process flow diagram. Figure 3 is the overall site plan, including all phases for the Sandia WRP, and the recharge basins.

Table 10: Effluent Recharge Basins	
Top area, sf, each	218,578
Top area, acres	5.0
Total top area, acres, without roads	20.0

INITIAL LOW FLOW SCENARIO

The WRP must be constructed and permitted prior to the occupancy of any homes, including models, at the development. As such, it may be several months before wastewater is discharged in a quantity that can be efficiently treated at the plant. There are alternatives to mitigating these concerns, including:

- Vault and haul
- Throwaway WWTP
- Use of a portion of the phase 1 for treatment

VAULT AND HAUL

The vault and haul method is particularly useful in new developments when the state requires that the WRP is constructed but there is little or no flow to operate it successfully. ADEQ allows for interim vault and haul such that any raw wastewater is collected in the influent pump station and removed periodically using a vactor truck. The raw wastewater is then hauled to the closest WWTP for disposal. In this case, the nearest treatment plant is City of Coolidge, however, it may not be accepting of any other wastewater due to its potential lack of capacity. The Town of Florence may be able to take the flow.

THROW-AWAY WWTP

Some developers who have several new developments in initial stages, plan to use a above ground steel plant for flows up to 250,000 gpd. A plant of this size has an approximate construction cost of $1.5 million, and would not be incorporated into the final WRP. It is relatively portable and can be permitted easily with ADEQ. Unless there is a plan to use the package plant for other developments, and there is a place to store the plant in the interim, this method is not recommended.

PORTION OF PHASE 1 PLANT

The PERC SBR system is set up with separate anoxic basins. At the Sundance WRP, these basins were used as small SBRs until the flow reached a level that could be treated in the regular SBR. Some minor piping was installed to allow this method of treatment.

MODIFICATION OF PROCESS IN FUTURE

At any phase in the development, modifications to treatment plant's planned capacity may be made. The facility is flexible in its design to add more flow if the opportunity is presented.

The site is planned to add one more 1.0 mgd train of SBR system. However, operation and maintenance may be reduced by adding membrane treatment within the existing SBR basins. Membrane treatment, using membranes designed for wastewater (not water treatment membranes) allows the higher solids and flow rates to be added within the basin without more concrete tankage. In addition, no filtration is required as the membranes will filter and produce a turbidity less than 2 NTU.

Based on the phase 1 (1.0 mgd capacity) design, membranes can be added to one of the SBR tanks for an estimated construction cost of **$4.0 million** (today's dollars). This would bring the capacity of the plant to 3.0 mgd without the need for additional tanks. A microscreen is required upstream of the system to prevent larger solids into the membranes. The construction time would be reduced significantly as well. There is a retrofit facility under construction in Chino Valley, Arizona, and one in operation in California.

This is a consideration depending on the growth rate that should be further investigated.

Table 7: Water Balance for Village 1
Sandia Development - Woodruff Utility Company

Year 5 **Village 1**

Pertinent Information:

0 golf course(s) (18 holes)
54 acres of turf irrigation assumed 60% of park + open space turf
8 acres of effluent lakes, assumed
2700 dwelling units
90 acres of Turf per Golf Course
48 acres of Low Water Use Landscape Area (LWULA) assumed 60% of ROW landscaped
200 Average Annual Effluent Production Rate - gallons per day per dwelling unit

14-May-04

Water Usage Rates:

4.9 acre-ft per acre for Turf
6.2 acre-ft per acre for Pond/Lake Evaporation
1.5 acre-ft per acre for Low Water Use Landscape Area (LWULA)

WATER BALANCE

	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pond/Lake Evaporation per month	acre-ft per acre	0.2	0.2	0.4	0.6	0.8	0.8	0.9	0.8	0.6	0.4	0.3	0.2
Pond/Lake Evaporation per month	acre-ft	1.6	1.6	3.2	4.8	6.4	6.4	7.2	6.4	4.8	3.2	2.4	1.6
Watering of Turf	acre-ft per acre	0.1	0.1	0.2	0.4	0.5	0.7	0.9	0.8	0.5	0.4	0.2	0.1
Watering of Turf	acre-ft	5.4	5.4	10.8	21.6	27.0	37.8	48.6	43.2	27.0	21.6	10.8	5.4
Watering of LWULA	acre-ft per acre	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Watering of LWULA	acre-ft	4.8	4.8	4.8	4.8	4.8	9.6	9.6	9.6	4.8	4.8	4.8	4.8
Total Monthly Water Required	acre-ft	11.8	11.8	18.8	31.2	38.2	53.8	65.4	59.2	36.6	29.6	18.0	11.8
Days per month	days	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0
Monthly Effluent Production Rate	gpd/dwelling unit	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Total Monthly Effluent Produced	acre-ft	51.4	46.4	51.4	49.7	51.4	49.7	51.4	51.4	49.7	51.4	49.7	51.4
Average rainfall (est.)	inches	0.8	0.9	0.9	0.3	0.1	0.1	0.7	1.0	1.0	0.6	0.7	1.1
based on PebbleCreek	feet	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total Rainfall Volume	acre-ft	3.8	4.3	4.1	1.3	0.4	0.2	3.2	4.4	4.4	3.0	3.4	5.0
Total Monthly Water Produced	acre-ft	55.2	50.7	55.4	51.0	51.8	49.9	54.5	55.8	54.1	54.4	53.1	56.4
Water Balance	acre-ft	43.4	38.9	36.6	19.8	13.6	(3.9)	(10.9)	(3.4)	17.5	24.8	35.1	44.6
	gpm	316.5	314.7	267.4	149.2	99.2	(29.0)	(79.2)	(24.8)	132.4	180.7	264.6	325.3
	mgd	0.5	0.5	0.4	0.2	0.1	(0.0)	(0.1)	(0.0)	0.2	0.3	0.4	0.5

Total Excess Effluent	acre-ft	274.2	recharge or discharge each month, year total
	mgd	3.0	
Max month excess effluent	mgd	0.5	for recharge basin design purposes
Total Water Required	acre-ft	256.2	total per year
	mgd	2.8	

Table 8: Water Balance at Village 1 & 2
Sandia Development - Woodruff Utility Company

Village 1 + 2

Pertinent Information:

0 golf course(s) (18 holes)
91 acres of turf irrigation
8 acres of effluent lakes, assumed
5700 dwelling units
90 acres of Turf per Golf Course
72 acres of Low Water Use Landscape Area (LWULA)
200 Average Annual Effluent Production Rate - gallons per day per dwelling unit

14-May-04

Water Usage Rates:

4.9 acre-ft per acre for Turf
6.2 acre-ft per acre for Pond/Lake Evaporation
1.5 acre-ft per acre for Low Water Use Landscape Area (LWULA)

WATER BALANCE

	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pond/Lake Evaporation per month	acre-ft per acre	0.2	0.2	0.4	0.6	0.8	0.8	0.9	0.8	0.6	0.4	0.3	0.2
Pond/Lake Evaporation per month	acre-ft	1.6	1.6	3.2	4.8	6.4	6.4	7.2	6.4	4.8	3.2	2.4	1.6
Watering of Turf	acre-ft per acre	0.1	0.1	0.2	0.4	0.5	0.7	0.9	0.8	0.5	0.4	0.2	0.1
Watering of Turf	acre-ft	9.1	9.1	18.2	36.4	45.5	63.7	81.9	72.8	45.5	36.4	18.2	9.1
Watering of LWULA	acre-ft per acre	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Watering of LWULA	acre-ft	7.2	7.2	7.2	7.2	7.2	14.4	14.4	14.4	7.2	7.2	7.2	7.2
Total Monthly Water Required	acre-ft	17.9	17.9	28.6	48.4	59.1	84.5	103.5	93.6	57.5	46.8	27.8	17.9
Days per month	days	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0
Monthly Effluent Production Rate	gpd/dwelling unit	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Total Monthly Effluent Produced	acre-ft	108.5	98.0	108.5	105.0	108.5	105.0	108.5	108.5	105.0	108.5	105.0	108.5
Average rainfall (est.)	inches	0.8	0.9	0.9	0.3	0.1	0.1	0.7	1.0	1.0	0.6	0.7	1.1
based on PebbleCreek	feet	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total Rainfall Volume	acre-ft	5.4	6.2	5.8	1.8	0.6	0.3	4.5	6.3	6.3	4.3	4.8	7.1
Total Monthly Water Produced	acre-ft	113.9	104.2	114.3	106.8	109.1	105.3	113.0	114.8	111.3	112.7	109.8	115.6
Water Balance	acre-ft	96.0	86.3	85.7	58.4	50.0	20.8	9.5	21.2	53.8	65.9	82.0	97.7
	gpm	700.4	697.1	625.2	440.2	364.6	156.8	69.3	154.7	405.7	481.2	618.2	713.1
	mgd	1.0	1.0	0.9	0.6	0.5	0.2	0.1	0.2	0.6	0.7	0.9	1.0

Total Excess Effluent	acre-ft	717.5	recharge or discharge
	mgd	7.7	
Max month excess effluent	mgd	1.0	
Total Water Required	acre-ft	727.0	total per year - all waters
	mgd	7.8	

Table 9: Water Balance at Buildout
Sandia Development - Woodruff Utility Company

Buildout **Village 1, 2 & 3**

Pertinent Information:

1 golf course(s) (18 holes)
112 acres of turf irrigation
8 acres of effluent lakes, assumed
9500 dwelling units
90 acres of Turf per Golf Course
122 acres of Low Water Use Landscape Area (LWULA)
200 Average Annual Effluent Production Rate - gallons per day per dwelling unit

14-May-04

Water Usage Rates:

4.9 acre-ft per acre for Turf
6.2 acre-ft per acre for Pond/Lake Evaporation
1.5 acre-ft per acre for Low Water Use Landscape Area (LWULA)

WATER BALANCE

	Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pond/Lake Evaporation per month	acre-ft per acre	0.2	0.2	0.4	0.6	0.8	0.8	0.9	0.8	0.6	0.4	0.3	0.2
Pond/Lake Evaporation per month	acre-ft	1.6	1.6	3.2	4.8	6.4	6.4	7.2	6.4	4.8	3.2	2.4	1.6
Watering of Turf	acre-ft per acre	0.1	0.1	0.2	0.4	0.5	0.7	0.9	0.8	0.5	0.4	0.2	0.1
Watering of Turf	acre-ft	20.2	20.2	40.4	80.8	101.0	141.4	181.8	161.6	101.0	80.8	40.4	20.2
Watering of LWULA	acre-ft per acre	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Watering of LWULA	acre-ft	12.2	12.2	12.2	12.2	12.2	24.4	24.4	24.4	12.2	12.2	12.2	12.2
Total Monthly Water Required	acre-ft	34.0	34.0	55.8	97.8	119.6	172.2	213.4	192.4	118.0	96.2	55.0	34.0
Days per month	days	31.0	28.0	31.0	30.0	31.0	30.0	31.0	31.0	30.0	31.0	30.0	31.0
Monthly Effluent Production Rate	gpd/dwelling unit	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Total Monthly Effluent Produced	acre-ft	180.8	163.3	180.8	174.9	180.8	174.9	180.8	180.8	174.9	180.8	174.9	180.8
Average rainfall (est.)	inches	0.8	0.9	0.9	0.3	0.1	0.1	0.7	1.0	1.0	0.6	0.7	1.1
based on PebbleCreek	feet	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Total Rainfall Volume	acre-ft	14.9	17.1	16.0	5.0	1.7	0.9	12.5	17.4	17.4	11.7	13.2	19.6
Total Monthly Water Produced	acre-ft	195.6	180.3	196.7	179.9	182.4	175.8	193.2	198.2	192.3	192.5	188.1	200.4
Water Balance	acre-ft	161.6	146.3	140.9	82.1	62.8	3.6	(20.2)	5.8	74.3	96.3	133.1	166.4
	gpm	1179.7	1182.5	1028.6	619.1	458.5	27.5	(147.3)	42.1	560.8	702.9	1004.2	1214.5
	mgd	1.7	1.7	1.5	0.9	0.7	0.0	(0.2)	0.1	0.8	1.0	1.4	1.7

Total Excess Effluent	acre-ft	1063.8	recharge or discharge each month, per year total
	mgd	11.5	
Max month excess effluent	mgd	1.7	for recharge design purposes
Total Water Required	acre-ft	1053.1	total per year
	mgd	11.3	water demand

ENGINEER'S ESTIMATE OF PROBABLE CONSTRUCTION COST

An engineer's estimate of probable construction cost for Phases 1, 2 and 3 is shown in Table 6.

Table 6: Engineer's Estimate of Probable Construction Costs

ENR = 7000 - all in today's dollars	Base Cost	With 15% Contingency	Cost per Gallon
Phase 1 - 1.0 mgd	$7.5 million	$8.6 million	$8.60
Phase 2 - 2.0 mgd	$4.5 million	$5.2 million	$5.20
Phase 3 - 3.0 mgd	$6.0 million	$6.9 million	$6.90

The estimated costs do not include permitting fees and engineering. A 15 percent factor is included in all processes for piping (process and associated yard), and a 20 percent factor is included for electrical and instrumentation. The site work includes the site masonry wall, some paving, miscellaneous yard structures and manholes, and the standby generator.

The cost estimate only includes on-site work, and does not incorporate any off-site work, piping, flood control berming. The effluent pump station size was estimated, and may be more expensive based on final design.

EFFLUENT MANAGEMENT

Effluent will be treated to a high degree of quality such that the water can be utilized for a variety of discharges, including:

- Turf and landscape irrigation at parks, right-of-ways, and golf course
- Lake filling
- Discharge to San Carlos Wash
- Recharge using percolation basins or aquifer storage and recovery (ASR) wells

The water balance is shown in Tables 7, 8, and 9 for the three phases of plant construction that would correspond with the three phases, or villages, of development at Sandia.

The water balance shows that in Phase 1, there is not enough demand in the winter to use the effluent supply. Therefore, the effluent must be recharged or discharged. It is possible to recharge the effluent in the San Carlos Wash; however, unless there are actual recharge basins constructed, then only 50% credit for the recharge can be received from the Arizona Department of Water Resources (ADWR). This may be adequate for the overall development water planning.

The discharge of the full 3 mgd on a relatively constant basis into the wash may not be acceptable to the Gila River Indian Community. A flow rate of that quantity would likely not percolate fast enough prior to the wash entering the boundaries of the GRIC. The Indian Community has a history of not accepting this type of effluent discharge onto the tribal lands. Therefore for the purpose of this report, it is assumed that discharge after phase 1 is not acceptable, and recharge method must use up the excess effluent.

Table 10 indicates the size of recharge basins that would be required, given an estimated percolation rate of 4 inches per day. This rate will be adjusted based on actual testing to be performed.

Table 10: Effluent Recharge Basins	
Max effluent to recharge, mgd	1.72 mgd
(depends on irrigation acreage, see Tables 7-9)	
Percolation rate, in/day	4.0
Acreage Required, acres	15.81
, sf, total	688,577
Number of basins	4
Water Depth, ft	5
Freeboard Depth, ft (required by ADEQ)	3
Total Depth, ft	8
Slope	3:1
Bottom area, sf, each	172,144

WOODRUFF UTILITY COMPANY
SANDIA WATER RECLAMATION PLANT
CONCEPTUAL DESIGN REPORT

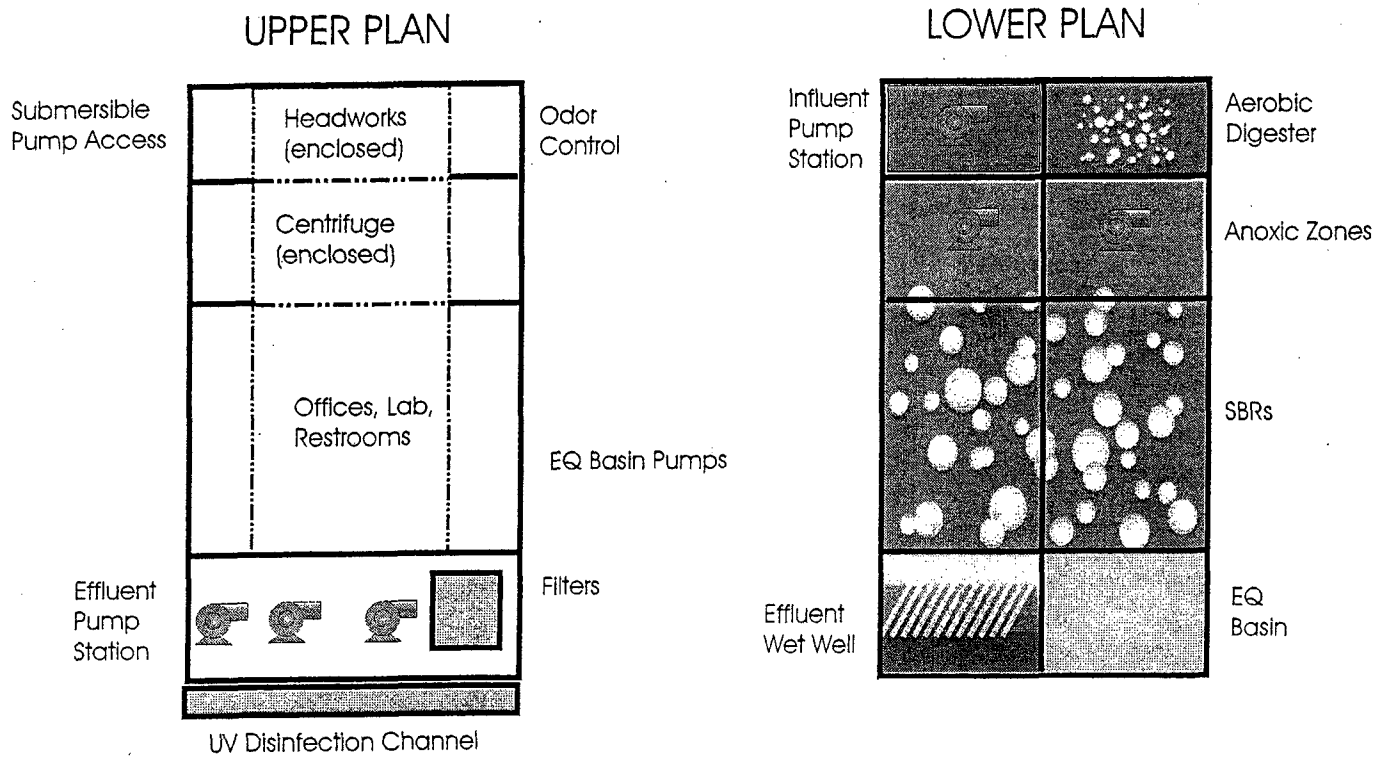


Figure 1
SBR Upper and Lower Plans

Farrington Engineers, Inc.

WOODRUFF UTILITY COMPANY
SANDIA WATER RECLAMATION PLANT
CONCEPTUAL DESIGN REPORT

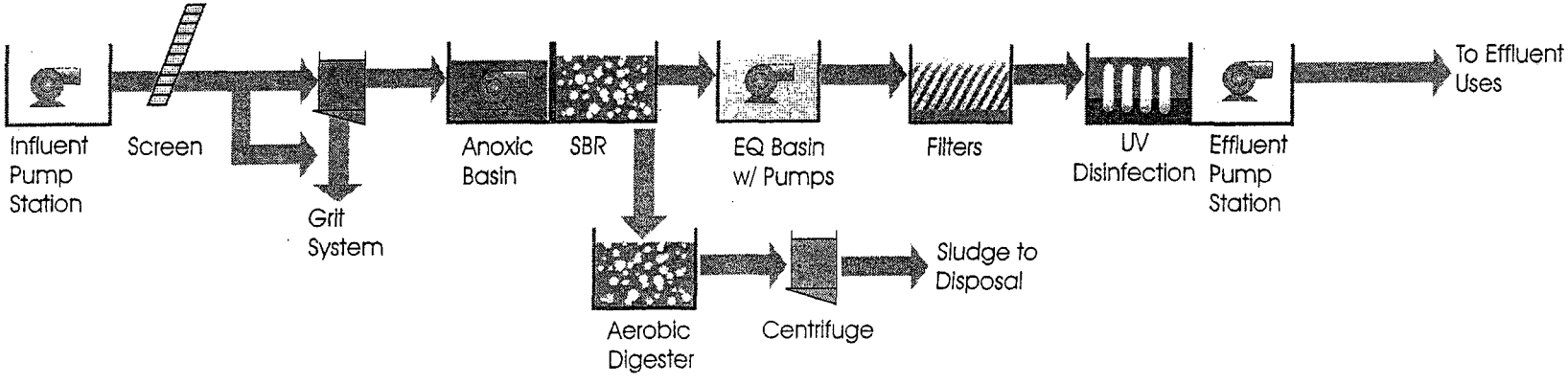
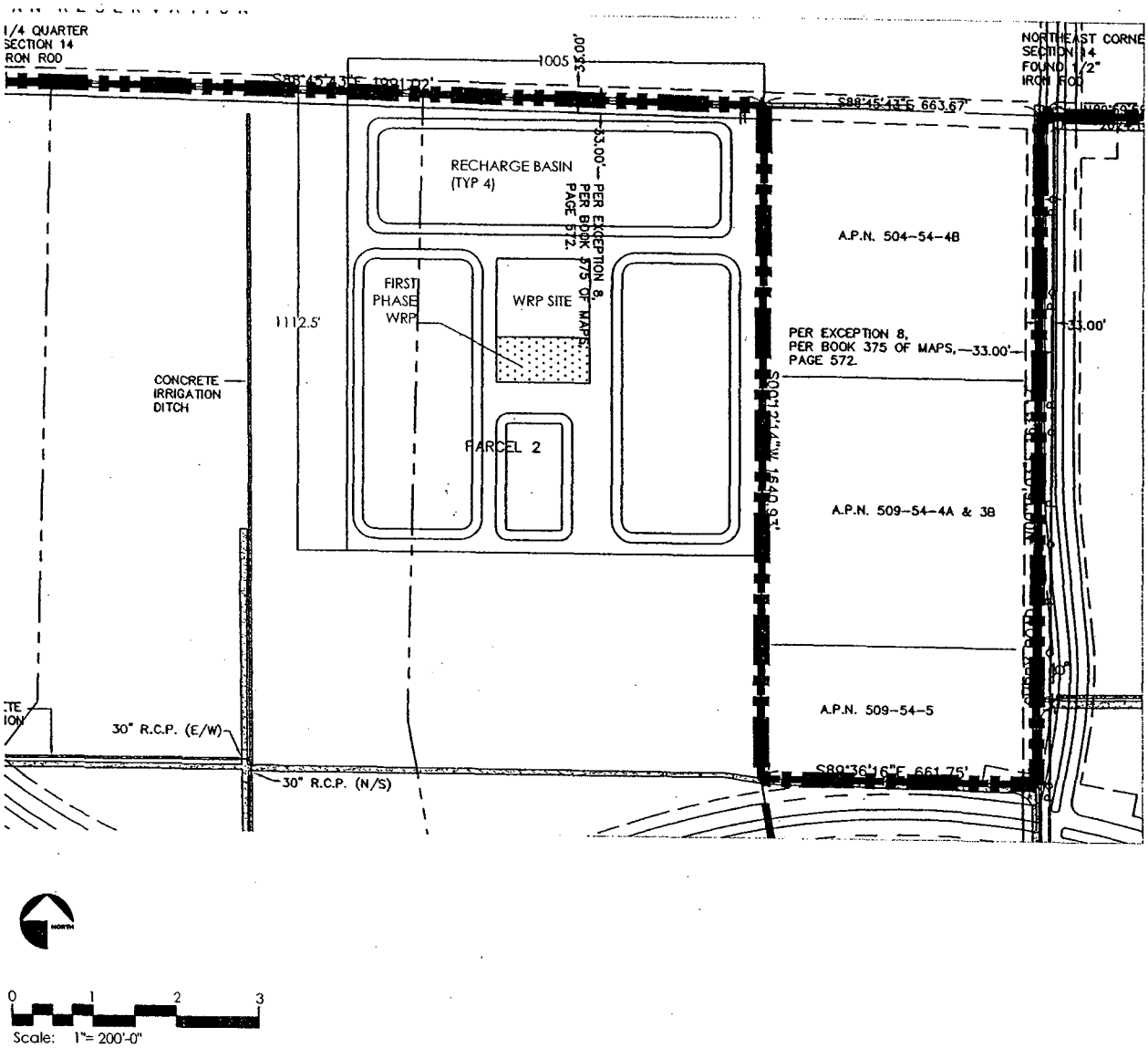


Figure 2
Process Flow Diagram

Farrington Engineers, Inc.



FARRINGTON
ENGINEERS, INC.

FIGURE 3
OVERALL SITE PLAN

ATTACHMENT F
ADEQ Meeting Notes

Memorandum

To: File

CC: Marcy Mullins and Debra Daniel, ADEQ

From: Lisa Farrington

Date: 6/21/2004

Re: Sandia Pre Application Meeting

A telephone conversation was held on Monday, June 21, 2004 at 9:30 am to discuss the various permitting requirements for the Sandia Water Reclamation Plant. Marcy Mullins, ADEQ APP Unit, and Debra Daniels, AZPDES Unit, were in attendance.

A brief description of the facility was given, including:

1. The location of the WRP (northwest of Coolidge, near the Gila River Indian Community)
2. The planned capacity (first phase 1 mgd)
3. The effluent quality (A+ effluent, meeting all BADCT standards)
4. Effluent management (reuse on parks, landscaped areas and lakes, recharge in basins on the plant site, and emergency discharge into the wash)

LJF had some questions as to the viability of getting an AZPDES with the Gila River Indian Community to the immediate north of the discharge point. Ms. Daniels responded that the GRIC may have in place their own final standards for surface discharge that may impact the permit, but those standards are still in draft form now. The GRIC will be noticed on the permit and will have opportunity to comment. The permit application will include form 2A and 2S. Estimated water quality data is acceptable since the plant is not constructed.

LJ Farrington Engineers, Inc.
4005 East Gable Circle
Mesa, Arizona 85206
480.218.5559 480.218.1849 (f)

The APP application is straight-forward. As ADEQ is using a fact sheet now in lieu of an executive summary, it may be helpful for LJF to put a summary in the front of the permit application stating the following:

1. Type of effluent category - A+

2. Depth to groundwater and groundwater flow direction (in the Hydrogeological report, but bring forward into the summary)

3. Nearest point of use in the aquifer to the WRP and its use: define the location of the closest well and its use, whether it is potable or irrigation.

The reuse will require a Type 2 reuse permit. It is advised for the developer to apply for one Type 2 permit for all the reuse areas, since they are included within the development, and now they are all owned by the same company. Then if the ownership of certain reuse areas are transferred in the future, then separate Type 2 permits can be sought.

It was recommended to contact Khaumil Parghi at ADEQ Technical Review Unit for any other questions regarding the technical requirements of the WRP.

ATTACHMENT G
Woodruff Utility Company
Financials

ATTACHMENT C

PROFORMA BALANCE SHEET (SEWER)

Woodruff Utility Company

	Year 1	Year 2	Year 3	Year 4	Year 5
Long-Term Debt					
Deferred Credits					
Advances in Aid of Construction	$ 500,000	$ 500,000	$ 1,388,743	$ 3,058,981	$ 3,830,132
Contribution in Aid of Construction, Net of Amortization	148,500	444,975	737,380	1,021,715	1,300,000
Accumulated Deferred Income Tax	-	-	-	-	-
Total Deferred Credits	$ 648,500	$ 944,975	$ 2,126,123	$ 4,080,696	$ 5,130,132
CAPITAL ACCOUNT					
Common Stock	8,261,280	8,261,280	8,761,280	8,761,280	8,761,280
Preferred	0	0	0	0	0
Paid in Capital	0	0	0	0	0
Retained Earnings	(127,773)	(130,631)	73,990	336,336	756,681
Total Capital	$ 8,133,507	$ 8,130,649	$ 8,835,270	$ 9,097,616	$ 9,517,961
TOTAL LIABILITIES AND CAPITAL	$ 8,782,007	$ 9,075,624	$ 10,961,393	$ 13,178,312	$ 14,648,093

PROFORMA INCOME STATEMENT (SEWER)
Woodruff Utility Company

	Year One	Year Two	Year Three	Year Four	Year Five
Flat Rate Revenues	$ 111,630	$ 412,260	$ 792,336	$ 1,172,292	$ 1,549,812
Measured Revenues	9,973	41,453	87,901	134,348	177,481
Establishment Charges					
Other Operating Revenue					
Total Operating Revenue	$ 121,603	$ 453,713	$ 880,237	$ 1,306,640	$ 1,727,293
OPERATING EXPENSES:					
Salaries and Wages	$ 68,500	$ 70,555	$ 72,672	$ 74,852	$ 77,097
Purchased Sewer Treatment					
Sludge Removal Expense	3,000	3,090	3,183	3,278	3,377
Purchased Power for Pumping Equipment	12,906	52,714	108,670	182,626	236,431
Sewage Treatment and Testing	16,000	20,180	24,365	28,556	32,753
Repairs and Maintenance	2,000	6,000	9,000	12,000	15,000
Office Supplies Expense	3,709	13,863	26,762	39,661	52,551
Outside Services	54,800	56,444	58,137	59,881	61,678
Rents	6,000	6,180	6,365	6,556	6,753
Transportation Expense	3,500	3,605	3,713	3,825	3,939
General Insurance	4,000	4,120	4,244	4,371	4,502
Depreciation	65,405	207,215	323,652	439,977	525,482
Health and Life Insurance					
Income Taxes	50	50	17,364	161,090	255,078
Property Tax	2,881	6,434	14,317	26,528	39,637
Taxes Other than Property & Income					
Miscellaneous Expenses	7,000	7,060	7,122	7,185	7,251
Total Operating Expense	$ 249,751	$ 457,510	$ 679,566	$ 1,050,387	$ 1,321,529
OPERATING INCOME OR LOSS	$ (128,148)	$ (3,797)	$ 200,670	$ 256,253	$ 405,765
OTHER INCOME / EXPENSE					
Interest Income	375	939	3,950	6,093	14,580
Other Income					
Other Expense					
Interest Expenses					
TOTAL OTHER INCOME / EXPENS	375	939	3,950	6,093	14,580
NET INCOME (LOSS)	$ (127,773)	$ (2,858)	$ 204,621	$ 262,346	$ 420,345

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, ARIZONA 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6878 • WWW.AZWATER.COM

March 23, 2005

Mr. Jim Fisher
Executive Consultant II
Utilities Division
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

Re: Woodruff Water Company, Inc. – Woodruff Utility Company, Inc. and Arizona Water Company, Docket Nos. W-04264A-04-0438; SW-04265A-04-0439 and W-01445A-04-0755; Arizona Water Company's Objections to Staff's March 3, 2005 Report.

Dear Mr. Fisher:

Pursuant to the Procedural Orders entered in this matter, Arizona Water Company hereby submits its objections to the Staff's March 3, 2005 Report.

Objections to Executive Summary

- *The Commission has long supported financially viable, interconnected utilities operating for long-term compliance with the states water policy goals.*

The Staff Report fails to advance the worthy public policy objectives set out in the Commission's "Proposed Policy for Water Certificates of Convenience and Necessity ("CC&N Policy"). That policy has the laudable public interest goal of eliminating the

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unnecessary proliferation of water systems when an existing Class A water company, such as Arizona Water Company is able to serve at substantially lower rates. Arizona Water Company is ready, willing and better able to serve the disputed area than Woodruff Water Company and has an existing Certificate of Convenience and Necessity ("CC&N") and water system facilities within a mile of that area. The Staff brushes aside the Commission's CC&N Policy in favor of its own, new policy, which advocates "regional planning for water and wastewater to ensure economies of scale for both services." As discussed further below, there is no evidence that any such economies, if available at all, are any more achievable by Woodruff Water Company than by Arizona Water Company. This latter theory has never been relied upon by the Commission, is not set forth in its written policies, and is contrary to the facts of this case, as set forth below.

The Commission is obligated to ensure that any water utility extending water service or entering into the water service industry is financially viable. But the Commission's stated support for a combined water and sewer utility as set forth in its ultimate recommendation in this matter fails to consider the primary factor to be weighed regarding these two competing applications: the public interest, public need and public benefits when considering any water company for a CC&N.

Part of the Commission's review must weigh how the public interest is best served by considering: cost of service, operating efficiency, economies of scale, water system reliability, managerial capacity, regulatory performance history, water service history, water infrastructure capital investment history, evidence of prudent business

decisions, leadership, and the proven ability to provide safe and reliable water service. When these interests are properly weighed, the public interest overwhelmingly favors Arizona Water Company's application to be the provider of water utility service for the disputed area.

- *Staff supports regional planning for water and wastewater to ensure an economy of scale for both services. Staff recognizes integrated utilities provide enhanced services to work in conjunction with public policy goals of clean water, use of reclaimed water for turf facilities and recharge of the aquifer.*

This is contrary to the Commission's policy regarding new, startup water providers attempting to carve out CC&N in the path of existing, proven public service corporations like Arizona Water Company. Also, Staff misunderstands the meaning of regional planning and economies of scale. For example, Woodruff Water Company and its parent company, Pivotal Group, are confining their planning only to their own specific development, Sandia, not for the region or even the general area surrounding the development. In comparison, Arizona Water Company already has performed and is performing regional water supply planning for the Casa Grande, Coolidge, Stanfield, and Tierra Grande areas, and the ultimate interconnection of these water systems into a fully integrated, truly <u>regional</u> water system. Anything less would not be a regional water plan.

Further, Staff provides no evidence or authority that demonstrates that only a combined water and sewer utility can meet such a policy goal. Arizona Water Company has worked side-by-side with wastewater providers in every one of the eight counties of Arizona where it provides water service and has consistently demonstrated that such arrangements are in the public interest. As for economies of scale, Woodruff Water Company's proposed water rates are more than 50% higher than Arizona Water Company's present rates, notwithstanding any of Woodruff Water Company's purported economies of scale. Since Arizona Water Company and the City of Coolidge are ready, willing and able to provide water and wastewater service, respectively, (as they already do in the Coolidge service area), there is no need to favor a new start-up water company like Woodruff Water Company simply because it is affiliated with the sewer system operator. Staff has failed to consider the full economies of scale that Arizona Water Company customers currently receive, and the residents of Sandia would receive should they receive water service from Arizona Water Company instead of Woodruff Water Company. The value of Arizona Water Company's engineering, accounting, financial, operations, legal, administrative and managerial expertise and experience is significant and should be the controlling factor in any analysis of the public interest. These significant public interests have not been fully quantified nor analyzed in Staff's report.

Finally, combined water supply and wastewater utilities are not the only way to achieve the public policy goals of clean water, use of reclaimed water and recharge of the aquifer. As a wastewater system operator, Woodruff Utility Company is required to

meet the requirements of the Clean Water Act and the requirements of ADEQ's Aquifer Protection Program. This requirement applies irrespective of whether it also operates a public water supply system or not.

Concerning the use of reclaimed water for turf facilities, Arizona Water Company supports the use of reclaimed water, especially if such use can offset the use of potable water supplies and provided that use doesn't adversely affect existing drinking water wells. Arizona Water Company already works with wastewater system operators to provide reclaimed water for turf facilities and sees no reason why it cannot do likewise in this instance, as well. An example of such cooperative efforts is in the SaddleBrooke Ranch project near Oracle, where Arizona Water Company has worked jointly with Robson Communities to ensure reclaimed water is used and that other non-groundwater resources, such as long term stored effluent can be delivered to turf facilities. In addition, Woodruff Utility Company's plan to discharge treated wastewater to replenish the groundwater basin would adversely impact Arizona Water Company's wells near Sandia. With Arizona Water Company as the water provider to Sandia, a joint effort and regional planning can be achieved to avert such a conflict.

- *Except for Martin Ranch, Arizona Water Company has not received a request for service for any other parcel included in its application for extension, including the proposed Sandia development. Staff believes Arizona Water's request should be granted for Martin Ranch and denied for the area requested by Woodruff Water Company.*

Staff is well aware that the Commission's CC&N Policy does not require a Class A utility to submit a request for service, nor does the CC&N Policy require joint water/sewer services. In fact, the CC&N Policy requires an applicant that is not already providing public utility water service to demonstrate that the existing water utility has refused to extend its CC&N to include the requested area. Past Commission decisions have granted CC&N extensions to Arizona Water Company and other utilities without requests for service for all areas included within the requested CC&N areas. Such a request is far from a fundamental requirement for service and is but only one factor (and likely a small one) in weighing the larger public interest. Nothing in the Commission's rules or policies provide that the customer has the right to insist upon service from a particular utility. In fact, past Commission decisions have focused on the public interest, cost of service, reliability and continuity of service, the orderly and logical expansion of service area, and other public interest factors, none of which rely upon who submitted the request for service. Finally, the overwhelming weight given to this single factor by Staff is especially inappropriate because the party requesting service from Woodruff Water Company will not even be receiving service. That is because the request for service is from the very same landowner who is selling his property to Woodruff Water Company's parent company, which is going to develop the property for future customers who will actually be receiving the utility service.

Comments on Staff Condition Number 2 Regarding Arizona Water Company's CC&N to Serve Martin Ranch

Staff misunderstands the purpose for a Physical Availability Demonstration ("PAD"), which is to have a demonstrated physical supply of water that can be used to demonstrate an assured water supply for use by that water utility's service area. ADWR has no such requirement to amend a PAD simply to extend a service area. Arizona Water Company's PAD applies to the entire service areas of its Casa Grande, Coolidge and Tierra Grande systems, whether served individually or collectively as in the case of consolidation and interconnection of these service areas. This should not be included in the Staff Report, since it is not a requirement of ADWR, the state regulatory agency that approves Certificates of an Assured Water Supply.

Comments On Staff Report

Page 3, First Paragraph

- *Arizona Water has stated that it eventually plans to interconnect the Casa Grande and Coolidge water systems at some undisclosed future date.*

The Staff Report should state that Arizona Water Company's master plan provides for the interconnection of the Casa Grande and Coolidge (also Tierra Grande)

water systems into one regional water system. Also, the Staff Report should recognize that interconnection of the Casa Grande and Coolidge water systems will be facilitated by Arizona Water Company's providing water service to both the Sandia and Martin Ranch developments. A glance at a map shows that the disputed area is the single remaining link to be filled in to complete this interconnection and consolidation. The Staff is aware that the systems are planned to be fully integrated within five years and that each will share the benefits of a central CAP Water Treatment Plant. Arizona Water Company is already poised to serve some fifteen master planned communities along the western border of Coolidge. If Woodruff Water Company is allowed to start its own small water company to serve Sandia, an island or barrier in the middle of this area will be created that will hinder the orderly interconnection of the Coolidge and Casa Grande water systems and thereby would be detrimental to the public interest.

Page 4, "Arizona Water Company's Extension Request"

- *Arizona Water Company currently serves approximately 65,000 customers.*

Arizona Water Company currently serves over 73,000 customers and is growing at a rate of over 3,000 customers per year.

Page 4, "Request for Service"

- *The Wuertz family has requested water and wastewater service from Woodruff Water Company. Mr. Wuertz has also offered public comment in opposition to AWC certification of the property.*

As noted above, the Wuertz family, although technically requesting service as the current property owner in the proposed development, will not be the owner of the property at the time water service is extended, as verified by Pivotal's response to Arizona Water Company's data requests. The critical distinction in this area of the Staff Report is that there is a need to evaluate how the eventual customers will best be served. The Wuertz's preference should carry little weight with the Commission in light of the fact that they are selling the property to the developer who owns Woodruff Water Company. In the end, it is the customers' interests that the Commission must consider, not the farmer who is selling the property and will no longer be involved, as a customer or otherwise.

- *AWC has not been requested to serve any other portion of the extension request.*

It is not critical that Arizona Water Company receive requests for water service for every square foot of the area for which Arizona Water Company seeks a certificate extension. In light of the fact that there is significant growth taking place in Pinal

County, specifically in the Casa Grande and Coolidge areas Arizona Water Company is poised to serve, it is imperative that the Arizona Water Company interconnection between Casa Grande and Coolidge be made at this time.

Page 5, "The Water System"

The water system components identified in the Staff Report as they relate to wells, treatment facilities, water storage and major water transmission mains are not based on known water quality, well conditions, or other factors necessary to determine if the water supply is adequate or of suitable quality to serve Sandia from irrigation wells, as proposed by Woodruff Water Company. Nor does the report address what additional facilities will be needed to provide water service and what the cost and rate implications of such additional facilities will be.

The focus of the Staff Report is misdirected on arsenic, and fails to confront the higher priority concerns relating to nitrates in the old irrigation wells Woodruff Water Company proposes to use. The water quality data provided by Woodruff Water Company and discussed by Staff is insufficient and inadequate to determine the rate implications associated with necessary water quality improvements in those old irrigation wells. As a result, there is an insufficient basis for the finding that Woodruff Water Company is better suited for water service. The report recommends that the yet to be determined arsenic and fluoride levels of Woodruff Water Company's proposed drinking water wells be filed within 365 days of a decision in this matter, but how can the

adequacy and reliability of Woodruff Water Company's water supply, treatment plant and blending plan, and its financial projections, be evaluated without complete water quality information on each of the old irrigation wells that it plans to use as the backbone of its system?

Page 6, "Arizona Water Company Offer to Serve Sandia"

The Staff Report does not fully and accurately characterize the customer advance repayment terms proposed for the Sandia development and the Martin Ranch development. Arizona Water Company proposes to invest in the major infrastructure for both projects, including wells, water storage, booster stations, 12-inch and larger transmission and distribution mains and water treatment facilities through a guaranteed payback arrangement that pays back the full cost of these facilities through refunds to the developers for each customer that initially establishes service with Arizona Water Company. The benefit of this arrangement is that it assigns the risk of water infrastructure investment initially to the developer. Only when customers are added to the water distribution system does Arizona Water Company refund the full infrastructure cost on a per customer basis. Arizona Water Company has successfully implemented this approach in other projects. In contrast, Woodruff Water Company's best projections show Woodruff Water Company is only barely beginning to cover its expenses in the first five years of operation, which places the risk primarily on the

customers. On the other hand, the refund approach proposed by Arizona Water Company is protective of rate impacts to customers and fair to the developer.

The Staff Report concludes that Arizona Water Company is able to develop and construct water storage and production facilities and can treat and provide water, that complies with ADEQ's Safe Drinking Water Rules. The Staff Report fails to point out that Arizona Water Company is one of only a very few water companies in the state that have advanced the program of arsenic treatment to the point that Arizona Water Company is on schedule to comply with the new arsenic standard by January 23, 2006. The Staff Report also fails to recognize that Arizona Water Company has been mentoring other Arizona water companies and public entities on arsenic treatment methods, costs, operations, financing methods and operator training through the Arsenic Remediation Coalition, an organization formed to help Arizona's water utilities comply with the new arsenic standard.

Page 6, "Arsenic"

The Staff Report concludes that Woodruff Water Company can construct and develop adequate water storage and production facilities producing water that meets water quality standards required by ADEQ's Safe Drinking Water Rules. The one critical component missing from this conclusion is that since the water quality is not known in the Sandia development, Staff cannot be sure that the resulting water rates will be even higher than Arizona Water Company's rates, that Woodruff Water Company

already projects, further increasing the rate differential between the two applicants' water rates.

As indicated above, Woodruff Water Company has not even included water quality results in its application. As such, the ultimate cost of meeting drinking water standards from water pumped and treated from the old wells within the Sandia development is unknown and there is risk to the residents that the costs could likely be significantly greater than water service from Arizona Water Company. Additionally, the Staff Report erroneously states that Arizona Water Company's Coolidge system will require arsenic treatment, which it will not.

As also noted above, another critical component missing from the Staff Report is the presence of nitrates and high total dissolved solids within the Sandia development and neighboring areas. Arizona Water Company has reviewed the information on each of the old wells that Woodruff Water Company proposes to use to serve Sandia. The existing wells are of inadequate construction and do not comply with standards for community water system service, and the age and life of the water wells will not survive until the last lot is sold. More importantly, Arizona Water Company's experience with rehabilitation of such wells shows that the use of agricultural wells is marginal given the difficulty and high cost of rehabilitating wells to remove sources of nitrate and other contaminants. In sealing off the upper areas, which are typically high in nitrates and total dissolved solids but low in arsenic, the overall arsenic concentrations increase. The costs of treating for high nitrates, total dissolved solids, or even fluoride are much greater than the cost of treating for the removal of arsenic.

The Staff Report states that Arizona Water Company would propose to construct arsenic treatment facilities for Sandia and Martin Ranch through advances. This statement lacks specificity as it concerns Arizona Water Company's guaranteed refunds based on a per customer basis for major infrastructure capital investment. Further, Woodruff Water Company's estimate of $1.0 million for constructing arsenic treatment facilities does not include any operating or maintenance expenses, such as media replacement, media servicing, waste disposal, among other costs, which can exceed the rate impacts from capital investments.

Concerning the cost impacts from arsenic treatment, the Commission concluded that Arizona Water Company's estimated costs presented in its Northern and Eastern Group rate proceedings were reasonable. The same will result from Arizona Water Company's Western Group rate proceeding. Arizona Water Company has already submitted arsenic levels for all of its production wells to the Commission pursuant to a request by Utilities Director Ernest Johnson. In addition, Arizona Water Company has begun design and construction on many of its arsenic treatment facilities, ahead of most, if not all other water companies in the state. Because of the extent and reliability of its production resources in the area, Arizona Water Company can provide groundwater from outside the Sandia area to mitigate the on-site arsenic, fluoride and other water quality problems Woodruff Water Company faces.

Page 9, "Proposed Water Rates"

Staff reports that Woodruff Water Company's proposed initial water rates ($24.00 minimum charge with $2.00, $3.00 and $4.00 per thousand gallons for the first 7,000, next 7,000 and use above 14,000 gallons, respectively) compare with Staff's recommended initial rates of $20.00 per month and $2.08, $3.13 and $3.74 for the first 4,000, next 16,000 and use above 20,000 gallons, respectively. The Staff notes that Arizona Water Company intends to offer service at its Coolidge tariff rates, but fails to disclose that Arizona Water Company's charges would be significantly less than Woodruff Water Company's. Arizona Water Company's currently filed tariff rates, in place since January 1993, provide a $10.88 minimum monthly charge including the first 1,000 gallons and $2.092 per thousand gallons thereafter.

It is of particular interest that even Arizona Water Company's proposed rates for the Coolidge system, which are the subject of a pending rate application in Docket No. W-01445A-04-0650, are less than the initial rates proposed by the Staff and Woodruff Water Company in this case.

Based on these proposed and existing rates, and based on a projected use of 10,000 gallons per month, a residential customer in Sandia would pay the following monthly bill:

Source of Comparison	Monthly Bill	Difference From Present Coolidge Rates
Woodruff Water Company -- Proposed Rates	*$47.00*	*+$17.29/Month or +58.2%*
Staff Proposed Rates	*$47.04*	*+$17.33/Month or +58.3%*
Arizona Water Company		
-- Present Rates	*$29.71*	*N/A*
-- Proposed Rates	*$41.13*	*+$11.42/Month or +38.4%*

Additionally, the rate proposed by Woodruff Water Company and Staff is only an initial rate. Permanent rates can only be established by the Commission upon a full rate application by Woodruff Water Company. The initial rates being proposed by Woodruff Water Company and Staff are already 58% higher than Arizona Water Company's present rates, and it is very likely that future rates will be even higher due to inherent uncertainties in establishing initial rates, which are based on projections that usually underestimate the actual cost of providing water service.

Page 9, "Special Service Tariffs"

The Staff Report recommends that Woodruff Water Company file a curtailment plan and cross connection/backflow tariffs within 60 days of a final order of the Commission. The Staff does not recognize that Arizona Water Company already has such special service tariffs in place and has two backflow prevention control specialists on its staff who are well suited to administer such programs. Staff also fails to point out

that Arizona Water Company's adopted and approved curtailment tariff is designed to provide specific and practical tariff actions that are more comprehensive than the standard Staff curtailment tariff, and which will enable Arizona Water Company to provide better control and performance in the event of a supply shortage. It is more efficient for Arizona Water Company to operate under existing tariffs than for Woodruff Water Company to file for new tariffs. In addition, Arizona Water Company, as an ongoing established utility, has already established administrative, managerial, operational and billing procedures addressed in the tariff, including emergency operation plans, vulnerability assessments, emergency response plans and an environmental management system. The Staff Report fails to recognize these components of primary public interest, and the fact that Woodruff Water Company has no such capabilities.

Pages 10-14, Environmental Issues

Arizona Water Company's general comments as to these sections of the Staff Report concern the lack of a regional wastewater collection system, reuse and recharge planning that typically would be performed by a wastewater provider such as the City of Coolidge. The City of Coolidge should logically be the wastewater provider to the Sandia development. The City of Coolidge is capable of providing wastewater service to Sandia and all areas within the City of Coolidge, now and in future expansions of the city limits, and the provision of this service by the City of Coolidge would be in the public

interest. Additionally, Woodruff Utility Company's proposed sewer rates are $52.00 per month, ($156.00 per quarter) while the City of Coolidge's rates range from $31.20 per quarter to a maximum of $62.40 per quarter. Woodruff Utility Company's proposed rates would be 250% to 500% higher than the City of Coolidge's existing sewer rates.

Woodruff Utility Company may interfere with the City of Coolidge's long-term plans since sewer service to Sandia and the Central Arizona College could have been planned for in a regional way and not in a development-specific way.

Finally, concerning the discharge of treated effluent from the Woodruff Utility Company's wastewater treatment plant, Arizona Water Company has legitimate concerns about the adverse impact of such discharges on its wells adjacent to the Sandia development. The cost of remedying these impacts would make Woodruff Utility Company's wastewater costs even higher than present estimates.

Page 14, "Staff Analysis of Competing Applications"

In summary, Staff inappropriately minimizes factors such as Arizona Water Company's experience, reliability and lower rates that are in the public interest and instead inappropriately gives weight to the fact that Woodruff Water Company and Woodruff Utility Company proposes to furnish both water supply and wastewater service and to the present owner's request for service even though the present property owner has a conflict of interest and will never receive service as a customer. The Staff properly concludes that Arizona Water Company is a fit and proper entity with the

financial and technical capabilities to serve the public. This fact alone should be dispositive in deciding that Arizona Water Company should be the water provider for Sandia under Arizona law and the policy of the Commission.

Arizona's stated policy regarding public service corporations is one of "regulated monopoly" rather than one of "free-wheeling competition." *Arizona Corporation Commission v. Tucson Insurance and Bonding Agency,* 3 Ariz. App. 458, 462, 415 P.2d 472, 476 (1966). Unlike the analysis undertaken by Staff in its report, there must be an adequate showing that the public interest will be served in deciding CC&N issuances or deletions. *James P. Paul Water Co. v. Arizona Corporation Commission,* 137 Ariz. 432, 434, 671 P.2d 410, 412 (App. 1982), *approved as modified, 137 Ariz. 426, 671 P.2d 404 (1983).* The Staff Report should have focused on Arizona Water Company's lower rates and superior experience, investment in plant and property, and demonstrated staffing, expertise, and capacity in providing service to the Sandia area, rather than on Woodruff Water Company's purported interface with sewer service, which has never been recognized as a relevant factor by Arizona's courts. Moreover, even if Woodruff Water Company could demonstrate that it equaled Arizona Water Company on these factors, which it cannot, Arizona's courts and the Commission have recognized that the public interest is not carried forward by allowing service areas to be "gerrymandered in small non-integrated tracts served by different companies" that inevitably lead to "injury [to] both the consumer and the companies." *See Davis v. Arizona Corporation Commission,* 96 Ariz. 215, 217, 393 P.2d 909, 911 (1964). This conclusion is especially

mandated where, as here, Arizona Water Company so clearly is the more fit and appropriate water provider for the Sandia development.

The appropriate test is more clearly recognized in other states—in the absence of proof that the existing, established utility is unable or unfit to provide service, that it is never in the public interest to allow a competing provider to enter the field—especially in the case of an entity like Woodruff Water Company, which would have much higher rates than Arizona Water Company. This conclusion is also consistent with the Commission's CC&N Policy regarding CC&Ns on its own website. That Policy has a goal of ensuring that Arizona consumers are served by viable water utilities, by avoiding the proliferation of unnecessary, isolated water systems when a Class A utility like Arizona Water Company is ready, willing and able to serve at a substantially lower cost.

Conclusion

Arizona Water Company does not support the Staff's recommendation that Woodruff Water Company be authorized to provide public utility water service to Sandia and its recommendation that Arizona Water Company only be authorized to serve the Martin Ranch development. The Staff has misapplied the true charge of the Staff and the Commission, which is to ensure that the best interests of the public are served as opposed to the financial goals of a developer/water utility marketing agent. Absent a showing to the contrary, Arizona Water Company should be authorized to provide public

utility water service to the entire area it has requested in this matter, and Woodruff Water Company's application should be denied. In addition, if Staff is concerned about regional wastewater planning, they would be best served to contact the City of Coolidge to determine whether a 250-500% higher wastewater rate is also in the public interest and if the proposed Woodruff Utility Company's wastewater rates are just and reasonable in the context of the overall customer needs.

RESPECTFULLY SUBMITTED this 23rd day of March, 2005.

ARIZONA WATER COMPANY

By: Robert W. Geake

Robert W. Geake
Vice President and General Counsel
P. O. Box 29006
Phoenix, AZ 85038-9006

Steven A. Hirsch
Bryan Cave LLP
Two N. Central Avenue, Suite 2200
Phoenix, AZ 85004-4406

Attorneys for Arizona Water Company

Original and 17 copies of the foregoing filed this 23rd day of March to:

Docket Control
Arizona Corporation Commission
1200 W. Washington Street
Phoenix, AZ 85007

A copy of the foregoing mailed this 23rd day of March, 2005 to:

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By: Robert W. Geake

ARIZONA WATER COMPANY

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PHONE: (602) 240-6860 • FAX: (602) 240-6878 • WWW.AZWATER.COM

December 30, 2004

Mr. Jim Fisher
Executive Consultant Utilities Division
Arizona Corporation Commission
1200 West Washington Street
Phoenix, AZ 85007

Re: Arizona Water Company – Application for an Extension of its Certificate of Convenience and Necessity (CC&N) Docket W-01445A-04-0755
INSUFFICIENCY LETTER

Dear Mr. Fisher:

In reference to Arizona Corporation Commission's INSUFFICIENCY LETTER, dated November 12, 2004, this letter is in response to you requests.

1. Please provide a request for service each of the affected property owners.
   See Exhibit "2" in the original application

2. Please provide a map of the requested service territory with an identification of the respective property owners requesting service.
   See Exhibit "3" in the original application

3. Please provide a drinking water design report which clarifies how water will be provided to the proposed CC&N.

   The report should identify existing and future sources, the capacities of existing sources, the estimated capacities of future sources and any existing demand on the present water sources.
   See Design Report Attachments - Well and Tank Analysis
   - A-6 Sandia
   - B-7 Sandia Phase 1
   - C-8 Martin Ranch
   - D-7 Sandia and Martin Ranch

   The report should include the estimated water demand from a typical dwelling unit, the estimated demand from the proposed CC&N.
   See Design Report Attachments – Demand Estimates

FILE COPY

WWC-23
Admitted

- A-3 Sandia
- B-2 Sandia Phase 1
- C-3 Martin Ranch
- D-1 Sandia and Martin Ranch

The report should identify the location of future and existing transmission mains and include the timing or construction phasing of facilities.
See Design Report Figures – Subdivision Layout

- A Sandia
- B Sandia Phase 1
- C Martin Ranch
- D Sandia and Martin Ranch

Also see Design Report Attachments – Construction Schedule and Cost Estimate

- A-2 Sandia
- B-1 Sandia
- C-2 Martin Ranch

The design report should describe water quality and address any water quality problems with the existing and future sources of water (as an example, will extra treatment costs arise in order to meet existing or future maximum contaminant levels for arsenic, nitrates, or fluorides in the drinking water?).
See Design Report – Water Treatment Section

4. Please provide a copy of the Arizona Department of Water resources Analysis of Adequate Water Supply for the proposed service territory.
   See Design Report Attachment A-1 Sandia and C-1 Martin Ranch - Physical Availability Demonstration

5. Please provide any other information which will allow the Commission to analyze and conclude that the company has sufficient water production capacity, or can develop enough drinking water capacity to service the existing and future demands from the proposed CC&N.
   See Design Report

6. Please provide a set of design plans for the proposed water facilities.
   See Design Report Figure E

7. Please provide an estimate of the water facilities costs necessary to serve the proposed CC&N. The cost should include a description of the major components with the cost of the component (i.e., wells, number and size of storage tanks, etc.). The method of financing for the major components should be described specifically.
   See Design Report Attachments – Construction Schedule and Cost Estimate
   - A-2 Sandia

- B-1 Sandia Phase 1
- C-2 Martin Ranch

8. Please provide a copy of the Pinal County Franchise for the requested area. See Exhibit " 8" in the original application

Very truly yours,

Mike Loggins
Engineer
engineering@azwater.com

kd

Enclosures

Water Plan for Sandia & Martin Ranch

Prepared by:

Arizona Water Company
PO Box 29006
Phoenix, AZ 85038-9006

December 17, 2004

Introduction

The Sandia and Martin Ranch projects are residential subdivisions located between Arizona Water Company's (the "Company") Casa Grande and Coolidge Certificates of Convenience and Necessity (CC&N). The Company's current application to extend its Casa Grande and Coolidge CC&Ns filed with the Arizona Corporation Commission ("Commission"), if approved by the Commission, would integrate the two CC&N's into one single CC&N. Water system planning for this integrated Casa Grande/Coolidge CC&N is accomplished through the Company's Pinal Valley Master Water Plan.

The Sandia project consists of approximately 9,000 or more residential housing units (approximately 3,200 acres) located West of Coolidge, Arizona, in Pinal County bordered on the East by Macrae Road, on the West by Signal Peak Road, on the North by London Road and on the South by Woodruff Road. It is more accurately described as a portion of Sections 13, 14, 23, 24, and 25 Township 5 South, Range 7 East of the Gila and Salt River Base and Meridian Pinal County, Arizona.

The Martin Ranch project consists of approximately 2,100 or more residential housing units (approximately 565.5 acres) located East of Casa Grande, Arizona, in Pinal County adjacent to the Sandia Development bordered on the East by Curry Road, on the West by Signal Peak Road, on the South by Woodruff Road, and a quarter mile North of Val Vista Road. It is more accurately described as a portion of Sections 23, 25, and 26 Township 5 South, Range 7 East of the Gila and Salt River Base and Meridian Pinal County, Arizona.

Water Supply

Sandia

The Company proposes to supply water to the Sandia project from six 750 gpm wells that will be drilled within the boundaries of the project and from existing water supplies within the Company's Coolidge water system to be distributed by a 16-inch water main tied into the Coolidge System. Treated Central Arizona Project ("CAP") water will also be available for potable use within the Sandia project upon completion of the Company's CAP water treatment plant. Attachment A-1 is a copy of the Physical Availability Demonstration ("PAD") approval on file with the Arizona Department of Water Resources ("ADWR"). This approval indicates that there is approximately 13,510 acre feet per year of groundwater available in the Coolidge service area, although more physical groundwater supplies can be demonstrated through an updated PAD the Company intends to submit to ADWR in the future.

The Company has adequate production and storage capacity within its Coolidge water system to serve the first phase of the Sandia project. The Company proposes to serve the first phase of this project by interconnecting this development to the Company's Coolidge water system, which will require the installation of 18,500 linear feet of 12-inch Ductile Iron Pipe. After the first five hundred residential housing units within the Sandia project are developed, the developer will be required to advance funds to the Company to drill the first 750 gpm well, build a one million gallon water storage tank, and a booster pump station. See Attachment B-1 for the construction schedule of Sandia Phase 1. The Company will invest its own capital to increase the size of the interconnection main from 12-inch to 16-inch in accordance with the Company's Pinal Valley Master Water Plan Design. The Company will refund to the developer the cost of production wells, 12-inch and larger water mains, water storage tank and booster pump station on a per lot basis.

Martin Ranch

The Martin Ranch project will advance funds to the Company for it to construct one 750 gpm water production well and to install 18,500 linear feet of 16-inch water main from the Company's existing Casa Grande water system. Attachment C-1 is a copy of the Physical Availability Demonstration approval on file with the Arizona Department of Water Resources. This approval indicates that there is approximately 57,507 acre feet per year of groundwater physically available for the Company's Casa Grande service area and any extensions there from.

The Martin Ranch project's water storage will be met from the existing 15 million gallons of water storage located within the Casa Grande water system. As with the Sandia project, the Company will refund to the developer the cot of the production well and 12-inch and larger water mains on a per lot basis.

Sandia and Martin Ranch

The water distribution system design for these two developments will result in the interconnection of the Company's Casa Grande and Coolidge water distribution systems, allowing the Company to provide greater water system reliability and better access to physical supplies of groundwater and CAP water. When combined to form the Master Planned Pinal Valley Service Area, the Company will have approximately 75,000 acre feet per year of ground water and 11,000 acre feet per year of Central Arizona Project Water available to serve this entire area.

75
11
86K acre ft/yr.

When the Sandia project reaches 1,500 residential units, the developer will be required to advance funds to the Company to drill a second 750 gpm well, and this process will be repeated for every 1,500 residential housing units added thereafter until this project reaches full build out. During the course of developing the distribution system to serve the Sandia and Martin Ranch projects, the Company's Casa Grande and Coolidge water systems will be fully integrated, allowing the

Sandia project to also benefit from the existing 15 million gallons of water storage within the Casa Grande system. The area covering the Sandia project, as well as the Martin Ranch project will be served from the same pressure zone as the central portion of the Company's Casa Grande water system. The proposed construction schedule for Sandia is shown in Attachment A-2. The Company has sufficient tank site property to add an additional 15 million gallons of water storage, doubling the existing water storage capacity. Although this water storage would be adequate for the Company to serve significant additions to its Casa Grande/Coolidge water systems, the Company is also planning to acquire additional property suitable to build two additional five million gallon storage tanks in the future when additional water storage is warranted. This additional property will be located in close proximity to the Sandia and Martin Ranch projects.

? total of 30MG

plus 10MG

The Martin Ranch project will not be required to advance funds to provide water storage because existing water storage (15 million gallons) is adequate to serve this project. The construction schedule for Martin Ranch is shown in Attachment C-2

Water Treatment

The Company is in compliance with all of Arizona Department of Environmental Quality drinking water standards. The current maximum contaminant level (MCL) for Arsenic is 50 parts per billion (PPB). A new arsenic MCL of 10 PPB becomes effective on January 23, 2006. The Company has already begun the process of bidding, designing, and building Arsenic treatment plants in the Casa Grande and Coolidge System and plans on meeting new arsenic MCL standard before the January 23, 2006 deadline. If water treatment is needed for the proposed wells, funds will be advanced by the developer, which is also subject to the same method of refund as described above.

Distribution System Model

The distribution system analysis for the developments was performed using PIPE2000 developed by the University of Kentucky Civil Engineering Software Center. It is a Windows version of the original KY-Pipe developed by the University which used Fortran Code. The model uses the Hazen-Williams formula for system analysis. The modeling software allows the distribution system to be developed with consideration for different flow conditions.

Analysis

Sandia Phase 1

The estimated Average Day Peak Month (ADPM) demand was calculated and is shown in Attachment B-2. This ADPM demand was multiplied by a factor of 1.2 to estimate the Peak Day Demand. A summary of the demand estimate calculations is shown in Table 1. See Figure A. for a layout of the KY Pipe Model. The estimated peak day demand was then distributed throughout the model for analysis. Four different scenarios were used for Sandia's Phase 1 analysis:

- peak day demand no new well, tank, or booster pump.
- peak day demand with Sandia well #1, one million gallon water storage tank, and booster pumps on.
- peak day demand with fire flow no new well, tank, or booster pump.
- peak day demand with fire flow and Sandia well #1, one million gallon water storage tank, and booster pumps on.

Sandia

The estimated Average Day Peak Month (ADPM) demand was calculated in Attachment A-3. This ADPM demand was multiplied by a factor of 1.2 to estimate the Peak Day Demand. A summary of the demand estimate calculations is shown in Table 1. See Figure B. Sandia Phase 1

for a layout of the KY Pipe Model. The estimated peak day demand was then distributed throughout the model for analysis. Two different scenarios were used for Sandia's analysis:

- peak day demand with all six Sandia wells running, one million gallon water storage tank, and booster pumps on.
- peak day demand with fire flow and all six Sandia wells running, one million gallon water storage tank, and booster pumps on.

Martin Ranch

The estimated Average Day Peak Month (ADPM) demand was calculated in Attachment C-3. This demand was multiplied by a factor of 1.5 to estimate the Peak Day Demand. A summary of the demand estimate calculations is shown in Table 1. See Figure C. Martin Ranch for a layout of the KY Pipe Model. The estimated peak day demand was then distributed throughout the model for analysis. Four different scenarios were used for analysis:

- peak day demand with no new well.
- peak day demand with Martin Ranch well #1 running.
- peak day demand with fire flow with no new well.
- peak day demand with fire flow with Martin ranch well #1 running.

Sandia and Martin Ranch

The estimated Average Day Peak Month (ADPM) demand was calculated in Attachment D-1. This demand was calculated by adding together Sandia's ADPM and Martin Ranch's ADPM to estimate the Peak Day Demand. A summary of the demand estimate calculations is shown in Table 1. See Figure D Sandia and Martin Ranch for a layout of the KY Pipe Model. The estimated peak day demand was then distributed throughout the model for analysis. Five different scenarios were used for analysis:

- peak day demand with no new wells, tank, or booster pump station.
- peak day demand with one well running, one million gallon water storage tank, and booster pumps on.

- peak day demand with 7 new wells running, one million gallon water storage tank, and booster pumps on.

- peak day demand with fire flow with one well running, one million gallon water storage tank, and booster pumps on.

- peak day demand with fire flow with 7 new wells running, one million gallon water storage tank, and booster pumps on.

Table 1 – Demand Estimates

Development	Lots/ DUs	Density people/DU	Demand GPCD	ADPM	Peak Day Demand
				gpm	Gpm
Sandia Phase 1	1,500	2.85	143	425	637
Sandia	9,000	2.85	143	2,547	3,821
Martin Ranch	2,100	2.85	143	589	707
Sandia and Martin Ranch	11,100	2.85	143	3136	4528

1.2
1.5

The conditions used in development of the analysis are presented as follows:

- *Fire flow condition*: 1000 gallons per minute (gpm) at 20 pounds per square inch gauge (psig) pressure per ADEQ requirements. 2500gpm

- *Pipe considerations*: Ductile iron pipe (DIP) with a friction factor of C = 140 in the model. use PVC

- *Valving considerations*: Valves and other minor losses are assumed to be negligible and were not included in the model of the system. The hydrant testing was performed under assumed peak conditions and reflected all valve and fitting losses. ?No loss for fittings

- *Hydrant considerations*: The most hydraulically remote locations within the development were determined, then the fire flow demand was placed at these locations.

- *Average Day Peak Month Demand (ADPM)*: The average day peak month demand for Sandia and Martin Ranch are based on 143 gallons per capita per day (GPCD) based on Arizona Water Company's criteria. The density for this community will be approximately 2.85 people per dwelling unit (DU).

- *Peak Day Demand*: Is determined by multiplying the ADPM by a peaking factor of 1.2 for Casa Grande and 1.5 for Coolidge.

Peak Day Demand. The model was analyzed using the peak day demand distributed throughout the development. Each attachment contains the full design report for the peak day conditions with all pumps off (gravity flow only).

Attachment B-3 Sandia Phase 1

Attachment C-4 Martin Ranch

Attachment D-2 Sandia and Martin Ranch

The design report in each attachment below uses the same demand conditions but predict pressures within the distribution system resulting from one new well providing service to the development simulated in an operating condition.

Attachment B-4 Sandia Phase 1

Attachment C-5 Martin Ranch

Attachment D-3 Sandia and Martin Ranch

A summary of the results are shown in Table 2.

The design report in each attachment below uses the same demand conditions but predict pressures within the distribution system resulting from all new wells and booster pumps on providing service to the development simulated in an operating condition.

Attachment A-4 Sandia

Attachment D-4 Sandia and Martin Ranch

Peak Day Demand with Fire Flow. The model was next analyzed using the peak day demand and fire flow demand distributed throughout the development. Each attachment below contains the full design report for these demand conditions with all wells off, simulating results from a " worst case" scenario.

Attachment B-5 Sandia Phase 1

Attachment C-6 Martin Ranch

The design report in each attachment below uses the same "worst case" demand conditions but with one new well providing service to the development simulated in an operating condition.

Attachment B-6 Sandia Phase 1

Attachment C-7 Martin Ranch

Attachment D-5 Sandia and Martin Ranch

The design report in each attachment below uses the same "worst case" demand conditions but with all wells providing service to the development simulated in an operating condition.

Attachment A-5 Sandia

Attachment D-6 Sandia and Martin Ranch

Table 2
Modeled System Conditions

Peak Day Demand Conditions (All Pumps Off)		
Sandia Phase 1 Lowest Pressure	J-5	57.95 psig
Martin Ranch Lowest Pressure	J-27	57.98 psig
Sandia and Martin Ranch	J-5	29.48 psig
Peak Day Demand Conditions (One Well On)		
Sandia Phase 1 Lowest Pressure	(Sandia Tie in Point)	65.64 psig
Martin Ranch Lowest Pressure	J-27	61.07 psig
Sandia and Martin Ranch	J-27	43.25 psig
Peak Day Demand Conditions (All Wells On)		
Sandia	(Sandia Tie in Point)	71.64 psig
Sandia and Martin Ranch	J-27	61.58 psig
Peak Day Demand with 1000gpm Fire Flow (All Pumps Off)		
Sandia Phase 1	J-10	21.02 psig
Martin Ranch	J-27	38.71 psig
Peak Day Demand with 1000gpm Fire Flow (One Well On)		
Sandia Phase 1	J-10	53.98 psig
Martin Ranch	J-27	49.86 psig
Sandia and Martin Ranch	J-5	33.13 psig
Peak Day Demand with 1000gpm Fire Flow (All Wells On)		
Sandia	J-4	64.34 psig
Martin Ranch	J-27	60.54 psig

→ 12" or 16"?

Well and Storage Analysis

Attachments below represents the results of an engineering analysis of water source and water storage adequacy for various scenarios for the Company's existing and future consolidated water systems with demands from both developments included in these scenarios. The engineering analysis indicates that the existing and proposed storage exceed the minimum requirements for fire protection and the production capacity exceeds the needs of the current and proposed customers even with two wells out of service.

Attachment A-6 Sandia

Attachment B-7 Sandia Phase 1

Attachment C-8 Martin Ranch

Attachment D-7 Sandia and Martin Ranch

SANDIA

Attachment A-1

Physical Availability Demonstration

ARIZONA DEPARTMENT OF WATER RESOURCES
Hydrology Division
500 North Third Street, Phoenix, Arizona 85004
Telephone 602 417-2448
Fax 602 417-2425

JANE DEE HULL
Governor

JOSEPH C. SMITH
Director

April 24, 2002

RECEIVED
APR 26 2002
ARIZONA WATER COMPANY
PHOENIX - EXECUTIVE

Mr. William Garfield
Arizona Water Company
3805 North Black Canyon Highway
Phoenix, Arizona 85015

RE: Arizona Water Company
Application for Physical Availability Demonstration #20-400600

Dear Mr. Garfield:

The Department has completed review of the report entitled ***Hydrology Study Report, Pinal AMA, Casa Grande Groundwater Flow Model,*** prepared by Clear Creek Associates, August 31, 2001. The area of review has been limited to the Casa Grande (including Arizona City), Coolidge, and Tierra Grande service areas of Arizona Water Company's Pinal County CC&Ns. The model study area is located primarily in the Maricopa-Stanfield and Eloy sub-basins of the Pinal Active Management Area.

In accordance with A.A.C. R-12-15-702(C), it was determined that approximately 57,507 acre-feet per year of groundwater is available for the Casa Grande service area; 13,510 acre-feet per year is available for the Coolidge service area; and 4,786 acre-feet per year is available for the Tierra Grande service area. These quantities represent the amount of groundwater available for new demands within the service area of each system. The groundwater is projected to be physically available for 100 years under A.A.C. R-12-15-703(B) for assured water supply purposes in the respective areas. Currently, the water supply systems are in compliance with water quality standards for the purposes of A.A.C. R-12-15-704. It is the Department's conclusion that, pumping the projected demands for 100 years, will take the depth-to-static water level to approximately the maximum depth allowed by A.A.C. R-12-15-703(B).

The results of the Department's hydrologic review fulfill the requirements of A.A.C. R12-15-702 (C) and can be cited in applications for a Certificates of Assured Water Supply or for Designation of Assured Water Supply. These applications have certain additional requirements based on the assured water supply criteria referenced in A.R.S. §45-576 and A.A.C. R-12-15-701 *et. seq.* For further information on these requirements, please contact the Office of Assured and Adequate Water Supply Certification at (602)417-2465. **If the Department finds that the groundwater supply is not available because the assumptions and information used in determining the physical availability under the current criteria prove incorrect, the Department will modify the availability of groundwater accordingly.**

The Department's determination is an appealable agency action. In order to appeal this decision, you must request an appeal within thirty (30) days from receipt of this letter. I have enclosed a summary of the appeals process and an appeal form should you wish to pursue this option.

If you have any questions regarding the physical availability review, please contact me at (602) 417-2448.

Sincerely,

Greg Wallace
Chief Hydrologist

GW/KM/rd
202245

cc: Steve Corell, Clear Creek Associates
Doug Dunham, ADWR
Dennis Kimberlin, ADWR, Pinal AMA

SANDIA

Attachment A-2

Construction Schedule and Cost Estimate

Arizona Water Company

Sandia, Pinal County, Arizona

Summary of the Backbone Water System Required to provide Water Service to Sandia

Phase 1

Units	* Wells	** Arsenic Treatment	Hydro System	*** 1,000,000 GAL Tank	Backbone Infrastructure	Total Cost
0-500	$0	$0	$0	$0	$600,000	$600,000
501-1500	$950,000	$0	$220,000	$400,000	$0	$1,570,000
1501-3000	$950,000	$0	$0	$0	$0	$950,000
						$3,120,000

Total Project

Units	* Wells	** Arsenic Treatment	Hydro System	*** 1,000,000 GAL Tank	Backbone Infrastructure	Total Cost
0-500	$0	$0	$0	$0	$600,000	$600,000
501-1500	$950,000	$0	$220,000	$400,000	$0	$1,570,000
1501-3000	$950,000	$0	$0	$0	$0	$950,000
3001-4500	$950,000	$0	$0	$0		$950,000
4501-6000	$950,000	$0	$0	$0		$950,000
6501-7500	$950,000	$0	$0	$0		$950,000
7501-9000	$950,000	$0	$0	$0		$950,000
Totals						$6,920,000

Total cost of 1 Well, Tank, and Hydro System	$1,570,000
Total cost of Wells, Tanks, and Hydro Systems	$6,920,000

* Assume new wells will be capable of 750 gallons per minute
** Any wells that require Arsenic Treatment add $600,000
*** Any additional storage required will be served from Coolidge's existing system

SANDIA

Attachment A-3

Demand Estimate
Average Day Peak Month

ARIZONA WATER COMPANY

Sandia
COOLIDGE, PINAL COUNTY, ARIZONA

Calculation to determine Average Day Peak Month (ADPM)

Assume:

1.	GPCD	143
2.	Per Capita Occupancy	2.85
3.	Dwelling Units	9000
4.	Average Days per Month	30.42

Peak Month (gallons/month) = (143)(9000)(30.42)(2.85)
Peak Month (gallons/month) = 111,579,039
Average Day Peak Month (gallons/day) = 111,579,039/30.42
ADPM (gallons/day) = 3,667,950

Average GPM= 2,547
Peak Day GPM= 3,821 1.5 peak factor

SANDIA

Attachment A-4

Peak Day Demand Conditions
(All Wells On)

```
* * * * * * * * * * *.  K Y P I P E 4   * * * * * * * * * *
*                                                          *
*    University of Kentucky Network Modeling Software      *
*                                                          *
*              Copyrighted by KPFS 1998                    *
*             Version 1.200 - 01/26/2000                   *
*                                                          *
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Date & Time: Wed Dec 29 15:40:49 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.	
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00	15K of 12"
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00	
P-03	J-04	J-03	847.64	16.53	140.0000	0.00	
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00	= approx. 21K l.f. of 16
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00	
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00	
P-07	J-08	J-07	864.64	16.53	140.0000	0.00	
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00	
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00	
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00	
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00	22K lf of 12"
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00	
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00	
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00	
P-15	J-08@~Pump Sta		10.00	16.53	140.0000	0.00	
P-16	Pump Statil Mil. Tan		10.00	16.53	140.0000	0.00	
P-17	1 Mil. Tan Well #1 S		10.00	16.53	140.0000	0.00	
P-18	J-07 Well #2 S		2296.76	12.09	140.0000	0.00	
P-19	J-12 Well #3 S		3923.69	12.09	140.0000	0.00	
P-20	J-13 Well #4 S		345.97	12.09	140.0000	0.00	
P-21	J-13 Well #5 S		342.69	12.09	140.0000	0.00	
P-22	J-05 Well #6 S		4542.25	12.09	140.0000	0.00	
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00	

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD FLOWRATE EFFICIENCY

(ft)	(gpm)	(%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-31		0.00	1385.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 S		-750.00	1385.00	
Well #2 S		-750.00	1380.00	
Well #3 S		-750.00	1380.00	
Well #4 S		-750.00	1385.00	
Well #5 S		-750.00	1385.00	
Well #6 S		-750.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 23
NUMBER OF END NODES .....(j) = 20
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 2
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 4 TRIALS: ACCURACY = 0.00012

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-01	Sandia tie	Coolidge S	672.17	15.32	0.00	1.88	1.02
P-02	J-03	Sandia tie	672.17	1.79	0.00	1.00	0.22
P-03	J-04	J-03	672.17	0.19	0.00	1.00	0.22
P-04	J-05	J-04	43.72	0.00	0.00	0.07	0.00
P-05	J-06	J-05	-406.28	0.37	0.00	0.61	0.09
P-06	J-07	J-06	412.71	0.13	0.00	0.62	0.09
P-07	J-08	J-07	-337.29	0.05	0.00	0.50	0.06
P-08	J-09	J-08	-1059.47	1.23	0.00	1.58	0.52
P-09	J-10	J-09	-359.47	1.10	0.00	1.00	0.32
P-10	J-10	J-11	-340.53	2.10	0.00	0.95	0.29
P-11	J-11	J-12	-921.54	3.22	0.00	2.58	1.83
P-12	J-12	J-13	-171.54	0.26	0.00	0.48	0.08
P-13	J-13	J-04	628.46	2.97	0.00	1.76	0.90
P-14	J-11	J-06	-118.99	0.15	0.00	0.33	0.04
P-15	J-08	Pump Stati	-722.17	0.00	0.00	1.08	0.25
P-16	Pump Stati	1 Mil. Tan	-722.17	0.00	0.00	1.08	0.25
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27
P-18	J-07	Well #2 S	-750.00	2.87	0.00	2.10	1.25
P-19	J-12	Well #3 S	-750.00	4.91	0.00	2.10	1.25
P-20	J-13	Well #4 S	-750.00	0.43	0.00	2.10	1.25
P-21	J-13	Well #5 S	-750.00	0.43	0.00	2.10	1.25
P-22	J-05	Well #6 S	-750.00	5.68	0.00	2.10	1.25
P-23	J-09	J-31	0.00	0.00	0.00	0.00	0.00

PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)
Pump Stati	722.17	0.00	177.02	177.0	----	-----	---	----

END NODE RESULTS

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1562.11	1395.00	167.11	72.41
J-04		0.00	1562.30	1395.00	167.30	72.50
J-05		300.00	1562.30	1395.00	167.30	72.50
J-06		700.00	1561.93	1385.00	176.93	76.67
J-07		0.00	1562.07	1385.00	177.07	76.73
J-08		0.00	1562.01	1385.00	177.01	76.71
J-09		700.00	1560.78	1385.00	175.78	76.17
J-10		700.00	1559.68	1380.00	179.68	77.86
J-11		700.00	1561.78	1380.00	181.78	78.77
J-12		0.00	1565.01	1380.00	185.01	80.17
J-13		700.00	1565.27	1385.00	180.27	78.12
J-31		0.00	1560.78	1385.00	175.78	76.17
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1560.32	1395.00	165.32	71.64
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Well #2 S		-750.00	1564.94	1380.00	184.94	80.14
Well #3 S		-750.00	1569.92	1380.00	189.92	82.30
Well #4 S		-750.00	1565.70	1385.00	180.70	78.30
Well #5 S		-750.00	1565.70	1385.00	180.70	78.30
Well #6 S		-750.00	1567.99	1395.00	172.99	74.96
Pump Stati		0.00	1562.02	1385.00	177.02	76.71

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	-27.83	
Coolidge Sy	-672.17	

NET SYSTEM INFLOW = 0.00
NET SYSTEM OUTFLOW = -700.00
NET SYSTEM DEMAND = -700.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA

Attachment A-5

Peak Day Demand Conditions with Fire Flow
(All Pumps On)

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* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
*    University of Kentucky Network Modeling Software    *
*                                                        *
*              Copyrighted by KPFS 1998                  *
*             Version 1.200 - 01/26/2000                 *
*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Dec 29 15:39:55 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia.RS2

****
S U M M A R Y O F O R I G I N A L D A T A
****

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00
P-18	J-07	Well #2 S	2296.76	12.09	140.0000	0.00
P-19	J-12	Well #3 S	3923.69	12.09	140.0000	0.00
P-20	J-13	Well #4 S	345.97	12.09	140.0000	0.00
P-21	J-13	Well #5 S	342.69	12.09	140.0000	0.00
P-22	J-05	Well #6 S	4542.25	12.09	140.0000	0.00
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD FLOWRATE EFFICIENCY

(ft)	(gpm)	(%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		1700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-31		0.00	1385.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 S		-750.00	1385.00	
Well #2 S		-750.00	1380.00	
Well #3 S		-750.00	1380.00	
Well #4 S		-750.00	1385.00	
Well #5 S		-750.00	1385.00	
Well #6 S		-750.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 23
NUMBER OF END NODES .....(j) = 20
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 2
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 4 TRIALS: ACCURACY = 0.00111

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

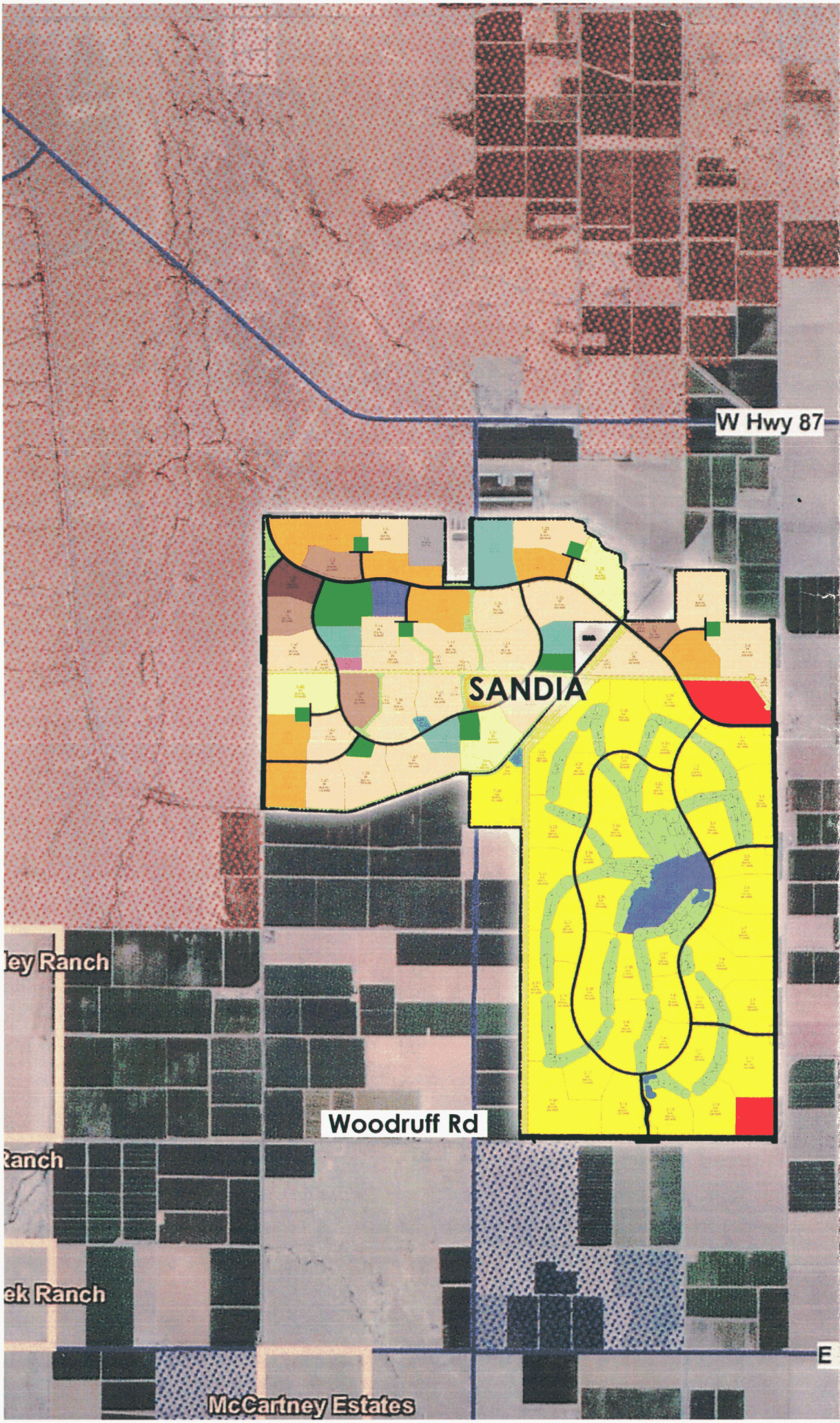
PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-01	Sandia tie	Coolidge S	-181.06	1.35	0.00	0.51	0.09
P-02	J-03	Sandia tie	-181.06	0.16	0.00	0.27	0.02
P-03	J-04	J-03	-181.06	0.02	0.00	0.27	0.02
P-04	J-05	J-04	-627.46	0.64	0.00	0.94	0.20
P-05	J-06	J-05	-1077.46	2.25	0.00	1.61	0.53
P-06	J-07	J-06	-41.09	0.00	0.00	0.06	0.00
P-07	J-08	J-07	-791.09	0.26	0.00	1.18	0.30
P-08	J-09	J-08	-1660.03	2.84	0.00	2.48	1.19
P-09	J-10	J-09	-960.03	6.79	0.00	2.68	1.98
P-10	J-10	J-11	-739.97	8.86	0.00	2.07	1.22
P-11	J-11	J-12	-1103.60	4.50	0.00	3.08	2.56
P-12	J-12	J-13	-353.60	0.99	0.00	0.99	0.31
P-13	J-13	J-04	446.40	1.58	0.00	1.25	0.48
P-14	J-11	J-06	-336.37	1.03	0.00	0.94	0.28
P-15	J-08	Pump Stati	-868.93	0.00	0.00	1.30	0.36
P-16	Pump Stati	1 Mil. Tan	-868.93	0.00	0.00	1.30	0.36
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27
P-18	J-07	Well #2 S	-750.00	2.87	0.00	2.10	1.25
P-19	J-12	Well #3 S	-750.00	4.91	0.00	2.10	1.25
P-20	J-13	Well #4 S	-750.00	0.43	0.00	2.10	1.25
P-21	J-13	Well #5 S	-750.00	0.43	0.00	2.10	1.25
P-22	J-05	Well #6 S	-750.00	5.68	0.00	2.10	1.25
P-23	J-09	J-31	0.00	0.00	0.00	0.00	0.00

PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)
Pump Stati	868.93	0.00	155.33	155.3	----	-----	---	----

END NODE RESULTS

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1543.49	1395.00	148.49	64.35
J-04		0.00	1543.48	1395.00	148.48	64.34
J-05		300.00	1542.84	1395.00	147.84	64.06
J-06		700.00	1540.59	1385.00	155.59	67.42
J-07		0.00	1540.58	1385.00	155.58	67.42
J-08		0.00	1540.32	1385.00	155.32	67.31
J-09		700.00	1537.49	1385.00	152.49	66.08
J-10		1700.00	1530.70	1380.00	150.70	65.30
J-11		700.00	1539.56	1380.00	159.56	69.14
J-12		0.00	1544.06	1380.00	164.06	71.09
J-13		700.00	1545.05	1385.00	160.05	69.36
J-31		0.00	1537.49	1385.00	152.49	66.08
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1543.65	1395.00	148.65	64.42
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Well #2 S		-750.00	1543.46	1380.00	163.46	70.83
Well #3 S		-750.00	1548.97	1380.00	168.97	73.22
Well #4 S		-750.00	1545.48	1385.00	160.48	69.54
Well #5 S		-750.00	1545.48	1385.00	160.48	69.54
Well #6 S		-750.00	1548.52	1395.00	153.52	66.52
Pump Stati		0.00	1540.33	1385.00	155.33	67.31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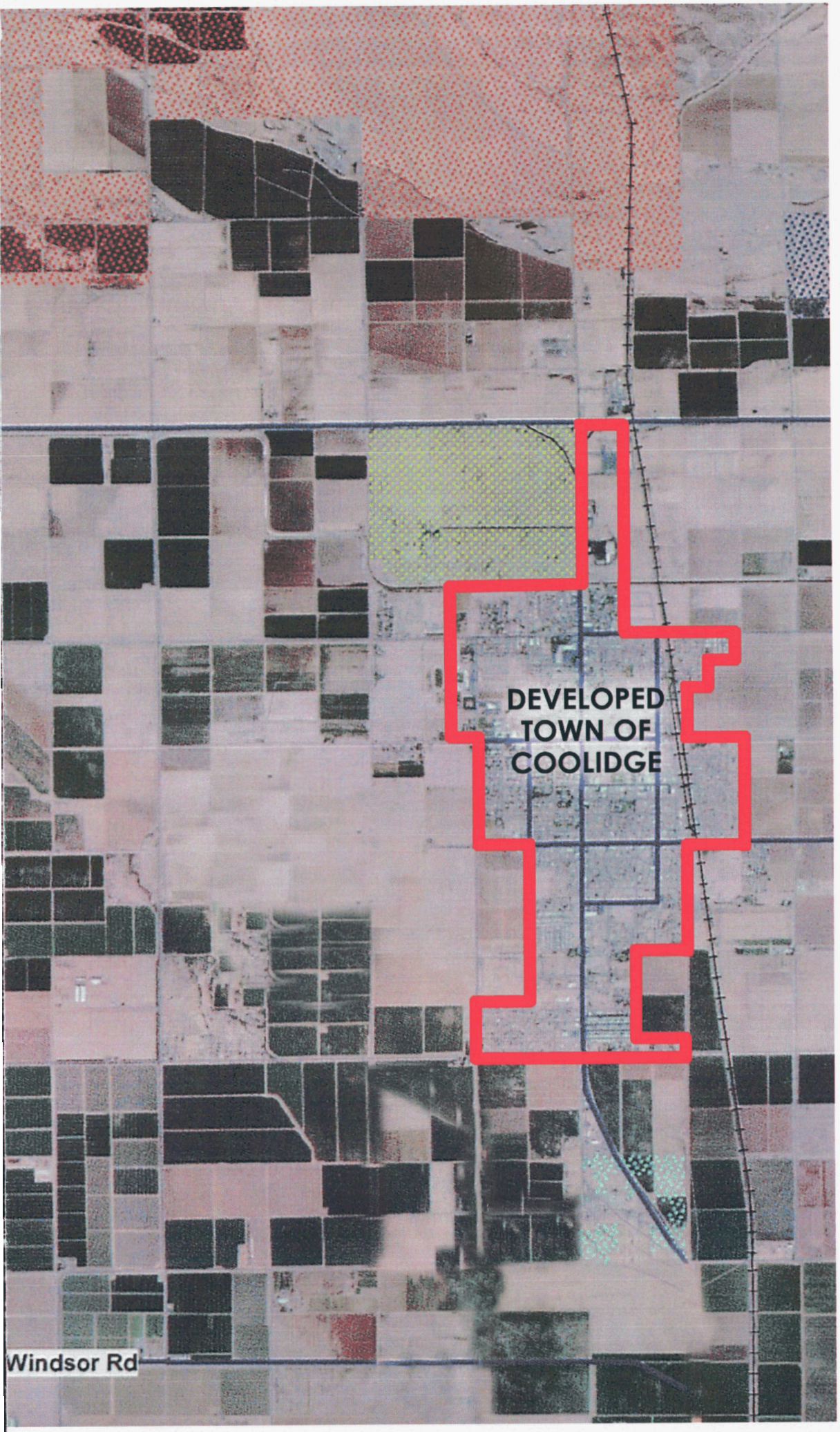
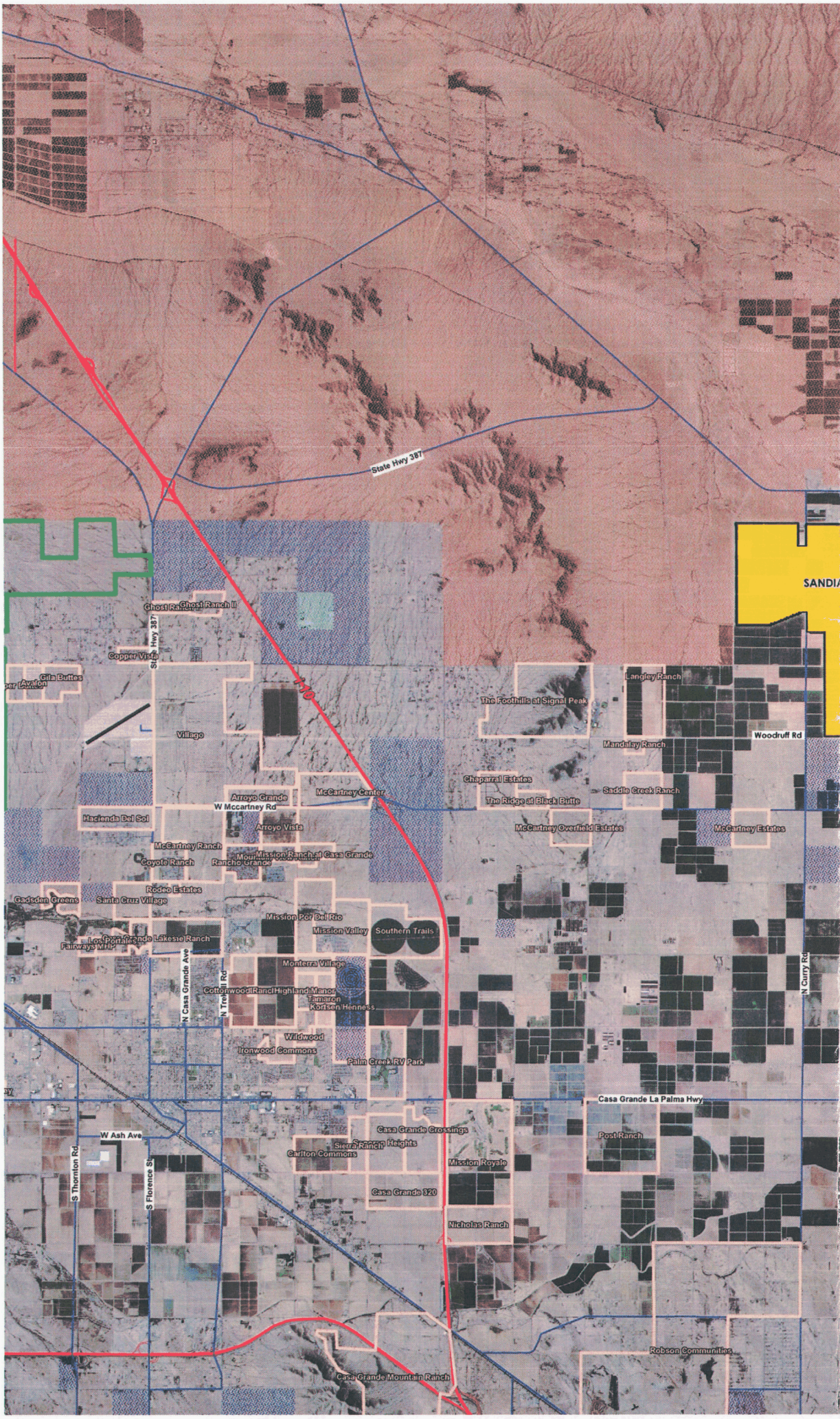
Woodruff Rd
Ranch
ek Ranch
E
McCartney Estates

WWC-33
Admitted





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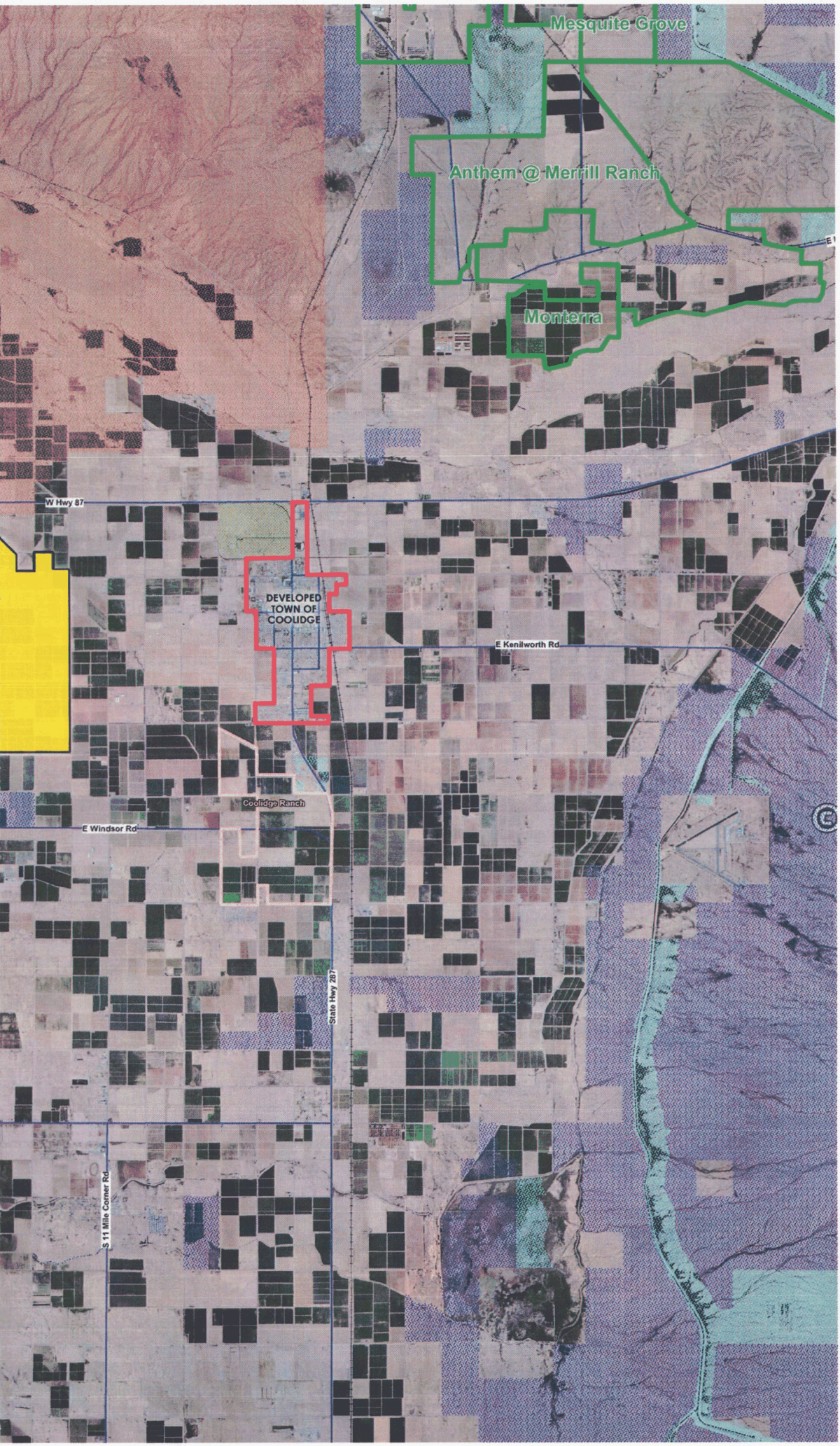
Admitted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Anthem @ Merrill Ranch
Monterra
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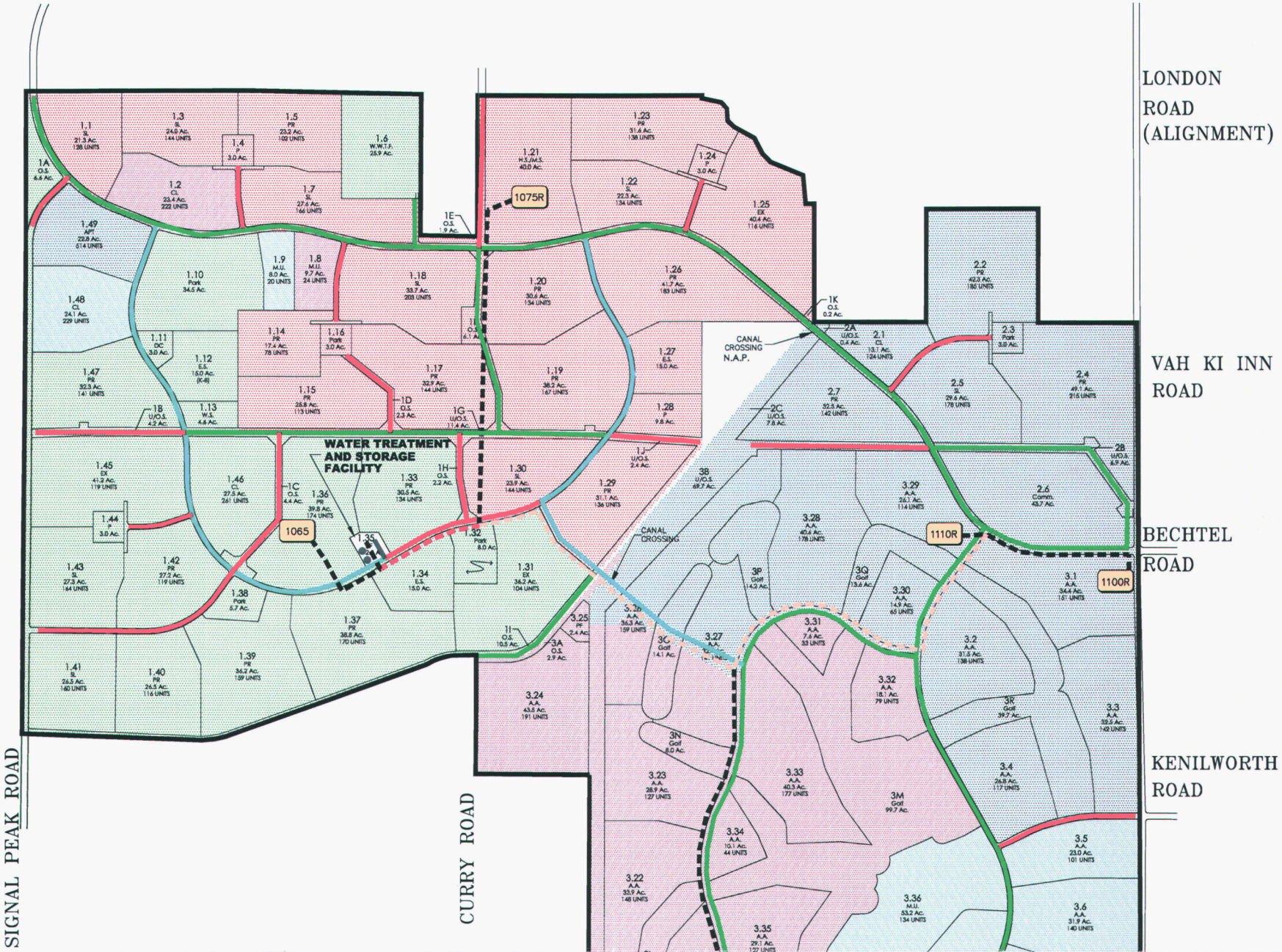
DEVELOPED TOWN OF COOLIDGE
E Kenilworth Rd
Coolidge Ranch
E Windsor Rd
State Hwy 287
S 11 Mile Corner Rd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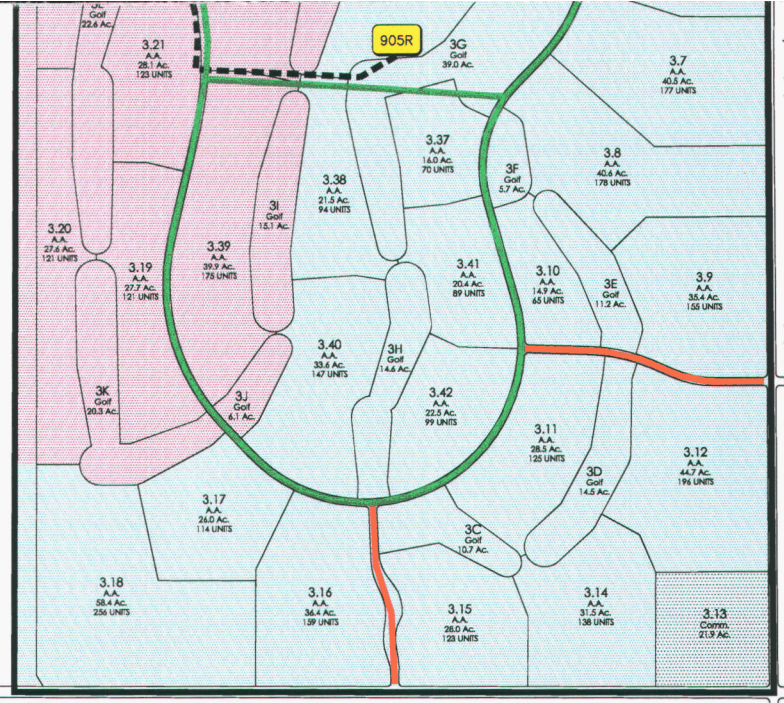
VAH KI INN ROAD
BECHTEL ROAD
KENILWORTH ROAD
CURRY ROAD
SIGNAL PEAK ROAD
WATER TREATMENT AND STORAGE FACILITY
CANAL CROSSING N.A.P.
CANAL CROSSING
1075R
1110R
1100R
1065

LEGEND

- POTABLE 8-INCH WATER LINE
- POTABLE 12-INCH WATER LINE
- POTABLE 16-INCH WATER LINE
- POTABLE 24-INCH WATER LINE
- POTABLE 30-INCH WATER LINE
- RAW 12-INCH WATER LINE
- RAW 20-INCH WATER LINE
- RAW 24-INCH WATER LINE
- PROJECT BOUNDARY
- PARCEL BOUNDARY
- 1100 WELL NUMBER (R = REPLACEMENT WELL)
- 2.5 MILLION GALLON TANK
- CONSTRUCTION PHASE 1
- CONSTRUCTION PHASE 2
- CONSTRUCTION PHASE 3
- CONSTRUCTION PHASE 4
- CONSTRUCTION PHASE 5



Notes:

Lotting and roadway layouts are conceptual and subject to change. The pipe locations and diameters are a conceptual design and should not be used for construction.

PIVOTAL GROUP
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Phoenix, Arizona 85016
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WOOD/PATEL
CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS
2051 West Northern, Suite 100, Phoenix, Arizona 85021 Phone: (602) 335-8500

Sandia
the sweet life

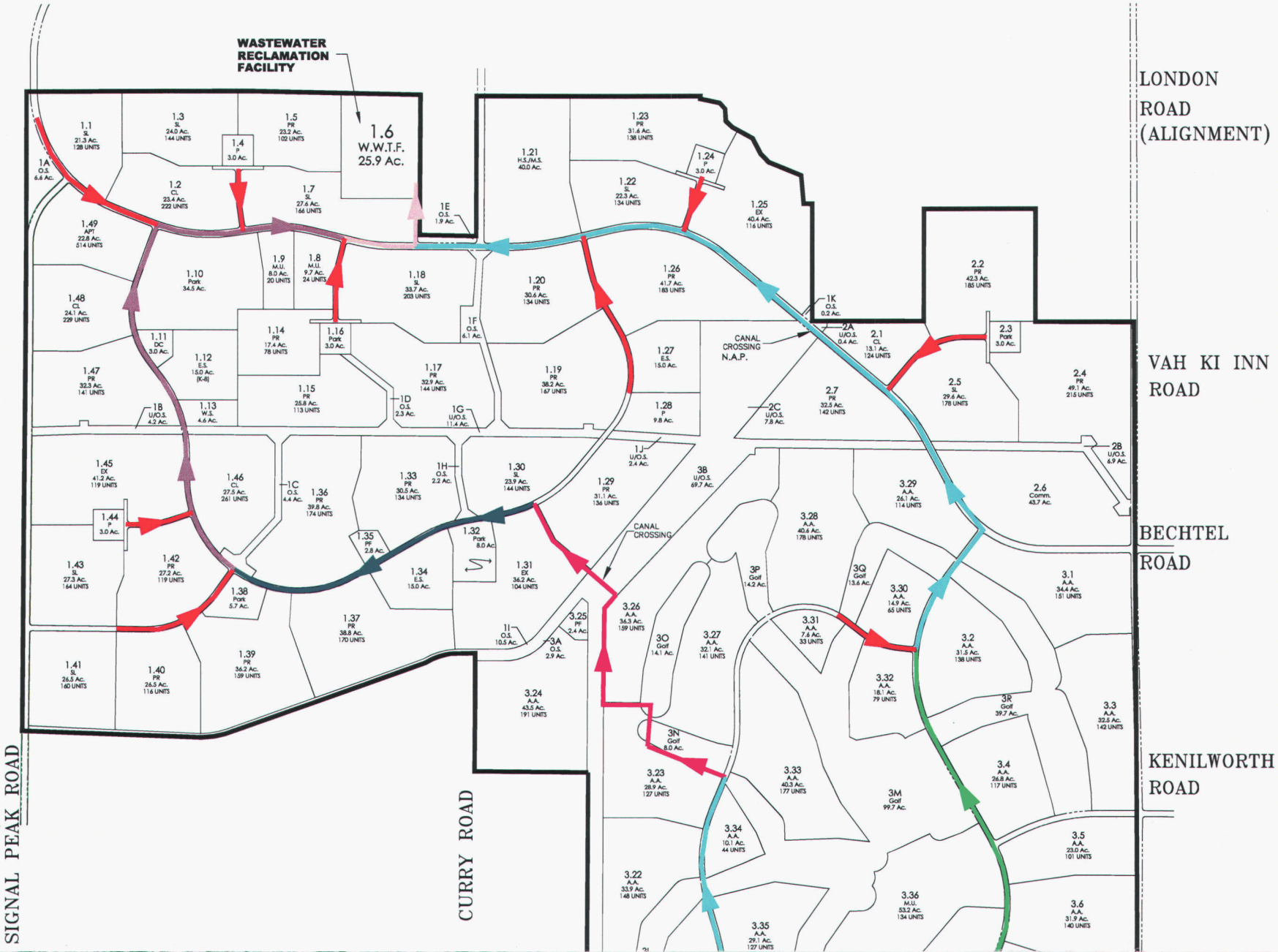
MASTER WATER EXHIBIT
COOLIDGE, ARIZONA

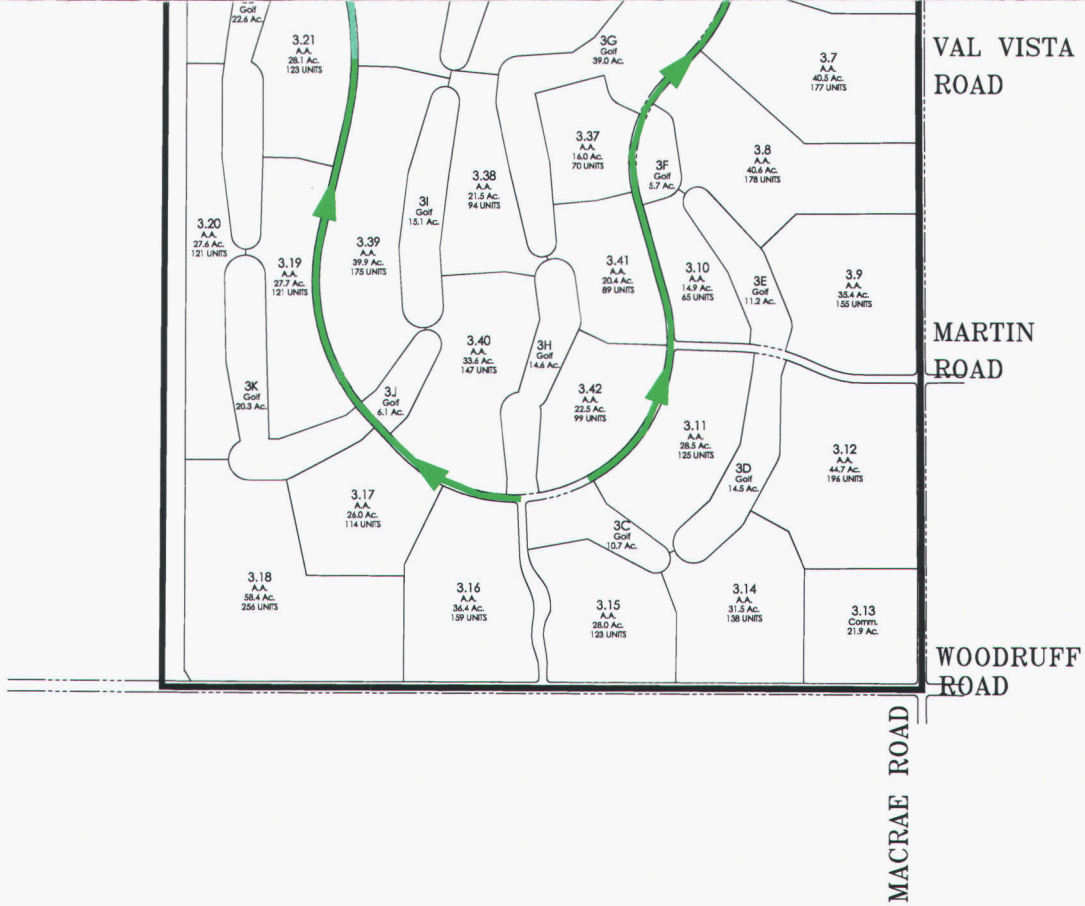
N

1" = 500'

WWC-35
Admitted

WWC-36
Adm. Hed





LEGEND

- DIRECTION OF FLOW
- 8-INCH SEWER LINE
- 12-INCH SEWER LINE
- 15-INCH SEWER LINE
- 18-INCH SEWER LINE
- 21-INCH SEWER LINE
- 24-INCH SEWER LINE
- 30-INCH SEWER LINE
- PROJECT BOUNDARY
- PARCEL BOUNDARY

Notes:

Lotting and roadway layouts are conceptual and subject to change. The pipe locations and diameters are a conceptual design and should not be used for construction.

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Sandia
the sweet life

N

1" = 500'

MASTER WASTEWATER EXHIBIT
COOLIDGE, ARIZONA

WOOD/PATEL
CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS
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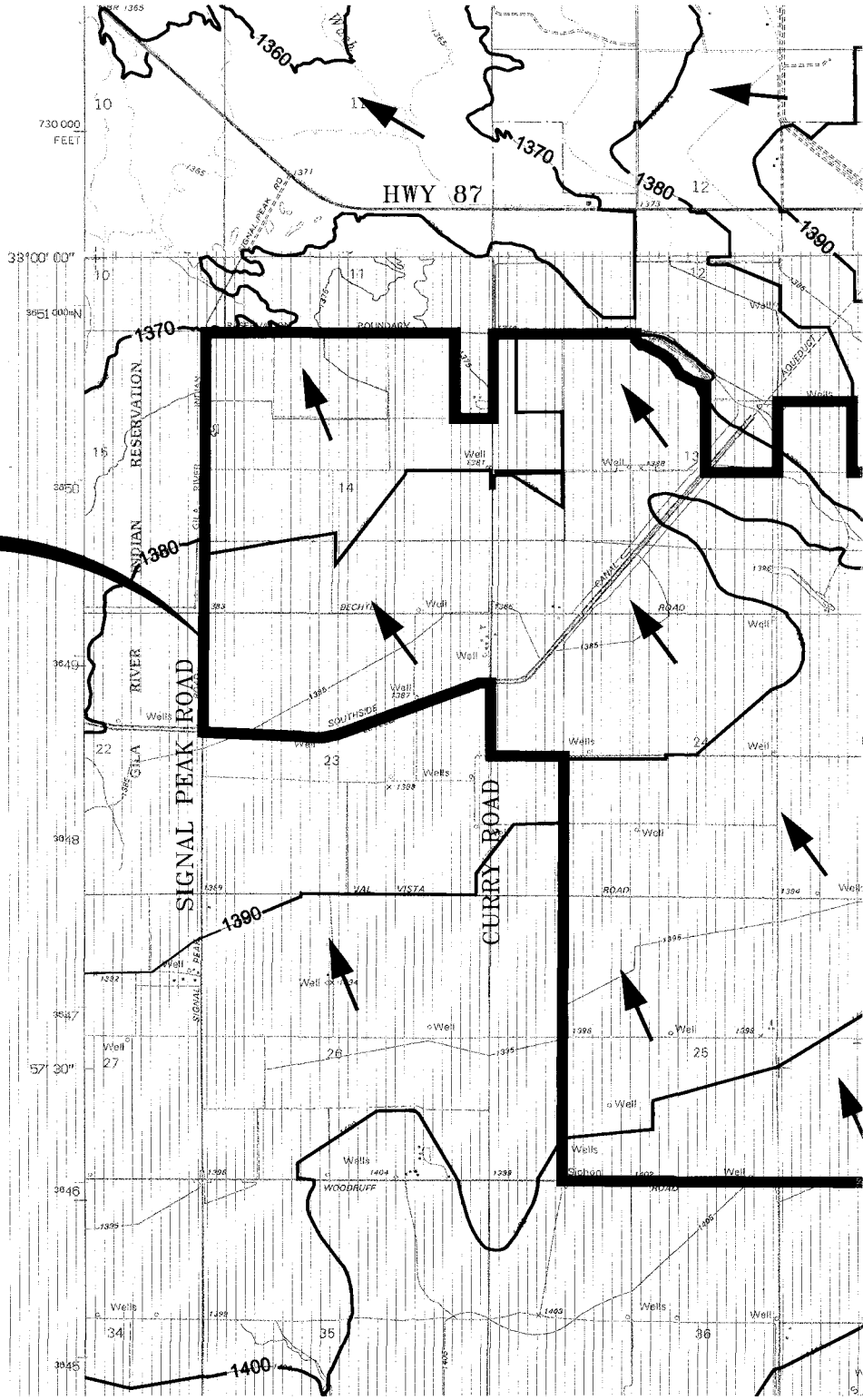

PROJECT AREA

N

1500 0 750 1500

DATE: APRIL 13, 2005

TOPOGRAPHICAL

PIVOTAL GROUP
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Phoenix, Arizona 85016
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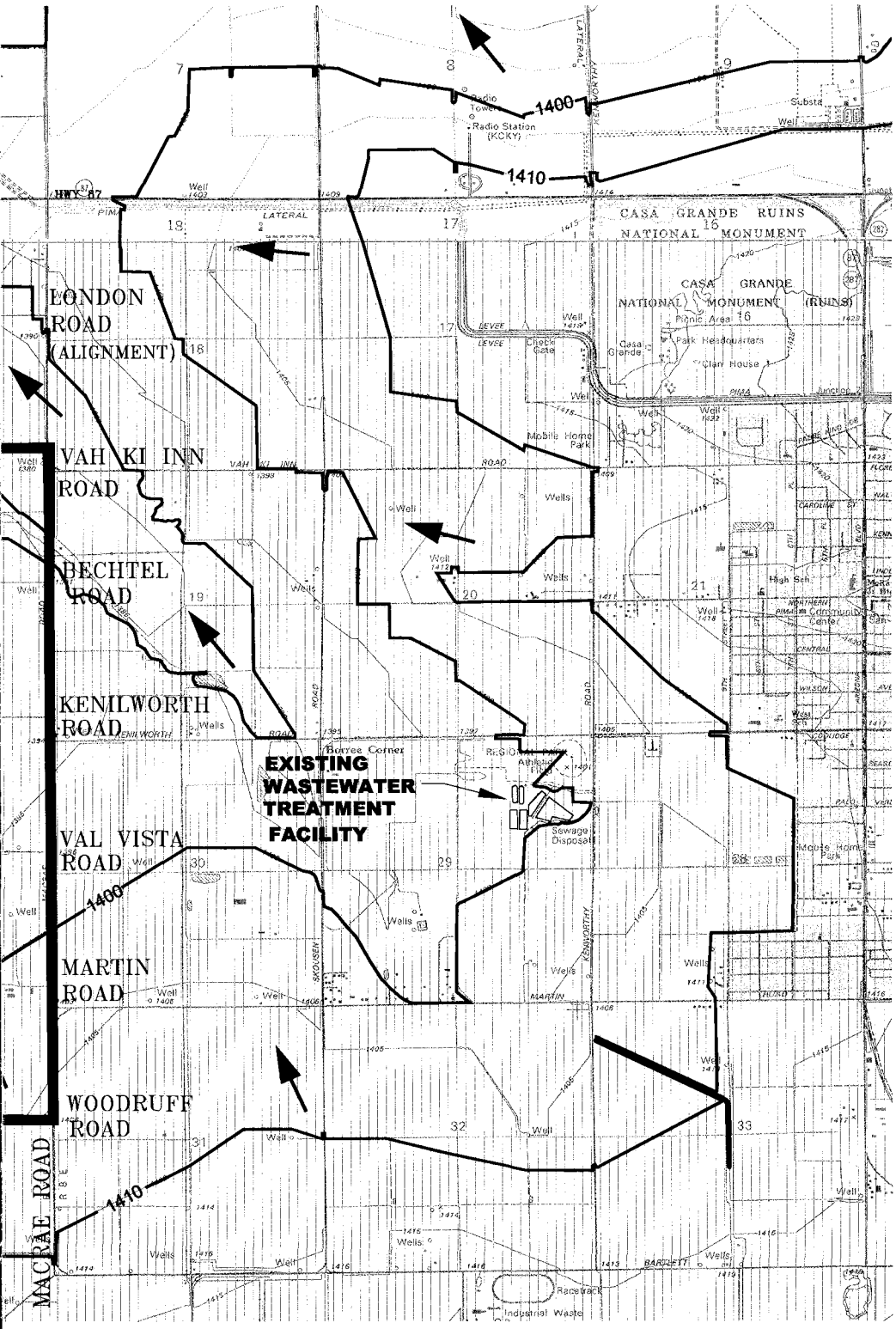
602.956.2313 fax

Sar

the sw

WWC-37
Admitted

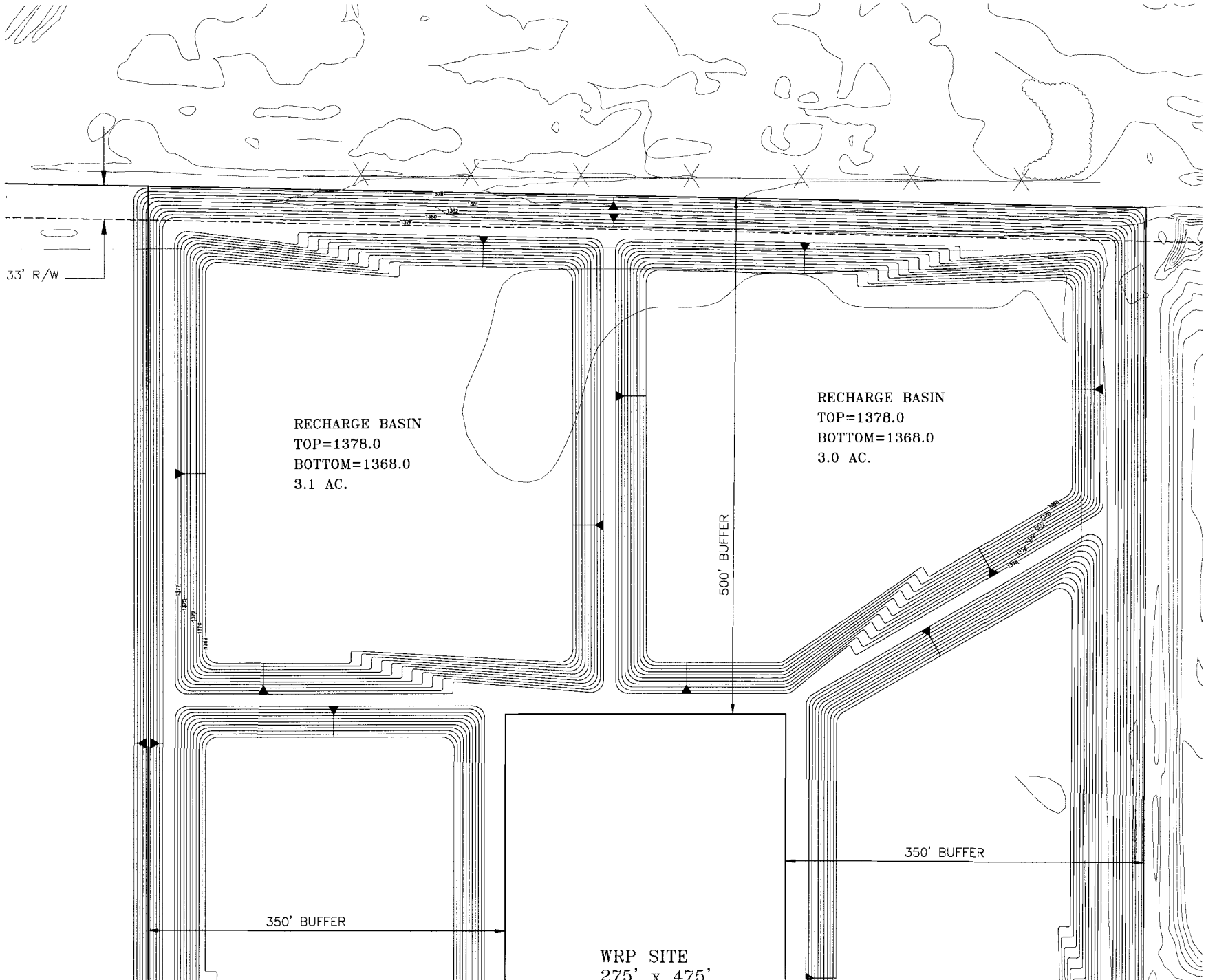


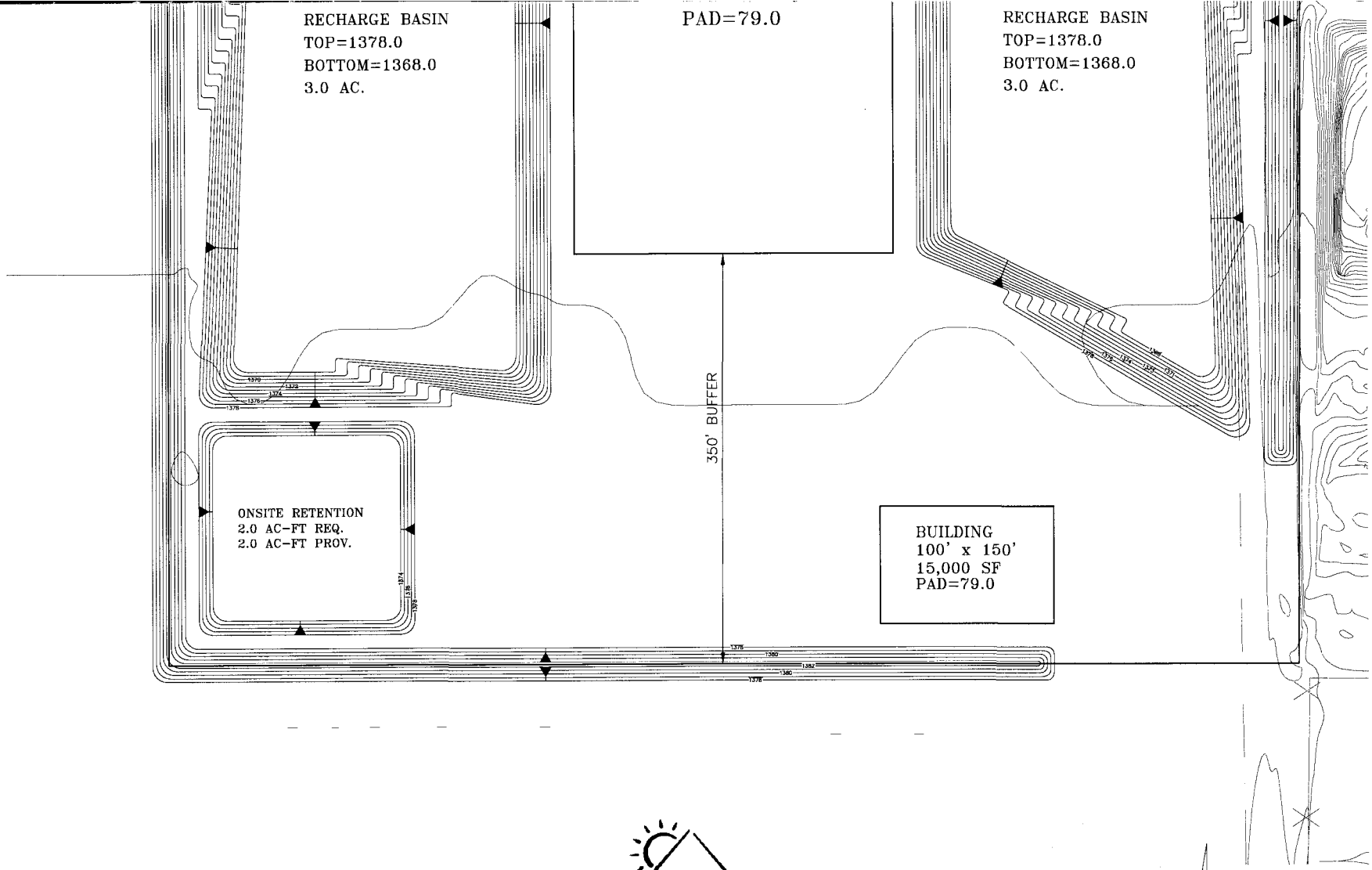
L SEWER EXHIBIT

dia
eet life

WOOD/PATEL
CIVIL ENGINEERS HYDROLOGISTS LAND SURVEYORS CONSTRUCTION MANAGERS
2051 West Northern, Suite 100, Phoenix, Arizona 85021 Phone: (602) 335-8500

R:\Sandra\2004\042127.03\Project Support\Hydro\Exhibits\ TOPO-SEWER-EXHIBIT.dwg Apr 18,2005


33' R/W
RECHARGE BASIN
TOP=1378.0
BOTTOM=1368.0
3.1 AC.
RECHARGE BASIN
TOP=1378.0
BOTTOM=1368.0
3.0 AC.
500' BUFFER
350' BUFFER
350' BUFFER
WRP SITE
275' x 475'



Sandia
the sweet life

PIVOTAL GROUP
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WWTP GRADING EXHIBIT
COOLIDGE, ARIZONA

1" = 60'

WWC-38
Admitted

PRELIMINARY RECHARGE CHARACTERIZATION

WOODRUFF UNDERGROUND STORAGE FACILITY
Pinal County, Arizona

Prepared for:

Pivotal Group
2555 East Camelback Road
Phoenix, Arizona 85016

Prepared by:

Southwest Ground-water Consultants, Inc.
3900 East Camelback Road
Suite 200
Phoenix, AZ 85018-2636

November 16, 2004

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

WWC-39
Admitted

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	118.93	
Coolidge Sy	181.06	

NET SYSTEM INFLOW = 300.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 300.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA

Attachment A-6

Well and Tank Analysis

ARIZONA WATER COMPANY

System: COOLIDGE AND SANDIA

SYSTEM	MONTH 2004	AVERAGE DAY PEAK MONTH (gpd)	PEAK DAY PEAK MONTH (gpd)	MAXIMUM PRODUCTION (gpd) LESS LARGEST PRODUCER	STORAGE AVAILABLE FOR USE (gpd)	NET GAIN or (LOSS) (gpm)
CL	June	5,783,717	8,675,575	10,440,000	461,083	1,545

No Additional production required

Well Number and Name	Production (gpm)	Tank Name	Storage (gal)
#1 - Sandia	750	Sandia Tank #1	1,000,000
#2 - Sandia	750	Warehouse Tank #1	100,000
#3 - Sandia	750	Warehouse Tank #2	500,000
#4 - Sandia	750	Warehouse Tank #3	1,000,000
#5 - Sandia	750	North Tank #1	35,500
#6 -Sandia	750	North Tank #2	116,000
#7 - Coolidge	1140	Valley Farms Tank	15,000
#9 - Coolidge	1350		
#10 - Coolidge	1500		
#2 - Valley Farms	260		
TOTAL PRODUCTION:	8,750	TOTAL STORAGE:	2,766,500

Largest producer out-of-service.

Design Statement for Well Production:

The water distribution system must have sufficient well capacity to meet the peak day demand for three consecutive days with the largest producing well out-of-service. One-half of the available storage can be used to meet the peak day demand over the same period of time with the remaining storage held in reserve for fire protection.

Design Criteria:

Peak Day Peak Month = 1.5 x Average Day Peak Month

All other wells run 24 hours per day

ARIZONA WATER COMPANY

DAY ONE
STORAGE CALCULATIONS
SYSTEM - COOLIDGE

* PRODUCTION (Gallons) =	10,440,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	435,000
AVERAGE DAY PEAK MONTH (Gallons) =	5,783,717
PEAK DAY PEAK MONTH (Gal/day) =	8,675,575
AVERAGE HOURLY DEMAND (Peak Day)=	361,482

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	488.43	435	-53.43	-53.43
7-8 AM	0.0779	675.83	435	-240.83	-294.26
8-9 AM	0.0824	714.87	435	-279.87	-574.13
9-10 AM	0.0769	667.15	435	-232.15	-806.28
10-11 AM	0.0657	569.99	435	-134.99	-941.27
11-12 PM	0.0569	493.64	435	-58.64	-999.91
12-1 PM	0.0496	430.31	435	4.69	-995.22
1-2 PM	0.0458	397.34	435	37.66	-957.56
2-3 PM	0.0423	366.98	435	68.02	-889.53
3-4 PM	0.0402	348.76	435	86.24	-803.29
4-5 PM	0.0451	391.27	435	43.73	-759.56
5-6 PM	0.0442	383.46	435	51.54	-708.02
6-7 PM	0.0461	399.94	435	35.06	-672.96
7-8 PM	0.0417	361.77	435	73.23	-599.74
8-9 PM	0.038	329.67	435	105.33	-494.41
9-10 PM	0.0387	335.74	435	99.26	-395.15
10-11 PM	0.033	286.29	435	148.71	-246.45
11-12 AM	0.0246	213.42	435	221.58	-24.87
12-1 AM	0.016	138.81	435	296.19	271.33
1-2 AM	0.0102	88.49	435	346.51	617.83
2-3 AM	0.0102	88.49	435	346.51	964.34
3-4 AM	0.0139	120.59	435	314.41	1278.75
4-5 AM	0.016	138.81	435	296.19	1574.94
5-6 AM	0.0283	245.52	435	189.48	1764.43
TOTAL	1	8,675.5750			

Minimum Storage Requirements	999,907	Gallons
*** Fire Flow Requirements	240,000	Gallons
TOTAL STORAGE REQUIRED	1,239,907	Gallons
TOTAL STORAGE AVAILABLE	2,766,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

*Largest Producer out-of-service.
***Fire Flows - 1,000 gpm @ 4 hours = 240,000 gallons.

ARIZONA WATER COMPANY

DAY TWO
STORAGE CALCULATIONS
SYSTEM - COOLIDGE

* PRODUCTION (Gallons) =	10,440,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	435,000
AVERAGE DAY PEAK MONTH (Gallons) =	5,783,717
PEAK DAY PEAK MONTH (Gal/day) =	8,675,575
AVERAGE HOURLY DEMAND (Peak Day)=	361,482

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	488.43	435	-53.43	1710.99
7-8 AM	0.0779	675.83	435	-240.83	1470.16
8-9 AM	0.0824	714.87	435	-279.87	1190.30
9-10 AM	0.0769	667.15	435	-232.15	958.14
10-11 AM	0.0657	569.99	435	-134.99	823.16
11-12 PM	0.0569	493.64	435	-58.64	764.52
12-1 PM	0.0496	430.31	435	4.69	769.21
1-2 PM	0.0458	397.34	435	37.66	806.87
2-3 PM	0.0423	366.98	435	68.02	874.89
3-4 PM	0.0402	348.76	435	86.24	961.13
4-5 PM	0.0451	391.27	435	43.73	1004.87
5-6 PM	0.0442	383.46	435	51.54	1056.40
6-7 PM	0.0461	399.94	435	35.06	1091.46
7-8 PM	0.0417	361.77	435	73.23	1164.69
8-9 PM	0.038	329.67	435	105.33	1270.02
9-10 PM	0.0387	335.74	435	99.26	1369.27
10-11 PM	0.033	286.29	435	148.71	1517.98
11-12 AM	0.0246	213.42	435	221.58	1739.56
12-1 AM	0.016	138.81	435	296.19	2035.75
1-2 AM	0.0102	88.49	435	346.51	2382.26
2-3 AM	0.0102	88.49	435	346.51	2728.77
3-4 AM	0.0139	120.59	435	314.41	2766.50
4-5 AM	0.016	138.81	435	296.19	2766.50
5-6 AM	0.0283	245.52	435	189.48	2766.50
TOTAL	1	8,675.575			

Minimum Storage Requirements	0	Gallons
*** Fire Flow Requirements	240,000	Gallons
TOTAL STORAGE REQUIRED	240,000	Gallons
TOTAL STORAGE AVAILABLE	2,766,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service.
***Fire Flows - 1,000 gpm @ 4 hours = 240,000 gallons.

ARIZONA WATER COMPANY

DAY THREE
STORAGE CALCULATIONS
SYSTEM - COOLIDGE

* PRODUCTION (Gallons) =	10,440,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	435,000
AVERAGE DAY PEAK MONTH (Gallons) =	5,783,717
PEAK DAY PEAK MONTH (Gal/day) =	8,675,575
AVERAGE HOURLY DEMAND (Peak Day)=	361,482

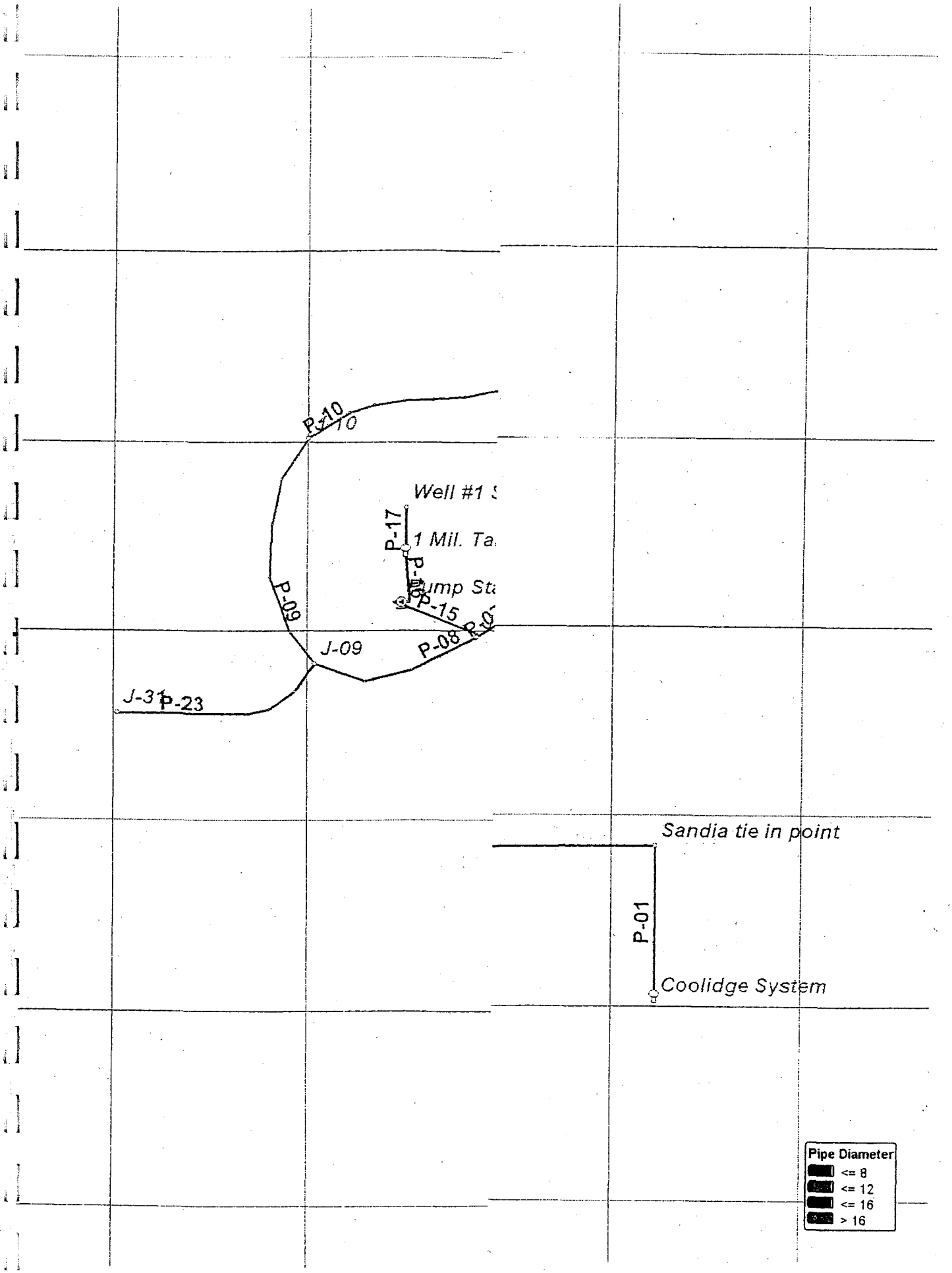
TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	488.43	435	-53.43	2713.07
7-8 AM	0.0779	675.83	435	-240.83	2472.24
8-9 AM	0.0824	714.87	435	-279.87	2192.37
9-10 AM	0.0769	667.15	435	-232.15	1960.22
10-11 AM	0.0657	569.99	435	-134.99	1825.23
11-12 PM	0.0569	493.64	435	-58.64	1766.59
12-1 PM	0.0496	430.31	435	4.69	1771.28
1-2 PM	0.0458	397.34	435	37.66	1808.94
2-3 PM	0.0423	366.98	435	68.02	1876.97
3-4 PM	0.0402	348.76	435	86.24	1963.21
4-5 PM	0.0451	391.27	435	43.73	2006.94
5-6 PM	0.0442	383.46	435	51.54	2058.48
6-7 PM	0.0461	399.94	435	35.06	2093.54
7-8 PM	0.0417	361.77	435	73.23	2166.76
8-9 PM	0.038	329.67	435	105.33	2272.09
9-10 PM	0.0387	335.74	435	99.26	2371.35
10-11 PM	0.033	286.29	435	148.71	2520.05
11-12 AM	0.0246	213.42	435	221.58	2741.63
12-1 AM	0.016	138.81	435	296.19	2766.50
1-2 AM	0.0102	88.49	435	346.51	2766.50
2-3 AM	0.0102	88.49	435	346.51	2766.50
3-4 AM	0.0139	120.59	435	314.41	2766.50
4-5 AM	0.016	138.81	435	296.19	2766.50
5-6 AM	0.0283	245.52	435	189.48	2766.50
TOTAL	1	8,675.575			

Minimum Storage Requirements	0	Gallons
*** Fire Flow Requirements	240,000	Gallons
TOTAL STORAGE REQUIRED	240,000	Gallons
TOTAL STORAGE AVAILABLE	2,766,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service.
***Fire Flows - 1,000 gpm @ 4 hours = 240,000 gallons.

FIGURE A

Sandia Subdivision Layout


P-10
Well #1
P-17
1 Mil. Ta
P-09
P-15
J-09
P-08
J-31
P-23
Sandia tie in point
P-01
Coolidge System
Pipe Diameter
<= 8
<= 12
<= 16
> 16

SANDIA Phase 1

Attachment B-1

Construction Schedule and Cost Estimate

Arizona Water Company

Sandia, Pinal County, Arizona

Summary of the Backbone Water System Required to provide Water Service to Sandia

Phase 1

Units	* Wells	** Arsenic Treatment	Hydro System	*** 1,000,000 GAL Tank	Backbone Infrastructure	Total Cost
0-500	$0	$0	$0	$0	$600,000	$600,000
501-1500	$950,000	$0	$220,000	$400,000	$0	$1,570,000
1501-3000	$950,000	$0	$0	$0	$0	$950,000
						$3,120,000

Total Project

Units	* Wells	** Arsenic Treatment	Hydro System	*** 1,000,000 GAL Tank	Backbone Infrastructure	Total Cost
0-500	$0	$0	$0	$0	$600,000	$600,000
501-1500	$950,000	$0	$220,000	$400,000	$0	$1,570,000
1501-3000	$950,000	$0	$0	$0	$0	$950,000
3001-4500	$950,000	$0	$0	$0		$950,000
4501-6000	$950,000	$0	$0	$0		$950,000
6501-7500	$950,000	$0	$0	$0		$950,000
7501-9000	$950,000	$0	$0	$0		$950,000
Totals						$6,920,000

Total cost of 1 Well, Tank, and Hydro System	$1,570,000
Total cost of Wells, Tanks, and Hydro Systems	$6,920,000

* Assume new wells will be capable of 750 gallons per minute
** Any wells that require Arsenic Treatment add $600,000
*** Any additional storage required will be served from Coolidge's existing system

SANDIA Phase 1

Attachment B-2

Typical Dwelling Unit
Average Day Peak Month

ARIZONA WATER COMPANY

Sandia Phase 1
COOLIDGE, PINAL COUNTY, ARIZONA

Calculation to determine Average Day Peak Month (ADPM)

Assume:

1.	GPCD	143
2.	Per Capita Occupancy	2.85
3.	Dwelling Units	1500
4.	Average Days per Month	30.42

Peak Month (gallons/month) = (143)(1500)(30.42)(2.85)
Peak Month (gallons/month) = 18,596,507
Average Day Peak Month (gallons/day) = 18,596,507/30.42
ADPM (gallons/day) = 611,325

Average GPM= 425
Peak Day GPM= 637

SANDIA Phase 1

Attachment B-3

Peak Day Demand Conditions
(All Wells Off)

```
* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
*    University of Kentucky Network Modeling Software    *
*                                                        *
*              Copyrighted by KPFS 1998                  *
*             Version 1.200 - 01/26/2000                 *
*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 16:39:01 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia_P.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia_P.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia_P.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE	NODE	EXTERNAL	JUNCTION	EXTERNAL

NAME	TITLE	DEMAND (gpm)	ELEVATION (ft)	GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		0.00	1395.00	
J-06		0.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		300.00	1385.00	
J-10		336.00	1380.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 S		0.00	1385.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 12
NUMBER OF END NODES .....(j) = 11
NUMBER OF PRIMARY LOOPS .....(l) = 0
NUMBER OF SUPPLY NODES .....(f) = 2
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-01	Sandia tie	Coolidge S	-636.00	13.83	0.00	1.78	0.92
P-02	J-03	Sandia tie	-636.00	1.61	0.00	0.95	0.20
P-03	J-04	J-03	-636.00	0.17	0.00	0.95	0.20
P-04	J-05	J-04	-636.00	0.66	0.00	0.95	0.20
P-05	J-06	J-05	-636.00	0.85	0.00	0.95	0.20
P-06	J-07	J-06	-636.00	0.30	0.00	0.95	0.20
P-07	J-08	J-07	-636.00	0.17	0.00	0.95	0.20
P-08	J-09	J-08	-636.00	0.48	0.00	0.95	0.20
P-09	J-10	J-09	-336.00	0.97	0.00	0.94	0.28
P-15	J-08	Pump Stati	0.00	0.00	0.00	0.00	0.00
P-16	Pump Stati	1 Mil. Tan	0.00	0.00	0.00	0.00	0.00
P-17	1 Mil. Tan	Well #1 S	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Device "Pump Statio" is closed

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1529.56	1395.00	134.56	58.31
J-04		0.00	1529.39	1395.00	134.39	58.23
J-05		0.00	1528.73	1395.00	133.73	57.95
J-06		0.00	1527.88	1385.00	142.88	61.92
J-07		0.00	1527.58	1385.00	142.58	61.79
J-08		0.00	1527.41	1385.00	142.41	61.71
J-09		300.00	1526.93	1385.00	141.93	61.50
J-10		336.00	1525.96	1380.00	145.96	63.25
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1531.17	1395.00	136.17	59.01
Well #1 S		0.00	1385.00	1385.00	0.00	0.00
Pump Stati		0.00	1527.41	1385.00	142.41	61.71

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	0.00	
Coolidge Sy	636.00	

NET SYSTEM INFLOW = 636.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 636.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA Phase 1

Attachment B-4

Peak Day Demand Conditions
(One Well On)

```
* * * * * * * * * *  K Y P I P E 4  * * * * * * * * * *
*                                                       *
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*             Version 1.200 - 01/26/2000                *
*                                                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Dec 29 16:06:20 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia_P.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia_P.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia_P.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan Well	#1 S	10.00	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE	NODE	EXTERNAL	JUNCTION	EXTERNAL

NAME	TITLE	DEMAND (gpm)	ELEVATION (ft)	GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		0.00	1395.00	
J-06		0.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		0.00	1385.00	
J-10		636.00	1380.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 S		-750.00	1385.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 12
NUMBER OF END NODES .....(j) = 11
NUMBER OF PRIMARY LOOPS .....(l) = 0
NUMBER OF SUPPLY NODES .....(f) = 2
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 4 TRIALS: ACCURACY = 0.00089

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-01	Sandia tie	Coolidge S	190.11	1.48	0.00	0.53	0.10
P-02	J-03	Sandia tie	190.11	0.17	0.00	0.28	0.02
P-03	J-04	J-03	190.11	0.02	0.00	0.28	0.02
P-04	J-05	J-04	190.11	0.07	0.00	0.28	0.02
P-05	J-06	J-05	190.11	0.09	0.00	0.28	0.02
P-06	J-07	J-06	190.11	0.03	0.00	0.28	0.02
P-07	J-08	J-07	190.11	0.02	0.00	0.28	0.02
P-08	J-09	J-08	-636.00	0.48	0.00	0.95	0.20
P-09	J-10	J-09	-636.00	3.17	0.00	1.78	0.92
P-15	J-08	Pump Stati	-826.11	0.00	0.00	1.23	0.33
P-16	Pump Stati	1 Mil. Tan	-826.11	0.00	0.00	1.23	0.33
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)
Pump Stati	826.11	0.00	161.88	161.9	----	-----	---	----

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1546.65	1395.00	151.65	65.71
J-04		0.00	1546.67	1395.00	151.67	65.72
J-05		0.00	1546.74	1395.00	151.74	65.75
J-06		0.00	1546.83	1385.00	161.83	70.13
J-07		0.00	1546.86	1385.00	161.86	70.14
J-08		0.00	1546.88	1385.00	161.88	70.15
J-09		0.00	1546.40	1385.00	161.40	69.94
J-10		636.00	1543.23	1380.00	163.23	70.73
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1546.48	1395.00	151.48	65.64
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Pump Stati		0.00	1546.88	1385.00	161.88	70.15

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	76.11	
Coolidge Sy	-190.11	

NET SYSTEM INFLOW = 76.11
NET SYSTEM OUTFLOW = -190.11
NET SYSTEM DEMAND = -114.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA Phase 1

Attachment B-5

Peak Day Demand Conditions with Fire Flow
(All Wells Off)

```
* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
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*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Dec 29 16:39:43 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia_P.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia_P.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia_P.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	l Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE	NODE	EXTERNAL	JUNCTION	EXTERNAL

NAME	TITLE	DEMAND (gpm)	ELEVATION (ft)	GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		0.00	1395.00	
J-06		0.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		300.00	1385.00	
J-10		1336.00	1380.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 S		0.00	1385.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 12
NUMBER OF END NODES .....(j) = 11
NUMBER OF PRIMARY LOOPS .....(l) = 0
NUMBER OF SUPPLY NODES .....(f) = 2
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-01	Sandia tie	Coolidge S	-1636.00	79.57	0.00	4.57	5.30
P-02	J-03	Sandia tie	-1636.00	9.28	0.00	2.45	1.16
P-03	J-04	J-03	-1636.00	0.98	0.00	2.45	1.16
P-04	J-05	J-04	-1636.00	3.78	0.00	2.45	1.16
P-05	J-06	J-05	-1636.00	4.88	0.00	2.45	1.16
P-06	J-07	J-06	-1636.00	1.72	0.00	2.45	1.16
P-07	J-08	J-07	-1636.00	1.00	0.00	2.45	1.16
P-08	J-09	J-08	-1636.00	2.76	0.00	2.45	1.16
P-09	J-10	J-09	-1336.00	12.52	0.00	3.73	3.65
P-15	J-08	Pump Stati	0.00	0.00	0.00	0.00	0.00
P-16	Pump Stati	1 Mil. Tan	0.00	0.00	0.00	0.00	0.00
P-17	1 Mil. Tan	Well #1 S	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Device "Pump Statio" is closed

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1456.15	1395.00	61.15	26.50
J-04		0.00	1455.17	1395.00	60.17	26.07
J-05		0.00	1451.39	1395.00	56.39	24.44
J-06		0.00	1446.52	1385.00	61.52	26.66
J-07		0.00	1444.79	1385.00	59.79	25.91
J-08		0.00	1443.79	1385.00	58.79	25.48
J-09		300.00	1441.03	1385.00	56.03	24.28
J-10		1336.00	1428.52	1380.00	48.52	21.02
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1465.43	1395.00	70.43	30.52
Well #1 S		0.00	1385.00	1385.00	0.00	0.00
Pump Stati		0.00	1443.79	1385.00	58.79	25.48

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	0.00	
Coolidge Sy	1636.00	

NET SYSTEM INFLOW = 1636.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 1636.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA Phase 1

Attachment B-6

Peak Day Demand Conditions with Fire Flow
(One Well On)

SANDIA Phase 1

Attachment B-5

Peak Day Demand Conditions with Fire Flow
(All Wells Off)

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* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
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*                                                        *
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*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Dec 29 16:39:43 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia_P.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia_P.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia_P.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	l Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE	NODE	EXTERNAL	JUNCTION	EXTERNAL

NAME	TITLE	DEMAND (gpm)	ELEVATION (ft)	GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		0.00	1395.00	
J-06		0.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		300.00	1385.00	
J-10		1336.00	1380.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 S		0.00	1385.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 12
NUMBER OF END NODES .....(j) = 11
NUMBER OF PRIMARY LOOPS .....(l) = 0
NUMBER OF SUPPLY NODES .....(f) = 2
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-01	Sandia tie	Coolidge S	-1636.00	79.57	0.00	4.57	5.30
P-02	J-03	Sandia tie	-1636.00	9.28	0.00	2.45	1.16
P-03	J-04	J-03	-1636.00	0.98	0.00	2.45	1.16
P-04	J-05	J-04	-1636.00	3.78	0.00	2.45	1.16
P-05	J-06	J-05	-1636.00	4.88	0.00	2.45	1.16
P-06	J-07	J-06	-1636.00	1.72	0.00	2.45	1.16
P-07	J-08	J-07	-1636.00	1.00	0.00	2.45	1.16
P-08	J-09	J-08	-1636.00	2.76	0.00	2.45	1.16
P-09	J-10	J-09	-1336.00	12.52	0.00	3.73	3.65
P-15	J-08	Pump Stati	0.00	0.00	0.00	0.00	0.00
P-16	Pump Stati	1 Mil. Tan	0.00	0.00	0.00	0.00	0.00
P-17	1 Mil. Tan	Well #1 S	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Device "Pump Statio" is closed

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1456.15	1395.00	61.15	26.50
J-04		0.00	1455.17	1395.00	60.17	26.07
J-05		0.00	1451.39	1395.00	56.39	24.44
J-06		0.00	1446.52	1385.00	61.52	26.66
J-07		0.00	1444.79	1385.00	59.79	25.91
J-08		0.00	1443.79	1385.00	58.79	25.48
J-09		300.00	1441.03	1385.00	56.03	24.28
J-10		1336.00	1428.52	1380.00	48.52	21.02
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1465.43	1395.00	70.43	30.52
Well #1 S		0.00	1385.00	1385.00	0.00	0.00
Pump Stati		0.00	1443.79	1385.00	58.79	25.48

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	0.00	
Coolidge Sy	1636.00	

NET SYSTEM INFLOW = 1636.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 1636.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA Phase 1

Attachment B-6

Peak Day Demand Conditions with Fire Flow
(One Well On)

```
* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
*    University of Kentucky Network Modeling Software    *
*                                                        *
*              Copyrighted by KPFS 1998                  *
*             Version 1.200 - 01/26/2000                 *
*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 16:07:00 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia_P.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia_P.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia_P.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE	NODE	EXTERNAL	JUNCTION	EXTERNAL

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC-ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)
Pump Stati	962.22	0.00	140.43	140.4	----	-----	---	----

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1527.82	1395.00	132.82	57.55
J-04		0.00	1527.63	1395.00	132.63	57.47
J-05		0.00	1526.89	1395.00	131.89	57.15
J-06		0.00	1525.95	1385.00	140.95	61.08
J-07		0.00	1525.62	1385.00	140.62	60.93
J-08		0.00	1525.43	1385.00	140.43	60.85
J-09		0.00	1522.67	1385.00	137.67	59.66
J-10		1636.00	1504.45	1380.00	124.45	53.93
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1529.61	1395.00	134.61	58.33
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Pump Stati		0.00	1525.43	1385.00	140.43	60.85

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	212.22	
Coolidge Sy	673.78	

NET SYSTEM INFLOW = 886.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 886.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA Phase 1

Attachment B-7

Well and Tank Analysis

ARIZONA WATER COMPANY

System: COOLIDGE AND SANDIA PHASE 1

SYSTEM	MONTH 2004	AVERAGE DAY PEAK MONTH (gpd)	PEAK DAY PEAK MONTH (gpd)	MAXIMUM PRODUCTION (gpd) LESS LARGEST PRODUCER	STORAGE AVAILABLE FOR USE (gpd)	NET GAIN or (LOSS) (gpm)
CL	June	2,727,092	4,090,638	5,040,000	461,083	979

No Additional production required

Well Number and Name	Production (gpm)	Tank Name	Storage (gal)
#1 - Sandia	750	Sandia Tank #1	1,000,000
#7 - Coolidge	1140	Warehouse Tank #1	100,000
#9 - Coolidge	1350	Warehouse Tank #2	500,000
#10 - Coolidge	1500	Warehouse Tank #3	1,000,000
#2 - Valley Farms	260	North Tank #1	35,500
		North Tank #2	116,000
		Valley Farms Tank	15,000
TOTAL PRODUCTION:	5,000	TOTAL STORAGE:	2,766,500

Largest producer out-of-service.

Design Statement for Well Production:

The water distribution system must have sufficient well capacity to meet the peak day demand for three consecutive days with the largest producing well out-of-service. One-half of the available storage can be used to meet the peak day demand over the same period of time with the remaining storage held in reserve for fire protection.

Design Criteria:

Peak Day Peak Month = 1.5 x Average Day Peak Month

All other wells run 24 hours per day

ARIZONA WATER COMPANY

DAY ONE
STORAGE CALCULATIONS
SYSTEM - COOLIDGE

* PRODUCTION (Gallons) =	5,040,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	210,000
AVERAGE DAY PEAK MONTH (Gallons) =	2,727,092
PEAK DAY PEAK MONTH (Gal/day) =	4,090,638
AVERAGE HOURLY DEMAND (Peak Day)=	170,443

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	230.30	210	-20.30	-20.30
7-8 AM	0.0779	318.66	210	-108.66	-128.96
8-9 AM	0.0824	337.07	210	-127.07	-256.03
9-10 AM	0.0769	314.57	210	-104.57	-360.60
10-11 AM	0.0657	268.75	210	-58.75	-419.36
11-12 PM	0.0569	232.76	210	-22.76	-442.11
12-1 PM	0.0496	202.90	210	7.10	-435.01
1-2 PM	0.0458	187.35	210	22.65	-412.36
2-3 PM	0.0423	173.03	210	36.97	-375.40
3-4 PM	0.0402	164.44	210	45.56	-329.84
4-5 PM	0.0451	184.49	210	25.51	-304.33
5-6 PM	0.0442	180.81	210	29.19	-275.13
6-7 PM	0.0461	188.58	210	21.42	-253.71
7-8 PM	0.0417	170.58	210	39.42	-214.29
8-9 PM	0.038	155.44	210	54.56	-159.73
9-10 PM	0.0387	158.31	210	51.69	-108.04
10-11 PM	0.033	134.99	210	75.01	-33.03
11-12 AM	0.0246	100.63	210	109.37	76.34
12-1 AM	0.016	65.45	210	144.55	220.89
1-2 AM	0.0102	41.72	210	168.28	389.16
2-3 AM	0.0102	41.72	210	168.28	557.44
3-4 AM	0.0139	56.86	210	153.14	710.58
4-5 AM	0.016	65.45	210	144.55	855.13
5-6 AM	0.0283	115.77	210	94.23	949.36
TOTAL	1	4,090.6375			

Minimum Storage Requirements	442,114	Gallons
*** Fire Flow Requirements	240,000	Gallons
TOTAL STORAGE REQUIRED	682,114	Gallons
TOTAL STORAGE AVAILABLE	2,766,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service.
***Fire Flows - 1,000 gpm @ 4 hours = 240,000 gallons.

ARIZONA WATER COMPANY

DAY TWO
STORAGE CALCULATIONS
SYSTEM - COOLIDGE

* PRODUCTION (Gallons) =	5,040,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	210,000
AVERAGE DAY PEAK MONTH (Gallons) =	2,727,092
PEAK DAY PEAK MONTH (Gal/day) =	4,090,638
AVERAGE HOURLY DEMAND (Peak Day)=	170,443

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	230.30	210	-20.30	929.06
7-8 AM	0.0779	318.66	210	-108.66	820.40
8-9 AM	0.0824	337.07	210	-127.07	693.33
9-10 AM	0.0769	314.57	210	-104.57	588.76
10-11 AM	0.0657	268.75	210	-58.75	530.01
11-12 PM	0.0569	232.76	210	-22.76	507.25
12-1 PM	0.0496	202.90	210	7.10	514.35
1-2 PM	0.0458	187.35	210	22.65	537.00
2-3 PM	0.0423	173.03	210	36.97	573.97
3-4 PM	0.0402	164.44	210	45.56	619.52
4-5 PM	0.0451	184.49	210	25.51	645.04
5-6 PM	0.0442	180.81	210	29.19	674.23
6-7 PM	0.0461	188.58	210	21.42	695.65
7-8 PM	0.0417	170.58	210	39.42	735.07
8-9 PM	0.038	155.44	210	54.56	789.63
9-10 PM	0.0387	158.31	210	51.69	841.32
10-11 PM	0.033	134.99	210	75.01	916.33
11-12 AM	0.0246	100.63	210	109.37	1025.70
12-1 AM	0.016	65.45	210	144.55	1170.25
1-2 AM	0.0102	41.72	210	168.28	1338.52
2-3 AM	0.0102	41.72	210	168.28	1506.80
3-4 AM	0.0139	56.86	210	153.14	1659.94
4-5 AM	0.016	65.45	210	144.55	1804.49
5-6 AM	0.0283	115.77	210	94.23	1898.73
TOTAL	1	4,090.638			

Minimum Storage Requirements	0	Gallons
*** Fire Flow Requirements	240,000	Gallons
TOTAL STORAGE REQUIRED	240,000	Gallons
TOTAL STORAGE AVAILABLE	2,766,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service.
***Fire Flows - 1,000 gpm @ 4 hours = 240,000 gallons.

ARIZONA WATER COMPANY

DAY THREE
STORAGE CALCULATIONS
SYSTEM - COOLIDGE

* PRODUCTION (Gallons) =	5,040,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	210,000
AVERAGE DAY PEAK MONTH (Gallons) =	2,727,092
PEAK DAY PEAK MONTH (Gal/day) =	4,090,638
AVERAGE HOURLY DEMAND (Peak Day)=	170,443

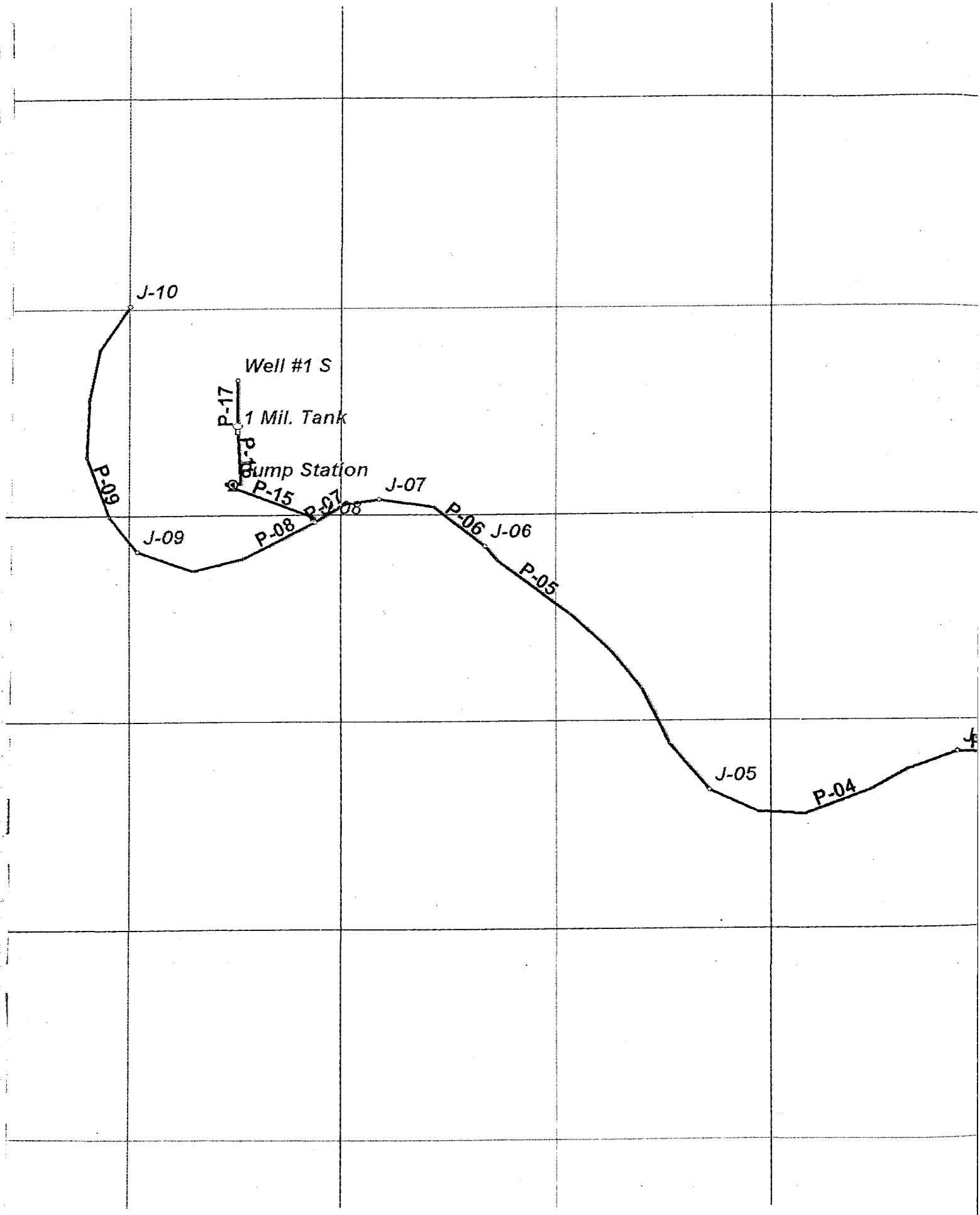
TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	230.30	210	-20.30	1878.42
7-8 AM	0.0779	318.66	210	-108.66	1769.76
8-9 AM	0.0824	337.07	210	-127.07	1642.69
9-10 AM	0.0769	314.57	210	-104.57	1538.12
10-11 AM	0.0657	268.75	210	-58.75	1479.37
11-12 PM	0.0569	232.76	210	-22.76	1456.61
12-1 PM	0.0496	202.90	210	7.10	1463.72
1-2 PM	0.0458	187.35	210	22.65	1486.36
2-3 PM	0.0423	173.03	210	36.97	1523.33
3-4 PM	0.0402	164.44	210	45.56	1568.89
4-5 PM	0.0451	184.49	210	25.51	1594.40
5-6 PM	0.0442	180.81	210	29.19	1623.59
6-7 PM	0.0461	188.58	210	21.42	1645.01
7-8 PM	0.0417	170.58	210	39.42	1684.43
8-9 PM	0.038	155.44	210	54.56	1738.99
9-10 PM	0.0387	158.31	210	51.69	1790.68
10-11 PM	0.033	134.99	210	75.01	1865.69
11-12 AM	0.0246	100.63	210	109.37	1975.06
12-1 AM	0.016	65.45	210	144.55	2119.61
1-2 AM	0.0102	41.72	210	168.28	2287.89
2-3 AM	0.0102	41.72	210	168.28	2456.16
3-4 AM	0.0139	56.86	210	153.14	2609.30
4-5 AM	0.016	65.45	210	144.55	2753.85
5-6 AM	0.0283	115.77	210	94.23	2766.50
TOTAL	1	4,090.638			

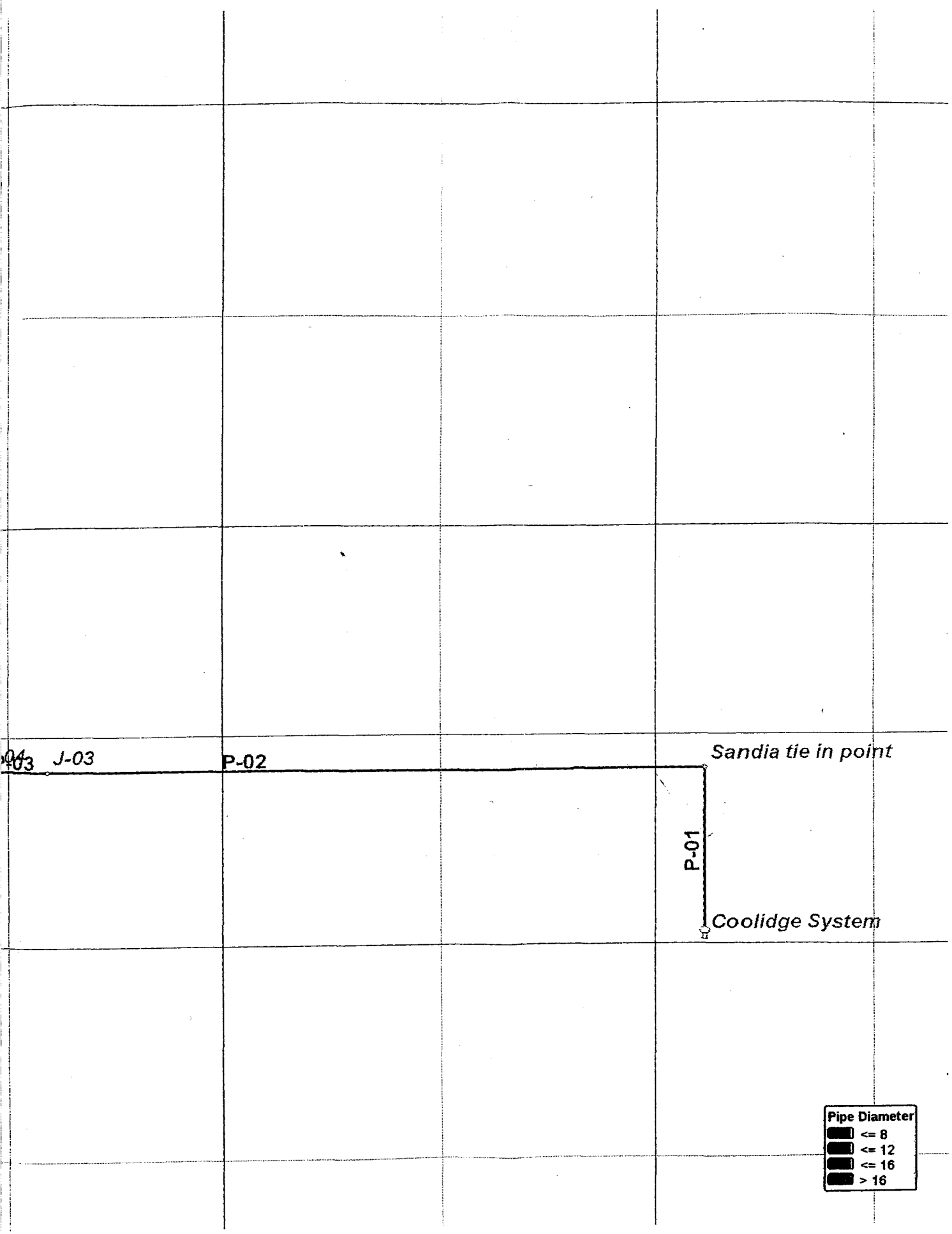
Minimum Storage Requirements	0	Gallons
*** Fire Flow Requirements	240,000	Gallons
TOTAL STORAGE REQUIRED	240,000	Gallons
TOTAL STORAGE AVAILABLE	2,766,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service.
***Fire Flows - 1,000 gpm @ 4 hours = 240,000 gallons.

FIGURE B

Sandia Phase 1 Subdivision Layout


J-10
Well #1 S
P-17
1 Mil. Tank
P-16
Pump Station
P-15
P-07
J-08
J-07
P-06
J-06
P-05
P-09
J-09
P-08
J-05
P-04


J-03
P-02
Sandia tie in point
P-01
Coolidge System
Pipe Diameter
<= 8
<= 12
<= 16
> 16

MARTIN RANCH

Attachment C-1

Physical Availability Demonstration

ARIZONA DEPARTMENT OF WATER RESOURCES
Hydrology Division
500 North Third Street, Phoenix, Arizona 85004
Telephone 602 417-2448
Fax 602 417-2425

JANE DEE H
Governor
JOSEPH C. SM
Director

April 24, 2002

RECEIVED
APR 26 2002
ARIZONA WATER COMPANY
PHOENIX - EXECUTIVE

Mr. William Garfield
Arizona Water Company
3805 North Black Canyon Highway
Phoenix, Arizona 85015

RE: Arizona Water Company
Application for Physical Availability Demonstration #20-400600

Dear Mr. Garfield:

The Department has completed review of the report entitled ***Hydrology Study Report, Pinal AMA, Casa Grande Groundwater Flow Model,*** prepared by Clear Creek Associates, August 31, 2001. The area of review has been limited to the Casa Grande (including Arizona City), Coolidge, and Tierra Grande service areas of Arizona Water Company's Pinal County CC&Ns. The model study area is located primarily in the Maricopa-Stanfield and Eloy sub-basins of the Pinal Active Management Area.

In accordance with A.A.C. R-12-15-702(C), it was determined that approximately 57,507 acre-feet per year of groundwater is available for the Casa Grande service area; 13,510 acre-feet per year is available for the Coolidge service area; and 4,786 acre-feet per year is available for the Tierra Grande service area. These quantities represent the amount of groundwater available for new demands within the service area of each system. The groundwater is projected to be physically available for 100 years under A.A.C. R-12-15-703(B) for assured water supply purposes in the respective areas. Currently, the water supply systems are in compliance with water quality standards for the purposes of A.A.C. R-12-15-704. It is the Department's conclusion that, pumping the projected demands for 100 years, will take the depth-to-static water level to approximately the maximum depth allowed by A.A.C. R-12-15-703(B).

The results of the Department's hydrologic review fulfill the requirements of A.A.C. R12-15-702 (C) and can be cited in applications for a Certificates of Assured Water Supply or for Designation of Assured Water Supply. These applications have certain additional requirements based on the assured water supply criteria referenced in A.R.S. §45-576 and A.A.C. R-12-15-701 *et. seq.* For further information on these requirements, please contact the Office of Assured and Adequate Water Supply Certification at (602)417-2465. **If the Department finds that the groundwater supply is not available because the assumptions and information used in determining the physical availability under the current criteria prove incorrect, the Department will modify the availability of groundwater accordingly.**

The Department's determination is an appealable agency action. In order to appeal this decision, you must request an appeal within thirty (30) days from receipt of this letter. I have enclosed a summary of the appeals process and an appeal form should you wish to pursue this option.

If you have any questions regarding the physical availability review, please contact me at (602) 417-2448.

Sincerely,

Greg Wallace
Chief Hydrologist

GW/KM/rd
202245

cc: Steve Corell, Clear Creek Associates
Doug Dunham, ADWR
Dennis Kimberlin, ADWR, Pinal AMA

MARTIN RANCH

Attachment C-2

Construction Schedule and Cost Estimate

Arizona Water Company

Martin Ranch, Pinal County, Arizona

Summary of the Backbone Water System Required to provide Water Service to Martin Ranch

Phase 1

Units	* Wells	** Arsenic Treatment	Hydro System	*** 1,000,000 GAL Tank	Backbone Infrastructure	Total Cost
0-500	$0	$0	$0	$0	$600,000	$600,000
501-1500	$950,000	$0	$0	$0	$0	$950,000
						$1,550,000

Total cost of Wells, Tanks, and Hydro Systems $1,550,000

* Assume new wells will be capable of 750 gallons per minute
** Any wells that require Arsenic Treatment add $600,000
*** Any additional storage required will be served from Casa Grande's existing system

MARTIN RANCH

Attachment C-3

Demand Estimate
Average Day Peak Month

ARIZONA WATER COMPANY

Martin Ranch
CASA GRANDE, PINAL COUNTY, ARIZONA

Calculation to determine Average Day Peak Month (ADPM)

Assume:

1.	GPCD	143
2.	Per Capita Occupancy	2.85
3.	Dwelling Units	2082
4.	Average Days per Month	30.42

Peak Month (gallons/month) = (143)(2082)(30.42)(2.85)
Peak Month (gallons/month) = 25,811,951
Average Day Peak Month (gallons/day) = 25,811,951/30.42
ADPM (gallons/day) = 848,519

Average GPM= 589
Peak Day GPM= 707 1.2 p.f.

MARTIN RANCH

Attachment C-4

Peak Day Demand Conditions
(All Wells Off)

```
* * * * * * * * * *  K Y P I P E 4  * * * * * * * * * *
*                                                      *
*    University of Kentucky Network Modeling Software  *
*                                                      *
*              Copyrighted by KPFS 1998                *
*             Version 1.200 - 01/26/2000               *
*                                                      *
* * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 13:58:53 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Martin_R.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Martin_R.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Martin_R.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-24	Casa Grand	Martin Ran	1126.86	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16101.26	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00
P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
Casa Grand		----	1545.00	1545.00
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
Martin Ran		0.00	1403.00	
Well #1 MR		0.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 11
NUMBER OF END NODES .....(j) = 9
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 1
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 6 TRIALS: ACCURACY = 0.00200

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-24	Casa Grand	Martin Ran	700.00	0.27	0.00	1.05	0.24
P-25	Martin Ran	J-20	700.00	3.86	0.00	1.05	0.24
P-26	J-20	J-22	454.69	0.28	0.00	0.68	0.11
P-27	J-22	J-23	354.69	0.86	0.00	0.99	0.31
P-28	J-23	J-24	227.61	0.37	0.00	0.64	0.14
P-29	J-24	J-25	127.61	0.05	0.00	0.36	0.05
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	-72.39	0.38	0.00	0.45	0.12
P-32	J-26	J-23	-27.08	0.04	0.00	0.17	0.02
P-33	J-26	J-20	-145.31	1.18	0.00	0.91	0.43
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
Casa Grand		----	1545.00	1545.00	0.00	0.00
J-20		100.00	1540.86	1392.00	148.86	64.51
J-22		100.00	1540.59	1389.00	151.59	65.69
J-23		100.00	1539.72	1390.00	149.72	64.88
J-24		100.00	1539.35	1390.00	149.35	64.72
J-25		0.00	1539.30	1395.00	144.30	62.53
J-26		100.00	1539.69	1395.00	144.69	62.70
J-27		200.00	1538.80	1405.00	133.80	57.98
Martin Ran		0.00	1544.73	1403.00	141.73	61.42
Well #1 MR		0.00	1539.30	1395.00	144.30	62.53

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
Casa Grande	700.00	

NET SYSTEM INFLOW = 700.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 700.00

***** HYDRAULIC ANALYSIS COMPLETED *****

MARTIN RANCH

Attachment C-5

Peak Day Demand Conditions
(One Well On)

```
* * * * * * * * * * *  K Y P I P E 4  * * * * * * * * * * *
*                                                          *
*    University of Kentucky Network Modeling Software      *
*                                                          *
*              Copyrighted by KPFS 1998                    *
*             Version 1.200 - 01/26/2000                   *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 14:11:22 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Martin_R.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Martin_R.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Martin_R.RS2

****
S U M M A R Y O F O R I G I N A L D A T A
****

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-24	Casa Grand	Martin Ran	1152.84	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16100.97	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00
P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
Casa Grand		----	1545.00	1545.00
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
Martin Ran		0.00	1403.00	
Well #1 MR		-750.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 11
NUMBER OF END NODES .....(j) = 9
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 1
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 6 TRIALS: ACCURACY = 0.00006

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-24	Casa Grand	Martin Ran	-50.00	0.00	0.00	0.07	0.00
P-25	Martin Ran	J-20	-50.00	0.03	0.00	0.07	0.00
P-26	J-20	J-22	-88.44	0.01	0.00	0.13	0.01
P-27	J-22	J-23	-188.44	0.27	0.00	0.53	0.10
P-28	J-23	J-24	-317.62	0.68	0.00	0.89	0.25
P-29	J-24	J-25	-417.62	0.44	0.00	1.17	0.42
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	132.38	1.17	0.00	0.83	0.36
P-32	J-26	J-23	-29.18	0.04	0.00	0.18	0.02
P-33	J-26	J-20	61.56	0.24	0.00	0.39	0.09
P-34	J-25	Well #1 MR	-750.00	0.25	0.00	1.12	0.27

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
Casa Grand		----	1545.00	1545.00	0.00	0.00
J-20		100.00	1545.03	1392.00	153.03	66.31
J-22		100.00	1545.04	1389.00	156.04	67.62
J-23		100.00	1545.31	1390.00	155.31	67.30
J-24		100.00	1545.99	1390.00	155.99	67.60
J-25		0.00	1546.44	1395.00	151.44	65.62
J-26		100.00	1545.27	1395.00	150.27	65.12
J-27		200.00	1545.93	1405.00	140.93	61.07
Martin Ran		0.00	1545.00	1403.00	142.00	61.53
Well #1 MR		-750.00	1546.69	1395.00	151.69	65.73

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
Casa Grande	-50.00	

NET SYSTEM INFLOW = 0.00
NET SYSTEM OUTFLOW = -50.00
NET SYSTEM DEMAND = -50.00

***** HYDRAULIC ANALYSIS COMPLETED *****

MARTIN RANCH

Attachment C-6

Peak Day Demand Conditions with Fire Flow
(All Wells Off)

```
* * * * * * * * * *.  K Y P I P E 4   * * * * * * * * * *
*                                                       *
*    University of Kentucky Network Modeling Software   *
*                                                       *
*              Copyrighted by KPFS 1998                 *
*             Version 1.200 - 01/26/2000                *
*                                                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 14:00:32 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Martin_R.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Martin_R.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Martin_R.RS2

****
S U M M A R Y O F O R I G I N A L D A T A
****

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-24	Casa Grand	Martin Ran	1152.84	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16100.97	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00
P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
Casa Grand		----	1545.00	1545.00
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		1200.00	1405.00	
Martin Ran		0.00	1403.00	
Well #1 MR		0.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 11
NUMBER OF END NODES .....(j) = 9
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 1
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00011

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-24	Casa Grand	Martin Ran	1700.00	1.43	0.00	2.54	1.24
P-25	Martin Ran	J-20	1700.00	19.99	0.00	2.54	1.24
P-26	J-20	J-22	1179.25	1.63	0.00	1.76	0.63
P-27	J-22	J-23	1079.25	6.79	0.00	3.02	2.46
P-28	J-23	J-24	954.91	5.23	0.00	2.67	1.96
P-29	J-24	J-25	854.91	1.67	0.00	2.39	1.59
P-30	J-25	J-27	1200.00	13.93	0.00	3.35	2.99
P-31	J-25	J-26	-345.09	6.87	0.00	2.16	2.13
P-32	J-26	J-23	-24.33	0.03	0.00	0.15	0.02
P-33	J-26	J-20	-420.75	8.44	0.00	2.64	3.07
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
Casa Grand		----	1545.00	1545.00	0.00	0.00
J-20		100.00	1523.58	1392.00	131.58	57.02
J-22		100.00	1521.95	1389.00	132.95	57.61
J-23		100.00	1515.17	1390.00	125.17	54.24
J-24		100.00	1509.93	1390.00	119.93	51.97
J-25		0.00	1508.26	1395.00	113.26	49.08
J-26		100.00	1515.14	1395.00	120.14	52.06
J-27		1200.00	1494.34	1405.00	89.34	38.71
Martin Ran		0.00	1543.57	1403.00	140.57	60.91
Well #1 MR		0.00	1508.26	1395.00	113.26	49.08

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
Casa Grande	1700.00	

NET SYSTEM INFLOW = 1700.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 1700.00

***** HYDRAULIC ANALYSIS COMPLETED *****

MARTIN RANCH

Attachment C-7

Peak Day Demand Conditions with Fire Flow
(One Well On)

```
> I P E 4   * * * * * * * * * *
                               *
/ Network Modeling Software    *
                               *
1 by KPFS 1998                 *
)0 - 01/26/2000                *
                               *
* * * * * * * * * * * * * * * *
```

!004

C:\PROGRA~1\PIPE20~1\Martin_R.DT2
C:\PROGRA~1\PIPE20~1\Martin_R.OT2
C:\PROGRA~1\PIPE20~1\Martin_R.RS2

```
*****************************
  O R I G I N A L   D A T A
*****************************
```

th Fire Flow

'minute

CV -CHECK VALVE

LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
1152.84	16.53	140.0000	0.00
16100.97	16.53	140.0000	0.00
2579.79	16.53	140.0000	0.00
2764.72	12.09	140.0000	0.00
2673.53	12.09	140.0000	0.00
1046.85	12.09	140.0000	0.00
4661.57	12.09	140.0000	0.00
3231.86	8.07	140.0000	0.00
1876.41	8.07	140.0000	0.00
2750.65	8.07	140.0000	0.00
931.47	16.53	140.0000	0.00

ıL)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
--	1545.00	1545.00
)0	1392.00	
)0	1389.00	
)0	1390.00	
)0	1390.00	
)0	1395.00	
)0	1395.00	
)0	1405.00	
)0	1403.00	
)0	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 11
NUMBER OF END NODES .....(j) = 9
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 1
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00011

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-24	Casa Grand	Martin Ran	1700.00	1.43	0.00	2.54	1.24
P-25	Martin Ran	J-20	1700.00	19.99	0.00	2.54	1.24
P-26	J-20	J-22	1179.25	1.63	0.00	1.76	0.63
P-27	J-22	J-23	1079.25	6.79	0.00	3.02	2.46
P-28	J-23	J-24	954.91	5.23	0.00	2.67	1.96
P-29	J-24	J-25	854.91	1.67	0.00	2.39	1.59
P-30	J-25	J-27	1200.00	13.93	0.00	3.35	2.99
P-31	J-25	J-26	-345.09	6.87	0.00	2.16	2.13
P-32	J-26	J-23	-24.33	0.03	0.00	0.15	0.02
P-33	J-26	J-20	-420.75	8.44	0.00	2.64	3.07
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
Casa Grand		----	1545.00	1545.00	0.00	0.00
J-20		100.00	1523.58	1392.00	131.58	57.02
J-22		100.00	1521.95	1389.00	132.95	57.61
J-23		100.00	1515.17	1390.00	125.17	54.24
J-24		100.00	1509.93	1390.00	119.93	51.97
J-25		0.00	1508.26	1395.00	113.26	49.08
J-26		100.00	1515.14	1395.00	120.14	52.06
J-27		1200.00	1494.34	1405.00	89.34	38.71
Martin Ran		0.00	1543.57	1403.00	140.57	60.91
Well #1 MR		0.00	1508.26	1395.00	113.26	49.08

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
Casa Grande	1700.00	

NET SYSTEM INFLOW = 1700.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 1700.00

***** HYDRAULIC ANALYSIS COMPLETED *****

```
* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
*    University of Kentucky Network Modeling Software    *
*                                                        *
*              Copyrighted by KPFS 1998                  *
*             Version 1.200 - 01/26/2000                 *
*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 14:09:48 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Martin_R.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Martin_R.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Martin_R.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-24	Casa Grand	Martin Ran	1152.84	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16100.97	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00
P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
Casa Grand		----	1545.00	1545.00
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		1200.00	1405.00	
Martin Ran		0.00	1403.00	
Well #1 MR		-750.00	1395.00	

MARTIN RANCH

Attachment C-7

Peak Day Demand Conditions with Fire Flow
(One Well On)

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 11
NUMBER OF END NODES .....(j) = 9
NUMBER OF PRIMARY LOOPS .....(l) = 2
NUMBER OF SUPPLY NODES .....(f) = 1
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00161

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
P-24	Casa Grand	Martin Ran	950.00	0.49	0.00	1.42	0.42
P-25	Martin Ran	J-20	950.00	6.80	0.00	1.42	0.42
P-26	J-20	J-22	636.11	0.52	0.00	0.95	0.20
P-27	J-22	J-23	536.11	1.86	0.00	1.50	0.67
P-28	J-23	J-24	409.14	1.09	0.00	1.14	0.41
P-29	J-24	J-25	309.14	0.25	0.00	0.86	0.24
P-30	J-25	J-27	1200.00	13.93	0.00	3.35	2.99
P-31	J-25	J-26	-140.86	1.31	0.00	0.88	0.40
P-32	J-26	J-23	-26.97	0.04	0.00	0.17	0.02
P-33	J-26	J-20	-213.89	2.41	0.00	1.34	0.88
P-34	J-25	Well #1 MR	-750.00	0.25	0.00	1.12	0.27

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
Casa Grand		----	1545.00	1545.00	0.00	0.00
J-20		100.00	1537.71	1392.00	145.71	63.14
J-22		100.00	1537.19	1389.00	148.19	64.22
J-23		100.00	1535.33	1390.00	145.33	62.98
J-24		100.00	1534.24	1390.00	144.24	62.51
J-25		0.00	1533.99	1395.00	138.99	60.23
J-26		100.00	1535.30	1395.00	140.30	60.80
J-27		1200.00	1520.06	1405.00	115.06	49.86
Martin Ran		0.00	1544.51	1403.00	141.51	61.32
Well #1 MR		-750.00	1534.24	1395.00	139.24	60.34

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
Casa Grande	950.00	

NET SYSTEM INFLOW = 950.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 950.00

***** HYDRAULIC ANALYSIS COMPLETED *****

MARTIN RANCH

Attachment C-8

Well and Tank Analysis

ARIZONA WATER COMPANY

System: Casa Grande and Martin Ranch

SYSTEM	MONTH 2004	AVERAGE DAY PEAK MONTH (gpd)	PEAK DAY PEAK MONTH (gpd)	MAXIMUM PRODUCTION (gpd) LESS LARGEST PRODUCER	STORAGE AVAILABLE FOR USE (gpd)	NET GAIN or (LOSS) (gpm)
CG	June	16,211,252	19,453,503	19,224,000	2,478,333	1,562

No Additional production required

Well Number and Name	Production (gpm)	Tank Name	Storage (gal)
#1 - Martin Ranch	750	Martin Ranch	1,000,000
#10 - Casa Grande	900	Indian Hills	100,000
#14 - Cottonwood Ln.	150	Cottonwood	1,000,000
#17 - Casa Grande	800	Burgess Peak	2,000,000
#19 - Poonian	1620	Casa Grande Mtn	5,000,000
#20 - Casa Grande	1200	Scott Drive #1	110,000
#21 - Casa Grande	720	Scott Drive #2	5,000,000
#22 - Singh/Quaid	1100	North Park	625,000
#23 - Casa Grande	1600	North Park	35,000
#24 - Casa Grande	1000		
#25 - Casa Grande	1300		
#26 - Casa Grande	1460		
#27 - Lake in the Desert	470		
#28 - Az City	1500		
#29 - Mission Royale	1500		
TOTAL PRODUCTION:	16,070	TOTAL STORAGE:	14,870,000

Largest producer out-of-service taking the Blend Plan with it.

Design Statement for Well Production:

The water distribution system must have sufficient well capacity to meet the peak day demand for

Design Criteria:

Peak Day Peak Month = 1.2 x Average Day Peak Month

All other wells run 24 hours per day

ARIZONA WATER COMPANY

DAY ONE
STORAGE CALCULATIONS.
SYSTEM - CASA GRANDE

* PRODUCTION (Gallons) =	19,224,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	801,000
AVERAGE DAY PEAK MONTH (Gallons) =	16,211,252
PEAK DAY PEAK MONTH (Gal/day) =	19,453,503
AVERAGE HOURLY DEMAND (Peak Day)=	810,563

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	1095.23	801	-294.23	-294.23
7-8 AM	0.0779	1515.43	801	-714.43	-1008.66
8-9 AM	0.0824	1602.97	801	-801.97	-1810.63
9-10 AM	0.0769	1495.97	801	-694.97	-2505.60
10-11 AM	0.0657	1278.10	801	-477.10	-2982.70
11-12 PM	0.0569	1106.90	801	-305.90	-3288.60
12-1 PM	0.0496	964.89	801	-163.89	-3452.50
1-2 PM	0.0458	890.97	801	-89.97	-3542.47
2-3 PM	0.0423	822.88	801	-21.88	-3564.35
3-4 PM	0.0402	782.03	801	18.97	-3545.38
4-5 PM	0.0451	877.35	801	-76.35	-3621.73
5-6 PM	0.0442	859.84	801	-58.84	-3680.58
6-7 PM	0.0461	896.81	801	-95.81	-3776.38
7-8 PM	0.0417	811.21	801	-10.21	-3786.60
8-9 PM	0.038	739.23	801	61.77	-3724.83
9-10 PM	0.0387	752.85	801	48.15	-3676.68
10-11 PM	0.033	641.97	801	159.03	-3517.65
11-12 AM	0.0246	478.56	801	322.44	-3195.20
12-1 AM	0.016	311.26	801	489.74	-2705.46
1-2 AM	0.0102	198.43	801	602.57	-2102.88
2-3 AM	0.0102	198.43	801	602.57	-1500.31
3-4 AM	0.0139	270.40	801	530.60	-969.71
4-5 AM	0.016	311.26	801	489.74	-479.97
5-6 AM	0.0283	550.53	801	250.47	-229.50
TOTAL	1	19,453.5028			

Minimum Storage Requirements	3,786,596	Gallons
*** Fire Flow Requirements	480,000	Gallons
TOTAL STORAGE REQUIRED	4,266,596	Gallons
TOTAL STORAGE AVAILABLE	14,870,000	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service taking Blen Plan with it.
***Fire Flows - 2,000 gpm @ 4 hours = 480,000 gallons.

ARIZONA WATER COMPANY

DAY TWO
STORAGE CALCULATIONS
SYSTEM - CASA GRANDE

* PRODUCTION (Gallons) =	19,224,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	801,000
AVERAGE DAY PEAK MONTH (Gallons) =	16,211,252
PEAK DAY PEAK MONTH (Gal/day) =	19,453,503
AVERAGE HOURLY DEMAND (Peak Day)=	810,563

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	1095.23	801	-294.23	-523.74
7-8 AM	0.0779	1515.43	801	-714.43	-1238.16
8-9 AM	0.0824	1602.97	801	-801.97	-2040.13
9-10 AM	0.0769	1495.97	801	-694.97	-2735.11
10-11 AM	0.0657	1278.10	801	-477.10	-3212.20
11-12 PM	0.0569	1106.90	801	-305.90	-3518.11
12-1 PM	0.0496	964.89	801	-163.89	-3682.00
1-2 PM	0.0458	890.97	801	-89.97	-3771.97
2-3 PM	0.0423	822.88	801	-21.88	-3793.85
3-4 PM	0.0402	782.03	801	18.97	-3774.88
4-5 PM	0.0451	877.35	801	-76.35	-3851.24
5-6 PM	0.0442	859.84	801	-58.84	-3910.08
6-7 PM	0.0461	896.81	801	-95.81	-4005.89
7-8 PM	0.0417	811.21	801	-10.21	-4016.10
8-9 PM	0.038	739.23	801	61.77	-3954.33
9-10 PM	0.0387	752.85	801	48.15	-3906.18
10-11 PM	0.033	641.97	801	159.03	-3747.15
11-12 AM	0.0246	478.56	801	322.44	-3424.70
12-1 AM	0.016	311.26	801	489.74	-2934.96
1-2 AM	0.0102	198.43	801	602.57	-2332.39
2-3 AM	0.0102	198.43	801	602.57	-1729.81
3-4 AM	0.0139	270.40	801	530.60	-1199.22
4-5 AM	0.016	311.26	801	489.74	-709.47
5-6 AM	0.0283	550.53	801	250.47	-459.01
TOTAL	1	19,453.503			

Minimum Storage Requirements	4,016,099	Gallons
*** Fire Flow Requirements	480,000	Gallons
TOTAL STORAGE REQUIRED	4,496,099	Gallons
TOTAL STORAGE AVAILABLE	14,870,000	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

*Largest Producer out-of-service taking Blen Plan with it.
***Fire Flows - 2,000 gpm @ 4 hours = 480,000 gallons.

ARIZONA WATER COMPANY

DAY THREE
STORAGE CALCULATIONS
SYSTEM - CASA GRANDE

* PRODUCTION (Gallons) =	19,224,000
HOURLY SOURCE OF SUPPLY (Gal/day)=	801,000
AVERAGE DAY PEAK MONTH (Gallons) =	16,211,252
PEAK DAY PEAK MONTH (Gal/day) =	19,453,503
AVERAGE HOURLY DEMAND (Peak Day)=	810,563

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	1095.23	801	-294.23	-753.24
7-8 AM	0.0779	1515.43	801	-714.43	-1467.67
8-9 AM	0.0824	1602.97	801	-801.97	-2269.63
9-10 AM	0.0769	1495.97	801	-694.97	-2964.61
10-11 AM	0.0657	1278.10	801	-477.10	-3441.70
11-12 PM	0.0569	1106.90	801	-305.90	-3747.61
12-1 PM	0.0496	964.89	801	-163.89	-3911.50
1-2 PM	0.0458	890.97	801	-89.97	-4001.47
2-3 PM	0.0423	822.88	801	-21.88	-4023.36
3-4 PM	0.0402	782.03	801	18.97	-4004.39
4-5 PM	0.0451	877.35	801	-76.35	-4080.74
5-6 PM	0.0442	859.84	801	-58.84	-4139.58
6-7 PM	0.0461	896.81	801	-95.81	-4235.39
7-8 PM	0.0417	811.21	801	-10.21	-4245.60
8-9 PM	0.038	739.23	801	61.77	-4183.83
9-10 PM	0.0387	752.85	801	48.15	-4135.69
10-11 PM	0.033	641.97	801	159.03	-3976.65
11-12 AM	0.0246	478.56	801	322.44	-3654.21
12-1 AM	0.016	311.26	801	489.74	-3164.46
1-2 AM	0.0102	198.43	801	602.57	-2561.89
2-3 AM	0.0102	198.43	801	602.57	-1959.31
3-4 AM	0.0139	270.40	801	530.60	-1428.72
4-5 AM	0.016	311.26	801	489.74	-938.97
5-6 AM	0.0283	550.53	801	250.47	-688.51
TOTAL	1	19,453.503			

Minimum Storage Requirements	4,245,602	Gallons
*** Fire Flow Requirements	480,000	Gallons
TOTAL STORAGE REQUIRED	4,725,602	Gallons
TOTAL STORAGE AVAILABLE	14,870,000	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service taking Blen Plan with it.
***Fire Flows - 2,000 gpm @ 4 hours = 480,000 gallons.

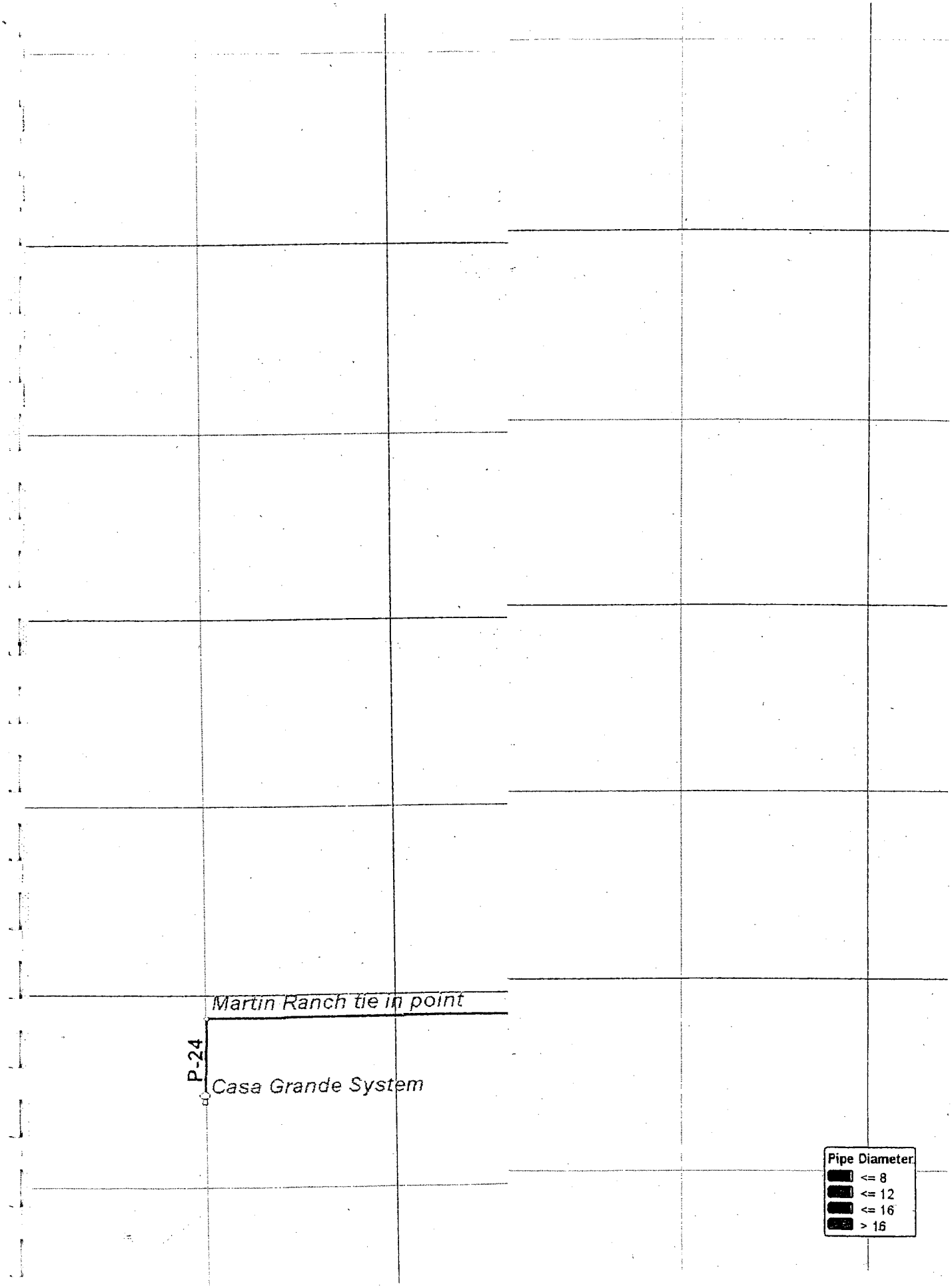
FIGURE C

Martin Ranch Subdivision Layout

SANDIA and MARTIN RANCH

Attachment D-1

Demand Estimate
Average Day Peak Month


Martin Ranch tie in point
P-24
Casa Grande System
Pipe Diameter
<= 8
<= 12
<= 16
> 16

SANDIA and MARTIN RANCH

Attachment D-2

Peak Day Demand Conditions
(All Wells Off)

```
* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
*   University of Kentucky Network Modeling Software     *
*                                                        *
*              Copyrighted by KPFS 1998                  *
*             Version 1.200 - 01/26/2000                 *
*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 13:34:15 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia-M.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia-M.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia-M.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
Interconne	J-31	J-22	4174.93	16.53	140.0000	0.00
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00
P-18	J-07	Well #2 S	2296.76	12.09	140.0000	0.00
P-19	J-12	Well #3 S	3923.69	12.09	140.0000	0.00
P-20	J-13	Well #4 S	345.97	12.09	140.0000	0.00
P-21	J-13	Well #5 S	342.69	12.09	140.0000	0.00
P-22	J-05	Well #6 S	4542.25	12.09	140.0000	0.00
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00
P-24	Casa Grand	Martin Ran	1127.63	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16101.26	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00

P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A PUMP AT NODE Pump Stati; USEFUL POWER = 0.00 (Efficiency = 1.00%)

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Casa Grand		----	1545.00	1545.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
J-31		0.00	1385.00	
Martin Ran		0.00	1403.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 MR		0.00	1395.00	
Well #1 S		0.00	1385.00	
Well #2 S		0.00	1380.00	
Well #3 S		0.00	1380.00	
Well #4 S		0.00	1385.00	
Well #5 S		0.00	1385.00	
Well #6 S		0.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 35
NUMBER OF END NODES .....(j) = 29
NUMBER OF PRIMARY LOOPS .....(l) = 4
NUMBER OF SUPPLY NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00045

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
Interconne	J-31	J-22	-2252.91	8.73	0.00	3.37	2.09
P-01	Sandia tie	Coolidge S	-1547.10	71.75	0.00	4.32	4.78
P-02	J-03	Sandia tie	-1547.10	8.37	0.00	2.31	1.04
P-03	J-04	J-03	-1547.10	0.88	0.00	2.31	1.04
P-04	J-05	J-04	-781.83	0.96	0.00	1.17	0.29
P-05	J-06	J-05	-481.83	0.51	0.00	0.72	0.12
P-06	J-07	J-06	803.92	0.46	0.00	1.20	0.31
P-07	J-08	J-07	803.92	0.27	0.00	1.20	0.31
P-08	J-09	J-08	803.92	0.74	0.00	1.20	0.31
P-09	J-10	J-09	-748.98	4.29	0.00	2.09	1.25
P-10	J-10	J-11	48.98	0.06	0.00	0.14	0.01
P-11	J-11	J-12	-65.27	0.02	0.00	0.18	0.01
P-12	J-12	J-13	-65.27	0.04	0.00	0.18	0.01
P-13	J-13	J-04	-765.27	4.28	0.00	2.14	1.30
P-14	J-11	J-06	-585.75	2.87	0.00	1.64	0.79
P-15	J-08	Pump Stati	0.00	0.00	0.00	0.00	0.00
P-16	Pump Stati	1 Mil. Tan	0.00	0.00	0.00	0.00	0.00
P-17	1 Mil. Tan	Well #1 S	0.00	0.00	0.00	0.00	0.00
P-18	J-07	Well #2 S	0.00	0.00	0.00	0.00	0.00
P-19	J-12	Well #3 S	0.00	0.00	0.00	0.00	0.00
P-20	J-13	Well #4 S	0.00	0.00	0.00	0.00	0.00
P-21	J-13	Well #5 S	0.00	0.00	0.00	0.00	0.00
P-22	J-05	Well #6 S	0.00	0.00	0.00	0.00	0.00
P-23	J-09	J-31	-2252.91	6.24	0.00	3.37	2.09
P-24	Casa Grand	Martin Ran	2952.91	3.89	0.00	4.41	3.45
P-25	Martin Ran	J-20	2952.91	55.58	0.00	4.41	3.45
P-26	J-20	J-22	2501.72	6.55	0.00	3.74	2.54
P-27	J-22	J-23	148.81	0.17	0.00	0.42	0.06
P-28	J-23	J-24	181.73	0.24	0.00	0.51	0.09
P-29	J-24	J-25	81.73	0.02	0.00	0.23	0.02
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	-118.27	0.95	0.00	0.74	0.29
P-32	J-26	J-23	132.92	0.68	0.00	0.83	0.36
P-33	J-26	J-20	-351.19	6.04	0.00	2.20	2.20
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC- ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Device "Pump Statio" is closed

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Casa Grand		----	1545.00	1545.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1464.89	1395.00	69.89	30.28
J-04		0.00	1464.00	1395.00	69.00	29.90
J-05		300.00	1463.04	1395.00	68.04	29.48
J-06		700.00	1462.53	1385.00	77.53	33.60
J-07		0.00	1463.00	1385.00	78.00	33.80
J-08		0.00	1463.26	1385.00	78.26	33.91
J-09		700.00	1464.00	1385.00	79.00	34.24
J-10		700.00	1459.72	1380.00	79.72	34.54
J-11		700.00	1459.66	1380.00	79.66	34.52
J-12		0.00	1459.68	1380.00	79.68	34.53
J-13		700.00	1459.73	1385.00	74.73	32.38
J-20		100.00	1485.53	1392.00	93.53	40.53
J-22		100.00	1478.98	1389.00	89.98	38.99
J-23		100.00	1478.81	1390.00	88.81	38.48
J-24		100.00	1478.56	1390.00	88.56	38.38
J-25		0.00	1478.54	1395.00	83.54	36.20
J-26		100.00	1479.49	1395.00	84.49	36.61
J-27		200.00	1478.04	1405.00	73.04	31.65
J-31		0.00	1470.25	1385.00	85.25	36.94
Martin Ran		0.00	1541.11	1403.00	138.11	59.85
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1473.25	1395.00	78.25	33.91
Well #1 MR		0.00	1478.54	1395.00	83.54	36.20
Well #1 S		0.00	1385.00	1385.00	0.00	0.00
Well #2 S		0.00	1463.00	1380.00	83.00	35.96
Well #3 S		0.00	1459.68	1380.00	79.68	34.53
Well #4 S		0.00	1459.73	1385.00	74.73	32.38
Well #5 S		0.00	1459.73	1385.00	74.73	32.38
Well #6 S		0.00	1463.04	1395.00	68.04	29.48
Pump Stati		0.00	1463.26	1385.00	78.26	33.91

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	0.00	
Casa Grande	2952.91	
Coolidge Sy	1547.10	

NET SYSTEM INFLOW = 4500.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 4500.00

***** HYDRAULIC ANALYSIS COMPLETED *****

J L T S

LE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
	----	1385.00	1385.00	0.00	0.00
	----	1545.00	1545.00	0.00	0.00
	----	1545.00	1545.00	0.00	0.00
	0.00	1464.89	1395.00	69.89	30.28
	0.00	1464.00	1395.00	69.00	29.90
	300.00	1463.04	1395.00	68.04	29.48
	700.00	1462.53	1385.00	77.53	33.60
	0.00	1463.00	1385.00	78.00	33.80
	0.00	1463.26	1385.00	78.26	33.91
	700.00	1464.00	1385.00	79.00	34.24
	700.00	1459.72	1380.00	79.72	34.54
	700.00	1459.66	1380.00	79.66	34.52
	0.00	1459.68	1380.00	79.68	34.53
	700.00	1459.73	1385.00	74.73	32.38
	100.00	1485.53	1392.00	93.53	40.53
	100.00	1478.98	1389.00	89.98	38.99
	100.00	1478.81	1390.00	88.81	38.48
	100.00	1478.56	1390.00	88.56	38.38
	0.00	1478.54	1395.00	83.54	36.20
	100.00	1479.49	1395.00	84.49	36.61
	200.00	1478.04	1405.00	73.04	31.65
	0.00	1470.25	1385.00	85.25	36.94
	0.00	1541.11	1403.00	138.11	59.85
	0.00	1385.00	1385.00	0.00	0.00
	0.00	1473.25	1395.00	78.25	33.91
	0.00	1478.54	1395.00	83.54	36.20
	0.00	1385.00	1385.00	0.00	0.00
	0.00	1463.00	1380.00	83.00	35.96
	0.00	1459.68	1380.00	79.68	34.53
	0.00	1459.73	1385.00	74.73	32.38
	0.00	1459.73	1385.00	74.73	32.38
	0.00	1463.04	1395.00	68.04	29.48
	0.00	1463.26	1385.00	78.26	33.91

N F L O W S A N D O U T F L O W S

EM FROM SUPPLY NODES
TEM INTO SUPPLY NODES

TE	NODE TITLE
0.00	
.91	
10	
4500.00	
0.00	
00.00	

G ANALYSIS COMPLETED *****

P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A PUMP AT NODE Pump Stati; USEFUL POWER = 0.00 (Efficiency = 1.00%)

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Casa Grand		----	1545.00	1545.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
J-31		0.00	1385.00	
Martin Ran		0.00	1403.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 MR		0.00	1395.00	
Well #1 S		0.00	1385.00	
Well #2 S		0.00	1380.00	
Well #3 S		0.00	1380.00	
Well #4 S		0.00	1385.00	
Well #5 S		0.00	1385.00	
Well #6 S		0.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 35
NUMBER OF END NODES .....(j) = 29
NUMBER OF PRIMARY LOOPS .....(l) = 4
NUMBER OF SUPPLY NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00045

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
Interconne	J-31	J-22	-2252.91	8.73	0.00	3.37	2.09
P-01	Sandia tie	Coolidge S	-1547.10	71.75	0.00	4.32	4.78
P-02	J-03	Sandia tie	-1547.10	8.37	0.00	2.31	1.04
P-03	J-04	J-03	-1547.10	0.88	0.00	2.31	1.04
P-04	J-05	J-04	-781.83	0.96	0.00	1.17	0.29
P-05	J-06	J-05	-481.83	0.51	0.00	0.72	0.12
P-06	J-07	J-06	803.92	0.46	0.00	1.20	0.31
P-07	J-08	J-07	803.92	0.27	0.00	1.20	0.31
P-08	J-09	J-08	803.92	0.74	0.00	1.20	0.31
P-09	J-10	J-09	-748.98	4.29	0.00	2.09	1.25
P-10	J-10	J-11	48.98	0.06	0.00	0.14	0.01
P-11	J-11	J-12	-65.27	0.02	0.00	0.18	0.01
P-12	J-12	J-13	-65.27	0.04	0.00	0.18	0.01
P-13	J-13	J-04	-765.27	4.28	0.00	2.14	1.30
P-14	J-11	J-06	-585.75	2.87	0.00	1.64	0.79
P-15	J-08	Pump Stati	0.00	0.00	0.00	0.00	0.00
P-16	Pump Statil	Mil. Tan	0.00	0.00	0.00	0.00	0.00
P-17	1 Mil. Tan	Well #1 S	0.00	0.00	0.00	0.00	0.00
P-18	J-07	Well #2 S	0.00	0.00	0.00	0.00	0.00
P-19	J-12	Well #3 S	0.00	0.00	0.00	0.00	0.00
P-20	J-13	Well #4 S	0.00	0.00	0.00	0.00	0.00
P-21	J-13	Well #5 S	0.00	0.00	0.00	0.00	0.00
P-22	J-05	Well #6 S	0.00	0.00	0.00	0.00	0.00
P-23	J-09	J-31	-2252.91	6.24	0.00	3.37	2.09
P-24	Casa Grand	Martin Ran	2952.91	3.89	0.00	4.41	3.45
P-25	Martin Ran	J-20	2952.91	55.58	0.00	4.41	3.45
P-26	J-20	J-22	2501.72	6.55	0.00	3.74	2.54
P-27	J-22	J-23	148.81	0.17	0.00	0.42	0.06
P-28	J-23	J-24	181.73	0.24	0.00	0.51	0.09
P-29	J-24	J-25	81.73	0.02	0.00	0.23	0.02
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	-118.27	0.95	0.00	0.74	0.29
P-32	J-26	J-23	132.92	0.68	0.00	0.83	0.36
P-33	J-26	J-20	-351.19	6.04	0.00	2.20	2.20
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC- ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Device "Pump Statio" is closed

SANDIA and MARTIN RANCH

Attachment D-3

Peak Day Demand Conditions
(One Well On)

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Casa Grand		----	1545.00	1545.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1464.89	1395.00	69.89	30.28
J-04		0.00	1464.00	1395.00	69.00	29.90
J-05		300.00	1463.04	1395.00	68.04	29.48
J-06		700.00	1462.53	1385.00	77.53	33.60
J-07		0.00	1463.00	1385.00	78.00	33.80
J-08		0.00	1463.26	1385.00	78.26	33.91
J-09		700.00	1464.00	1385.00	79.00	34.24
J-10		700.00	1459.72	1380.00	79.72	34.54
J-11		700.00	1459.66	1380.00	79.66	34.52
J-12		0.00	1459.68	1380.00	79.68	34.53
J-13		700.00	1459.73	1385.00	74.73	32.38
J-20		100.00	1485.53	1392.00	93.53	40.53
J-22		100.00	1478.98	1389.00	89.98	38.99
J-23		100.00	1478.81	1390.00	88.81	38.48
J-24		100.00	1478.56	1390.00	88.56	38.38
J-25		0.00	1478.54	1395.00	83.54	36.20
J-26		100.00	1479.49	1395.00	84.49	36.61
J-27		200.00	1478.04	1405.00	73.04	31.65
J-31		0.00	1470.25	1385.00	85.25	36.94
Martin Ran		0.00	1541.11	1403.00	138.11	59.85
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1473.25	1395.00	78.25	33.91
Well #1 MR		0.00	1478.54	1395.00	83.54	36.20
Well #1 S		0.00	1385.00	1385.00	0.00	0.00
Well #2 S		0.00	1463.00	1380.00	83.00	35.96
Well #3 S		0.00	1459.68	1380.00	79.68	34.53
Well #4 S		0.00	1459.73	1385.00	74.73	32.38
Well #5 S		0.00	1459.73	1385.00	74.73	32.38
Well #6 S		0.00	1463.04	1395.00	68.04	29.48
Pump Stati		0.00	1463.26	1385.00	78.26	33.91

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	0.00	
Casa Grande	2952.91	
Coolidge Sy	1547.10	

NET SYSTEM INFLOW = 4500.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 4500.00

***** HYDRAULIC ANALYSIS COMPLETED *****

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* * * * * * * * * * *  K Y P I P E 4  * * * * * * * * * *
*                                                        *
*    University of Kentucky Network Modeling Software    *
*                                                        *
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*                                                        *
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Date & Time: Wed Dec 29 13:49:20 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia-M.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia-M.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia-M.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
Interconne	J-31	J-22	4174.93	16.53	140.0000	0.00
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	l Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00
P-18	J-07	Well #2 S	2296.76	12.09	140.0000	0.00
P-19	J-12	Well #3 S	3923.69	12.09	140.0000	0.00
P-20	J-13	Well #4 S	345.97	12.09	140.0000	0.00
P-21	J-13	Well #5 S	342.69	12.09	140.0000	0.00
P-22	J-05	Well #6 S	4542.25	12.09	140.0000	0.00
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00
P-24	Casa Grand	Martin Ran	1127.63	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16101.26	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00

P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Casa Grand		----	1545.00	1545.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
J-31		0.00	1385.00	
Martin Ran		0.00	1403.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 MR		0.00	1395.00	
Well #1 S		-750.00	1385.00	
Well #2 S		0.00	1380.00	
Well #3 S		0.00	1380.00	
Well #4 S		0.00	1385.00	
Well #5 S		0.00	1385.00	
Well #6 S		0.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 35
NUMBER OF END NODES .....(j) = 29

NUMBER OF PRIMARY LOOPS .....(l) = 4
NUMBER OF SUPPLY NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00147

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
Interconne	J-31	J-22	-1525.24	4.24	0.00	2.28	1.02
P-01	Sandia tie	Coolidge S	-1156.89	41.88	0.00	3.23	2.79
P-02	J-03	Sandia tie	-1156.89	4.88	0.00	1.73	0.61
P-03	J-04	J-03	-1156.89	0.52	0.00	1.73	0.61
P-04	J-05	J-04	-455.16	0.35	0.00	0.68	0.11
P-05	J-06	J-05	-155.16	0.06	0.00	0.23	0.01
P-06	J-07	J-06	1168.36	0.92	0.00	1.75	0.62
P-07	J-08	J-07	1168.36	0.54	0.00	1.75	0.62
P-08	J-09	J-08	50.49	0.00	0.00	0.08	0.00
P-09	J-10	J-09	-774.75	4.56	0.00	2.17	1.33
P-10	J-10	J-11	74.75	0.13	0.00	0.21	0.02
P-11	J-11	J-12	-1.72	0.00	0.00	0.00	0.00
P-12	J-12	J-13	-1.72	0.00	0.00	0.00	0.00
P-13	J-13	J-04	-701.72	3.64	0.00	1.96	1.11
P-14	J-11	J-06	-623.53	3.23	0.00	1.74	0.89
P-15	J-08	Pump Stati	-1117.87	0.01	0.00	1.67	0.57
P-16	Pump Statil	Mil. Tan	-1117.87	0.01	0.00	1.67	0.57
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27
P-18	J-07	Well #2 S	0.00	0.00	0.00	0.00	0.00
P-19	J-12	Well #3 S	0.00	0.00	0.00	0.00	0.00
P-20	J-13	Well #4 S	0.00	0.00	0.00	0.00	0.00
P-21	J-13	Well #5 S	0.00	0.00	0.00	0.00	0.00
P-22	J-05	Well #6 S	0.00	0.00	0.00	0.00	0.00
P-23	J-09	J-31	-1525.24	3.03	0.00	2.28	1.02
P-24	Casa Grand	Martin Ran	2225.24	2.30	0.00	3.33	2.04
P-25	Martin Ran	J-20	2225.24	32.91	0.00	3.33	2.04
P-26	J-20	J-22	1850.11	3.75	0.00	2.77	1.45
P-27	J-22	J-23	224.86	0.37	0.00	0.63	0.13
P-28	J-23	J-24	206.10	0.31	0.00	0.58	0.11
P-29	J-24	J-25	106.10	0.04	0.00	0.30	0.03
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	-93.90	0.62	0.00	0.59	0.19
P-32	J-26	J-23	81.23	0.27	0.00	0.51	0.15
P-33	J-26	J-20	-275.14	3.84	0.00	1.73	1.40
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC- ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Pump Stati	1117.87	-0.01	113.77	113.8	----	-----	---	----

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Casa Grand		----	1545.00	1545.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1498.23	1395.00	103.23	44.73
J-04		0.00	1497.72	1395.00	102.72	44.51
J-05		300.00	1497.36	1395.00	102.36	44.36
J-06		700.00	1497.30	1385.00	112.30	48.66
J-07		0.00	1498.23	1385.00	113.23	49.06
J-08		0.00	1498.76	1385.00	113.76	49.30
J-09		700.00	1498.77	1385.00	113.77	49.30
J-10		700.00	1494.20	1380.00	114.20	49.49
J-11		700.00	1494.08	1380.00	114.08	49.43
J-12		0.00	1494.08	1380.00	114.08	49.43
J-13		700.00	1494.08	1385.00	109.08	47.27
J-20		100.00	1509.78	1392.00	117.78	51.04
J-22		100.00	1506.04	1389.00	117.04	50.72
J-23		100.00	1505.67	1390.00	115.67	50.12
J-24		100.00	1505.36	1390.00	115.36	49.99
J-25		0.00	1505.32	1395.00	110.32	47.81
J-26		100.00	1505.94	1395.00	110.94	48.07
J-27		200.00	1504.82	1405.00	99.82	43.25
J-31		0.00	1501.80	1385.00	116.80	50.61
Martin Ran		0.00	1542.70	1403.00	139.70	60.53
Pump Stati		0.00	1384.99	1385.00	-0.01	0.00
Sandia tie		0.00	1503.12	1395.00	108.12	46.85
Well #1 MR		0.00	1505.32	1395.00	110.32	47.81
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Well #2 S		0.00	1498.23	1380.00	118.23	51.23
Well #3 S		0.00	1494.08	1380.00	114.08	49.43
Well #4 S		0.00	1494.08	1385.00	109.08	47.27
Well #5 S		0.00	1494.08	1385.00	109.08	47.27
Well #6 S		0.00	1497.36	1395.00	102.36	44.36
Pump Stati		0.00	1498.77	1385.00	113.77	49.30

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	367.87	
Casa Grande	2225.24	
Coolidge Sy	1156.89	

NET SYSTEM INFLOW = 3750.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3750.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA and MARTIN RANCH

Attachment D-4

Peak Day Demand Conditions
(All Wells On)

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* * * * * * * * * *  K Y P I P E 4  * * * * * * * * * *
*                                                      *
*    University of Kentucky Network Modeling Software  *
*                                                      *
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*                                                      *
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Date & Time: Wed Dec 29 13:46:51 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia-M.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia-M.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia-M.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
Interconne	J-31	J-22	4174.93	16.53	140.0000	0.00
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00
P-18	J-07	Well #2 S	2296.76	12.09	140.0000	0.00
P-19	J-12	Well #3 S	3923.69	12.09	140.0000	0.00
P-20	J-13	Well #4 S	345.97	12.09	140.0000	0.00
P-21	J-13	Well #5 S	342.69	12.09	140.0000	0.00
P-22	J-05	Well #6 S	4542.25	12.09	140.0000	0.00
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00
P-24	Casa Grand	Martin Ran	1127.63	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16101.26	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00

P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Casa Grand		----	1545.00	1545.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
J-31		0.00	1385.00	
Martin Ran		0.00	1403.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 MR		-750.00	1395.00	
Well #1 S		-750.00	1385.00	
Well #2 S		-750.00	1380.00	
Well #3 S		-750.00	1380.00	
Well #4 S		-750.00	1385.00	
Well #5 S		-750.00	1385.00	
Well #6 S		-750.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 35
NUMBER OF END NODES .....(j) = 29

NUMBER OF PRIMARY LOOPS .....(l) = 4
NUMBER OF SUPPLY NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00037

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
Interconne	J-31	J-22	386.54	0.33	0.00	0.58	0.08
P-01	Sandia tie	Coolidge S	371.30	5.10	0.00	1.04	0.34
P-02	J-03	Sandia tie	371.30	0.60	0.00	0.56	0.07
P-03	J-04	J-03	371.30	0.06	0.00	0.56	0.07
P-04	J-05	J-04	-218.77	0.09	0.00	0.33	0.03
P-05	J-06	J-05	-668.77	0.93	0.00	1.00	0.22
P-06	J-07	J-06	167.18	0.03	0.00	0.25	0.02
P-07	J-08	J-07	-582.82	0.15	0.00	0.87	0.17
P-08	J-09	J-08	-1390.67	2.04	0.00	2.08	0.86
P-09	J-10	J-09	-304.13	0.81	0.00	0.85	0.24
P-10	J-10	J-11	-395.87	2.78	0.00	1.11	0.38
P-11	J-11	J-12	-959.93	3.48	0.00	2.68	1.98
P-12	J-12	J-13	-209.93	0.38	0.00	0.59	0.12
P-13	J-13	J-04	590.07	2.64	0.00	1.65	0.80
P-14	J-11	J-06	-135.94	0.19	0.00	0.38	0.05
P-15	J-08	Pump Stati	-807.85	0.00	0.00	1.21	0.31
P-16	Pump Statil	Mil. Tan	-807.85	0.00	0.00	1.21	0.31
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27
P-18	J-07	Well #2 S	-750.00	2.87	0.00	2.10	1.25
P-19	J-12	Well #3 S	-750.00	4.91	0.00	2.10	1.25
P-20	J-13	Well #4 S	-750.00	0.43	0.00	2.10	1.25
P-21	J-13	Well #5 S	-750.00	0.43	0.00	2.10	1.25
P-22	J-05	Well #6 S	-750.00	5.68	0.00	2.10	1.25
P-23	J-09	J-31	386.54	0.24	0.00	0.58	0.08
P-24	Casa Grand	Martin Ran	-436.54	0.11	0.00	0.65	0.10
P-25	Martin Ran	J-20	-436.54	1.61	0.00	0.65	0.10
P-26	J-20	J-22	-455.35	0.28	0.00	0.68	0.11
P-27	J-22	J-23	-168.81	0.22	0.00	0.47	0.08
P-28	J-23	J-24	-315.13	0.67	0.00	0.88	0.25
P-29	J-24	J-25	-415.13	0.44	0.00	1.16	0.42
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	134.87	1.21	0.00	0.85	0.37
P-32	J-26	J-23	-46.32	0.10	0.00	0.29	0.05
P-33	J-26	J-20	81.19	0.40	0.00	0.51	0.15
P-34	J-25	Well #1 MR	-750.00	0.25	0.00	1.12	0.27

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC- ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Pump Stati	807.85	0.00	164.62	164.6	----	-----	---	----

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Casa Grand		----	1545.00	1545.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1550.70	1395.00	155.70	67.47
J-04		0.00	1550.76	1395.00	155.76	67.50
J-05		300.00	1550.67	1395.00	155.67	67.46
J-06		700.00	1549.74	1385.00	164.74	71.39
J-07		0.00	1549.77	1385.00	164.77	71.40
J-08		0.00	1549.62	1385.00	164.62	71.33
J-09		700.00	1547.58	1385.00	162.58	70.45
J-10		700.00	1546.77	1380.00	166.77	72.27
J-11		700.00	1549.55	1380.00	169.55	73.47
J-12		0.00	1553.03	1380.00	173.03	74.98
J-13		700.00	1553.40	1385.00	168.40	72.98
J-20		100.00	1546.72	1392.00	154.72	67.05
J-22		100.00	1547.00	1389.00	158.00	68.47
J-23		100.00	1547.22	1390.00	157.22	68.13
J-24		100.00	1547.89	1390.00	157.89	68.42
J-25		0.00	1548.33	1395.00	153.33	66.44
J-26		100.00	1547.13	1395.00	152.13	65.92
J-27		200.00	1547.83	1405.00	142.83	61.89
J-31		0.00	1547.34	1385.00	162.34	70.35
Martin Ran		0.00	1545.11	1403.00	142.11	61.58
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1550.10	1395.00	155.10	67.21
Well #1 MR		-750.00	1548.59	1395.00	153.59	66.55
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Well #2 S		-750.00	1552.64	1380.00	172.64	74.81
Well #3 S		-750.00	1557.94	1380.00	177.94	77.11
Well #4 S		-750.00	1553.84	1385.00	168.84	73.16
Well #5 S		-750.00	1553.83	1385.00	168.83	73.16
Well #6 S		-750.00	1556.35	1395.00	161.35	69.92
Pump Stati		0.00	1549.62	1385.00	164.62	71.34

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	57.85	
Casa Grande	-436.54	
Coolidge Sy	-371.30	

NET SYSTEM INFLOW = 57.85
NET SYSTEM OUTFLOW = -807.84
NET SYSTEM DEMAND = -750.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA and MARTIN RANCH

Attachment D-2

Peak Day Demand Conditions with Fire Flows
(One Well On)

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* * * * * * * * * *  K Y P I P E 4  * * * * * * * * * *
*                                                       *
*    University of Kentucky Network Modeling Software   *
*                                                       *
*              Copyrighted by KPFS 1998                 *
*             Version 1.200 - 01/26/2000                *
*                                                       *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Dec 29 13:50:48 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia-M.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia-M.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia-M.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
Interconne	J-31	J-22	4174.93	16.53	140.0000	0.00
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00
P-18	J-07	Well #2 S	2296.76	12.09	140.0000	0.00
P-19	J-12	Well #3 S	3923.69	12.09	140.0000	0.00
P-20	J-13	Well #4 S	345.97	12.09	140.0000	0.00
P-21	J-13	Well #5 S	342.69	12.09	140.0000	0.00
P-22	J-05	Well #6 S	4542.25	12.09	140.0000	0.00
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00
P-24	Casa Grand	Martin Ran	1127.63	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16101.26	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00

P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Casa Grand		----	1545.00	1545.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		1700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
J-31		0.00	1385.00	
Martin Ran		0.00	1403.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 MR		0.00	1395.00	
Well #1 S		-750.00	1385.00	
Well #2 S		0.00	1380.00	
Well #3 S		0.00	1380.00	
Well #4 S		0.00	1385.00	
Well #5 S		0.00	1385.00	
Well #6 S		0.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 35
NUMBER OF END NODES .....(j) = 29

NUMBER OF PRIMARY LOOPS .....(l) = 4
NUMBER OF SUPPLY NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00062

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
Interconne	J-31	J-22	-2076.07	7.50	0.00	3.10	1.80
P-01	Sandia tie	Coolidge S	-1463.53	64.73	0.00	4.09	4.32
P-02	J-03	Sandia tie	-1463.53	7.55	0.00	2.19	0.94
P-03	J-04	J-03	-1463.53	0.80	0.00	2.19	0.94
P-04	J-05	J-04	-530.41	0.47	0.00	0.79	0.14
P-05	J-06	J-05	-230.41	0.13	0.00	0.34	0.03
P-06	J-07	J-06	1363.52	1.23	0.00	2.04	0.83
P-07	J-08	J-07	1363.52	0.71	0.00	2.04	0.83
P-08	J-09	J-08	103.11	0.02	0.00	0.15	0.01
P-09	J-10	J-09	-1272.95	11.45	0.00	3.56	3.33
P-10	J-10	J-11	-427.05	3.20	0.00	1.19	0.44
P-11	J-11	J-12	-233.11	0.25	0.00	0.65	0.14
P-12	J-12	J-13	-233.11	0.46	0.00	0.65	0.14
P-13	J-13	J-04	-933.11	6.17	0.00	2.61	1.88
P-14	J-11	J-06	-893.93	6.29	0.00	2.50	1.73
P-15	J-08	Pump Stati	-1260.41	0.01	0.00	1.88	0.71
P-16	Pump Stati	1 Mil. Tan	-1260.41	0.01	0.00	1.88	0.71
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27
P-18	J-07	Well #2 S	0.00	0.00	0.00	0.00	0.00
P-19	J-12	Well #3 S	0.00	0.00	0.00	0.00	0.00
P-20	J-13	Well #4 S	0.00	0.00	0.00	0.00	0.00
P-21	J-13	Well #5 S	0.00	0.00	0.00	0.00	0.00
P-22	J-05	Well #6 S	0.00	0.00	0.00	0.00	0.00
P-23	J-09	J-31	-2076.07	5.37	0.00	3.10	1.80
P-24	Casa Grand	Martin Ran	2776.07	3.47	0.00	4.15	3.08
P-25	Martin Ran	J-20	2776.07	49.57	0.00	4.15	3.08
P-26	J-20	J-22	2343.79	5.81	0.00	3.50	2.25
P-27	J-22	J-23	167.72	0.22	0.00	0.47	0.08
P-28	J-23	J-24	188.20	0.26	0.00	0.53	0.10
P-29	J-24	J-25	88.20	0.02	0.00	0.25	0.02
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	-111.80	0.85	0.00	0.70	0.26
P-32	J-26	J-23	120.48	0.57	0.00	0.76	0.30
P-33	J-26	J-20	-332.28	5.45	0.00	2.08	1.98
P-34	J-25	Well #1 MR	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC- ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

PUMP Pump Statio IS OPERATING OUT OF RANGE ....

Pump Stati	1260.41	-0.01	88.27	88.3	----	-----	---	----

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Casa Grand		----	1545.00	1545.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1472.72	1395.00	77.72	33.68
J-04		0.00	1471.92	1395.00	76.92	33.33
J-05		300.00	1471.45	1395.00	76.45	33.13
J-06		700.00	1471.32	1385.00	86.32	37.41
J-07		0.00	1472.55	1385.00	87.55	37.94
J-08		0.00	1473.26	1385.00	88.26	38.25
J-09		700.00	1473.28	1385.00	88.28	38.25
J-10		1700.00	1461.83	1380.00	81.83	35.46
J-11		700.00	1465.03	1380.00	85.03	36.85
J-12		0.00	1465.29	1380.00	85.29	36.96
J-13		700.00	1465.75	1385.00	80.75	34.99
J-20		100.00	1491.96	1392.00	99.96	43.31
J-22		100.00	1486.15	1389.00	97.15	42.10
J-23		100.00	1485.93	1390.00	95.93	41.57
J-24		100.00	1485.68	1390.00	95.68	41.46
J-25		0.00	1485.65	1395.00	90.65	39.28
J-26		100.00	1486.50	1395.00	91.50	39.65
J-27		200.00	1485.15	1405.00	80.15	34.73
J-31		0.00	1478.65	1385.00	93.65	40.58
Martin Ran		0.00	1541.53	1403.00	138.53	60.03
Pump Stati		0.00	1384.99	1385.00	-0.01	0.00
Sandia tie		0.00	1480.27	1395.00	85.27	36.95
Well #1 MR		0.00	1485.65	1395.00	90.65	39.28
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Well #2 S		0.00	1472.55	1380.00	92.55	40.11
Well #3 S		0.00	1465.29	1380.00	85.29	36.96
Well #4 S		0.00	1465.75	1385.00	80.75	34.99
Well #5 S		0.00	1465.75	1385.00	80.75	34.99
Well #6 S		0.00	1471.45	1395.00	76.45	33.13
Pump Stati		0.00	1473.27	1385.00	88.27	38.25

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	510.41	
Casa Grande	2776.07	
Coolidge Sy	1463.53	

NET SYSTEM INFLOW = 4750.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 4750.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA and MARTIN RANCH

Attachment D-6

Peak Day Demand Conditions with Fire Flows
(All Wells On)

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* * * * * * * * * *   K Y P I P E 4   * * * * * * * * * *
*                                                        *
*    University of Kentucky Network Modeling Software    *
*                                                        *
*              Copyrighted by KPFS 1998                  *
*             Version 1.200 - 01/26/2000                 *
*                                                        *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Dec 29 13:43:44 2004

INPUT DATA FILENAME ---------- C:\PROGRA~1\PIPE20~1\Sandia-M.DT2
TABULATED OUTPUT FILENAME -------- C:\PROGRA~1\PIPE20~1\Sandia-M.OT2
POSTPROCESSOR RESULTS FILENAME --- C:\PROGRA~1\PIPE20~1\Sandia-M.RS2

S U M M A R Y O F O R I G I N A L D A T A

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	NODE NAMES #2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
Interconne	J-31	J-22	4174.93	16.53	140.0000	0.00
P-01	Sandia tie	Coolidge S	15000.00	12.09	140.0000	0.00
P-02	J-03	Sandia tie	8024.93	16.53	140.0000	0.00
P-03	J-04	J-03	847.64	16.53	140.0000	0.00
P-04	J-05	J-04	3269.72	16.53	140.0000	0.00
P-05	J-06	J-05	4216.77	16.53	140.0000	0.00
P-06	J-07	J-06	1489.94	16.53	140.0000	0.00
P-07	J-08	J-07	864.64	16.53	140.0000	0.00
P-08	J-09	J-08	2386.62	16.53	140.0000	0.00
P-09	J-10	J-09	3434.04	12.09	140.0000	0.00
P-10	J-10	J-11	7256.85	12.09	140.0000	0.00
P-11	J-11	J-12	1759.49	12.09	140.0000	0.00
P-12	J-12	J-13	3194.65	12.09	140.0000	0.00
P-13	J-13	J-04	3292.21	12.09	140.0000	0.00
P-14	J-11	J-06	3629.72	12.09	140.0000	0.00
P-15	J-08	@~Pump Sta	10.00	16.53	140.0000	0.00
P-16	Pump Stati	1 Mil. Tan	10.00	16.53	140.0000	0.00
P-17	1 Mil. Tan	Well #1 S	10.00	16.53	140.0000	0.00
P-18	J-07	Well #2 S	2296.76	12.09	140.0000	0.00
P-19	J-12	Well #3 S	3923.69	12.09	140.0000	0.00
P-20	J-13	Well #4 S	345.97	12.09	140.0000	0.00
P-21	J-13	Well #5 S	342.69	12.09	140.0000	0.00
P-22	J-05	Well #6 S	4542.25	12.09	140.0000	0.00
P-23	J-09	J-31	2985.25	16.53	140.0000	0.00
P-24	Casa Grand	Martin Ran	1127.63	16.53	140.0000	0.00
P-25	Martin Ran	J-20	16101.26	16.53	140.0000	0.00
P-26	J-20	J-22	2579.79	16.53	140.0000	0.00
P-27	J-22	J-23	2764.72	12.09	140.0000	0.00
P-28	J-23	J-24	2673.53	12.09	140.0000	0.00
P-29	J-24	J-25	1046.85	12.09	140.0000	0.00
P-30	J-25	J-27	4661.57	12.09	140.0000	0.00

P-31	J-25	J-26	3231.86	8.07	140.0000	0.00
P-32	J-26	J-23	1876.41	8.07	140.0000	0.00
P-33	J-26	J-20	2750.65	8.07	140.0000	0.00
P-34	J-25	Well #1 MR	931.47	16.53	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump Stati DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
242.31	0.00	1.00
173.08	750.00	1.00
112.50	1125.00	1.00

E N D N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
1 Mil. Tan		----	1385.00	1385.00
Casa Grand		----	1545.00	1545.00
Coolidge S		----	1545.00	1545.00
J-03		0.00	1395.00	
J-04		0.00	1395.00	
J-05		300.00	1395.00	
J-06		700.00	1385.00	
J-07		0.00	1385.00	
J-08		0.00	1385.00	
J-09		700.00	1385.00	
J-10		1700.00	1380.00	
J-11		700.00	1380.00	
J-12		0.00	1380.00	
J-13		700.00	1385.00	
J-20		100.00	1392.00	
J-22		100.00	1389.00	
J-23		100.00	1390.00	
J-24		100.00	1390.00	
J-25		0.00	1395.00	
J-26		100.00	1395.00	
J-27		200.00	1405.00	
J-31		0.00	1385.00	
Martin Ran		0.00	1403.00	
Pump Stati		0.00	1385.00	
Sandia tie		0.00	1395.00	
Well #1 MR		-750.00	1395.00	
Well #1 S		-750.00	1385.00	
Well #2 S		-750.00	1380.00	
Well #3 S		-750.00	1380.00	
Well #4 S		-750.00	1385.00	
Well #5 S		-750.00	1385.00	
Well #6 S		-750.00	1395.00	

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(p) = 35
NUMBER OF END NODES .....(j) = 29

NUMBER OF PRIMARY LOOPS .....(l) = 4
NUMBER OF SUPPLY NODES .....(f) = 3
NUMBER OF SUPPLY ZONES .....(z) = 1

==========

Case: 0

RESULTS OBTAINED AFTER 5 TRIALS: ACCURACY = 0.00206

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE (gpm)	HEAD LOSS (ft)	MINOR LOSS (ft)	LINE VELO. (ft/s)	HL/ 1000 (ft/ft)
Interconne	J-31	J-22	-391.44	0.34	0.00	0.59	0.08
P-01	Sandia tie	Coolidge S	179.80	1.33	0.00	0.50	0.09
P-02	J-03	Sandia tie	179.80	0.16	0.00	0.27	0.02
P-03	J-04	J-03	179.80	0.02	0.00	0.27	0.02
P-04	J-05	J-04	-333.85	0.20	0.00	0.50	0.06
P-05	J-06	J-05	-783.85	1.25	0.00	1.17	0.30
P-06	J-07	J-06	279.79	0.07	0.00	0.42	0.04
P-07	J-08	J-07	-470.21	0.10	0.00	0.70	0.11
P-08	J-09	J-08	-1308.56	1.82	0.00	1.96	0.76
P-09	J-10	J-09	-1000.00	7.32	0.00	2.79	2.13
P-10	J-10	J-11	-700.00	7.99	0.00	1.96	1.10
P-11	J-11	J-12	-1036.36	4.01	0.00	2.90	2.28
P-12	J-12	J-13	-286.36	0.67	0.00	0.80	0.21
P-13	J-13	J-04	513.64	2.04	0.00	1.44	0.62
P-14	J-11	J-06	-363.64	1.19	0.00	1.02	0.33
P-15	J-08	Pump Stati	-838.35	0.00	0.00	1.25	0.34
P-16	Pump Stati	1 Mil. Tan	-838.35	0.00	0.00	1.25	0.34
P-17	1 Mil. Tan	Well #1 S	-750.00	0.00	0.00	1.12	0.27
P-18	J-07	Well #2 S	-750.00	2.87	0.00	2.10	1.25
P-19	J-12	Well #3 S	-750.00	4.91	0.00	2.10	1.25
P-20	J-13	Well #4 S	-750.00	0.43	0.00	2.10	1.25
P-21	J-13	Well #5 S	-750.00	0.43	0.00	2.10	1.25
P-22	J-05	Well #6 S	-750.00	5.68	0.00	2.10	1.25
P-23	J-09	J-31	-391.44	0.24	0.00	0.59	0.08
P-24	Casa Grand	Martin Ran	341.44	0.07	0.00	0.51	0.06
P-25	Martin Ran	J-20	341.44	1.02	0.00	0.51	0.06
P-26	J-20	J-22	291.06	0.12	0.00	0.44	0.05
P-27	J-22	J-23	-200.38	0.30	0.00	0.56	0.11
P-28	J-23	J-24	-318.69	0.69	0.00	0.89	0.26
P-29	J-24	J-25	-418.69	0.44	0.00	1.17	0.43
P-30	J-25	J-27	200.00	0.50	0.00	0.56	0.11
P-31	J-25	J-26	131.31	1.15	0.00	0.82	0.36
P-32	J-26	J-23	-18.31	0.02	0.00	0.11	0.01
P-33	J-26	J-20	49.62	0.16	0.00	0.31	0.06
P-34	J-25	Well #1 MR	-750.00	0.25	0.00	1.12	0.27

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE (gpm)	INLET HEAD (ft)	OUTLET HEAD (ft)	HEAD CHANGE (ft)	EFFIC- ENCY (%)	USEFUL POWER (Hp)	INCREMTL COST ($)	TOTAL COST ($)

Pump Stati	838.35	0.00	160.03	160.0	----	-----	---	----

E N D N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	HYDRAULIC GRADE (ft)	NODE ELEVATION (ft)	PRESSURE HEAD (ft)	NODE PRESSURE (psi)
1 Mil. Tan		----	1385.00	1385.00	0.00	0.00
Casa Grand		----	1545.00	1545.00	0.00	0.00
Coolidge S		----	1545.00	1545.00	0.00	0.00
J-03		0.00	1546.49	1395.00	151.49	65.64
J-04		0.00	1546.50	1395.00	151.50	65.65
J-05		300.00	1546.31	1395.00	151.31	65.57
J-06		700.00	1545.06	1385.00	160.06	69.36
J-07		0.00	1545.12	1385.00	160.12	69.39
J-08		0.00	1545.02	1385.00	160.02	69.34
J-09		700.00	1543.20	1385.00	158.20	68.55
J-10		1700.00	1535.88	1380.00	155.88	67.55
J-11		700.00	1543.87	1380.00	163.87	71.01
J-12		0.00	1547.88	1380.00	167.88	72.75
J-13		700.00	1548.55	1385.00	163.55	70.87
J-20		100.00	1543.91	1392.00	151.91	65.83
J-22		100.00	1543.78	1389.00	154.78	67.07
J-23		100.00	1544.08	1390.00	154.08	66.77
J-24		100.00	1544.77	1390.00	154.77	67.07
J-25		0.00	1545.21	1395.00	150.21	65.09
J-26		100.00	1544.07	1395.00	149.07	64.60
J-27		200.00	1544.71	1405.00	139.71	60.54
J-31		0.00	1543.44	1385.00	158.44	68.66
Martin Ran		0.00	1544.93	1403.00	141.93	61.50
Pump Stati		0.00	1385.00	1385.00	0.00	0.00
Sandia tie		0.00	1546.33	1395.00	151.33	65.58
Well #1 MR		-750.00	1545.47	1395.00	150.47	65.20
Well #1 S		-750.00	1385.00	1385.00	0.00	0.00
Well #2 S		-750.00	1548.00	1380.00	168.00	72.80
Well #3 S		-750.00	1552.79	1380.00	172.79	74.87
Well #4 S		-750.00	1548.98	1385.00	163.98	71.06
Well #5 S		-750.00	1548.98	1385.00	163.98	71.06
Well #6 S		-750.00	1551.99	1395.00	156.99	68.03
Pump Stati		0.00	1545.03	1385.00	160.03	69.34

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE
1 Mil. Tank	88.35	
Casa Grande	341.44	
Coolidge Sy	-179.80	

NET SYSTEM INFLOW = 429.80
NET SYSTEM OUTFLOW = -179.80
NET SYSTEM DEMAND = 250.00

***** HYDRAULIC ANALYSIS COMPLETED *****

SANDIA and MARTIN RANCH

Attachment D-7

Well and Tank Analysis

ARIZONA WATER COMPANY

System: Casa Grande, Coolidge, Martin Ranch, and Sandia

SYSTEM	MONTH 2004	AVERAGE DAY PEAK MONTH (gpd)	PEAK DAY PEAK MONTH (gpd)	MAXIMUM PRODUCTION (gpd) LESS LARGEST PRODUCER	STORAGE AVAILABLE FOR USE (gpd)	NET GAIN or (LOSS) (gpm)
CG, CL	June	21,994,969	26,393,963	31,727,520	2,917,583	5,730

No Additional production required

Well Number and Name	Production (gpm)	Tank Name	Storage (gal)
#1 - Martin Ranch	750	Martin Ranch	1,000,000
#10 - Casa Grande	900	Indian Hills	100,000
#14 - Cottonwood Ln.	150	Cottonwood	1,000,000
#17 - Casa Grande	800	Burgess Peak	2,000,000
#19 - Poonian	1620	Casa Grande Mtn	5,000,000
#20 - Casa Grande	1200	Scott Drive #1	110,000
#21 - Casa Grande	720	Scott Drive #2	5,000,000
#22 - Singh/Quaid	1100	North Park	625,000
#23 - Casa Grande	1600	North Park	35,000
#24 - Casa Grande	1000	Sandia Tank #1	1,000,000
#25 - Casa Grande	1300	Warehouse Tank #1	100,000
#26 - Casa Grande	1460	Warehouse Tank #2	500,000
#27 - Lake in the Desert	470	Warehouse Tank #3	1,000,000
#28 - Az City	1500	North Tank #1	35,500
#29 - Mission Royale	1500	North Tank #2	116,000
#1 - Sandia	750	Valley Farms Tank	15,000
#2 - Sandia	750		
#3 - Sandia	750		
#4 - Sandia	750		
#5 - Sandia	750		
#6 -Sandia	750		
#7 - Coolidge	1140		
#9 - Coolidge	1350		
#10 - Coolidge	1500		
#2 - Valley Farms	260		
TOTAL PRODUCTION:	24,820	TOTAL STORAGE:	17,505,500

Largest producer out-of-service in Casa Grande taking the Blend Plan with it.

Largest producer out-of-service in Coolidge

Design Statement for Well Production:

The water distribution system must have sufficient well capacity to meet the peak day demand for three consecutive days with the largest producing well out-of-service. One-half of the available storage can be used to meet the peak day demand over the same period of time with the remaining storage held in reserve for fire protection.

Design Criteria:

Peak Day Peak Month = 1.2 x Average Day Peak Month

All other wells run 24 hours per day

ARIZONA WATER COMPANY

DAY ONE
STORAGE CALCULATIONS
SYSTEM - CASA GRANDE, COOLIDGE, MARTIN RANCH, AND SANDIA

* PRODUCTION (Gallons) =	31,727,520
HOURLY SOURCE OF SUPPLY (Gal/day)=	1,321,980
AVERAGE DAY PEAK MONTH (Gallons) =	21,994,969
PEAK DAY PEAK MONTH (Gal/day) =	26,393,963
AVERAGE HOURLY DEMAND (Peak Day)=	1,099,748

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	1485.98	1321.98	-164.00	-164.00
7-8 AM	0.0779	2056.09	1321.98	-734.11	-898.11
8-9 AM	0.0824	2174.86	1321.98	-852.88	-1750.99
9-10 AM	0.0769	2029.70	1321.98	-707.72	-2458.71
10-11 AM	0.0657	1734.08	1321.98	-412.10	-2870.81
11-12 PM	0.0569	1501.82	1321.98	-179.84	-3050.65
12-1 PM	0.0496	1309.14	1321.98	12.84	-3037.81
1-2 PM	0.0458	1208.84	1321.98	113.14	-2924.67
2-3 PM	0.0423	1116.46	1321.98	205.52	-2719.16
3-4 PM	0.0402	1061.04	1321.98	260.94	-2458.21
4-5 PM	0.0451	1190.37	1321.98	131.61	-2326.60
5-6 PM	0.0442	1166.61	1321.98	155.37	-2171.23
6-7 PM	0.0461	1216.76	1321.98	105.22	-2066.02
7-8 PM	0.0417	1100.63	1321.98	221.35	-1844.66
8-9 PM	0.038	1002.97	1321.98	319.01	-1525.66
9-10 PM	0.0387	1021.45	1321.98	300.53	-1225.12
10-11 PM	0.033	871.00	1321.98	450.98	-774.14
11-12 AM	0.0246	649.29	1321.98	672.69	-101.45
12-1 AM	0.016	422.30	1321.98	899.68	798.22
1-2 AM	0.0102	269.22	1321.98	1052.76	1850.98
2-3 AM	0.0102	269.22	1321.98	1052.76	2903.75
3-4 AM	0.0139	366.88	1321.98	955.10	3858.85
4-5 AM	0.016	422.30	1321.98	899.68	4758.53
5-6 AM	0.0283	746.95	1321.98	575.03	5333.56
TOTAL	1	26,393.9628			

Minimum Storage Requirements	3,050,648	Gallons
*** Fire Flow Requirements	480,000	Gallons
TOTAL STORAGE REQUIRED	3,530,648	Gallons
TOTAL STORAGE AVAILABLE	17,505,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service taking Blen Plan with it.
***Fire Flows - 2,000 gpm @ 4 hours = 480,000 gallons.

ARIZONA WATER COMPANY

DAY TWO
STORAGE CALCULATIONS
SYSTEM - CASA GRANDE, COOLIDGE, MARTIN RANCH, AND SANDIA

* PRODUCTION (Gallons) =	31,727,520
HOURLY SOURCE OF SUPPLY (Gal/day)=	1,321,980
AVERAGE DAY PEAK MONTH (Gallons) =	21,994,969
PEAK DAY PEAK MONTH (Gal/day) =	26,393,963
AVERAGE HOURLY DEMAND (Peak Day)=	1,099,748

TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	1485.98	1321.98	-164.00	5169.56
7-8 AM	0.0779	2056.09	1321.98	-734.11	4435.45
8-9 AM	0.0824	2174.86	1321.98	-852.88	3582.56
9-10 AM	0.0769	2029.70	1321.98	-707.72	2874.85
10-11 AM	0.0657	1734.08	1321.98	-412.10	2462.75
11-12 PM	0.0569	1501.82	1321.98	-179.84	2282.91
12-1 PM	0.0496	1309.14	1321.98	12.84	2295.75
1-2 PM	0.0458	1208.84	1321.98	113.14	2408.89
2-3 PM	0.0423	1116.46	1321.98	205.52	2614.40
3-4 PM	0.0402	1061.04	1321.98	260.94	2875.34
4-5 PM	0.0451	1190.37	1321.98	131.61	3006.96
5-6 PM	0.0442	1166.61	1321.98	155.37	3162.32
6-7 PM	0.0461	1216.76	1321.98	105.22	3267.54
7-8 PM	0.0417	1100.63	1321.98	221.35	3488.89
8-9 PM	0.038	1002.97	1321.98	319.01	3807.90
9-10 PM	0.0387	1021.45	1321.98	300.53	4108.44
10-11 PM	0.033	871.00	1321.98	450.98	4559.41
11-12 AM	0.0246	649.29	1321.98	672.69	5232.10
12-1 AM	0.016	422.30	1321.98	899.68	6131.78
1-2 AM	0.0102	269.22	1321.98	1052.76	7184.54
2-3 AM	0.0102	269.22	1321.98	1052.76	8237.30
3-4 AM	0.0139	366.88	1321.98	955.10	9192.41
4-5 AM	0.016	422.30	1321.98	899.68	10092.08
5-6 AM	0.0283	746.95	1321.98	575.03	10667.11
TOTAL	1	26,393.963			

Minimum Storage Requirements	0	Gallons
*** Fire Flow Requirements	480,000	Gallons
TOTAL STORAGE REQUIRED	480,000	Gallons
TOTAL STORAGE AVAILABLE	17,505,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service taking Blen Plan with it.
***Fire Flows - 2,000 gpm @ 4 hours = 480,000 gallons.

ARIZONA WATER COMPANY

DAY THREE
STORAGE CALCULATIONS
SYSTEM - CASA GRANDE, COOLIDGE, MARTIN RANCH, AND SANDIA

* PRODUCTION (Gallons) =	31,727,520
HOURLY SOURCE OF SUPPLY (Gal/day)=	1,321,980
AVERAGE DAY PEAK MONTH (Gallons) =	21,994,969
PEAK DAY PEAK MONTH (Gal/day) =	26,393,963
AVERAGE HOURLY DEMAND (Peak Day)=	1,099,748

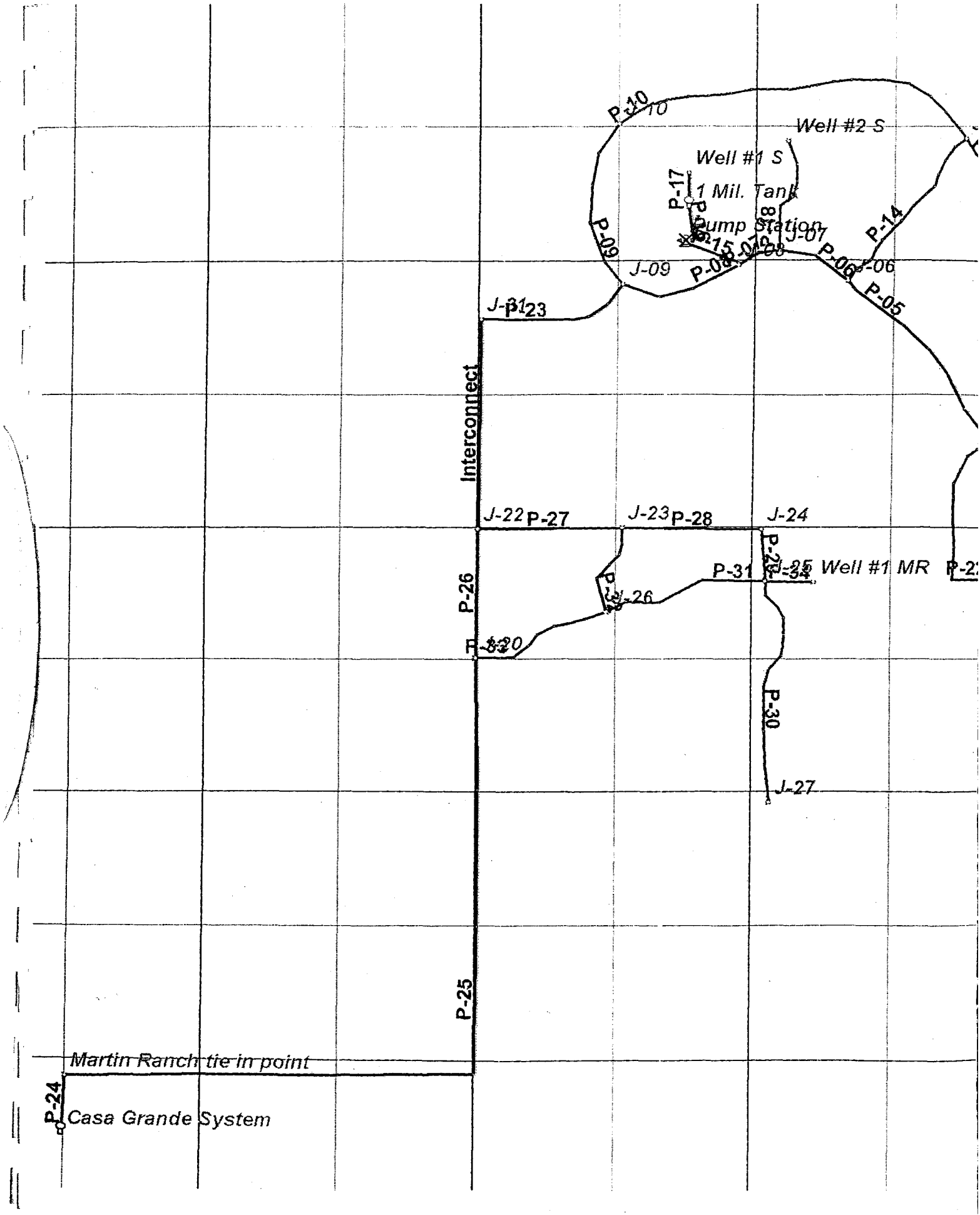
TIME	% OF AVERAGE DAY	THOUSAND GALLONS PER HOUR			STORAGE IN 1,000 GALLONS
		USE	FROM SOURCE	TO STORAGE	
6-7 AM	0.0563	1485.98	1321.98	-164.00	10503.11
7-8 AM	0.0779	2056.09	1321.98	-734.11	9769.00
8-9 AM	0.0824	2174.86	1321.98	-852.88	8916.12
9-10 AM	0.0769	2029.70	1321.98	-707.72	8208.41
10-11 AM	0.0657	1734.08	1321.98	-412.10	7796.30
11-12 PM	0.0569	1501.82	1321.98	-179.84	7616.47
12-1 PM	0.0496	1309.14	1321.98	12.84	7629.31
1-2 PM	0.0458	1208.84	1321.98	113.14	7742.44
2-3 PM	0.0423	1116.46	1321.98	205.52	7947.96
3-4 PM	0.0402	1061.04	1321.98	260.94	8208.90
4-5 PM	0.0451	1190.37	1321.98	131.61	8340.51
5-6 PM	0.0442	1166.61	1321.98	155.37	8495.88
6-7 PM	0.0461	1216.76	1321.98	105.22	8601.10
7-8 PM	0.0417	1100.63	1321.98	221.35	8822.45
8-9 PM	0.038	1002.97	1321.98	319.01	9141.46
9-10 PM	0.0387	1021.45	1321.98	300.53	9441.99
10-11 PM	0.033	871.00	1321.98	450.98	9892.97
11-12 AM	0.0246	649.29	1321.98	672.69	10565.66
12-1 AM	0.016	422.30	1321.98	899.68	11465.34
1-2 AM	0.0102	269.22	1321.98	1052.76	12518.10
2-3 AM	0.0102	269.22	1321.98	1052.76	13570.86
3-4 AM	0.0139	366.88	1321.98	955.10	14525.96
4-5 AM	0.016	422.30	1321.98	899.68	15425.64
5-6 AM	0.0283	746.95	1321.98	575.03	16000.67
TOTAL	1	26,393.963			

Minimum Storage Requirements	0	Gallons
*** Fire Flow Requirements	480,000	Gallons
TOTAL STORAGE REQUIRED	480,000	Gallons
TOTAL STORAGE AVAILABLE	17,505,500	Gallons
ADDITIONAL STORAGE REQUIRED	0	Gallons

* Largest Producer out-of-service taking Blen Plan with it.
***Fire Flows - 2,000 gpm @ 4 hours = 480,000 gallons.

FIGURE D

Sandia and Martin Ranch Subdivision Layout



P-10
J-10
Well #2 S
Well #1 S
P-17
1 Mil. Tank
Pump Station
P-09
J-09
P-08
J-07
P-06
J-06
P-14
P-05
J-31
P-23
Interconnect
J-22
P-27
J-23
P-28
J-24
P-31
J-25
Well #1 MR
P-26
J-26
P-32
J-20
P-30
J-27
P-25
Martin Ranch tie in point
P-24
Casa Grande System

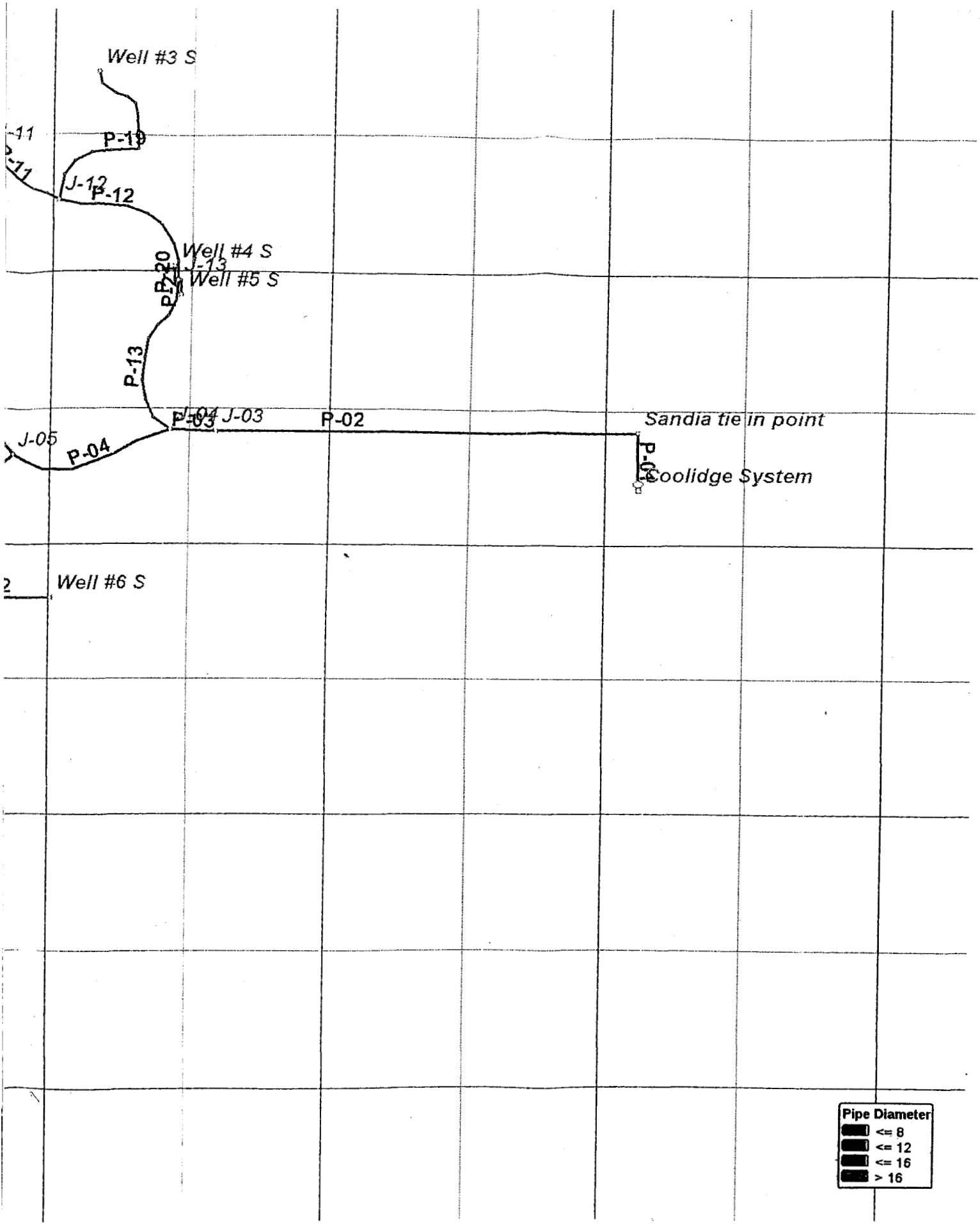
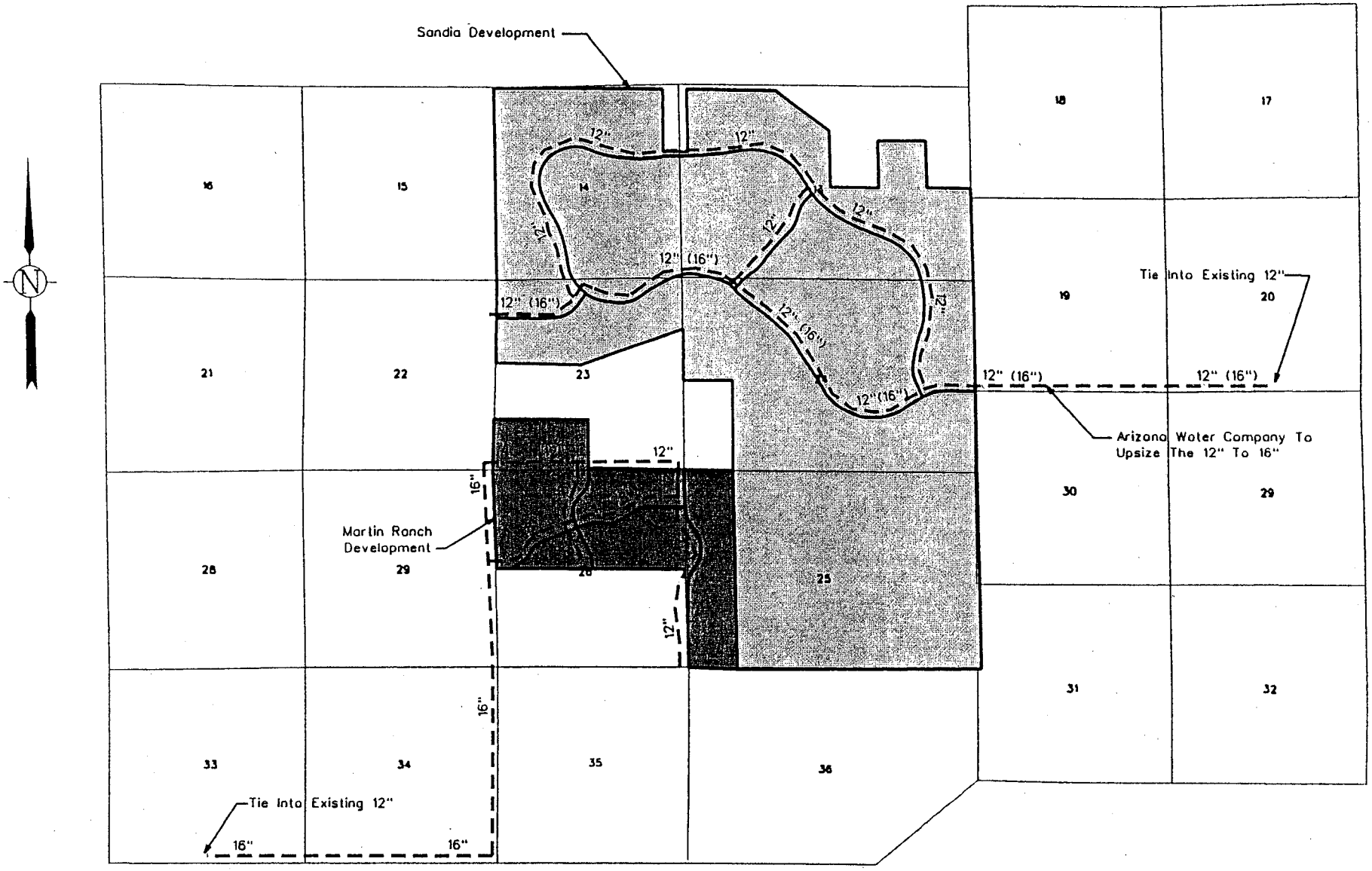

Well #3 S
P-19
J-12
P-12
Well #4 S
J-13
Well #5 S
P-20
P-13
J-04
J-03
P-03
P-02
Sandia tie in point
J-05
P-04
P-01
Coolidge System
Well #6 S
Pipe Diameter
<= 8
<= 12
<= 16
> 16

FIGURE E

Design Layout



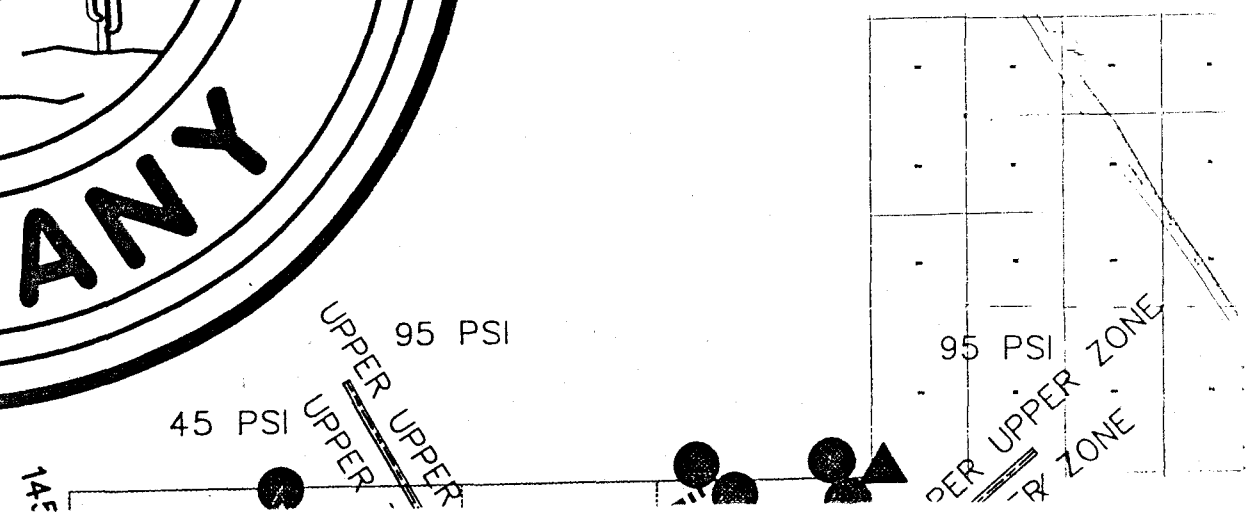
Sandia Development
Martin Ranch Development
Tie Into Existing 12"
Arizona Water Company To Upsize The 12" To 16"
Tie Into Existing 12"
12" (16")
12"
16"
N

Oversized Map See Supervisor

EXHIBIT
WWC-26A
Admitted

ARIZONA WATER COMPANY

PIN



Southwest Ground-water Consultants, Inc.

August 2, 2004

Mr. Russ L. Shasky
Senior Vice President Land Development
Pivotal Group
2555 East Camelback Road, Suite 700
Phoenix, Arizona 85016

SUBJECT: WELL EVALUATION AND SAMPLING – SUNDANCE FARMS WELLS 905, 1065, 1075, 1096, 1100, AND 1110, PINAL COUNTY, ARIZONA

Dear Mr. Shasky:

Southwest Ground-water Consultants, Inc. (SGC) has prepared this letter report to document water quality sampling and evaluation activities conducted at the existing Sundance Farms irrigation wells No. 905, 1065, 1075, 1096, 1100, and 1110. The well locations are shown in Figure 1.

This study was conducted to evaluate the composite ground-water quality in selected wells and zone specific water quality at various depths within well 1065. The scope of work conducted for this project is summarized in the following sections.

WELL SAMPLING

A ground-water sample was collected from Sundance Farms Well 1110 on January 28, 2004 and delivered to Precision Analytical Laboratories. Ground-water samples were collected from Sundance Farms wells 905, 1065, 1075, 1096, and 1100 on April 2, 2004 and delivered to Del Mar Analytical. All of the samples were analyzed for nitrate as nitrogen, fluoride, arsenic, and total dissolved solids (TDS). A summary of the analytical results are presented in Table 1 and the laboratory reports are included in Attachment I.

The Maximum Contaminant Level (MCL) of 4.0 milligrams per liter (mg/L) for fluoride was exceeded in the samples collected from wells 1096, 1100, and 1110. The MCL of 10 mg/L for nitrate as nitrogen was exceeded in the samples collected from wells 905 and 1075. The Secondary Drinking Water Standard of 500 mg/L for TDS was exceeded in the samples collected from all of the wells. TDS concentrations in wells 905, 1075, and 1096 ranged from 1500 to 3400 mg/L.

The current MCL of 0.05 mg/L for arsenic was not exceeded in any of the samples analyzed. However, all of the results, except for the sample collected from well 1075 exceeded the future MCL for arsenic 0.010 mg/L that will become effective in January of 2006.

3900 East Camelback Road, #200
Phoenix, Arizona 85018-2636
(602) 955-5547 Fax (602) 955-7585

WWC-31
Admitted

DOWNHOLE VIDEO SURVEY (WELL 1065)

The Weber Group (Weber) conducted a down-hole color video survey of Sundance Farms well 1065 on May 24, 2004. The outside diameter of the well casing is 16 inches. At the time of the survey, Weber observed approximately 100 feet of lubricating oil on the ground-water surface.

SGC reviewed the video and prepared a video survey log, which is included in Attachment II. Review of the video survey indicated that the bottom of the well casing is at 1,240 feet below land surface (bls), and open hole exists from 1,240 to 1,270 feet bls. The depth of the first encountered fluid in the well was observed at 160 feet bls.

The well perforations consist of Mill's Knife perforations from 840 to 1223 feet bls. Small holes were observed in the casing at 456, 538, 581, and 625 feet. The well perforations were approximately 70 to 90% clogged from 840 to 856 feet bls. The perforations appeared to be less than 50% clogged below 856 feet. Minor scale deposits were noted on the well casing from approximately 640 to 1,223 feet bls. A slight increase in scale build-up was observed below 1,223 feet bls to the bottom of the casing.

The video is dark with zero visibility from 160 to 242 feet bls and cloudy with poor visibility from 160 to 456 feet bls. Poor visibility is usually a result of minimal to no flow of water in that portion of the casing. The water was clear below 456 feet bls.

DOWNHOLE SPINNER LOGGING (WELL 1065)

Prior to conducting logging activities at well 1065, Coolidge Engine & Pump was contracted by the Pivotal Group to remove the lubricating oil from the ground-water surface. More than 900 gallons of oil were removed from the well over a two-day period.

SGC contracted Southwest Exploration Services, LLC (SEC) to conduct a spinner flow meter survey and collect depth specific samples on June 11, 2004. The spinner log conducted at Sundance Farms Well 1065 was used to determine the relative rate of fluid movement within the well casing. The resulting depth profile of fluid movement was then used to identify zones of productivity in the well. A copy of the spinner log is included in Attachment III.

The spinner log was created by lowering a flowmeter tool down the casing at a constant rate. The device records continuously, from the bottom of the spinner access tube to the bottom of the well casing, both the rate of movement of the device (linespeed) and the rate at which the impeller spins in units of counts per second (cps). Using these data, the rate of fluid movement in the well casing, and subsequently the volumetric flow rate were

determined. The estimated flow rate with depth in the well casing is presented in Figure 2. The contribution of flow from each perforated interval is presented below.

Depth Interval (ft bls)	Flow contribution (gpm)	Percent Contribution
0-868	109	21.7%
868-1000	80	16.0%
1000-1048	122	24.4%
1048-1152	51	10.2%
1152-1270	139	27.7
Total	**501**	**100%**

DEPTH SPECIFIC SAMPLING (WELL 1065)

Following field interpretation of the spinner log, four separate sampling points (868, 1000, 1048, and 1152 feet (bls) were chosen, and samples were collected from each of these points on June 11, 2004. In addition, a composite sample was collected from the wellhead at ground surface. Samples were delivered to Precision Analytical Laboratories and were analyzed for nitrate as nitrogen, fluoride, arsenic, and TDS. A summary of the analytical results are presented in Table 2 and the laboratory reports are included in Attachment I.

Depth-specific samples represent a composite of all water below the sampled depth. To estimate the quality of water entering the casing between each sampling point, the measured concentrations and the results of the spinner logging analysis were input into the following equation, which is based on mass-balance principles:

$$c_{zone} = \frac{c_T Q_T - c_B Q_B}{Q_{zone}}$$

Where:

c_{zone} = concentration of analyte entering casing between sample depths (mg/L)

c_T = concentration of analyte at top sampling depth (mg/L)

c_B = concentration of analyte at bottom sampling depth (mg/L)

Q_T = flowrate of water up casing at top sampling depth (gpm)

Q_B = flowrate of water up casing at bottom sampling depth (gpm)

$Q_{zone} = Q_T - Q_B$ = flowrate of water entering casing between sample depths (gpm)

Using the equation above, the concentrations of water entering the casing are summarized below:

Depth Interval (ft bls)	Flow Contribution (gpm)	NO_3 as N (mg/L)	F (mg/L)	As (mg/L)	TDS (mg/L)
0-868	109	1.50	3.06	0.0195	660
868-1000	80	1.50	1.43	0.0056	660
1000-1048	122	1.50	2.74	0.0110	691
1048-1152	51	1.77	3.82	0.0110	667
1152-1270	139	1.40	2.70	0.0110	630
Composite	501	1.50	2.70	0.0120	660

A review of the results indicates that nitrate as nitrogen, fluoride, arsenic, and TDS are all within acceptable limits. All of the arsenic results, except for the sample collected at 868 feet bls exceed the future limit of 0.01 mg/L, which will become effective January 23, 2006.

CONCLUSIONS

The best overall water quality was observed in Sundance Farms well 1065. In the composite samples and in the zone specific samples, concentrations of arsenic, TDS, fluoride, and nitrate were all below their respective MCls. Results of the zone specific sampling indicate that the best water quality is produced from the interval between 868 to 1,000 feet bls.

Based on the analytical data for the samples collected from all of the selected wells, it appears that wells screened at depths greater than 800 feet bls provide ground water with lower concentrations of TDS. However, even the lowest detected concentrations exceed the Secondary Drinking Water Standard of 500 mg/L for TDS. Nitrate was detected in two of the wells at concentrations that exceeded its MCL of 10 mg/L and fluoride was detected in three of the wells at concentrations that exceeded its MCL of 4.0 mg/L. It should be noted that total depth and perforated interval information for the sampled wells, other than well 1065, was obtained from Arizona Department of Water Resources (ADWR) databases and was not field verified by SGC. Variations in depth and perforated intervals could change the conclusions stated herein.

Some blending and/or treatment will be necessary to reduce concentrations of fluoride and nitrate. Also, following the reduction of the MCL for arsenic from 0.050 to 0.010 mg/L in January of 2006, it will probably be necessary to remediate pumped ground water to reduce arsenic concentrations to acceptable levels.

If you have any questions regarding the information provided herein, please call.

Sincerely,

Southwest Ground-water Consultants, Inc.

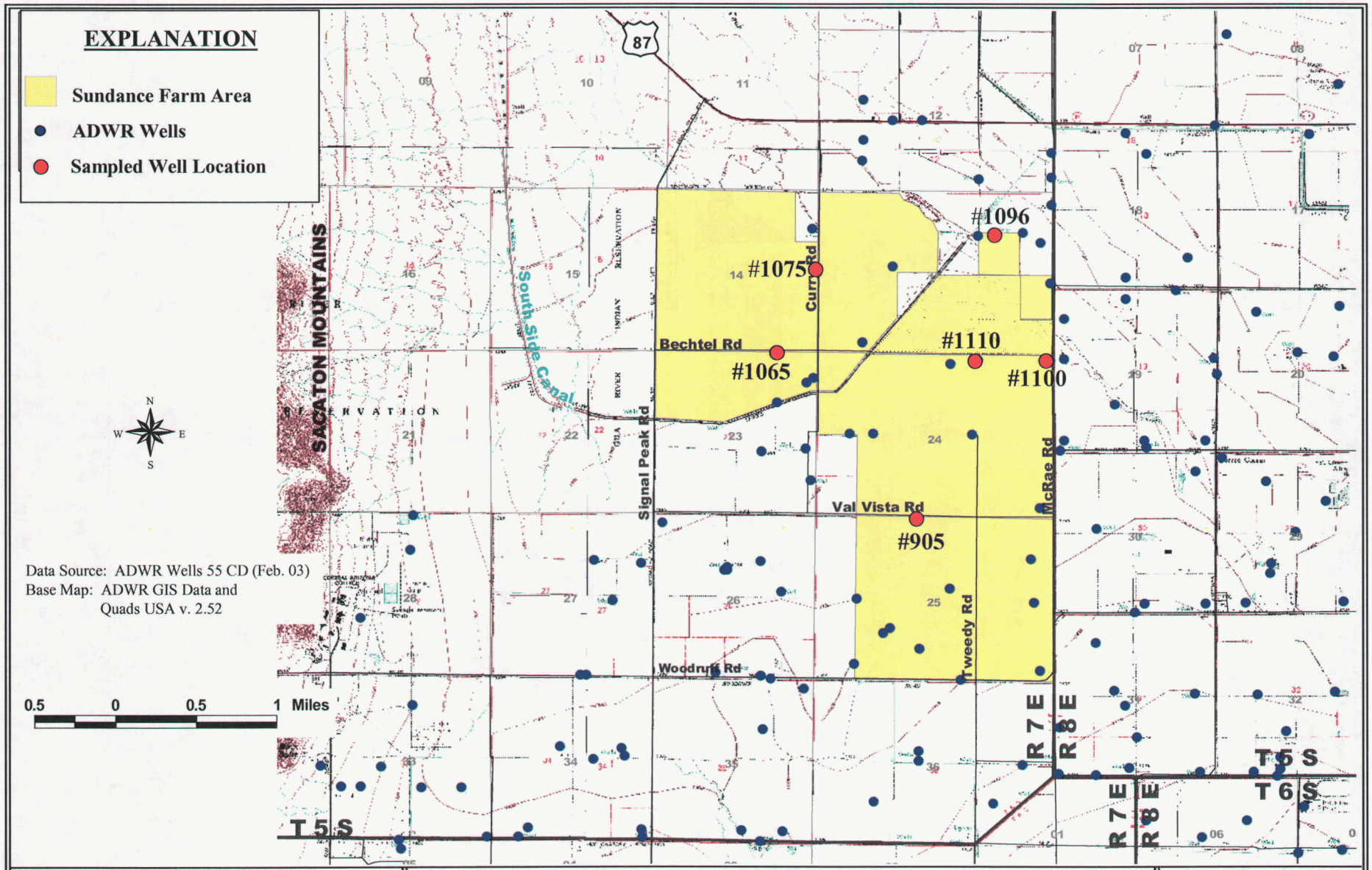
Stephen D. Noel, P.G.
President

REGISTERED GEOLOGIST
CERTIFICATE NO.
17065
STEPHEN D.
NOEL
Date Signed 8/2/04
ARIZONA, U.S.A.

Attachment I: Analytical Laboratory Reports
Attachment II: Video Survey Log
Attachment III: Spinner Log

Figures

FIGURES



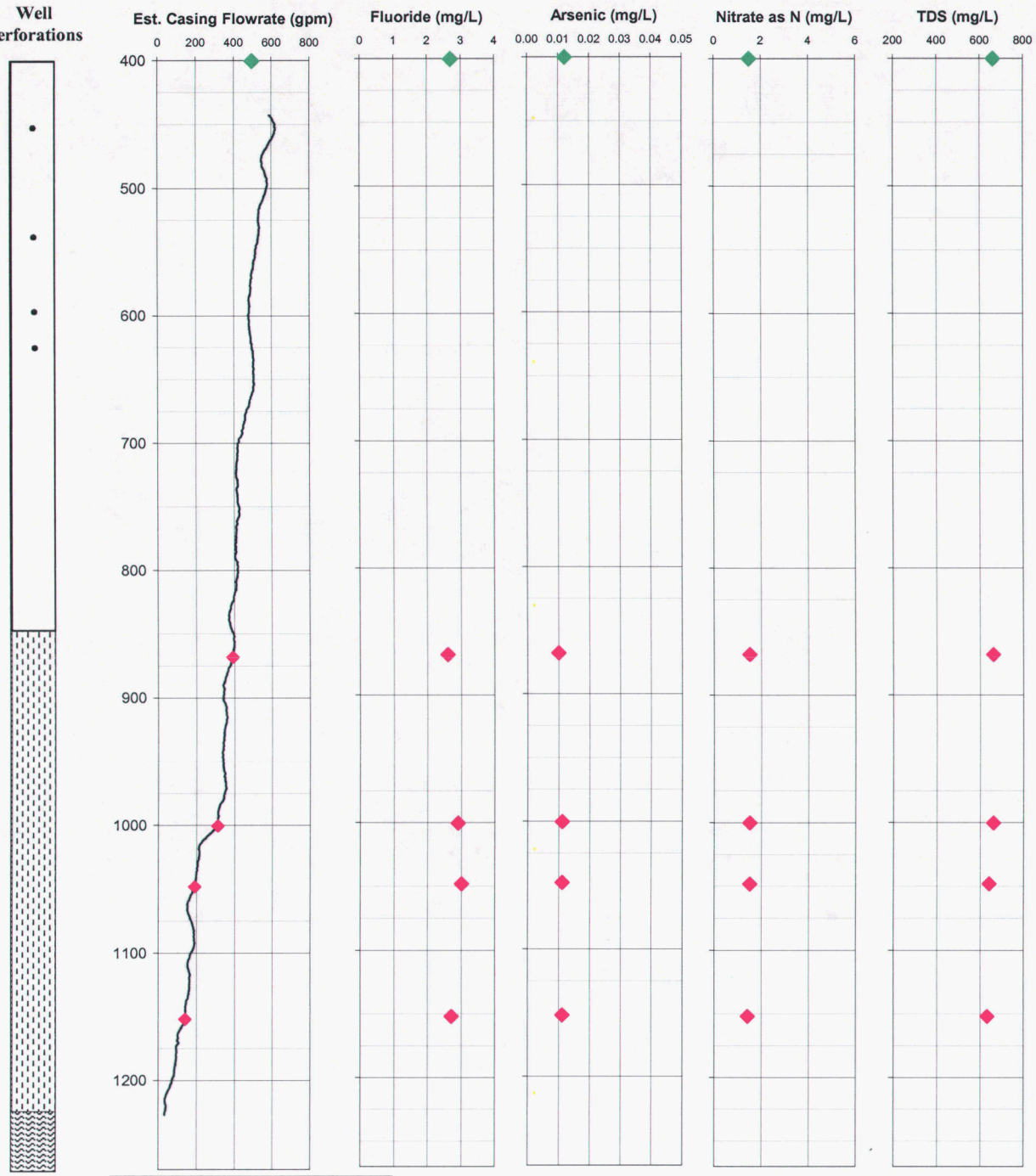
Southwest Ground-water Consultants, Inc.

April 23, 2004 Project B.793

WELL LOCATION MAP

Sundance Farms, Pinal County, Arizona

Figure 1



Southwest Ground-water Consultants, Inc.

July 29, 2004 **Project B.793**

DEPTH SPECIFIC SAMPLING ANALYSIS

Sundance Farms Well 1065
Pinal County, Arizona

Figure 2

Tables

TABLES

TABLE 1
ANALYTICAL RESULTS FOR COMPOSITE GROUND-WATER SAMPLES COLLECTED AT SUNDANCE FARMS

SAMPLE ID (ADWR WELL No.) [Cadastral Location]	SAMPLE DATE	WELL PERFORATED INTERVAL (feet)	WELL DEPTH (feet)	PUMP RATE (gpm)	NITRATE-N USEPA METHOD 300.0 (mg/l)	FLUORIDE USEPA METHOD 300.0 (mg/l)	ARSENIC USEPA METHOD 200.8 (mg/l)	TOTAL DISSOLVED SOLIDS METHOD SM2540C (mg/l)
Well 1065** (55-621828) [D(5-7)14dcd]	4/02/04	Holes@456, 538, 581, and 625 Mills Knife@840-1223	1270	1768	1.3	{3.3}	0.012	{620}
Well 1100 (55-621804) [D(5-7)24aaa]	4/02/04	Unknown	470 1500***	1917	3.4	**{4.4}**	0.025	{570}
Well 1110 (55-621805) [D(5-7)24abb]	1/28/04	950-1200	1230	1768	2.4	**{6.0}**	0.039	{550}
Well 1096 (55-621844) [D(5-7)13a]	4/02/04	Unknown	Unknown 1400***	0	8.8	**{4.4}**	0.018	{1500}
Well 905 (55-621826) [D(5-7)24dcc]	4/02/04	1260-1420 1545-1555	1315	800	**13**	{3.2}	0.018	{2000}
Well 1075 (55-621834) [D(5-7)14add]	4/02/04	110-440	466	0	**20**	{2.0}	0.0063	{3400}
Arizona Maximum Contaminant Levels (MCLs)					**10**	**4.0**	**0.05***	NL
USEPA Secondary Drinking Water Standard					NL	{2.0}	NL	{500}

mg/l = milligrams per liter
Bold = Analytical result is equal to or greater than the MCL
NL =MCL or Secondary Drinking Water Standard is not listed for this constituent
{570} = Analytical result is equal to or greater than Secondary Drinking Water Standard
* = MCL for Arsenic will be reduced to 0.01 ug/l effective January, 2006
** = Well analyzed for new source parameters
*** = Well depth provided by well owner

TABLE 2
ANALYTICAL RESULTS FOR ZONE SPECIFIC GROUND-WATER SAMPLES COLLECTED AT WELL 1065

SAMPLE ID	SAMPLE DATE	SAMPLE DEPTH (feet)	CHLORIDE USEPA METHOD 300.0 (mg/l)	SULFATE USEPA METHOD 300.0 (mg/l)	NITRATE-N USEPA METHOD 300.0 (mg/l)	FLUORIDE USEPA METHOD 300.0 (mg/l)	ARSENIC USEPA METHOD 200.8 (mg/l)	TOTAL DISSOLVED SOLIDS METHOD SM2540C (mg/l)
1065-868	6/11/04	868	220	160	1.5	{2.6}	0.0099	{660}
1065-1000	6/11/04	1000	230	150	1.5	{2.9}	0.011	{660}
1065-1048	6/11/04	1048	210	160	1.5	{3.0}	0.011	{640}
1065-1152	6/11/04	1152	210	150	1.4	{2.7}	0.011	{630}
1065-Composite	6/11/04	Composite	220	160	1.5	{2.7}	0.012	{660}
Arizona Maximum Contaminant Levels (MCLs)					**10**	**4.0**	**0.05***	NL
USEPA Secondary Drinking Water Standard					NL	{2.0}	NL	{500}

mg/l = milligrams per liter
Bold = Analytical result is equal to or greater than the MCL
NL =MCL or Secondary Drinking Water Standard is not listed for this constituent
{540} = Analytical result is equal to or greater than Secondary Drinking Water Standard
* = MCL for Arsenic will be reduced to 0.01 mg/l effective January, 2006
Well Depth = 1,502 feet bgs to fill
Screened Interval = Wire Wrap from 902 to 1,502 feet bgs
Static Water Level = 341 feet bgs on 6/02/04
Pump Rate = 520 gpm

Attachment 1

ATTACHMENT I

ANALYTICAL LABORATORY REPORTS

Aerotech Environmental Laboratories

a division of Aerotech Laboratories, Inc.

Thursday, June 24, 2004

Kevin Hebert
Southwest Ground-Water Consultants, Inc.
3900 East Camelback Road, Suite 200
Phoenix, AZ 85018-2636

TEL: (602) 955-5547
FAX (602) 955-7585

RE: Sandia Well #1065/B.793

Order No.: 04060870

Dear Kevin Hebert:

Aerotech Environmental received 5 sample(s) on 6/11/2004 for the analyses presented in the following report.

This report includes the following information:
- Case Narrative.
- Analytical Report: includes test results, report limit (Limit), any applicable data qualifier (Qual), units, dilution factor (DF), and date analyzed.
- QC Summary Report.

This communication is intended only for the individual or entity to whom it is directed. It may contain information that is privileged, confidential, or otherwise exempt from disclosure under applicable law. Dissemination, distribution, or copying of this communication by anyone other than the intended recipient, or a duly designated employee or agent of such recipient, is prohibited. If you have received this communication in error, please notify us immediately and destroy this message and all attachments thereto. If you have any questions regarding these test results, please do not hesitate to call.

Sincerely,

Lucas Menendez
Project Manager

Aerotech Environmental Laboratories

a division of Aerotech Laboratories, Inc.

Aerotech Environmental **Date:** *25-Jun-04*

CLIENT: Southwest Ground-Water Consultants, Inc.
Project: Sandia Well #1065/B.793
Lab Order: *04060870*

CASE NARRATIVE

Samples were analyzed using methods outlined in references such as:

Standard Methods for the Examination of Water and Wastewater, 19th Edition, 1995.
Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition.
40 CFR, Part 136, Revised 1995. Appendix A to Part 136 - Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater.

NIOSH Manual of Analytical Methods, Fourth Edition, 1994.
Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition, 1999.

Aerotech Environmental Laboratories (AEL) holds Arizona certification no. AZ0610 and AEL-Tucson holds Arizona certification no. AZ0609.

Aerotech Laboratories, Inc. (AEL division - Laboratory ID 154268) is accredited by the American Industrial Hygiene Association (AIHA) in the industrial hygiene program for the analytical techniques noted on the scope of accreditation. AEL participates in the AIHA Environmental Lead Proficiency Analytical Testing (ELPAT) program for lead in soil, paint chips and dust wipes.

Analytical Comments:
All method blanks and laboratory control spikes met EPA method and/or laboratory quality control objectives for the analyses included in this report.

Data Qualifiers:
Listed below are the data qualifiers used in your analytical report to explain any analytical or quality control issues. You will find them noted in your report under the column header "QUAL". Any quality control deficiencies that cannot be adequately described by these qualifiers will be addressed in the analytical comments section of this case narrative.

D2 Sample required dilution due to high concentration of target analyte.
M6 Matrix spike recovery was high. Data reported per ADEQ policy 0154.000.
N1 See case narrative.

N1- EPA Method 300:
The sample selected as the duplicate and matrix spike contained high concentrations of chloride and/or sulfate. The analyte concentration in the sample is disproportionate to the spike level and it was not practical to analyze the sample at a dilution, as the spike would be diluted out. The LCS/LCSD were recovered acceptably demonstrating that the analytical process was in control.

Main Laboratory: 4645 E. Cotton Center Boulevard, Building 3, Suite 189 Phoenix, AZ 85040 Phone: 602.437.3340 Toll Free: 866.772.5227 Fax. 623.445.6192 www.aeroenvirolabs.com
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Aerotech Environmental Laboratories

a division of Aerotech Laboratories, Inc.

Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-868'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 1:28:00 PM
Lab ID:	04060870-01A	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **LB**
Chloride	220	10	D2	mg/L	5	6/21/2004 12:08:00 PM
Fluoride	2.6	0.40		mg/L	1	6/11/2004 6:17:00 PM
Nitrogen, Nitrate (As N)	1.5	0.20		mg/L	1	6/11/2004 6:17:00 PM
Sulfate	160	10	D2	mg/L	5	6/21/2004 12:08:00 PM
ALKALINITY		**M2320 B**				Analyst: **T A**
Alkalinity, Bicarbonate (As CaCO3)	38	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Carbonate (As CaCO3)	8.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Total (As CaCO3)	46	6.0		mg/L CaCO3	1	6/14/2004
RESIDUE, FILTERABLE		**M2540 C**				Analyst: **AC**
Total Dissolved Solids	660	10		mg/L	1	6/14/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.
(1) AEL - Tucson Laboratory
(2) AEL - Knudsen Laboratory
(3) The holding time for pH analysis is immediate. For the most accurate result, the pH should be taken in the field within 15 minutes of sampling.

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Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-868'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 1:28:00 PM
Lab ID:	04060870-01B	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TOTAL RECOVERABLE		**E200.7**				Analyst: **TD**
Calcium	13	2.0		mg/L	1	6/15/2004
Chromium	0.026	0.010		mg/L	1	6/15/2004
Magnesium	< 2.0	2.0		mg/L	1	6/15/2004
Potassium	2.5	2.0		mg/L	1	6/15/2004
Sodium	210	20	D2	mg/L	10	6/22/2004
ICP/MS METALS, TOTAL RECOVERABLE		**E200.8**				Analyst: **RF**
Arsenic	0.0099	0.0010		mg/L	1	6/15/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-Composite
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 1:45:00 PM
Lab ID:	04060870-02A	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **LB**
Chloride	220	10	D2	mg/L	5	6/21/2004 12:24:00 PM
Fluoride	2.7	0.40		mg/L	1	6/11/2004 6:34:00 PM
Nitrogen, Nitrate (As N)	1.5	0.20		mg/L	1	6/11/2004 6:34:00 PM
Sulfate	160	10	D2	mg/L	5	6/21/2004 12:24:00 PM
ALKALINITY		**M2320 B**				Analyst: **T A**
Alkalinity, Bicarbonate (As CaCO3)	34	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Carbonate (As CaCO3)	8.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Total (As CaCO3)	42	6.0		mg/L CaCO3	1	6/14/2004
RESIDUE, FILTERABLE		**M2540 C**				Analyst: **AC**
Total Dissolved Solids	660	10		mg/L	1	6/14/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-Composite
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 1:45:00 PM
Lab ID:	04060870-02B	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TOTAL RECOVERABLE		**E200.7**				Analyst: **TD**
Calcium	13	2.0		mg/L	1	6/15/2004
Chromium	0.024	0.010		mg/L	1	6/15/2004
Magnesium	< 2.0	2.0		mg/L	1	6/15/2004
Potassium	2.3	2.0		mg/L	1	6/15/2004
Sodium	180	20	D2	mg/L	10	6/22/2004
ICP/MS METALS, TOTAL RECOVERABLE		**E200.8**				Analyst: **RF**
Arsenic	0.012	0.0010		mg/L	1	6/15/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-1000'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 2:02:00 PM
Lab ID:	04060870-03A	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **LB**
Chloride	230	10	D2	mg/L	5	6/21/2004 12:41:00 PM
Fluoride	2.9	0.40		mg/L	1	6/11/2004 6:50:00 PM
Nitrogen, Nitrate (As N)	1.5	0.20		mg/L	1	6/11/2004 6:50:00 PM
Sulfate	150	10	D2	mg/L	5	6/21/2004 12:41:00 PM
ALKALINITY		**M2320 B**				Analyst: **T A**
Alkalinity, Bicarbonate (As CaCO3)	32	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Carbonate (As CaCO3)	8.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Total (As CaCO3)	40	6.0		mg/L CaCO3	1	6/14/2004
RESIDUE, FILTERABLE		**M2540 C**				Analyst: **AC**
Total Dissolved Solids	660	10		mg/L	1	6/14/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-1000'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 2:02:00 PM
Lab ID:	04060870-03B	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TOTAL RECOVERABLE		**E200.7**				Analyst: **TD**
Calcium	13	2.0		mg/L	1	6/15/2004
Chromium	0.026	0.010		mg/L	1	6/15/2004
Magnesium	< 2.0	2.0		mg/L	1	6/15/2004
Potassium	2.4	2.0		mg/L	1	6/15/2004
Sodium	190	20	D2	mg/L	10	6/22/2004
ICP/MS METALS, TOTAL RECOVERABLE		**E200.8**				Analyst: **RF**
Arsenic	0.011	0.0010		mg/L	1	6/15/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.
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Aerotech Environmental Laboratories

a division of Aerotech Laboratories, Inc.

Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-1048'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 2:44:00 PM
Lab ID:	04060870-04A	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **LB**
Chloride	210	10	D2	mg/L	5	6/21/2004 12:57:00 PM
Fluoride	3.0	0.40		mg/L	1	6/11/2004 7:06:00 PM
Nitrogen, Nitrate (As N)	1.5	0.20		mg/L	1	6/11/2004 7:06:00 PM
Sulfate	160	10	D2	mg/L	5	6/21/2004 12:57:00 PM
ALKALINITY		**M2320 B**				Analyst: **T A**
Alkalinity, Bicarbonate (As CaCO3)	34	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Carbonate (As CaCO3)	8.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Total (As CaCO3)	42	6.0		mg/L CaCO3	1	6/14/2004
RESIDUE, FILTERABLE		**M2540 C**				Analyst: **AC**
Total Dissolved Solids	640	10		mg/L	1	6/14/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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(2) AEL - Knudsen Laboratory

(3) The holding time for pH analysis is immediate. For the most accurate result, the pH should be taken in the field within 15 minutes of sampling.

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Aerotech Environmental Laboratories

a division of Aerotech Laboratories, Inc.

Aerotech Environmental Analytical Report

Date: *25-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-1048'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 2:44:00 PM
Lab ID:	04060870-04B	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TOTAL RECOVERABLE		**E200.7**				Analyst: **TD**
Calcium	14	2.0		mg/L	1	6/15/2004
Chromium	0.025	0.010		mg/L	1	6/15/2004
Magnesium	< 2.0	2.0		mg/L	1	6/15/2004
Potassium	2.2	2.0		mg/L	1	6/15/2004
Sodium	200	20	D2	mg/L	10	6/22/2004
ICP/MS METALS, TOTAL RECOVERABLE		**E200.8**				Analyst: **RF**
Arsenic	0.011	0.0010		mg/L	1	6/15/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

(1) AEL - Tucson Laboratory

(2) AEL - Knudsen Laboratory

(3) The holding time for pH analysis is immediate. For the most accurate result, the pH should be taken in the field within 15 minutes of sampling.

Main Laboratory: 4645 E. Cotton Center Boulevard, Building 3, Suite 189 Phoenix, AZ 85040 Phone: 602.437.3340 Toll Free: 866.772.5227 Fax. 623.445.6192 www.aeroenvirolabs.com
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Aerotech Environmental Laboratories

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Aerotech Environmental Analytical Report

Date: *24-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-1152'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 3:22:00 PM
Lab ID:	04060870-05A	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ANIONS BY ION CHROMATOGRAPHY		**E300**				Analyst: **LB**
Chloride	210	10	D2	mg/L	5	6/21/2004 1:13:00 PM
Fluoride	2.7	0.40		mg/L	1	6/11/2004 7:23:00 PM
Nitrogen, Nitrate (As N)	1.4	0.20		mg/L	1	6/11/2004 7:23:00 PM
Sulfate	150	10	D2	mg/L	5	6/21/2004 1:13:00 PM
ALKALINITY		**M2320 B**				Analyst: **T A**
Alkalinity, Bicarbonate (As CaCO3)	36	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Carbonate (As CaCO3)	8.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0		mg/L CaCO3	1	6/14/2004
Alkalinity, Total (As CaCO3)	44	6.0		mg/L CaCO3	1	6/14/2004
RESIDUE, FILTERABLE		**M2540 C**				Analyst: **AC**
Total Dissolved Solids	630	10		mg/L	1	6/14/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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(2) AEL - Knudsen Laboratory

(3) The holding time for pH analysis is immediate. For the most accurate result, the pH should be taken in the field within 15 minutes of sampling.

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Aerotech Environmental Analytical Report

Date: *25-Jun-04*

CLIENT:	Southwest Ground-Water Consultants, Inc.	**Client Sample ID:**	1065-1152'
Lab Order:	04060870	**Tag Number:**	
Project:	Sandia Well #1065/B.793	**Collection Date:**	6/11/2004 3:22:00 PM
Lab ID:	04060870-05B	**Matrix:**	DRINKING WATER

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
ICP METALS, TOTAL RECOVERABLE		**E200.7**				Analyst: **TD**
Calcium	13	2.0		mg/L	1	6/15/2004
Chromium	0.026	0.010		mg/L	1	6/15/2004
Magnesium	< 2.0	2.0		mg/L	1	6/15/2004
Potassium	2.2	2.0		mg/L	1	6/15/2004
Sodium	200	20	D2	mg/L	10	6/22/2004
ICP/MS METALS, TOTAL RECOVERABLE		**E200.8**				Analyst: **RF**
Arsenic	0.011	0.0010		mg/L	1	6/15/2004

Footnotes: All analysis performed at AEL Phoenix laboratory unless indicated by footnotes.

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(3) The holding time for pH analysis is immediate. For the most accurate result, the pH should be taken in the field within 15 minutes of sampling.

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Aerotech Environmental

CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

Date: *24-Jun-04*

ANALYTICAL QC SUMMARY REPORT

TestCode: 200.7

Sample ID **MB-17797** | SampType: **MBLK** | TestCode: **200.7** | Units: **mg/L** | Prep Date: **6/14/2004** | RunNo: **48167**
Client ID: | Batch ID: **17797** | TestNo: **E200.7** | Analysis Date: **6/15/2004** | SeqNo: **571210**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	< 2.0	2.0									
Chromium	< 0.010	0.010									
Magnesium	< 2.0	2.0									
Potassium	< 2.0	2.0									
Sodium	< 2.0	2.0									

Sample ID **LCS-17797** | SampType: **LCS** | TestCode: **200.7** | Units: **mg/L** | Prep Date: **6/14/2004** | RunNo: **48167**
Client ID: | Batch ID: **17797** | TestNo: **E200.7** | Analysis Date: **6/15/2004** | SeqNo: **571208**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	10.30	2.0	10.5	0	98.1	85	115				
Chromium	0.4790	0.010	0.5	0	95.8	85	115				
Magnesium	10.30	2.0	10.5	0	98.1	85	115				
Potassium	10.20	2.0	10	0	102	85	115				
Sodium	9.210	2.0	10	0	92.1	85	115				

Sample ID **LCSD-17797** | SampType: **LCSD** | TestCode: **200.7** | Units: **mg/L** | Prep Date: **6/14/2004** | RunNo: **48167**
Client ID: | Batch ID: **17797** | TestNo: **E200.7** | Analysis Date: **6/15/2004** | SeqNo: **571209**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	10.30	2.0	10.5	0	98.1	85	115	10.30	0	20	
Chromium	0.4820	0.010	0.5	0	96.4	85	115	0.4790	0.624	20	
Magnesium	10.40	2.0	10.5	0	99.0	85	115	10.30	0.966	20	
Potassium	10.20	2.0	10	0	102	85	115	10.20	0	20	
Sodium	9.430	2.0	10	0	94.3	85	115	9.210	2.36	20	

Qualifiers:
- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 200.7

Sample ID **04060870-01B MS** SampType: **MS** TestCode: **200.7** Units: **mg/L** Prep Date: **6/14/2004** RunNo: **48167**
Client ID: **1065-868'** Batch ID: **17797** TestNo: **E200.7** Analysis Date: **6/15/2004** SeqNo: **571197**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	23.50	2.0	10.5	13.30	97.1	70	130				
Chromium	0.5170	0.010	0.5	0.02620	98.2	70	130				
Magnesium	11.80	2.0	10.5	0	112	70	130				
Potassium	17.60	2.0	10	2.490	151	70	130				M6

Sample ID **04060870-01B MS** SampType: **MS** TestCode: **200.7** Units: **mg/L** Prep Date: **6/14/2004** RunNo: **48167**
Client ID: **1065-868'** Batch ID: **17797** TestNo: **E200.7** Analysis Date: **6/22/2004** SeqNo: **574256**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	228.0	20	10	207.0	210	70	130				M6

Sample ID **04060870-01B MSD** SampType: **MSD** TestCode: **200.7** Units: **mg/L** Prep Date: **6/14/2004** RunNo: **48167**
Client ID: **1065-868'** Batch ID: **17797** TestNo: **E200.7** Analysis Date: **6/15/2004** SeqNo: **571198**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	23.60	2.0	10.5	13.30	98.1	70	130	23.50	0.425	20	
Chromium	0.5050	0.010	0.5	0.02620	95.8	70	130	0.5170	2.35	20	
Magnesium	11.60	2.0	10.5	0	110	70	130	11.80	1.71	20	
Potassium	17.40	2.0	10	2.490	149	70	130	17.60	1.14	20	M6

Sample ID **04060870-01B MSD** SampType: **MSD** TestCode: **200.7** Units: **mg/L** Prep Date: **6/14/2004** RunNo: **48167**
Client ID: **1065-868'** Batch ID: **17797** TestNo: **E200.7** Analysis Date: **6/22/2004** SeqNo: **574258**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Sodium	220.0	20	10	207.0	130	70	130	228.0	3.57	20	M6

Qualifiers:

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 200.8

Sample ID **MB-17780** | SampType: **MBLK** | TestCode: **200.8** | Units: **mg/L** | Prep Date: **6/11/2004** | RunNo: **48205**
Client ID: | Batch ID: **17780** | TestNo: **E200.8** | Analysis Date: **6/15/2004** | SeqNo: **571644**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	< 0.0010	0.0010									

Sample ID **MB-17808** | SampType: **MBLK** | TestCode: **200.8** | Units: **mg/L** | Prep Date: **6/15/2004** | RunNo: **48297**
Client ID: | Batch ID: **17808** | TestNo: **E200.8** | Analysis Date: **6/17/2004** | SeqNo: **572762**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	< 0.0010	0.0010									

Sample ID **LCS-17780** | SampType: **LCS** | TestCode: **200.8** | Units: **mg/L** | Prep Date: **6/11/2004** | RunNo: **48205**
Client ID: | Batch ID: **17780** | TestNo: **E200.8** | Analysis Date: **6/15/2004** | SeqNo: **571645**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.09959	0.0010	0.1	0	99.6	85	115				

Sample ID **LCS-17808** | SampType: **LCS** | TestCode: **200.8** | Units: **mg/L** | Prep Date: **6/15/2004** | RunNo: **48297**
Client ID: | Batch ID: **17808** | TestNo: **E200.8** | Analysis Date: **6/17/2004** | SeqNo: **572760**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.09669	0.0010	0.1	0	96.7	85	115				

Sample ID **LCSD-17780** | SampType: **LCSD** | TestCode: **200.8** | Units: **mg/L** | Prep Date: **6/11/2004** | RunNo: **48205**
Client ID: | Batch ID: **17780** | TestNo: **E200.8** | Analysis Date: **6/15/2004** | SeqNo: **571666**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.09879	0.0010	0.1	0	98.8	85	115	0.09959	0.807	20	

Qualifiers:
- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 200.8

Sample ID: **LCSD-17808** SampType: **LCSD** TestCode: **200.8** Units: **mg/L** Prep Date: **6/15/2004** RunNo: **48297**
Client ID: Batch ID: **17808** TestNo: **E200.8** Analysis Date: **6/17/2004** SeqNo: **572761**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.09896	0.0010	0.1	0	99.0	85	115	0.09669	2.32	20	

Sample ID: **04060840-01A MS** SampType: **MS** TestCode: **200.8** Units: **mg/L** Prep Date: **6/11/2004** RunNo: **48205**
Client ID: Batch ID: **17780** TestNo: **E200.8** Analysis Date: **6/15/2004** SeqNo: **571655**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1173	0.0010	0.1	0.02523	92.1	70	130				

Sample ID: **04060870-01B MS** SampType: **MS** TestCode: **200.8** Units: **mg/L** Prep Date: **6/11/2004** RunNo: **48205**
Client ID: **1065-868'** Batch ID: **17780** TestNo: **E200.8** Analysis Date: **6/15/2004** SeqNo: **571660**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.09481	0.0010	0.1	0.009880	84.9	70	130				

Sample ID: **04060870-01B MS** SampType: **MS** TestCode: **200.8** Units: **mg/L** Prep Date: **6/15/2004** RunNo: **48297**
Client ID: **1065-868'** Batch ID: **17808** TestNo: **E200.8** Analysis Date: **6/17/2004** SeqNo: **572741**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1034	0.0010	0.1	0.01034	93.1	70	130				

Sample ID: **04060874-04A MS** SampType: **MS** TestCode: **200.8** Units: **mg/L** Prep Date: **6/15/2004** RunNo: **48297**
Client ID: Batch ID: **17808** TestNo: **E200.8** Analysis Date: **6/17/2004** SeqNo: **572751**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1012	0.0010	0.1	0.005620	95.6	70	130				

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits	S	Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 200.8

Sample ID **04060840-01A MSD** SampType: **MSD** TestCode: **200.8** Units: **mg/L** Prep Date: **6/11/2004** RunNo: **48205**
Client ID: Batch ID: **17780** TestNo: **E200.8** Analysis Date: **6/15/2004** SeqNo: **571656**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1145	0.0010	0.1	0.02523	89.3	70	130	0.1173	2.40	20	

Sample ID **04060870-01B MSD** SampType: **MSD** TestCode: **200.8** Units: **mg/L** Prep Date: **6/11/2004** RunNo: **48205**
Client ID: **1065-868'** Batch ID: **17780** TestNo: **E200.8** Analysis Date: **6/15/2004** SeqNo: **571661**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.09362	0.0010	0.1	0.009880	83.7	70	130	0.09481	1.26	20	

Sample ID **04060870-01B MSD** SampType: **MSD** TestCode: **200.8** Units: **mg/L** Prep Date: **6/15/2004** RunNo: **48297**
Client ID: **1065-868'** Batch ID: **17808** TestNo: **E200.8** Analysis Date: **6/17/2004** SeqNo: **572742**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1051	0.0010	0.1	0.01034	94.7	70	130	0.1034	1.57	20	

Sample ID **04060874-04A MSD** SampType: **MSD** TestCode: **200.8** Units: **mg/L** Prep Date: **6/15/2004** RunNo: **48297**
Client ID: Batch ID: **17808** TestNo: **E200.8** Analysis Date: **6/17/2004** SeqNo: **572752**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	0.1041	0.0010	0.1	0.005620	98.5	70	130	0.1012	2.80	20	

Qualifiers:
- E Value above quantitation range
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- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W

Sample ID **MB-R48131** SampType: **MBLK** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48131**
Client ID: Batch ID: **R48131** TestNo: **E300** Analysis Date: **6/11/2004** SeqNo: **570944**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	< 0.40	0.40									
Nitrogen, Nitrate (As N)	< 0.20	0.20									

Sample ID **MB-R48408** SampType: **MBLK** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48408**
Client ID: Batch ID: **R48408** TestNo: **E300** Analysis Date: **6/21/2004** SeqNo: **574095**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	< 2.0	2.0									
Fluoride	< 0.40	0.40									
Nitrogen, Nitrate (As N)	< 0.20	0.20									
Sulfate	< 2.0	2.0									

Sample ID **LCS-R48131** SampType: **LCS** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48131**
Client ID: Batch ID: **R48131** TestNo: **E300** Analysis Date: **6/11/2004** SeqNo: **570945**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	3.830	0.40	4	0	95.8	90	110				
Nitrogen, Nitrate (As N)	3.710	0.20	4	0	92.8	90	110				

Sample ID **LCS-R48408** SampType: **LCS** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48408**
Client ID: Batch ID: **R48408** TestNo: **E300** Analysis Date: **6/21/2004** SeqNo: **574096**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	19.01	2.0	20	0	95.0	90	110				
Fluoride	3.760	0.40	4	0	94.0	90	110				N1
Nitrogen, Nitrate (As N)	3.660	0.20	4	0	91.5	90	110				
Sulfate	18.25	2.0	20	0	91.2	90	110				N1

Qualifiers:
E Value above quantitation range
ND Not Detected at the Reporting Limit
H Holding times for preparation or analysis exceeded
R RPD outside accepted recovery limits
J Analyte detected below quantitation limits
S Spike Recovery outside accepted recovery limits

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Corporate Address: 1501 W. Knudsen Drive, Phoenix, Arizona 85027

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W

Sample ID **LCSD-R48131** SampType: **LCSD** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48131**
Client ID: Batch ID: **R48131** TestNo: **E300** Analysis Date: **6/11/2004** SeqNo: **570955**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	3.880	0.40	4	0	97.0	90	110	3.830	1.30	20	
Nitrogen, Nitrate (As N)	3.710	0.20	4	0	92.8	90	110	3.710	0	20	

Sample ID **LCSD-R48408** SampType: **LCSD** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48408**
Client ID: Batch ID: **R48408** TestNo: **E300** Analysis Date: **6/21/2004** SeqNo: **574109**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloride	19.11	2.0	20	0	95.6	90	110	19.01	0.525	20	N1
Fluoride	3.820	0.40	4	0	95.5	90	110	3.760	1.58	20	
Nitrogen, Nitrate (As N)	3.710	0.20	4	0	92.8	90	110	3.660	1.36	20	
Sulfate	18.53	2.0	20	0	92.6	90	110	18.25	1.52	20	N1

Sample ID **04060869-01AMS** SampType: **MS** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48131**
Client ID: Batch ID: **R48131** TestNo: **E300** Analysis Date: **6/11/2004** SeqNo: **570949**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	4.490	0.40	4	0.6900	95.0	80	120				
Nitrogen, Nitrate (As N)	4.850	0.20	4	1.510	83.5	80	120				

Sample ID **04061096-01AMS** SampType: **MS** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48408**
Client ID: Batch ID: **R48408** TestNo: **E300** Analysis Date: **6/21/2004** SeqNo: **574108**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	6.780	0.40	4	2.700	102	80	120				
Nitrogen, Nitrate (As N)	11.17	0.20	4	7.370	95.0	80	120				

Qualifiers:
- E *Value above quantitation range*
- ND Not Detected at the Reporting Limit
- H *Holding times for preparation or analysis exceeded*
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: 300_W

Sample ID **04060869-01ADUP** SampType: **DUP** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48131**
Client ID: Batch ID: **R48131** TestNo: **E300** Analysis Date: **6/11/2004** SeqNo: **570948**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	0.7900	0.40						0.6900	13.5	20	
Nitrogen, Nitrate (As N)	1.520	0.20						1.510	0.660	20	

Sample ID **04061096-01ADUP** SampType: **DUP** TestCode: **300_W** Units: **mg/L** Prep Date: RunNo: **48408**
Client ID: Batch ID: **R48408** TestNo: **E300** Analysis Date: **6/21/2004** SeqNo: **574107**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	2.760	0.40						2.700	2.20	20	
Nitrogen, Nitrate (As N)	7.430	0.20						7.370	0.811	20	

Qualifiers:

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: ALKALINITY

Sample ID **MB-R48115** SampType: **MBLK** TestCode: **ALKALINITY** Units: **mg/L CaCO3** Prep Date: RunNo: **48115**
Client ID: Batch ID: **R48115** TestNo: **M2320 B** Analysis Date: **6/14/2004** SeqNo: **570656**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	< 2.0	2.0									
Alkalinity, Carbonate (As CaCO3)	< 2.0	2.0									
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0									
Alkalinity, Total (As CaCO3)	< 6.0	6.0									

Sample ID **LCS-R48115** SampType: **LCS** TestCode: **ALKALINITY** Units: **mg/L CaCO3** Prep Date: RunNo: **48115**
Client ID: Batch ID: **R48115** TestNo: **M2320 B** Analysis Date: **6/14/2004** SeqNo: **570657**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Total (As CaCO3)	252.0	6.0	250	0	101	90	110				

Sample ID **04060117-01ADUP** SampType: **DUP** TestCode: **ALKALINITY** Units: **mg/L CaCO3** Prep Date: RunNo: **48115**
Client ID: Batch ID: **R48115** TestNo: **M2320 B** Analysis Date: **6/14/2004** SeqNo: **570659**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Alkalinity, Bicarbonate (As CaCO3)	180.0	2.0						180.0	0	20	
Alkalinity, Carbonate (As CaCO3)	< 2.0	2.0						0	0	20	
Alkalinity, Hydroxide (As CaCO3)	< 2.0	2.0						0	0	20	
Alkalinity, Total (As CaCO3)	180.0	6.0						180.0	0	20	

Qualifiers:
- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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CLIENT: Southwest Ground-Water Consultants, Inc.
Work Order: 04060870
Project: Sandia Well #1065/B.793

ANALYTICAL QC SUMMARY REPORT

TestCode: S_TDS

Sample ID **MB-R48176** SampType: **MBLK** TestCode: **S_TDS** Units: **mg/L** Prep Date: RunNo: **48176**
Client ID: Batch ID: **R48176** TestNo: **M2540 C** Analysis Date: **6/14/2004** SeqNo: **571304**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids	< 10	10									

Sample ID **LCS-R48176** SampType: **LCS** TestCode: **S_TDS** Units: **mg/L** Prep Date: RunNo: **48176**
Client ID: Batch ID: **R48176** TestNo: **M2540 C** Analysis Date: **6/14/2004** SeqNo: **571316**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids	988.0	10	1000	0	98.8	90	110				

Sample ID **LCSD-R48176** SampType: **LCSD** TestCode: **S_TDS** Units: **mg/L** Prep Date: RunNo: **48176**
Client ID: Batch ID: **R48176** TestNo: **M2540 C** Analysis Date: **6/14/2004** SeqNo: **571317**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids	1000	10	1000	0	100	90	110	988.0	1.21	10	

Sample ID **04060870-02ADUP** SampType: **DUP** TestCode: **S_TDS** Units: **mg/L** Prep Date: RunNo: **48176**
Client ID: **1065-Composite** Batch ID: **R48176** TestNo: **M2540 C** Analysis Date: **6/14/2004** SeqNo: **571311**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Dissolved Solids	686.0	10						663.0	3.41	10	

Qualifiers:

- E Value above quantitation range
- ND Not Detected at the Reporting Limit
- H Holding times for preparation or analysis exceeded
- R RPD outside accepted recovery limits
- J Analyte detected below quantitation limits
- S Spike Recovery outside accepted recovery limits

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Corporate Address: 1501 W. Knudsen Drive, Phoenix, Arizona 85027

Aerotech Environmental Laboratories Sample Receipt Checklist Project checked by:_____

Laboratory Number: 04-06-0870	Checklist completed by: [signature] 6-11-04
Client Name: SWGW	Signature/Date
Matrix: DW / Carrier Name: Kevin	Date/Time Rec'd: 6-11-04 1658 By: [signature]

Temperature of Samples? 18.2 °C *Circle one:* Blue Ice (Wet Ice) Not Present

	Yes	No*	Not Present
Shipping container/cooler in good condition?	X		
Custody seals intact on shipping container/cooler?			X
Custody seals intact on sample containers?			X
Chain of Custody present and relinquished/received properly?	X		
Chain of Custody agrees with sample labels?	X		
Samples in proper containers/bottles?	X		
Sample containers intact?	X		
All samples received within holding time?	X		
Is there sufficient sample volume to perform the tests?	X		
Are different containers of the same sample identical in appearance?	X		
40mL vials for volatiles & SOCs received with zero headspace?			X

Soil Containers:
Brass Sleeve_____
Glass Jar_____
Methanol_____
Plastic Bag_____
Encore Samplers_____

**See Comment about Chlorine and pH

Total number of bottles received: 15 IH sample media:

Number of containers received by preservative and by sample number: (If more than 15 samples are rec'd, please continue on separate sheet(s))

Preservative	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A-General	1	1	1	1	1										
B-HNO3	1	1	1	1	1										
C-H2SO4	1	1	1	1	1										
D-HCl															
E-Na2S2O3															
F-NaOH															
G-Sulfide															
H-Na Sulfite															
I-MCAA															
J-Methanol															
K-HAA															
L-Other															

Water-pH acceptable upon receipt? Yes X No N/A

Preservative & pH		pH of samples upon receipt	If sample received with improper pH, list sample number and adjustments
Metals	<2	<2	
Nutrients	<2	<2	
Total Phenols	<2		
413 (O&G)	<2		
418 (TPH)	<2		
Cyanide	>12		
Sulfide	>9		

Any No response must be detailed in the comments section below. Contact the PM immediately to determine how to proceed. Refer to SOP 11-001.04, Section 1.8.6. Continue on back if additional space is needed.

*****The holding time for pH and Total Residual Chlorine analysis is immediate. For the most accurate result, the pH and Total Residual Chlorine should be taken in the field within 15 minutes of sampling.***

Comments:

Corrective Action:

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www.aeroenvirolabs.com or call toll-free 866.772.5227

Lab Number: 04-02-0870

Customer Number:
Customer: SOUTHWEST GROUNDWATER CONSULTANTS
Address: 3900 E. CAMELBACK ROAD STE 200
City, State, Zip: PHOENIX AZ 85018
Contact: KEVIN HEBERT
Phone: 602-955-5547 **Fax:**
E-Mail Address: Khebert@sgcgroundwater.com

Page 1 **of** 1
Sampler: KEVIN HEBERT
Project Name: SANDLA WELL #1065
Project Number: B.795
P.O. Number:
Fax Results: Y N
E-Mail Results: (Y) N

Sample Type Codes
DW - Drinking Water A - Air
WW - Waste Water S - Soil
HW - Hazardous Waste
Other

Sample Receipt
Temperature 18.2 °C
Custody Seals: Yes ✓ No ✗
Custody Seals Intact: Yes ✓ No N/A
Total # of Containers: 15

Turn Around Request
___ 24 Hours ___ 48 Hours
___ 72 Hours
___ 5 Working Days
X Standard 10 Working Days
Subject to scheduling & availability (surcharges apply).

Analyses Requested

Sample Information

Lab #	Sample Identification	Date	Time	Type	Metals As, Cr, Cr, Na, K, Na	NO3 BU	NO2													# of sample Containers
01	1065 - 868'	6/11/04	13:28	DW	X	X	X													3
02	1065 - Composite	6/11/04	13:45	DW	X	X	X													3
03	1065 - 1000'	6/11/04	14:02	DW	X	X	X													3
04	1065 - 1048'	6/11/04	14:44	DW	X	X	X													3
05	1065 - 1152'	6/11/04	15:22	DW	X	X	X													3

Instructions / Special Requirements:

Date:	Time:	Samples Relinquished By:	Received By:
6/11/04	1658	[signature]	[signature]

Analysis performed is subject to the Terms & Conditions available at www.aeroenvirolabs.com or call 866.772.5227 to request a copy.

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2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

LABORATORY REPORT

Prepared For: SW Groundwater Consultants - Phoenix
3900 East Camelback, Suite 200
Phoenix, AZ 85018
Attention: Steve Noel

Project: Sundance Farms / B.793

Sampled: 04/02/04
Received: 04/02/04
Issued: 04/13/04

AZ DHS #AZ0426

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This entire report was reviewed and approved for release.

CASE NARRATIVE

LABORATORY ID	CLIENT ID	MATRIX
PND0098-01	Well 1075	Water
PND0098-02	Well 1096	Water
PND0098-03	Well 905	Water
PND0098-04	Well 1100	Water

SAMPLE RECEIPT: Samples were received intact, at 1°C, on ice and with chain of custody documentation.

HOLDING TIMES: Holding times were met.

PRESERVATION: Samples requiring preservation were verified prior to sample analysis.

QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.

COMMENTS: No significant observations were made.

SUBCONTRACTED: Refer to the last page for specific subcontract laboratory information included in this report.

ADDITIONAL INFORMATION: N1-Concentration exceeds the calibration range and therefore result is semi-quantitative.

Del Mar Analytical - Phoenix
Tonda Waugh
Project Manager

Del Mar Analytical

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SW Groundwater Consultants - Phoenix
3900 East Camelback, Suite 200
Phoenix, AZ 85018
Attention: Steve Noel

Project ID: Sundance Farms / B.793

Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

TOTAL RECOVERABLE METALS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PND0098-01 (Well 1075 - Water)								
Reporting Units: mg/l								
Calcium	EPA 200.7	P4D0304	2.0	**300**	1	4/3/2004	4/6/2004	
Magnesium	EPA 200.7	P4D0304	0.50	**61**	1	4/3/2004	4/6/2004	
Potassium	EPA 258.1	P4D0605	1.0	**8.8**	1	4/6/2004	4/7/2004	
Sodium	EPA 273.1	P4D0605	250	**730**	50	4/6/2004	4/7/2004	
Sample ID: PND0098-02 (Well 1096 - Water)								
Reporting Units: mg/l								
Calcium	EPA 200.7	P4D0304	2.0	**100**	1	4/3/2004	4/6/2004	
Magnesium	EPA 200.7	P4D0304	0.50	**15**	1	4/3/2004	4/6/2004	
Potassium	EPA 258.1	P4D0605	1.0	**4.9**	1	4/6/2004	4/7/2004	
Sodium	EPA 273.1	P4D0605	100	**380**	20	4/6/2004	4/7/2004	
Sample ID: PND0098-03 (Well 905 - Water)								
Reporting Units: mg/l								
Calcium	EPA 200.7	P4D0304	2.0	**210**	1	4/3/2004	4/6/2004	
Magnesium	EPA 200.7	P4D0304	0.50	**40**	1	4/3/2004	4/6/2004	
Potassium	EPA 258.1	P4D0605	1.0	**5.6**	1	4/6/2004	4/7/2004	
Sodium	EPA 273.1	P4D0605	100	**390**	20	4/6/2004	4/7/2004	
Sample ID: PND0098-04 (Well 1100 - Water)								
Reporting Units: mg/l								
Calcium	EPA 200.7	P4D0304	2.0	**11**	1	4/3/2004	4/6/2004	
Magnesium	EPA 200.7	P4D0304	0.50	ND	1	4/3/2004	4/6/2004	
Potassium	EPA 258.1	P4D0605	1.0	**2.3**	1	4/6/2004	4/7/2004	
Sodium	EPA 273.1	P4D0605	100	**190**	20	4/6/2004	4/7/2004	

Del Mar Analytical - Phoenix
Ronda Waugh
Project Manager

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SW Groundwater Consultants - Phoenix
3900 East Camelback, Suite 200
Phoenix, AZ 85018
Attention: Steve Noel

Project ID: Sundance Farms / B.793

Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

INORGANICS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PND0098-01 (Well 1075 - Water)								
Reporting Units: mg/l								
Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**250**	1	4/12/2004	4/12/2004	
Bicarbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**250**	1	4/12/2004	4/12/2004	
Carbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Chloride	EPA 300.0	P4D0207	50	**930**	100	4/2/2004	4/3/2004	
Fluoride	EPA 300.0	P4D0207	1.0	**2.0**	10	4/2/2004	4/3/2004	
Hydroxide Alkalinity	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Nitrate-N	EPA 300.0	P4D0207	1.0	**20**	10	4/2/2004	4/3/2004	
Sulfate	EPA 300.0	P4D0207	50	**1100**	100	4/2/2004	4/3/2004	
Total Dissolved Solids	SM2540C	P4D0726	100	**3400**	5	4/7/2004	4/7/2004	
Sample ID: PND0098-02 (Well 1096 - Water)								
Reporting Units: mg/l								
Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**110**	1	4/12/2004	4/12/2004	
Bicarbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**110**	1	4/12/2004	4/12/2004	
Carbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Chloride	EPA 300.0	P4D0207	50	**440**	100	4/2/2004	4/3/2004	
Fluoride	EPA 300.0	P4D0207	0.10	**4.4**	1	4/2/2004	4/3/2004	
Hydroxide Alkalinity	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Nitrate-N	EPA 300.0	P4D0207	0.10	**8.8**	1	4/2/2004	4/3/2004	
Sulfate	EPA 300.0	P4D0207	50	**440**	100	4/2/2004	4/3/2004	
Total Dissolved Solids	SM2540C	P4D0726	40	**1500**	2	4/7/2004	4/7/2004	
Sample ID: PND0098-03 (Well 905 - Water)								
Reporting Units: mg/l								
Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**140**	1	4/12/2004	4/12/2004	
Bicarbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**140**	1	4/12/2004	4/12/2004	
Carbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Chloride	EPA 300.0	P4D0207	50	**570**	100	4/2/2004	4/3/2004	
Fluoride	EPA 300.0	P4D0207	0.10	**3.2**	1	4/2/2004	4/3/2004	
Hydroxide Alkalinity	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Nitrate-N	EPA 300.0	P4D0207	1.0	**13**	10	4/2/2004	4/3/2004	
Sulfate	EPA 300.0	P4D0207	50	**640**	100	4/2/2004	4/3/2004	
Total Dissolved Solids	SM2540C	P4D0726	100	**2000**	5	4/7/2004	4/7/2004	

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SW Groundwater Consultants - Phoenix
3900 East Camelback, Suite 200
Phoenix, AZ 85018
Attention: Steve Noel

Project ID: Sundance Farms / B.793

Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

INORGANICS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PND0098-04 (Well 1100 - Water)								
Reporting Units: mg/l								
Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**67**	1	4/12/2004	4/12/2004	
Bicarbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**59**	1	4/12/2004	4/12/2004	
Carbonate Alkalinity as CaCO3	SM2320B	P4D1217	5.0	**8.0**	1	4/12/2004	4/12/2004	
Chloride	EPA 300.0	P4D0207	5.0	**170**	10	4/2/2004	4/3/2004	
Fluoride	EPA 300.0	P4D0207	0.10	**4.4**	1	4/2/2004	4/3/2004	
Hydroxide Alkalinity	SM2320B	P4D1217	5.0	ND	1	4/12/2004	4/12/2004	
Nitrate-N	EPA 300.0	P4D0207	0.10	**3.4**	1	4/2/2004	4/3/2004	
Sulfate	EPA 300.0	P4D0207	5.0	**120**	10	4/2/2004	4/3/2004	
Total Dissolved Solids	SM2540C	P4D0726	20	**570**	1	4/7/2004	4/7/2004	

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Project ID: Sundance Farms / B.793

Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

METALS

Analyte	Method	Batch	Reporting Limit	Sample Result	Dilution Factor	Date Extracted	Date Analyzed	Data Qualifiers
Sample ID: PND0098-01 (Well 1075 - Water)								
Reporting Units: ug/l								
Arsenic	EPA 200.8	4D06068	1.0	**6.3**	1	4/6/2004	4/7/2004	
Chromium	EPA 200.8	4D06068	1.0	**4.2**	1	4/6/2004	4/7/2004	
Sample ID: PND0098-02 (Well 1096 - Water)								
Reporting Units: ug/l								
Arsenic	EPA 200.8	4D06068	1.0	**18**	1	4/6/2004	4/7/2004	
Chromium	EPA 200.8	4D06068	1.0	**9.1**	1	4/6/2004	4/7/2004	
Sample ID: PND0098-03 (Well 905 - Water)								
Reporting Units: ug/l								
Arsenic	EPA 200.8	4D06068	1.0	**18**	1	4/6/2004	4/7/2004	
Chromium	EPA 200.8	4D06068	1.0	**6.4**	1	4/6/2004	4/7/2004	
Sample ID: PND0098-04 (Well 1100 - Water)								
Reporting Units: ug/l								
Arsenic	EPA 200.8	4D06068	1.0	**25**	1	4/6/2004	4/7/2004	
Chromium	EPA 200.8	4D06068	1.0	**17**	1	4/6/2004	4/7/2004	

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Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

SHORT HOLD TIME DETAIL REPORT

	Hold Time (in days)	Date/Time Sampled	Date/Time Received	Date/Time Extracted	Date/Time Analyzed
Sample ID: Well 1075 (PND0098-01) - Water					
EPA 300.0	2	04/02/2004 10:10	04/02/2004 13:55	04/02/2004 17:39	04/03/2004 10:37
Sample ID: Well 1096 (PND0098-02) - Water					
EPA 300.0	2	04/02/2004 10:25	04/02/2004 13:55	04/02/2004 17:39	04/03/2004 11:05
Sample ID: Well 905 (PND0098-03) - Water					
EPA 300.0	2	04/02/2004 11:05	04/02/2004 13:55	04/02/2004 17:39	04/03/2004 12:02
Sample ID: Well 1100 (PND0098-04) - Water					
EPA 300.0	2	04/02/2004 12:25	04/02/2004 13:55	04/02/2004 17:39	04/03/2004 12:59

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Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

METHOD BLANK/QC DATA

TOTAL RECOVERABLE METALS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P4D0304 Extracted: 04/03/04										
Blank Analyzed: 04/06/04 (P4D0304-BLK1)										
Calcium	ND	2.0	mg/l							
Magnesium	ND	0.50	mg/l							
LCS Analyzed: 04/06/04 (P4D0304-BS1)										
Calcium	10.7	2.0	mg/l	9.99		107	85-115			
Magnesium	11.0	0.50	mg/l	9.99		110	85-115			
LCS Dup Analyzed: 04/06/04 (P4D0304-BSD1)										
Calcium	10.6	2.0	mg/l	9.99		106	85-115	1	20	
Magnesium	10.7	0.50	mg/l	9.99		107	85-115	3	20	
Matrix Spike Analyzed: 04/06/04 (P4D0304-MS1)					**Source: PND0095-01**					
Calcium	71.2	2.0	mg/l	9.99	60	112	70-130			
Magnesium	35.7	0.50	mg/l	9.99	25	107	70-130			
Matrix Spike Dup Analyzed: 04/06/04 (P4D0304-MSD1)					**Source: PND0095-01**					
Calcium	70.8	2.0	mg/l	9.99	60	108	70-130	1	20	
Magnesium	35.3	0.50	mg/l	9.99	25	103	70-130	1	20	
Batch: P4D0605 Extracted: 04/06/04										
Blank Analyzed: 04/07/04 (P4D0605-BLK1)										
Potassium	ND	1.0	mg/l							
Sodium	ND	5.0	mg/l							
LCS Analyzed: 04/07/04 (P4D0605-BS1)										
Potassium	11.2	1.0	mg/l	10.0		112	85-115			
Sodium	11.3	5.0	mg/l	10.0		113	85-115			

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Attention: Steve Noel

Project ID: Sundance Farms / B.793

Report Number: PND0098

Sampled: 04/02/04
Received: 04/02/04

METHOD BLANK/QC DATA

TOTAL RECOVERABLE METALS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P4D0605 Extracted: 04/06/04										
LCS Dup Analyzed: 04/07/04 (P4D0605-BSD1)										
Potassium	10.8	1.0	mg/l	10.0		108	85-115	4	15	
Sodium	11.1	5.0	mg/l	10.0		111	85-115	2	15	
Matrix Spike Analyzed: 04/07/04 (P4D0605-MS1)					**Source: PNC0996-01**					
Potassium	15.6	2.0	mg/l	10.0	5.6	100	85-115			
Sodium	122	50	mg/l	10.0	110	120	85-115			*M3*
Matrix Spike Dup Analyzed: 04/07/04 (P4D0605-MSD1)					**Source: PNC0996-01**					
Potassium	15.8	2.0	mg/l	10.0	5.6	102	85-115	1	15	
Sodium	119	50	mg/l	10.0	110	90	85-115	2	15	*M3*

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METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P4D0207 Extracted: 04/02/04										
Blank Analyzed: 04/02/04 (P4D0207-BLK1)										
Chloride	ND	0.50	mg/l							
Fluoride	ND	0.10	mg/l							
Nitrate-N	ND	0.10	mg/l							
Sulfate	ND	0.50	mg/l							
LCS Analyzed: 04/02/04 (P4D0207-BS1)										
Chloride	5.15	0.50	mg/l	5.00		103	90-110			
Fluoride	2.55	0.10	mg/l	2.50		102	90-110			
Nitrate-N	2.54	0.10	mg/l	2.50		102	90-110			
Sulfate	5.22	0.50	mg/l	5.00		104	90-110			
LCS Dup Analyzed: 04/02/04 (P4D0207-BSD1)										
Chloride	5.08	0.50	mg/l	5.00		102	90-110	1	15	
Fluoride	2.56	0.10	mg/l	2.50		102	90-110	0	20	
Nitrate-N	2.53	0.10	mg/l	2.50		101	90-110	0	15	
Sulfate	5.24	0.50	mg/l	5.00		105	90-110	0	15	
Matrix Spike Analyzed: 04/02/04 (P4D0207-MS1)					**Source: PNC1039-03RE**					
Chloride	771	5.0	mg/l	50.0	810	-78	80-120			*N1, M3*
Fluoride	27.0	1.0	mg/l	25.0	0.51	106	80-120			
Nitrate-N	31.8	1.0	mg/l	25.0	7.2	98	80-120			
Sulfate	1120	5.0	mg/l	50.0	1200	-160	80-120			*N1, M3*
Matrix Spike Dup Analyzed: 04/02/04 (P4D0207-MSD1)					**Source: PNC1039-03RE**					
Chloride	772	5.0	mg/l	50.0	810	-76	80-120	0	15	*N1, M3*
Fluoride	25.7	1.0	mg/l	25.0	0.51	101	80-120	5	20	
Nitrate-N	32.3	1.0	mg/l	25.0	7.2	100	80-120	2	15	
Sulfate	1130	5.0	mg/l	50.0	1200	-140	80-120	1	15	*N1, M3*

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METHOD BLANK/QC DATA

INORGANICS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: P4D0726 Extracted: 04/07/04										
Blank Analyzed: 04/07/04 (P4D0726-BLK1)										
Total Dissolved Solids	ND	20	mg/l							
LCS Analyzed: 04/07/04 (P4D0726-BS1)										
Total Dissolved Solids	382	20	mg/l	400		96	80-115			
LCS Dup Analyzed: 04/07/04 (P4D0726-BSD1)										
Total Dissolved Solids	394	20	mg/l	400		98	80-115	3	10	
Duplicate Analyzed: 04/07/04 (P4D0726-DUP1)					**Source: PNC1038-02**					
Total Dissolved Solids	470	20	mg/l		480			2	10	
Batch: P4D1217 Extracted: 04/12/04										
Duplicate Analyzed: 04/12/04 (P4D1217-DUP1)					**Source: PND0073-01**					
Alkalinity as CaCO3	332	5.0	mg/l		330			1	20	
Bicarbonate Alkalinity as CaCO3	332	5.0	mg/l		330			1	20	
Carbonate Alkalinity as CaCO3	ND	5.0	mg/l		ND				20	
Hydroxide Alkalinity	ND	5.0	mg/l		ND				20	
Duplicate Analyzed: 04/12/04 (P4D1217-DUP2)					**Source: PND0209-17**					
Alkalinity as CaCO3	231	5.0	mg/l		240			4	20	
Bicarbonate Alkalinity as CaCO3	231	5.0	mg/l		240			4	20	
Carbonate Alkalinity as CaCO3	ND	5.0	mg/l		ND				20	
Hydroxide Alkalinity	ND	5.0	mg/l		ND				20	
Reference Analyzed: 04/12/04 (P4D1217-SRM1)										
Alkalinity as CaCO3	77.0	5.0	mg/l	76.5		101	95.4-106.			

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Attention: Steve Noel

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Received: 04/02/04

METHOD BLANK/QC DATA

METALS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Data Qualifiers
Batch: 4D06068 Extracted: 04/06/04										
Blank Analyzed: 04/07/04 (4D06068-BLK1)										
Arsenic	ND	1.0	ug/l							
Chromium	ND	1.0	ug/l							
LCS Analyzed: 04/07/04 (4D06068-BS1)										
Arsenic	84.3	1.0	ug/l	80.0		105	85-115			
Chromium	81.4	1.0	ug/l	80.0		102	85-115			
Matrix Spike Analyzed: 04/07/04 (4D06068-MS1)					**Source: IND0209-01**					
Arsenic	86.6	1.0	ug/l	80.0	ND	108	70-130			
Chromium	83.0	1.0	ug/l	80.0	0.96	103	70-130			
Matrix Spike Dup Analyzed: 04/07/04 (4D06068-MSD1)					**Source: IND0209-01**					
Arsenic	86.7	1.0	ug/l	80.0	ND	108	70-130	0	20	
Chromium	83.0	1.0	ug/l	80.0	0.96	103	70-130	0	20	

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SW Groundwater Consultants - Phoenix	Project ID: Sundance Farms / B.793	
3900 East Camelback, Suite 200		Sampled: 04/02/04
Phoenix, AZ 85018	Report Number: PND0098	Received: 04/02/04
Attention: Steve Noel		

DATA QUALIFIERS AND DEFINITIONS

M3 The accuracy of the spike recovery value is reduced since the analyte concentration in the sample is disproportionate to spike level. The method control sample recovery was acceptable.

N1 See case narrative.

ND Analyte NOT DETECTED at or above the reporting limit or MDL, if MDL is specified.

RPD Relative Percent Difference

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Sampled: 04/02/04
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Certification Summary

Subcontracted Laboratories

Del Mar Analytical *NELAP Accreditation #01108CA, CA ELAP Cert #1197, AZ DHS Licence #AZ0428 and NV Cert #CA72-2002-63*
2852 Alton Parkway - Irvine, CA 92606
Method Performed: EPA 200.8
Samples: PND0098-01, PND0098-02, PND0098-03, PND0098-04

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1014 E. Cooley Dr., Suite A, Colton, CA 92324 Ph (909) 370-4667 Fax (909) 370-1046
9484 Chesapeake Drive, Suite 805, San Diego, CA 9212 Ph (619) 505-9596 Fax (619) 505-9689
9830 South 51st Street, Suite B-120, Phoenix, AZ 85504 Ph (480) 785-0043 Fax (480) 785-0851
2520 E. Sunset Rd., Suite #3, Las Vegas, NV 89120 Ph (702) 798-3620 Fax (702) 798-3621

SUBCONTRACT ORDER - PROJECT # PND0098

SENDING LABORATORY:
Del Mar Analytical - Phoenix
9830 South 51st Street, Suite B-120
Phoenix, AZ 85044
Phone: (480) 785-0043
Fax: (480) 785-0851
Project Manager: Tonda Waugh

RECEIVING LABORATORY:
Del Mar Analytical - Irvine
2852 Alton Parkway
Irvine, CA 92606
Phone :(949) 261-1022
Fax: (949) 261-1228

I.D.C.243

Analysis	Expiration	Due	Comments
Sample ID: PND0098-01 Water	**Sampled: 04/02/04 10:10**		
ICPMS-200.8-As-I	09/29/04 10:10	04/09/04 15:00	
ICPMS-200.8-Cr-I	09/29/04 10:10	04/09/04 15:00	
Containers Supplied:			
250 ml Poly w/HN03 (PND0098-01C)			
Sample ID: PND0098-02 Water	**Sampled: 04/02/04 10:25**		
ICPMS-200.8-As-I	09/29/04 10:25	04/09/04 15:00	
ICPMS-200.8-Cr-I	09/29/04 10:25	04/09/04 15:00	
Containers Supplied:			
250 ml Poly w/HN03 (PND0098-02C)			
Sample ID: PND0098-03 Water	**Sampled: 04/02/04 11:05**		
ICPMS-200.8-As-I	09/29/04 11:05	04/09/04 15:00	
ICPMS-200.8-Cr-I	09/29/04 11:05	04/09/04 15:00	
Containers Supplied:			
250 ml Poly w/HN03 (PND0098-03C)			
Sample ID: PND0098-04 Water	**Sampled: 04/02/04 12:25**		
ICPMS-200.8-As-I	09/29/04 12:25	04/09/04 15:00	
ICPMS-200.8-Cr-I	09/29/04 12:25	04/09/04 15:00	
Containers Supplied:			
250 ml Poly w/HN03 (PND0098-04C)			

SAMPLE INTEGRITY:

All containers intact: ☑ Yes ☐ No
Custody Seals Present: ☐ Yes ☑ No
Sample labels/COC agree: ☑ Yes ☐ No
Samples Preserved Properly: ☑ Yes ☐ No
Samples Received On Ice:: ☑ Yes ☐ No
Samples Received at (temp): 4°C

AIRBORNE

Released By	Date	Time	Received By	Date	Time
[signature]	4/5/04	1700		4/5/04	1700
			Yu Bach	4-6-04	1000

Del Mar Analytical
2852 Alton Ave., Irvine, CA 92606 (949) 261-1022 FAX (949) 261-1228
1014 E. Cooley Dr., Suite A, Colton, CA 92324 (909) 370-4667 FAX (909) 370-1046
7277 Hayvenhurst, Suite B-12, Van Nuys, CA 91406 (818) 779-1844 FAX (818) 779-1843
9830 South 51st St., Suite B-120, Phoenix, AZ 85044 (480) 785-0043 FAX (480) 785-0851
9484 Chesapeake Dr., Suite 805, San Diego, CA 92123 (858) 505-9596 FAX (858) 505-9689
2520 E. Sunset Rd. #3, Las Vegas, NV 89120 (702) 798-3620 FAX (702) 798-3621

CHAIN OF CUSTODY FORM

Client Name/Address: Southwest Ground-Water 3900 E Camelback Rd Ste 200 Phoenix AZ 85018

Project/PO Number: Sundance Farms/ B.793

Project Manager: Tonda

Phone Number: 602-955-5547

Sampler: MSG

Fax Number: 602-955-7585

Analysis Required

Sample Description	Sample Matrix	Container Type	# of Cont.	Sampling Date	Sampling Time	Preservatives	Calcium, Chromium	Magnesium, Potassium	Sodium	Arsenic	Chloride, Fluoride	N, Sulfate	Carb, Bicarb, Total Alk, Alk Hydroxide	TDS	Special Instructions
Well 1075	Water	Poly	2	4/2/04	1010	Ice HNO3	X	X	X	X	X	X	X	X	PND0098-01
Well 1096	Water	↓	2	4/2/04	1025	↓	X	X	X	X	X	X	X	X	↓ 02
Well 905	Water	↓	2	4/2/04	1105	↓	X	X	X	X	X	X	X	X	↓ 03
Well 1100	Water	↓	2	4/2/04	1225	↓	X	X	X	X	X	X	X	X	↓ 04

Relinquished By:	Date/Time:	Received by:	Date/Time:
[signature]	4/2/04 1355		
		Received in Lab by: [signature]	Date/Time: 4/2/04 1355

Turnaround Time: (Check)
same day ____ 72 hours ____
24 hours ____ 5 days X
48 hours ____ normal ____

Sample Integrity: (Check)
intact X on ice X 1.2°C

Note: By relinquishing samples to Del Mar Analytical, client agrees to pay for the services requested on this chain of custody form and any additional analyses performed on this project. Payment for services is due within 30 days from the date of invoice. Sample(s) will be disposed of after 30 days.

Attachment 11

ATTACHMENT II

VIDEO SURVEY LOG

DOWNHOLE VIDEO SURVEY LOG

Southwest Ground-water Consultants, Inc.

Well Name: SANDIA 1065
Well Location: D(5-7) 14dcd
Video Survey Co.: WEBER
Video Date: 5/24/04
Video: Color/B&W: COLOR
Datum: —

Reviewed By: K. HEBERT
Review Date: 7/14/04
Design: —
Total Depth: 1270 feet
Casing Diameter: 16"
Casing Perfs: holes @ 456, 538, 581 + 625 Mills Knife Perforations from 840-1223'

Casing	Depth Below Datum (ft)	Water Clarity	Amt. of Casing Encrust.	Encrust Color	Perf % Opening	Perf. Encrusting Color	Debris in Well	Remarks
	160'	POOR	NA	NA	NA		oil	Oil on top of water ≈ 100' @ 160'
	242'	POOR					oily	VIDEO IS DARK from 160' to 242'
	255'	cloudy						water very oily from 242' to 255'
	456	Good						water cloudy from 255' to 456'
								456 appears there is a Knife cut water clarity improves @ 456'
								Small holes @ 538 + 581, 625'
								mild scale @ 640 789 Knife cut
								Mills Knife perforations @ 840' to 1223'
								medium scale building below 1223
								bottom of casing @ 1240
								bottom of open hole @ 1270

Weber Group L.C.
16825 S. Weber Drive
Chandler, AZ 85226-4112
(480) 961-1141 Voice
(480) 961-0290 Fax

Well Video Log

Date: 5/24/04

Customer: Southwest Ground-water Consultants

Job #: 5071

Location: Hwy. 87 to Signal Peak Rd. south to Bechtel Rd. east about ½ mi. well on north side of road

Next to large pressure tank

Well #: 1065

City: Coolidge

County: Pinal

State: Arizona

Case Size: 16" OD

Liner Size: 14" ????

Drilling Method ????

Orig. Depth 1230'

Current Depth 1270'

S.W.L. 160'

Reference by: Fred T.

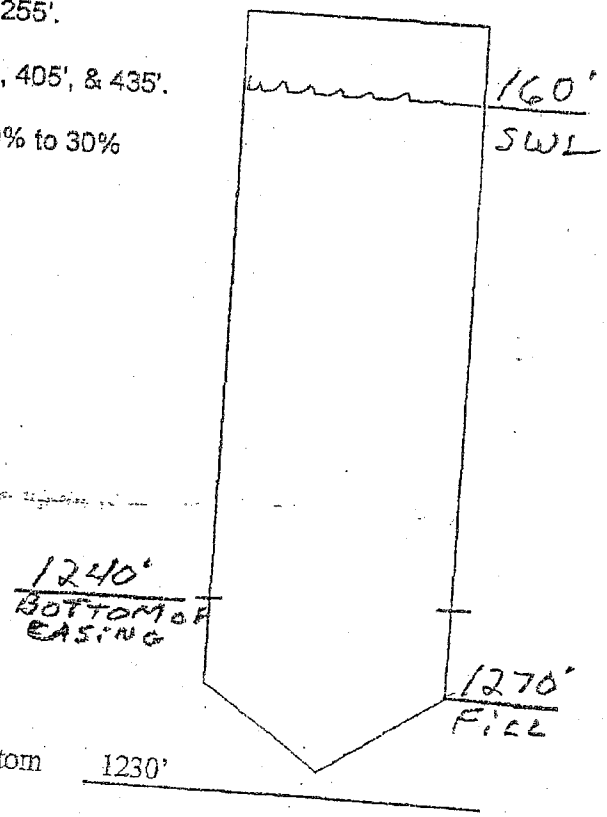
P. O. #:

Type of Perforation: Mills Knife

840' to 1223'

Type Drive Elec. Turbine

Results: There is about 100 ft. of oil on top of water, from 160' to 255'.
Water dirty from 160' to 460'.
Appears column pipe and bowls are against side of casing at 395', 405', & 435'.
Small holes at 454', 538', 581' & 625'.
Perforations appear to be 90% plugged 840' to 856', and about 20% to 30% plugged from 856 to 1223'.
Bottom of casing is at 1240', open hole from 1240' to 1270'.
No visible perforation above 840'.



Recommendations: Remove Oil and Test pump

Signed: Jim Murdock

Bottom 1230'

C:\Documents and Settings\Marianne\My Documents\well reports\swgwsundance1065.doc

APR 18 2005

City of Coolidge

130 W. Central Avenue
Coolidge, Arizona 85228
(520) 723-5361
TDD: (520) 723-4653 / Fax: (520) 723-7910

April 15, 2005

Dear Russ:

In reference to my letter to Central Arizona Association of Governments (CAAG) dated September 21, 2004, I am confirming that I agreed with Pivotal's request for a CAAG 208 Amendment.

I concluded that it is in the City's best interest to support the Woodriff Utility Company sewer service area identified in the CAAG 208 Amendment. The Woodruff Utility Company plans do not interfere with the City's plans to provide sewer service.

I also want to clarify that the City has no plans to expand the City's sewer facility to serve Sandia and that I support Woodruff Utility Company's CCN Application.

Sincerely,

Robert F. Flatley
City Manager

md

WWC-32
Admitted

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

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extends to 60 inches below ground surface (bgs). Selected portions of the USDA Soil Survey, including a site soil map and descriptions of soils at the site are presented in Appendix A.

SGC reviewed the results of soil borings conducted by Alpha Geotechnical & Materials, Inc. (Alpha). Alpha advanced thirty (30) soil test borings at the proposed Sundance Farms (Sandia) development on April 6, 2004 with a CME-45 hollow-stem auger rig. The borings were completed to evaluate subsurface soil at the proposed Sandia Development to determine if subsurface conditions are suitable to support the proposed facilities and infrastructure. One of the borings (Test Boring 24) was drilled to a depth of 11.5 feet bgs in the vicinity of the proposed WWTP and USF. The soil encountered in Test Boring 24 is described as a medium brown, poorly graded, sandy silt, which is consistent with descriptions of the Dateland fine sandy loam identified by the USDA Soil Survey. A copy of the lithologic log for Test Boring 24 is included in Appendix B.

Based on October and November 1997 data obtained from the ADWR Groundwater Site Inventory (GWSI) database (ADWR, 1999), the static ground-water level measured in wells in the vicinity of the proposed USF ranges from 81.6 to 161.9 ft bgs. A map of October and November 1997 ground-water levels and ground-water surface contours is presented in Figure 3. Review of this map indicates the regional direction of ground-water flow is to the south/southeast.

Ground-water levels were also measured in the two (2) boreholes that were drilled to the ground-water surface (See Section 2.1.2, below). Depth to ground water in each boring was measured inside the drill casing with an electric sounder. Water levels were measured at the depth of 50 feet bgs in boring DB-1 and 45 feet bgs in boring DB-2.

Historic ground-water level data have been monitored by ADWR in several wells in the vicinity of the study area. Hydrographs for wells are presented in Figure 4.

2.0 INVESTIGATIVE METHODS

SGC visited the site on July 28, 2004 to assess the Study Area for potential equipment access and other logistical issues and to field mark testing and boring locations. Other activities included identifying and coordinating subcontractors, as well as obtaining drilling permits from ADWR. SGC chose testing and drilling locations based on the data review and site inspection. SGC used a portable GPS device to identify the locations in the field and mark them with stakes and flags. Prior to conducting drilling activities, Arizona Bluestake was notified to identify potential subsurface utilities in the Study Area.

2.1 BOREHOLE DRILLING

Seven (7) boreholes were drilled at the site to further characterize the shallow subsurface, document the lithology to ground water, measure the depth to ground water below the site, and to evaluate whether low-permeability lithologic units exist below the site, which may be of sufficient lateral extent to potentially impede infiltrating recharge water.

2.1.1 Shallow Borings (Continuous Soil Coring)

SGC field staff observed shallow drilling operations, which were conducted at five (5) locations by WDC Exploration & Wells (WDC) on September 7, 2004 using a CME B-75 hollow stem auger to continuously core to approximately 18 feet bgs. Core samples were placed in chip trays and core boxes for future reference. SGC prepared detailed boring logs based on visual inspection of the cored materials. SGC inspected each core for the presence of fine sediments, particularly silt and clay, which might potentially impede the infiltration of recharge water. Lithologic logs for the shallow borings are presented in Appendix C. A cross section showing the lithology encountered in selected shallow borings is presented on Figure 5. Boring and cross-section locations are presented in Figure 2.

The shallow subsurface lithology in the study area consists primarily of poorly graded, clayey fine grained sand with low to medium plasticity in the upper 8 to 10 feet. Below that depth to the total depth of the boring (18 feet bgs), the lithology consisted primarily of poorly graded fine

grained sand with no plasticity. The shallow borings encountered only dry to slightly moist sediments. Boring logs are presented in Appendix C.

2.1.2 Borings to Ground Water

Layne Christensen Company (Layne) drilled two (2) boreholes in the Study Area on September 7, 2004 to characterize the deeper subsurface soil to ground water and to measure depth to ground water below the site. SGC field staff observed drilling operations, which were conducted using the reverse-circulation dual-tube percussion hammer drilling method. This method enabled the recovery of fine sediments, sand, gravel and cobbles intact, without pulverizing drilling materials or introducing fluids other than air. Boring DB-1 was drilled on the north end of the study area to a depth of 100 feet bgs, and Boring DB-2 was drilled on the southern portion of the Study Area to a depth of 80 feet bgs.

SGC staff collected composite samples of cuttings at 10-foot intervals to inspect for the presence of fine grained sediments (silt and clay) that might potentially impede the infiltration of recharge water. SGC prepared lithologic logs based on visual inspection of the cuttings. Deep boring lithologic logs are presented in Appendix C. A cross section showing the lithology of the deeper borings is presented in Figure 6. Boring and cross-section locations are presented in Figure 2.

The upper 10 to 15 feet encountered in borings DB-1 and DB-2 consisted of clayey silt with low to medium plasticity, with 5 to 10 % very fine grained sand. Below that depth to the total depth of each boring, the lithology consisted primarily of coarser grained sediments including silty sands and gravelly sands. Depth to water in borings DB-1 and DB-2 was measured at depths of 50 feet and 45 feet, respectively. Boring logs for the deeper borings are presented in Appendix C.

2.2 INFILTRATION TESTING

SGC conducted percolation testing using the single-ring infiltrometer testing method with corrections for lateral divergence (see Bouwer et al, 1999 for method and data analysis details). Infiltration rate measurements were recorded at fourteen (14) points spread over the Study Area (Figure 2). Infiltration rate measurements were conducted at Test Pits 1 through 7 on August 2 and 3, 2004. Because Test Pits 8 through 14 were located within the interior portion of a recently

irrigated cotton field, infiltration rate measurements at those locations could not be completed until August 11, 2004.

Assuming a Study Area of approximately 25 acres, measurements were recorded at an average of approximately one point per 1.8 acres. Infiltration tests were performed in backhoe-dug test pits. Test pits were excavated to a depth of approximately 3 feet below grade using a 580-B back-hoe. The area of each excavation was approximately 6 feet by 6 feet to safely accommodate equipment and staff during testing. Soil layers exhibiting weak to moderate cementation were encountered at various depths in most of the excavations.

Infiltrometers used for the tests were approximately 12 inches in height and the diameter of each was approximately 20 inches. At each testing location, the steel cylinders were driven straight down, approximately 3 to 4 inches into the ground. Soil was packed against the inside and outside of the cylinder to obtain a seal between the cylinder and soil in order to minimize preferential flow at the soil-ring contact. During the filling of each cylinder, water was poured onto plastic bubble wrap inside the cylinder to minimize erosion of the interior soil surface. As the cylinder filled with water, the bubble wrap floated to the surface and was removed from the cylinder. As soon as the cylinder was filled, starting clock time was recorded and the test was started. Water level drops over time were monitored inside each cylinder and the change in water level was measured with a ruler fixed to the inside of the cylinder. Following the recording of each water level drop and corresponding time increment, the cylinder was re-filled to the top. This process was repeated for approximately four hours or until cumulative infiltration had reached at least 15 inches, whichever came first.

Following completion of the test at each location, a shovel was used to dig outside the cylinder to measure the distance of lateral divergence. A hand auger was used to bore beneath the center of the wet soil to determine the depth of the wetting front. This measurement was used to estimate soil porosity. The lithology encountered at each test pit was logged by SGC field staff and is summarized in logs presented in Appendix D.

The saturated hydraulic conductivity (Ksat) for the test pits were calculated based on the results of the testing data. The recorded data and results of the calculations are provided in Table 1.

Approximately 25 acres were evaluated as a potential ground-water recharge facility. However, the area available for recharge (effective area) is reduced by a factor of 4, assuming that 50% of the area would be utilized for roads and sloped basin boundaries and that basins would be unused approximately 50% of the time to allow for maintenance and operational flexibility. This reduction allows approximately 6 acres to be available for recharge at any one time.

As shown in Table 1, calculations of saturated hydraulic conductivity (Ksat) based on infiltration measurements conducted across the Study Area, range from 0.02 to 1.34 ft/day and average approximately 0.59 ft/day. The variability noted in the infiltration rates and in the lateral divergence (Table 1) is probably directly related to the existence of soil layers containing weak to moderate cementation. Based on these calculations, SGC estimates that a recharge rate equal to Ksat over 6 acres of effective area would result in recharge rate of approximately 1,270 acre-ft/year (1.1 mgd).

3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on information obtained during the borehole drilling program and results of the preliminary infiltration testing, it appears that the condition of the soil in the upper 8 to 10 feet within the Study Area may not be suitable for ground-water recharge in its present state. The soil types encountered below 10 feet, however, appear to be favorable for ground-water recharge. Based on this information, some level of excavation/ removal or application of soil amendments in the upper 10 feet of soil may be necessary.

Once the location of the wastewater treatment plant is finalized, SGC recommends that one or more test basins be constructed using an area of at least 100 X 100 feet, to check the validity of the infiltrometer data, in view of spatial variability of the soil, and to study long-term infiltration behavior of the site (for up to one year, if feasible). Long-term small basin testing will also allow measurement of the effects of clogging, lead to preliminary plans for managing clogging by drying and cleaning, and aid in determining optimal water depth (Bouwer and Rice, 1989).

3.0 REFERENCES

ADWR, 1999b. Groundwater Site Inventory Database. Arizona Department of Water Resources. Last updated March 1999.

Alpha Geotechnical & Materials, Inc. 2004. Preliminary Geotechnical Subsurface Exploration for Sundance Farms Development.

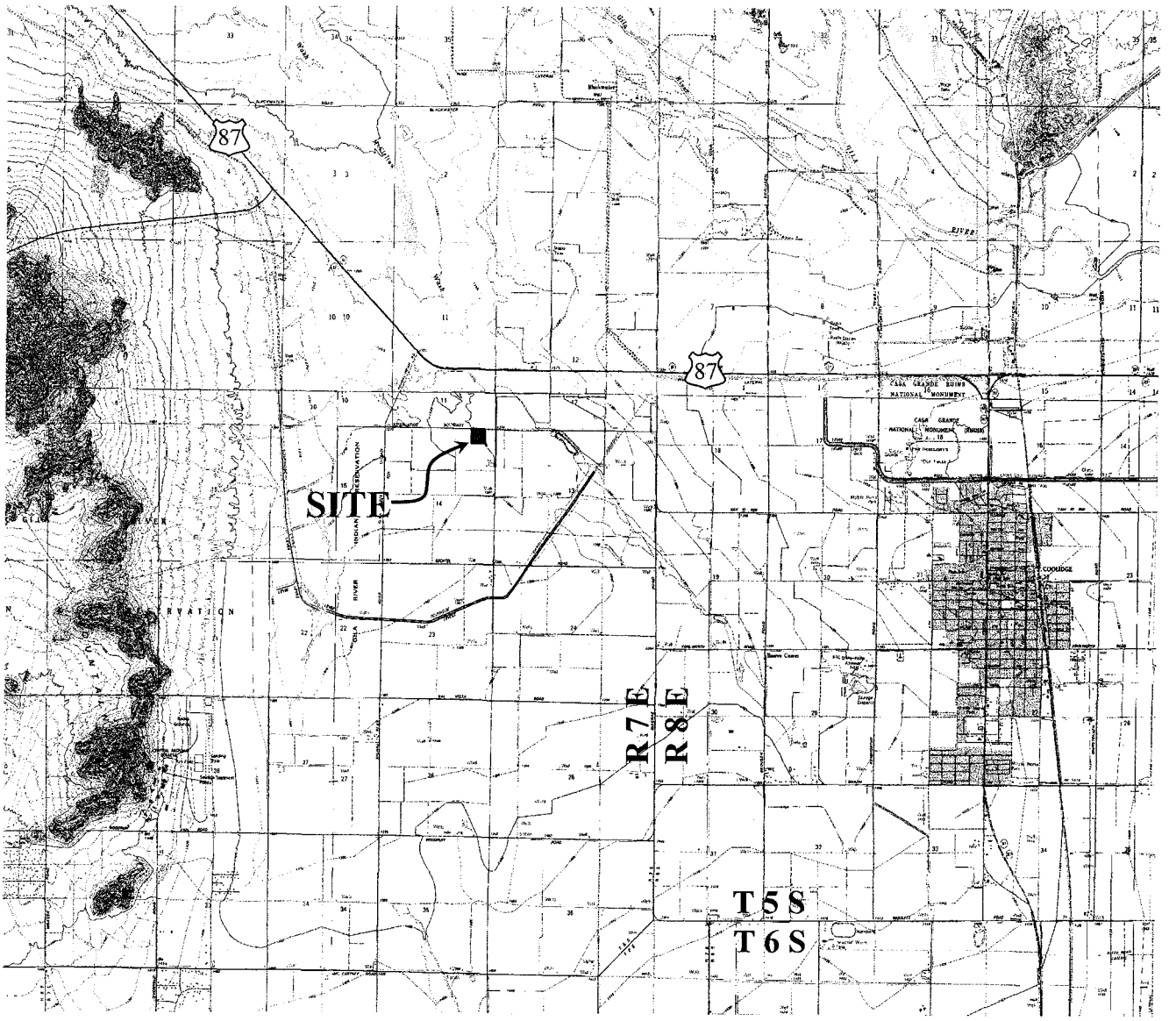
Bouwer, H., Back, J.T., and Oliver, J.M. 1999. Predicting Infiltration and Ground-water Mounds for Artificial Recharge. Journal of Hydrologic Engineering, Vol. 4, No. 4, 350-357, October.

Bouwer, H., Rice, R.C. 1989. Effect of Water Depth in Groundwater Recharge Basins on Infiltration. Journal of Irrigation and Drainage Engineering, Vol. 115, No. 4, 556-567, August.

Camp, P.D. 1986. Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona.

Soil Survey of Pinal County, Arizona, Western Part. Jon F. Hall, Soil Conservation Service, United States Department of Agriculture, 1983.

FIGURES



Source: QuadsUSA, Inc.

EXPLANATION

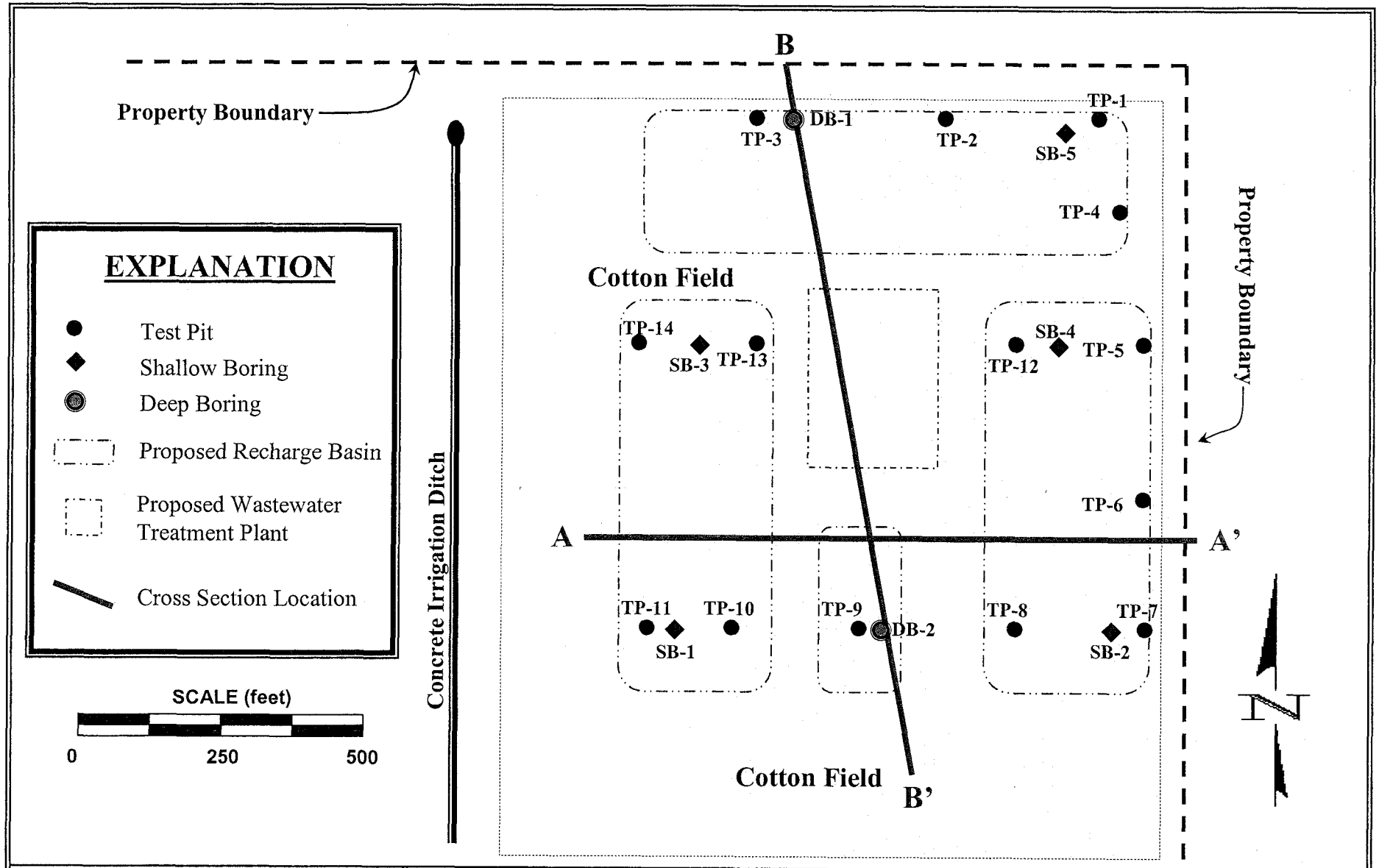
■ Site Location

N

APPROXIMATE SCALE (miles)

0 1 2 3

Southwest Ground-water Consultants, Inc. **October 1, 2004 Project B.859**	**SITE VICINITY MAP** **WOODRUFF UNDERGROUND STORAGE FACILITY** **Pinal County, Arizona**	**Figure 1**



Southwest Ground-water Consultants, Inc.

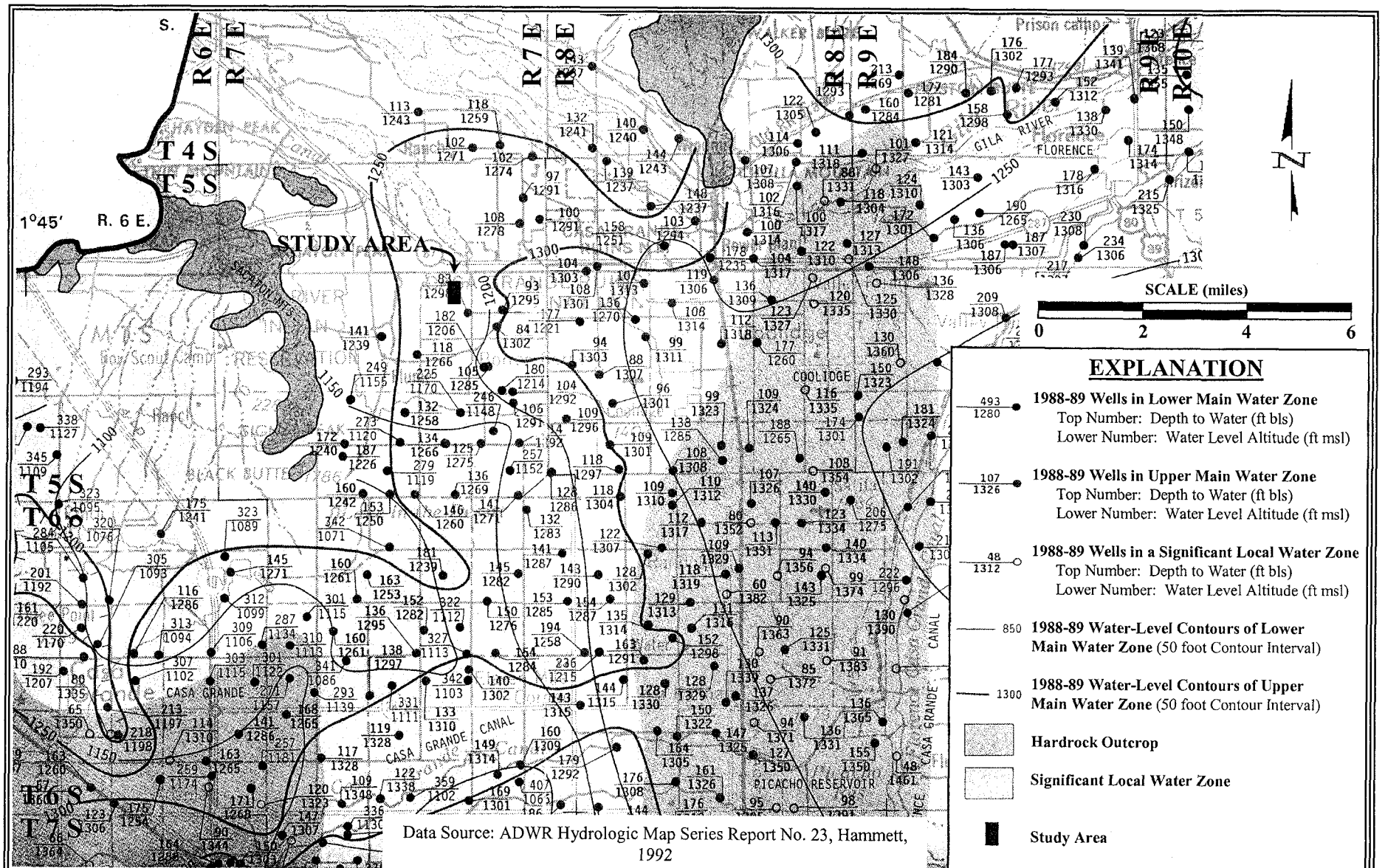
September 9, 2004 Project B.859

SITE MAP

WOODRUFF UNDERGOUND STORAGE FACILITY

Pinal County, Arizona

Figure 2



Data Source: ADWR Hydrologic Map Series Report No. 23, Hammett, 1992

Southwest Ground-water Consultants, Inc.

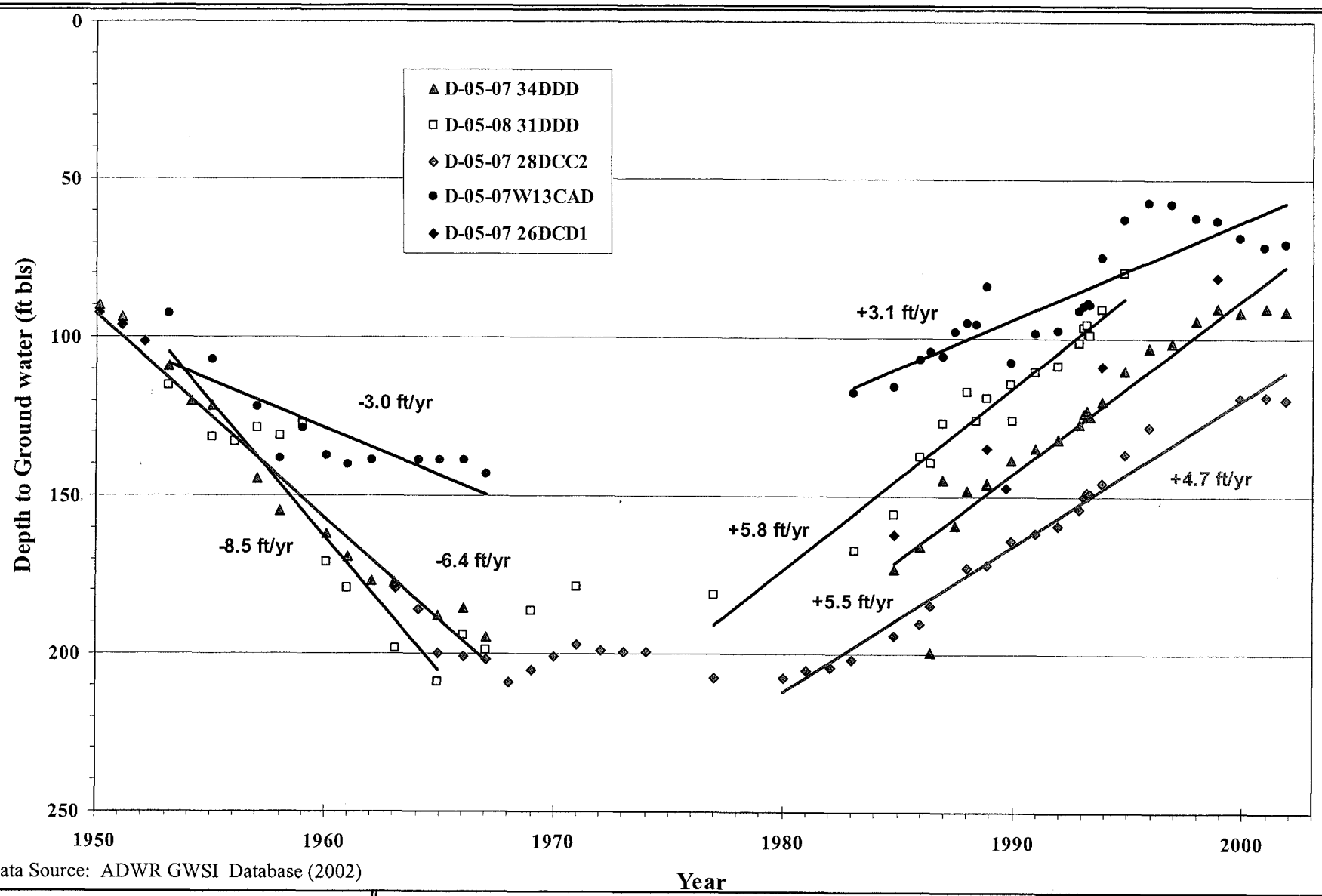
October 15, 2004 **Project B.859**

GROUND-WATER SURFACE MAP

WOODRUFF UNDERGROUND STORAGE FACILITY

Pinal County, Arizona

Figure 3



Data Source: ADWR GWSI Database (2002)

Southwest Ground-water Consultants, Inc.

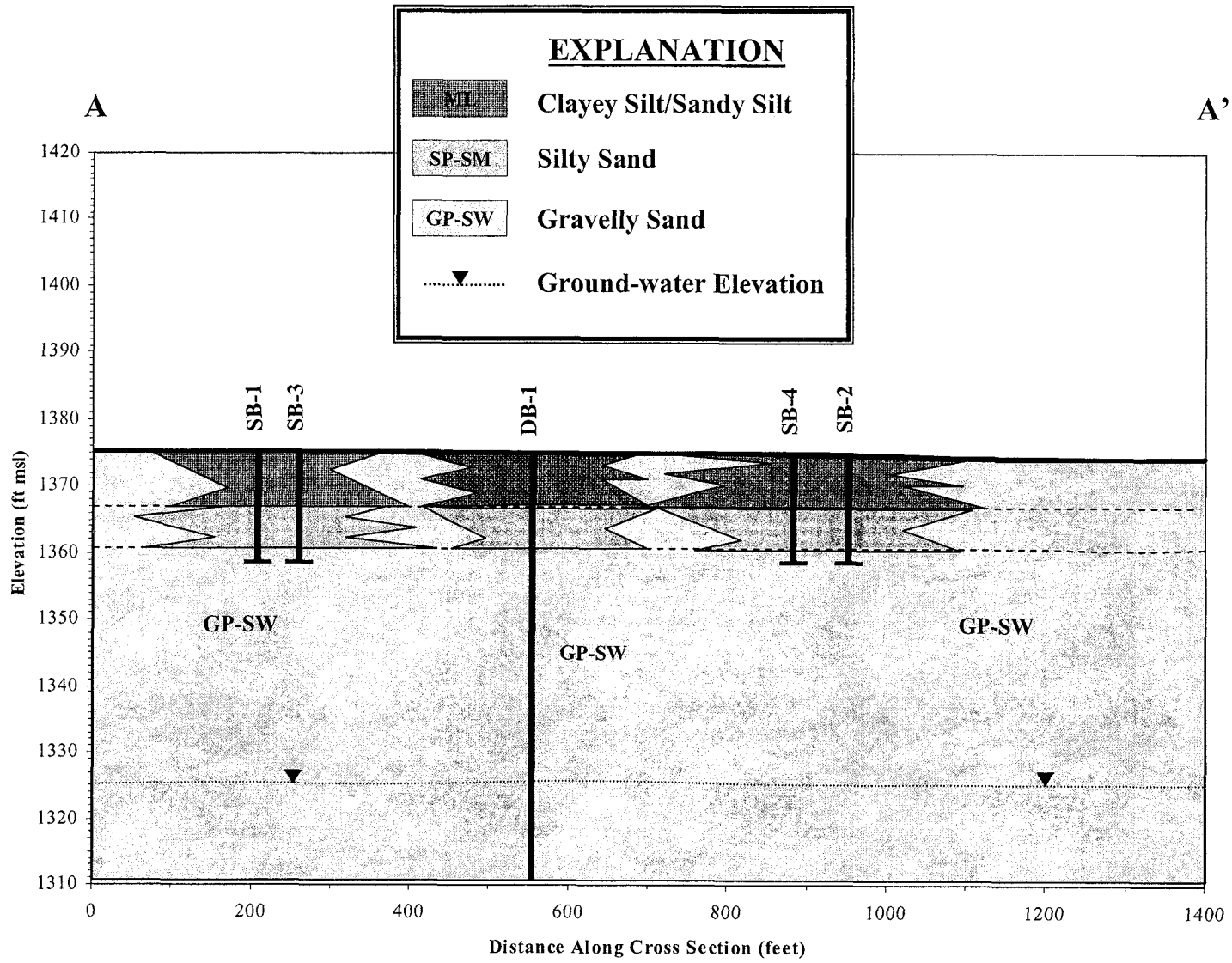
October 15, 2004 Project B.859

WELL HYDROGRAPHS

WOODRUFF UNDERGOUND STORAGE FACILITY

Pinal County, Arizona

Figure 4



Southwest Ground-water Consultants, Inc.

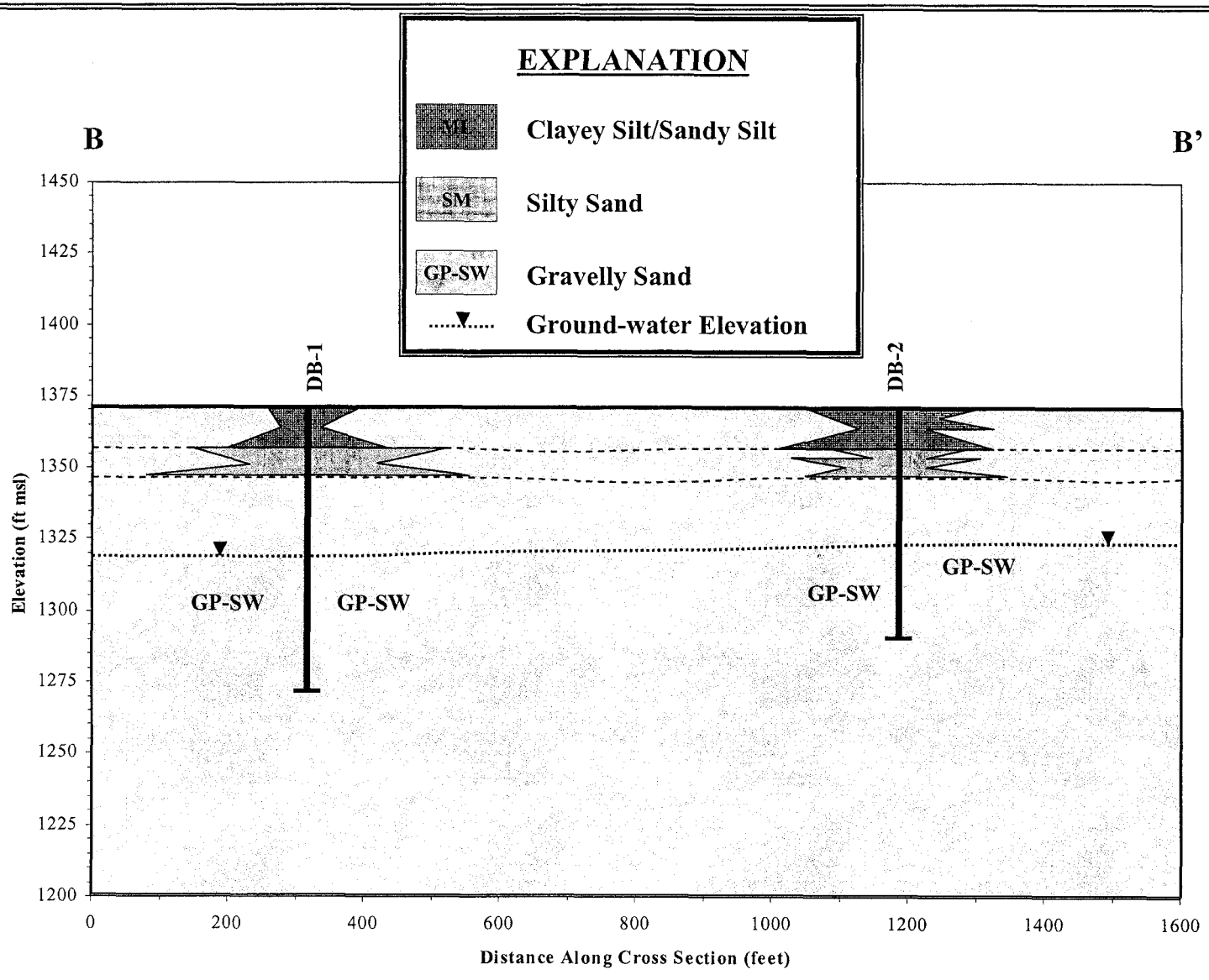
October 15, 2004 Project B.859

SHALLOW BORING CROSS-SECTION A-A'

WOODRUFF UNDERGROUND STORAGE FACILITY

Pinal County, Arizona

Figure 5



Southwest Ground-water Consultants, Inc.

October 15, 2004 Project B.859

DEEP BORING CROSS-SECTION B-B'

WOODRUFF UNDERGROUND STORAGE FACILITY

Pinal County, Arizona

Figure 6

TABLES

TABLE 1

INFILTRATION TESTING RESULTS

Location	Soil Type	L, Wetting Depth Measured (cm)	L, Wetting Depth Estimated (cm)	x Lateral Divergence (cm)	y_t Sum of Water Level Drops (cm)	n Porosity Computed	n Porosity Estimated	y_n, Last Water Level Drop (cm)	Δt_n, Last Time Interval (min)	I_n, Infiltration Rate (cm/min)	I_w (cm/min)	z, Average Height of Water During Last Drop (cm)	h_{we} Water Entry*	K, Hydraulic Conductivity (cm/min)	K (ft/day)
TP-1	Clayey Sand/Clayey Silt	91.4		19	22	0.08		5.6	48	0.12	0.04	23.2	-25	0.0247	1.17
TP-2	Clayey Sand/Clayey Silt		20.0	27	36.7		0.10	9.6	81	0.12	0.03	18.9	-25	0.0086	0.41
TP-3	Clayey Sand/Clayey Silt	7.0		8	4.9	0.40		4.9	91	0.02	0.01	23.5	-25	0.0012	0.06
TP-4	Clayey Sand/Clayey Silt	45.7		34	35.5		0.15	15.4	74	0.21	0.04	17.5	-25	0.0195	0.92
TP-5	Clayey Sand/Clayey Silt		20.0	43	31.6		0.13	14.4	68	0.21	0.03	20.0	-25	0.0089	0.42
TP-6	Clayey Sand/Clayey Silt		20.0	38	40.8		0.13	5.7	30	0.20	0.03	23.5	-25	0.0091	0.43
TP-7	Clayey Sand/Clayey Silt		20.0	36	39.2	0.00		9.8	54	0.18	0.03	20.1	-25	0.0094	0.44
TP-8	Clayey Sand/Clayey Silt	15.0		9	16.8		0.08	5.1	23	0.22	0.12	23.5	-25	0.0284	1.34
TP-9	Clayey Sand/Clayey Silt	3.0		5	7.2	0.67		2.9	36	0.01	0.01	22.3	-25	0.0005	0.02
TP-10	Clayey Sand/Clayey Silt	35.0		11	29.2	0.40		6.5	78	0.08	0.04	18.5	-25	0.0180	0.85
TP-11	Clayey Sand/Clayey Silt	17.0		4	27.9	1.22		7.1	87	0.08	0.06	18.1	-25	0.0172	0.81
TP-12	Clayey Sand/Clayey Silt	12.0			17.4	1.45		4.1	66	0.06	0.06	23.5	-25	0.0123	0.58
TP-13	Clayey Sand/Clayey Silt	14.0		17	39.1	0.99	0.13	9.4	67	0.14	0.05	13.8	-25	0.0132	0.62
TP-14	Clayey Sand/Clayey Silt	15.0		11	10.4	0.28		4.2	81	0.03	0.01	23.0	-25	0.0034	0.16

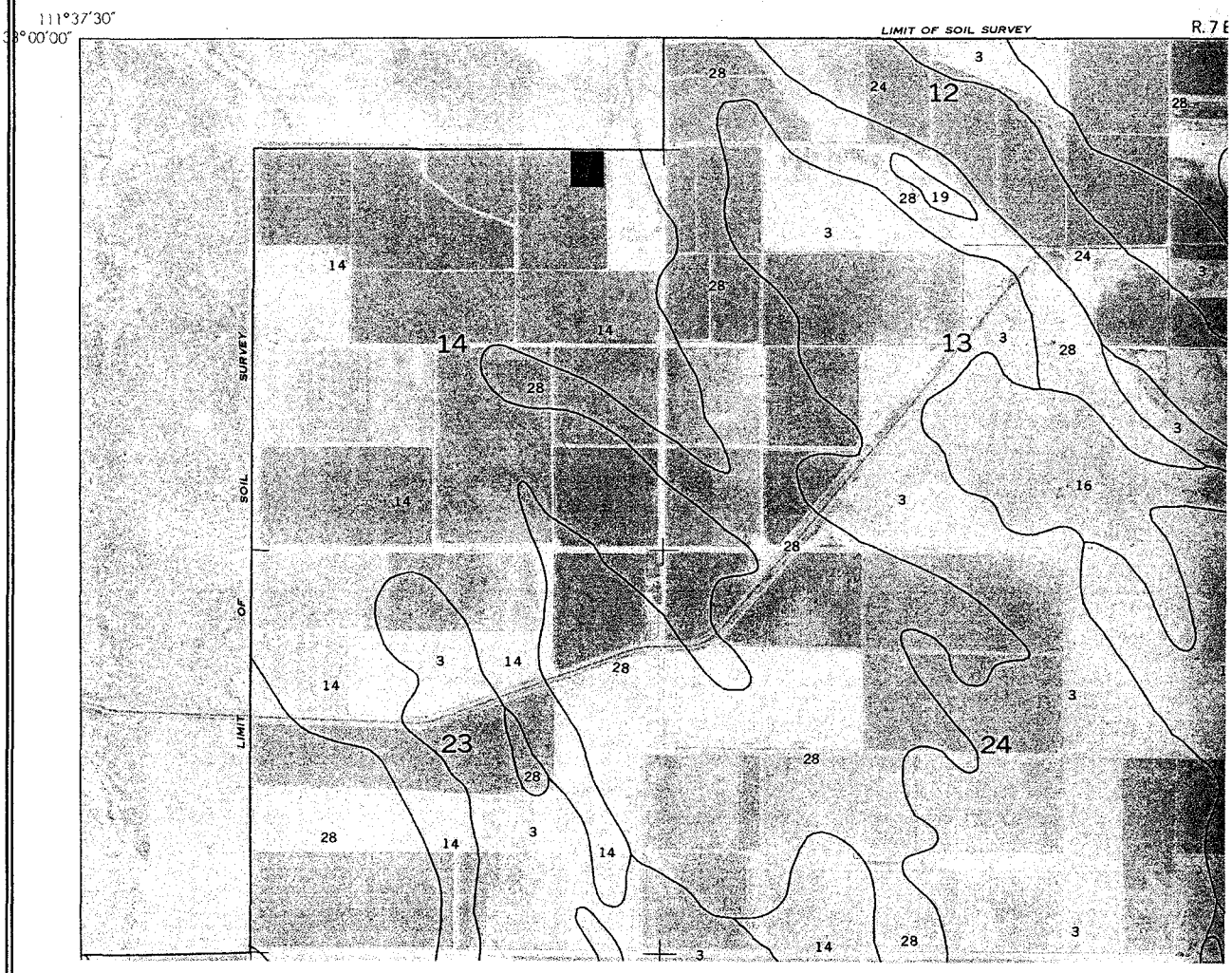
*Journal of Hydrologic Engineering, October 1989. Water entry value for sandy loam.

OVERALL AVERAGE	**0.59**
AVERAGE TP-1 THROUGH TP-14	**0.59**

APPENDICES

APPENDIX A

SELECTED PORTIONS OF USDA SOIL SURVEY



SCALE (miles)

0 1 2

EXPLANATION

Approximate Study Area Location

14 Dateland fine sandy loam

N

Source: Source: Soil Survey of Pinal County, AZ
United States Department of Agriculture Soil Conservation Service, 1978.

Southwest Ground-water Consultants, Inc. **October 15, 2004** **Project B.859**	**SOILS MAP** **WOODRUFF UNDERGROUND STORAGE FACILITY** **Pinal County, Arizona**	**Figure A-1**

suited to this unit. Maintaining crop residue on or near the surface reduces soil blowing and helps to maintain soil tilth and organic matter content. Keeping the soil surface moist helps to control soil blowing and thus reduces the risk of damage to young seedlings. Leveling the soil permits more efficient use of irrigation water. Properly designed and carefully installed diversions, dikes, channels, and levees can help to control flooding.

This unit is well suited to the production of desertic riparian herbaceous plants, shrubs, and trees that provide habitat for wildlife. It is moderately well suited to the production of irrigated grain and seed crops and domestic grasses and legumes.

This unit is in capability subclasses IIw, irrigated, and VIIw, nonirrigated. It is in the Sandy Bottom, 7- to 10-inch p.z., range site.

13—Dateland fine sandy loam. This deep, well drained soil is on fan terraces and stream terraces. It formed in fan and stream alluvium derived from mixed sources. Slope is 0 to 1 percent. Elevation is 1,140 to 2,000 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 68 to 72 degrees F, and the average frost-free period is 240 to 325 days.

Typically, the surface layer is light yellowish brown fine sandy loam about 2 inches thick. The subsoil is light yellowish brown and strong brown fine sandy loam 13 inches thick. The next layer is strong brown very fine sandy loam 25 inches thick. The substratum to a depth of 60 inches or more is strong brown sandy loam.

Included in this unit are small areas of Antho, Denure, Gilman, and Valencia soils. Included areas make up about 10 percent of the total acreage.

Permeability of this Dateland soil is moderate. Available water capacity also is moderate. Potential rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. Areas of this unit on stream terraces are subject to rare periods of flooding during high-intensity summer storms and prolonged winter rains.

This unit is used for irrigated crops, rangeland, and homesite development.

If this unit is used for irrigated crops, it is limited mainly by the moderate available water capacity and the hazard of soil blowing. Surface, trickle, and sprinkler irrigation systems are suited to this unit. A cropping system that includes crop rotation and the incorporation of crop residue or other organic material into the soil helps to maintain soil tilth and fertility, helps to conserve moisture, reduces soil blowing, and increases the available water capacity. Leveling the soil permits more efficient use of irrigation water. Areas subject to flooding can be protected by construction of properly designed dikes, diversions, or levees.

The potential native plant community on this unit is desertic shrubs, cacti, and a small percentage of annual and perennial grasses and forbs. The present vegetation is creosotebush, triangle bursage, annual grasses, and forbs.

If this unit is used for homesite development, the main limitation is the hazard of flooding. Protection from flooding can be provided by the use of diversions, dikes, or channels to divert the water. Construction of houses and access roads destroys the vegetation and leaves the surface unprotected and highly susceptible to soil blowing. Revegetating disturbed areas around construction sites as soon as possible helps to control soil blowing. Measures such as wrapping steel pipes and providing cathodic protection can be used to minimize corrosion of steel.

This unit is very poorly suited to the production of desertic herbaceous plants and is poorly suited to the production of desertic shrubs and trees that provide habitat for wildlife. It is well suited to the production of irrigated grain and seed crops and domestic grasses and legumes.

This unit is in capability class I, irrigated, and subclass VIIc, nonirrigated. It is in the Limy Fan, 7- to 10-inch p.z., range site.

14—Dateland fine sandy loam, saline. This unit is on relict basin floors. It formed in stream alluvium derived from mixed sources. Slope is 0 to 1 percent. Elevation is 1,140 to 2,000 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 68 to 72 degrees F, and the average frost-free period is 240 to 325 days.

Typically, the surface layer is light brown fine sandy loam about 2 inches thick. The subsoil is strong brown fine sandy loam 13 inches thick. The next layer is strong brown very fine sandy loam 25 inches thick. The substratum to a depth of 60 inches or more is strong brown sandy loam. The soil is moderately saline and strongly sodic throughout.

Included in this unit are small areas of Casa Grande soils. Included areas make up about 5 percent of the total acreage.

Permeability of this Dateland soil is moderate. Available water capacity is high. Potential rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of soil blowing is moderate. The content of toxic salts is high.

This unit is used for irrigated crops, rangeland, and homesite development.

If this unit is used for irrigated crops, it is limited

contradiction of available water capacity ?

mainly by the content of toxic salts, the hazard of soil blowing, and the low available water capacity. Surface and drip irrigation systems are suited to this unit. Intensive management is needed to reduce the salinity and sodicity of the soil to the minimum needed to maintain soil productivity. In most cropland areas of this unit, the toxic salts have been leached, at least partially, to a depth of 3 to 5 feet. The content of toxic salts can be reduced and maintained at a lower level by leaching, applying proper amounts of soil amendments, and returning crop residue to the soil. A cropping system that includes crop rotation and the incorporation of crop residue or other organic material into the soil helps to maintain soil tilth and fertility, conserves moisture, reduces soil blowing, and increases the available water capacity. Leveling the soil permits more efficient use of irrigation water. If this soil is leveled for irrigation water management, the cuts and fills in places are as much as 5 feet deep. This exposes the underlying layers, which have a high content of lime, salts, and sodium, and thus reduces the water intake rate and restricts the use of nutrients by plants.

The potential native plant community is desert saltbush, fourwing saltbush, and numerous winter and summer annual grasses and forbs. The present vegetation is desert saltbush, seepweed, mound cactus, and Mediterraneangrass.

This unit is limited for homesite development by the high content of toxic salts. Construction of homes and access roads in places destroys the vegetation and leaves the surface unprotected and highly susceptible to soil blowing. Revegetating disturbed areas around construction sites as soon as possible helps to control soil blowing. Selection of salt-tolerant vegetation is critical for the establishment of lawns, shrubs, and trees. Measures such as wrapping steel pipes or using cathodic protection and chemically resistant concrete can minimize the corrosion of steel and concrete.

This unit is poorly suited to the production of desertic herbaceous plants, shrubs, and trees that provide habitat for wildlife. It is also well suited to the production of irrigated grain and seed crops and domestic grasses and legumes.

This unit is in capability subclasses IIs, irrigated, and VIIs, nonirrigated. It is in the Saline Upland (loamy), 7- to 10-inch p.z., range site.

15—Denure very gravelly sandy loam, 1 to 8 percent slopes. This deep, somewhat excessively drained soil is on fan terraces. It formed in fan alluvium derived from mixed sources. Elevation is 1,140 to 2,000 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 68 to 72 degrees F, and the average frost-free period is 240 to 325 days.

Typically, the surface layer is light brown very gravelly sandy loam about 8 inches thick. The next 46 inches is light brown sandy loam and fine sandy loam. Below this to a depth of 60 inches or more is reddish brown sandy clay loam. Soft masses of lime are below a depth of about 19 inches.

Included in this unit are about 5 percent Tremant soils on the higher end of fan terraces and lower ridges, 5 percent Mohall soils on the lower end of fan terraces, and 2 percent Carrizo soils on flood plains.

Permeability of this Denure soil is moderately rapid. Available water capacity is moderate. Potential rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is slight.

This unit is used as rangeland.

The potential native plant community is a mixture of desertic shrubs and trees with an understory of perennial grasses. The present vegetation is littleleaf paloverde, triangle bursage, white bursage, ratany, creosotebush, bush muhly, and a variety of cacti, annual grasses, and forbs.

This unit is poorly suited to the production of desertic herbaceous plants, shrubs, and trees that provide habitat for wildlife.

This unit is in capability subclass VIIc, nonirrigated. It is in the Sandy Loam Upland, 7- to 10-inch p.z., range site.

16—Denure sandy loam, 1 to 3 percent slopes. This deep, somewhat excessively drained soil is on fan terraces. It formed in fan alluvium derived from mixed sources. Elevation is 1,140 to 2,000 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is 68 to 72 degrees F, and the average frost-free period is 240 to 325 days.

Typically, the surface layer is light brown sandy loam about 2 inches thick. The next 52 inches is light brown sandy loam and fine sandy loam. Below this to a depth of 60 inches or more is reddish brown sandy clay loam. This layer is 5 to 30 percent pebbles. A few soft masses of lime are below a depth of about 19 inches.

Included in this unit are small areas of Coolidge, Dateland, Momoli, and Valencia soils. Also included are small areas of soils that have a surface layer of gravelly sandy loam. Included areas make up about 15 percent of the total acreage.

Permeability of this Denure soil is moderately rapid. Available water capacity is moderate. Potential rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. The hazard of soil blowing is moderate.

This unit is used mainly as rangeland. It is also used for irrigated crops and homesite development.

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	In/hr	In/in	pH	mmhos/cm					Pct
12---------- Cuerda	0-9	15-20	0.6-2.0	0.13-0.15	7.9-8.4	<2	Low--------	0.24	5	3	<1
	9-30	15-20	0.6-2.0	0.15-0.17	7.9-8.4	<2	Low--------	0.24			
	30-60	20-25	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low--------	0.43			
13---------- Dateland	0-2	10-15	2.0-6.0	0.11-0.15	7.4-7.8	<2	Low--------	0.24	5	3	<.5
	2-40	10-20	0.6-2.0	0.11-0.15	7.9-8.4	<2	Low--------	0.24			
	40-60	10-20	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.24			
14---------- Dateland	0-2	10-20	2.0-6.0	0.05-0.10	8.5-9.0	8-16	Low--------	0.24	5	3	<1
	2-40	10-20	0.6-2.0	0.05-0.10	8.5-9.0	8-16	Low--------	0.24			
	40-60	10-20	2.0-6.0	0.05-0.08	8.5-9.0	8-16	Low--------	0.24			
15---------- Denure	0-8	10-15	2.0-6.0	0.09-0.11	7.9-8.4	<2	Low--------	0.17	5	8	.5-1
	8-54	10-20	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low--------	0.24			
	54-60	20-30	0.2-0.6	0.14-0.16	7.9-8.4	<2	Low--------	0.28			
16, 17---------- Denure	0-2	5-15	2.0-6.0	0.13-0.15	7.9-8.4	<2	Low--------	0.20	5	3	.5-1
	2-54	10-20	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low--------	0.24			
	54-60	20-30	0.2-0.6	0.14-0.16	7.9-8.4	<2	Low--------	0.28			
18---------- Denure	0-15	27-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate	0.32	5	5	.5-1
	15-54	10-20	2.0-6.0	0.11-0.13	7.9-8.4	<2	Low--------	0.24			
	54-60	20-30	0.2-0.6	0.14-0.16	7.9-8.4	<2	Low--------	0.28			
19*:											
Dumps.											
Pits.											
20---------- Gadsden	0-13	50-55	0.06-0.2	0.15-0.17	7.9-8.4	<2	High-------	0.28	5	8	<1
	13-42	50-55	0.06-0.2	0.15-0.17	7.9-8.4	<2	High-------	0.28			
	42-60	27-30	0.2-0.6	0.19-0.21	7.9-8.4	<2	Low--------	0.37			
21---------- Gilman	0-14	10-20	0.6-2.0	0.13-0.15	7.9-8.4	<2	Low--------	0.28	5	3	<.5
	14-60	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low--------	0.43			
22---------- Gilman	0-12	30-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate	0.32	5	4L	<.5
	12-60	10-15	0.6-2.0	0.16-0.18	7.9-8.4	<2	Low--------	0.43			
23---------- Ginland	0-24	40-55	0.06-0.2	0.14-0.17	7.9-8.4	<8	High-------	0.32	5	8	<2
	24-60	20-30	0.2-0.6	0.05-0.10	7.9-8.4	<8	Moderate	0.28			
24---------- Glenbar	0-13	30-40	0.2-0.6	0.16-0.18	7.9-8.4	<2	Moderate	0.32	5	4L	<.5
	13-60	18-35	0.2-0.6	0.19-0.21	7.9-8.4	<2	Moderate	0.37			
25*:											
Gunsight---------	0-3	15-25	0.6-2.0	0.04-0.10	7.9-8.4	<8	Low--------	0.15	5	8	<.5
	3-12	20-27	0.6-2.0	0.10-0.15	7.9-8.4	<8	Low--------	0.28			
	12-60	10-20	0.6-2.0	0.04-0.10	7.9-8.4	<8	Low--------	0.10			
Cipriano---------	0-2	15-25	0.6-2.0	0.12-0.15	7.9-8.4	<2	Low--------	0.32	1	8	<.5
	2-9	15-25	0.6-2.0	0.05-0.08	7.9-8.4	<2	Low--------	0.20			
	9	---	---	---	---	---	----------	----			
26*:											
Gunsight---------	0-3	15-25	0.6-2.0	0.04-0.10	7.9-8.4	<8	Low--------	0.15	5	8	<.5
	3-12	20-27	0.6-2.0	0.10-0.15	7.9-8.4	<8	Low--------	0.28			
	12-60	10-20	0.6-2.0	0.04-0.12	7.9-8.4	<8	Low--------	0.10			

See footnote at end of table.

TABLE 14.--SOIL AND WATER FEATURES

["Flooding" and terms such as "rare" and "brief" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Soil name and map symbol	Hydrologic group	Flooding			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Hardness	Depth	Thickness	Uncoated steel	Concrete
					In		In			
1*:										
Akela	D	None	---	---	4-20	Hard	---	---	High	Low.
Rock outcrop.										
2 Antho	B	Occasional	Brief	Jul-Sep	>60	---	---	---	High	Low.
3, 4 Casa Grande	C	None	---	---	>60	---	---	---	High	High.
5 Cashion	D	Occasional	Brief	Jul-Sep	>60	---	---	---	High	Low.
6*:										
Cellar	D	None	---	---	4-20	Hard	---	---	High	Low.
Rock outcrop.										
7*:										
Cherioni	D	None	---	---	6-21	Hard	5-20	Thick	High	Low.
Rock outcrop.										
8 Cipriano	D	None	---	---	>60	---	8-20	Thick	High	Low.
9, 10 Contine	C	None	---	---	>60	---	---	---	High	Low.
11 Coolidge	B	None	---	---	>60	---	---	---	High	Moderate.
12 Cuerda	B	Occasional	Very brief	Jul-Sep	>60	---	---	---	High	Low.
13 Dateland	B	Rare	---	Jul-Sep	>60	---	---	---	High	Low.
14 Dateland	B	None	---	---	>60	---	---	---	High	High.
15, 16, 17, 18 Denure	B	None	---	---	>60	---	---	---	High	Low.
19*:										
Dumps.										
Pits.										
20 Gadsden	D	Occasional	Brief	Jul-Sep	>60	---	---	---	High	Low.

See footnote at end of table.

APPENDIX B

LITHOLOGIC LOG OF TEST BORING 24

Alpha Project Number: 04-G-00027	LOG OF TEST BORING NO. B-24
Project: SUNDANCE FARMS	
Project Location: UNICORPORATED PINAL COUNTY, AZ	Boring Location: See attached site plan

Longitude: | Latitude:

Remarks: Bulk sample taken from 0'-2'.

SAMPLE TYPE	BLOWS PER 6"	DRY DENSITY (PCF)	MOISTURE (%)	DEPTH (FEET)	USCS CODE	DESCRIPTION OF SUBSURFACE CONDITIONS
B			7.6		ML	**SANDY SILT** Medium brown, poor gradation, sub angular particles, hard, low plasticity, dry, no cementation.
				1		
R	21-33-30	120	8.1	2		
				3		
				4		
S	8-22-27			5		Becomes moderately cemented.
				6		
				7		
				8		
				9		
S	8-15-15			10		
				11		**Bottom of boring @ 11.5' no groundwater encountered**
				12		
				13		
				14		
				15		
				16		

The stratification lines represent the approximate boundary lines Between soil and rock types: In-situ, the transition may be gradual.

Sample Type Key: S = Split Spoon B = Bulk Sample NR = No Recovery R = Ring Sampler RF = Refusal

Alpha Geotechnical & Materials, Inc.
5216 S. 40TH Street
Phoenix, Arizona 85040

Boring Date: 04/06/04

Drill Rig Type: CME- 45

APPENDIX C

LITHOLOGIC LOGS

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-1 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Between TP-10 and TP-11
FOREMAN: George
DRILLING CONTRACTOR: WDC
LOGGED BY: DJE
DRILLING EQUIPMENT: CME 75
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: 6-inch Auger
TOTAL DEPTH: 18'
SAMPLING METHOD: Continuous core
WATER LEVEL: Saturated sediments not encountered

Depth BGS (Feet)	DESCRIPTION	REMARKS
1	**CLAYEY SAND (ML):** Brown, dry, 70% v. fine to fine sand. 30% fines w/ low dry strength, med plasticity and toughness. Weak cementation. Mod reaction to HCL.	
2		
3		
4		
5	Light brown to white. Strong cementation. Strong reaction to HCL.	
6		
7		
8		
9	Light brown. Mod cementation. Strong reaction to HCL.	
10		
11	**POORLY GRADED SAND (SP):** Brown, dry, 95% v. fine to fine sand, 5% non plastic fines. Weak to no reaction to HCL.	
12		
13		
14		
15		

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-1 SHEET 2 OF 2

Depth BGS (Feet)	DESCRIPTION	REMARKS
15		
16		
17	Pred. 100% Fine to med sand, mixed source, angular to sub-rounded grains, trace gravel.	
18		
19		TD = 18 ft bgs
20		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-2 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Near TP-7
FOREMAN: George
DRILLING CONTRACTOR: WDC
LOGGED BY: DJE
DRILLING EQUIPMENT: CME-75
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: 6-inch Auger
TOTAL DEPTH: 18'
SAMPLING METHOD: Continuous core
WATER LEVEL: Saturated sediments not encountered

Depth BGS (Feet)	DESCRIPTION	REMARKS
1	**CLAYEY SAND (ML):** Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.	
2		
3		
4		
5	Same as above (ML): White, caliche clumps.	
6		
7		
8	Strong cementation (caliche). Strong reaction to HCL.	
9	**POORLY GRADED SAND (SP):** Brown, dry, 95% v. fine to fine sand, 5% low plasticity fines. Weak cementation. Mod reaction to HCL.	
10		
11		
12	No reaction to HCL.	
13		
14		
15		

Notes: 1. UTM NAD 83 Zone 12

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-2 SHEET 2 OF 2

Depth BGS (Feet)	DESCRIPTION	REMARKS
15		
16		
17	Light brown, dry, 100% v. fine to med sand.	
18		
19		TD = 18 ft bgs
20		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-3 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Between TP-13 and TP-14
FOREMAN: George
DRILLING CONTRACTOR: WDC
LOGGED BY: DJE
DRILLING EQUIPMENT: CME-75
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: 6-inch Auger
TOTAL DEPTH: 18'
SAMPLING METHOD: Continuous core
WATER LEVEL: Saturated sediments not encountered

Depth BGS (Feet)	DESCRIPTION	REMARKS
1	**CLAYEY SAND (ML):** Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.	
2		
3		
4	Same as above (ML): White, caliche clumps.	
5		
6	Strong cementation. Strong reaction to HCL. (Caliche)	
7		
8		
9	**POORLY GRADED SAND (SP):** Brown, dry, 95% v. fine to fine sand, 5% low plasticity fines. Weak cementation. Mod reaction to HCL.	
10		
11	No reaction to HCL.	
12		
13		
14		
15		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-3 SHEET 2 OF 2

Depth BGS (Feet)	DESCRIPTION	REMARKS
15		
16		
17	Light brown, dry, 100% v. fine to med sand. Trace gravel.	
18		
19		TD = 18 ft bgs
20		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-4 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Between TP-5 and TP-12
FOREMAN: George
DRILLING CONTRACTOR: WDC
LOGGED BY: DJE
DRILLING EQUIPMENT: CME-75
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: 6-inch Auger
TOTAL DEPTH: 18'
SAMPLING METHOD: Continuous core
WATER LEVEL: Saturated sediments not encountered

Depth BGS (Feet)	DESCRIPTION	REMARKS
1	**CLAYEY SAND (ML):** Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.	
2		
3		
4		
5		
6		
7	Same as above (ML). Light brown w/ white clumps (caliche). Weak cementation and mod reaction to HCL.	
8		
9		
10	**POORLY GRADED SAND (SP):** Brown, dry, 95% v. fine to coarse sand, 5% low plasticity fines. Weak cementation. Mod reaction to HCL.	
11		
12	Same as above (SP): Grey, 100% fine to coarse, mixed source (pred granitic), sub-rounded to rounded grains. Trace gravel. Mod reaction to HCL.	
13		
14		
15		

Notes: 1. UTM NAD 83 Zone 12

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-4 SHEET 2 OF 2

Depth BGS (Feet)	DESCRIPTION	REMARKS
15		
16	Same as above (SP)	
17		
18		
19		TD = 18 ft bgs
20		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-5 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Near TP-1
FOREMAN: George
DRILLING CONTRACTOR: WDC
LOGGED BY: DJE
DRILLING EQUIPMENT: CME-75
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: 6-inch Auger
TOTAL DEPTH: 18'
SAMPLING METHOD: Continuous core
WATER LEVEL: Saturated sediments not encountered

Depth BGS (Feet)	DESCRIPTION	REMARKS
1	**CLAYEY SAND (ML):** Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod to strong reaction to HCL.	
2		
3		
4	Same as above (ML). Strong reaction to HCL.	
5		
6		
7	Same as above (ML). Mod reaction to HCL.	
8		
9		
10		
11		
12		
13	**POORLY GRADED SAND (SP):** Brown, dry, 95% v. fine to coarse sand, 5% low plasticity fines. White precipitate on sand grains. Weak cementation. Strong reaction to HCL.	
14		
15		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. SB-5 SHEET 2 OF 2

Depth BGS (Feet)	DESCRIPTION	REMARKS
15	Same as above (SP). 100% fine to coarse sand of mixed source (pred granitic), sub-rounded to rounded grains. White precipitate on grains. Trace gravel.	
16		
17		
18		
19		TD = 18 ft bgs
20		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. DB-1 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Near TP-3
FOREMAN: Bryan Morris
DRILLING CONTRACTOR: Layne Christensen
LOGGED BY: K. Hebert
DRILLING EQUIPMENT: AP-1000 Casing Hammer
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: Casing Hammer
TOTAL DEPTH: 100 feet
SAMPLING METHOD: Split Spoon/Grab Samples
WATER LEVEL: 50 feet

Depth bgs (feet)	DESCRIPTION	REMARKS
5, 10	**CLAYEY SILT (ML):** Lt. brown, slightly moist, low plasticity, 90% fines with < 5% very fine sand.	
15, 20, 25	**SILTY SAND (SM):** Yellowish red, low moisture, well sorted sub-angular to sub-rounded fine grained sand, with few gravel and some rounded cobble sized pieces.	
30, 35, 40, 45	**GRAVELLY SAND (SW):** Yellowish red, well sorted fine to medium grained sand, with 25-35% sub-rounded gravel and 5-10% cobbles.	
50, 55	**GRAVELLY SAND (SW):** same as above except sand is coarser and is very damp	Driller notes water @ 50 feet
60, 65, 70, 75	**GRAVELLY SAND (SW):** same as above with <10% fines (silt and clay), very low plasticity, wet.	

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. DB-1 SHEET 2 OF 2

Depth bgs (Feet)	DESCRIPTION	REMARKS
75	**GRAVELLY SAND (SW):** Yellowish red, no plasticity, poorly sorted sand and gravel (25%) with 5-10% cobbles, very little fines.	
80		
85		
90		
95		
	GRAVELLY SAND (SW): 70 to 80% well sorted fine grained sand, wet.	Free water produced Through the cyclone
100	**Boring Terminated at 100 feet**	
105		
110		
115		
120		
125		
130		
135		
140		
145		
150		
155		
160		
165		
170		
175		

Notes:

Southwest Ground-water Consultants, Inc.

LOG OF BORING

BORING NO. DB-2 SHEET 1 OF 2

PROJECT: Sandia Recharge
PROJECT NO. B.859
BORING LOCATION: Near TP-9
FOREMAN: Bryan Morris
DRILLING CONTRACTOR: Layne Christensen
LOGGED BY: K. Hebert
DRILLING EQUIPMENT: AP-1000 Casing Hammer
DATE STARTED: 9/7/04 FINISHED: 9/7/04
DRILLING METHOD: Casing Hammer
TOTAL DEPTH: 80 feet
SAMPLING METHOD: Split Spoon/Grab Samples
WATER LEVEL: 45 feet

Depth bgs (feet)	DESCRIPTION	REMARKS
5, 10, 15	**SANDY SILT (ML):** Brown, slightly moist, 90% fines w/ low dry strength, low plasticity and toughness, <10% very fine sand.	
20, 25	**SILTY SAND (SM):** Yellowish red, low moisture, no plasticity, well graded sub-angular to sub-rounded fine to medium grained sand, with few gravel.	
30, 35	**GRAVELLY SAND (GP):** Brown, poorly graded, fine to course grained sand, with little or no fines, no plasticity.	
40, 45	**GRAVELLY SAND (GP):** Brown, poorly graded, medium to course grained, poorly sorted sand with sub-angular to sub-round gravel, 5% fines (clay), very low plasticity.	Driller notes water At 45 feet
50, 55	**GRAVELLY SAND (GP):** same as above with 5 to 10% fines (silt and clay), wet.	
60, 65, 70, 75	**GRAVELLY SAND (GP):** same as above with some cobbles.	

Southwest Ground-water Consultants, Inc.

LOG OF BORING

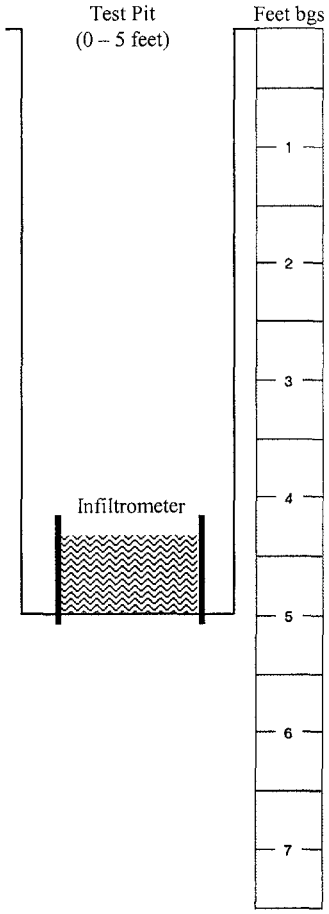
BORING NO. DB-2 SHEET 2 OF 2

Depth bgs (feet)	DESCRIPTION	REMARKS
75	**GRAVELLY SAND (GP):** brown, same as above with more gravel and cobbles.	
80	Boring Terminated at 80 feet	
85		
90		
95		
100		
105		
110		
115		
120		
125		
130		
135		
140		
145		
150		
155		
160		
165		
170		
175		

Notes:

APPENDIX D

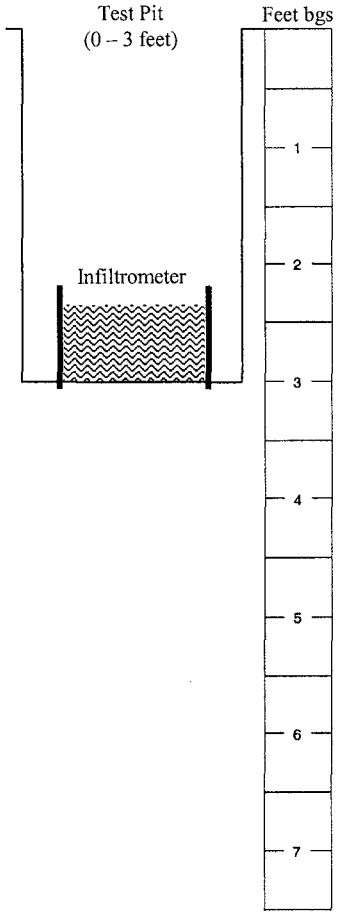
TEST PIT LOGS



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod to strong reaction to HCL.

Same as above (ML). Strong reaction to HCL.



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod to strong reaction to HCL.

Same as above (ML).

Not to Scale

TP-1
(Test Date- 08/02/04)

TP-2
(Test Date-08/02/04)

Southwest Ground-water Consultants, Inc.

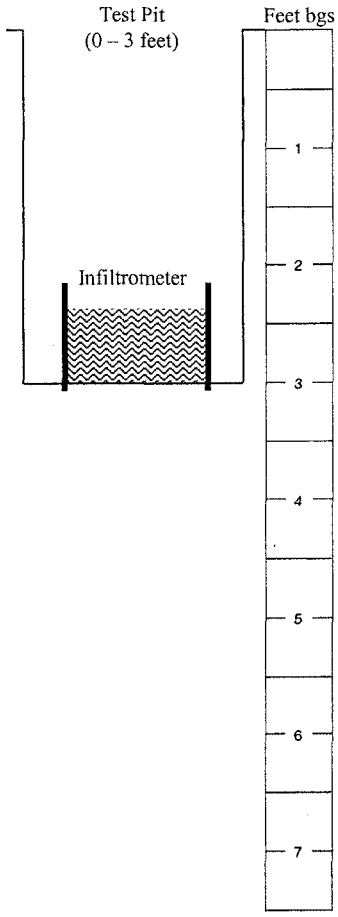
October 15, 2004 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure D-1



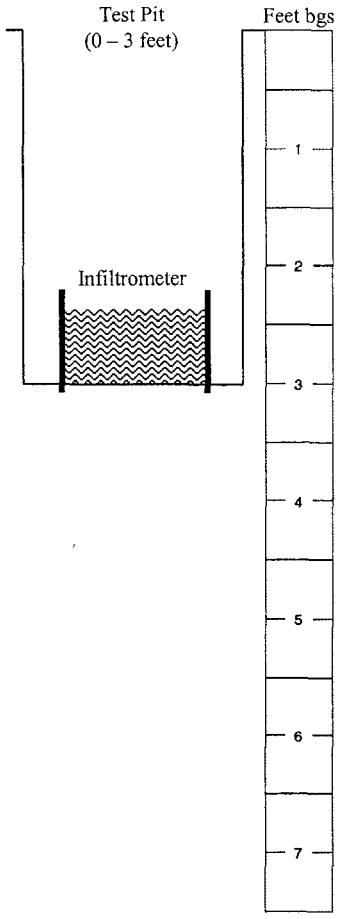
DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to fine sand. 30% fines w/ low dry strength, med plasticity and toughness. Weak cementation. Mod reaction to HCL.

Same as above (ML).

Not to Scale

TP-3
(Test Date-08/02/04)



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod to strong reaction to HCL.

Same as above (ML).

Caliche layer encountered at 5' 1", Auger refusal occurred.

TP-4
(Test Date-08/03/04)

Southwest Ground-water Consultants, Inc.

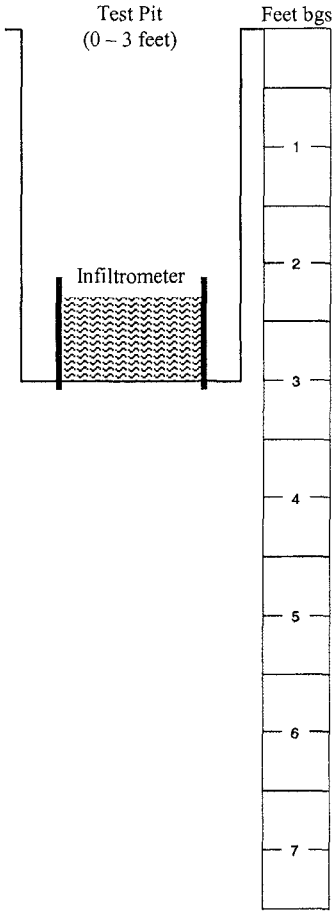
October 15, 2004 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure D-2



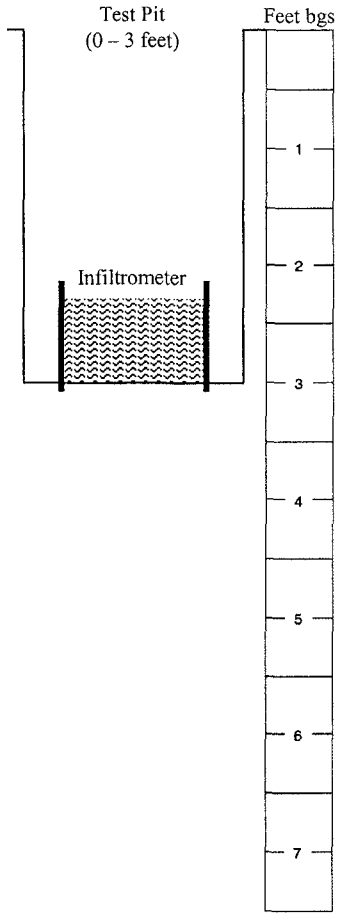
DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.

Same as above (ML).

Not to Scale

TP-5
(Test Date-08/03/04)



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.

Same as above (ML).

TP-6
(Test Date-08/03/04)

Southwest Ground-water Consultants, Inc.

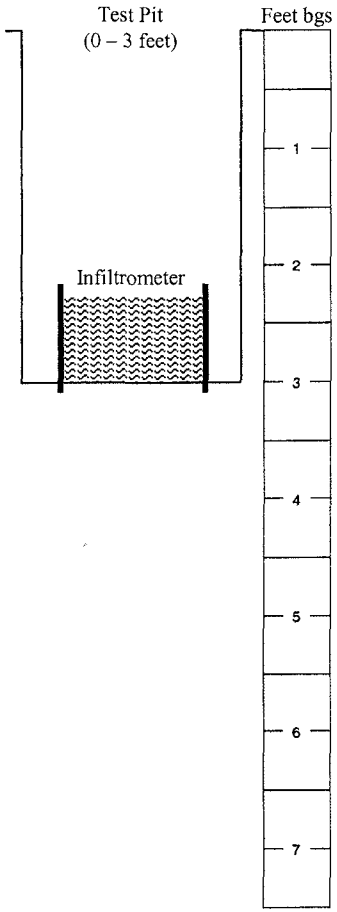
October 15, 2004 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure D-3



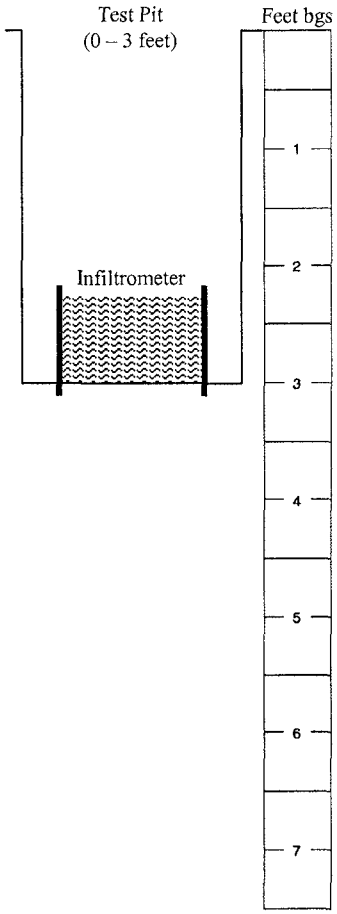
DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.

Same as above (ML).

Not to Scale

TP-7
(Test Date-08/03/04)



DESCRIPTION

SANDY SILT (ML): Brown, slightly moist, 90% fines w/ low dry strength, low plasticity and toughness, <10% very fine sand.

Same as above (ML).

TP-8
(Test Date-08/11/04)

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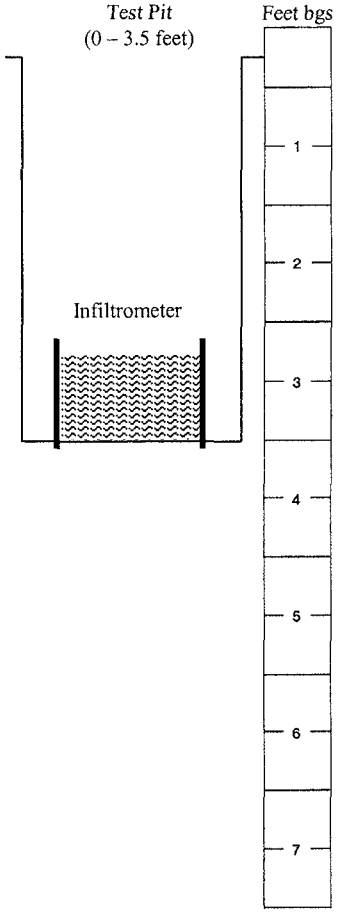
October 15, 2004 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure D-4



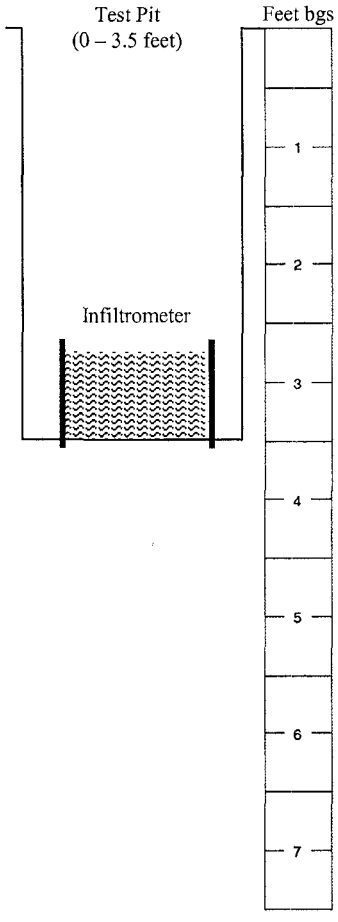
DESCRIPTION

SANDY SILT (ML): Brown, slightly moist, 90% fines w/ low dry strength, low plasticity and toughness, <10% very fine sand.

Same as above (ML).

Not to Scale

TP-9
(Test Date-08/11/04)



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to fine sand. 30% fines w/ low dry strength, med plasticity and toughness. Weak cementation. Mod reaction to HCL.

Same as above (ML).

TP-10
(Test Date-08/11/04)

Southwest Ground-water Consultants, Inc.

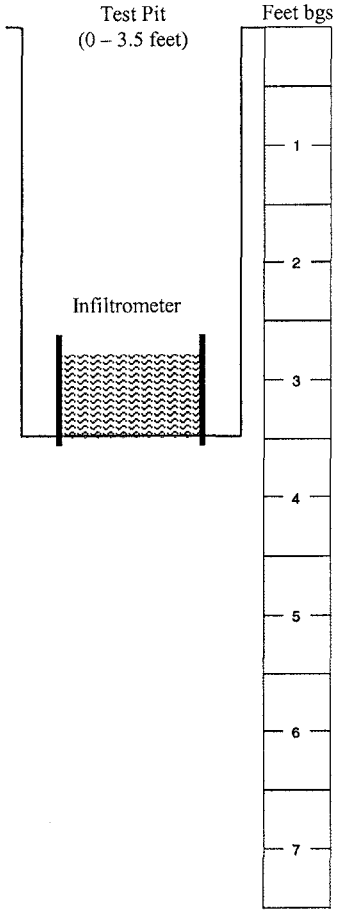
October 15, 2004 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure D-5



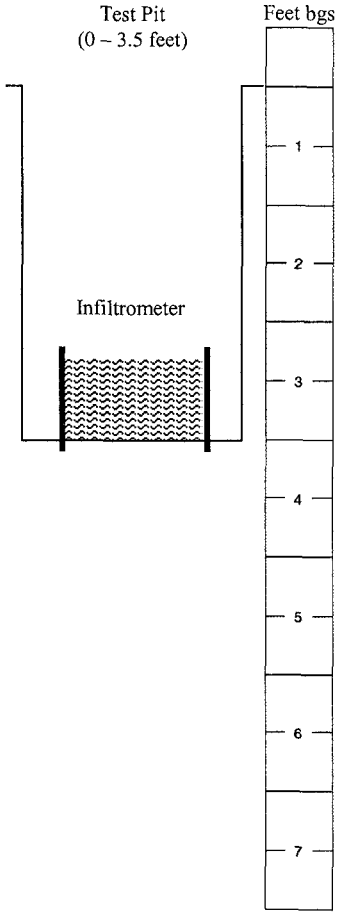
DESCRIPTION

CLAYEY SAND (ML): *Brown, dry, 70% v. fine to fine sand. 30% fines w/ low dry strength, med plasticity and toughness. Weak cementation. Mod reaction to HCL.*

Same as above (ML).

Not to Scale

TP-11
(Test Date-08/11/04)



DESCRIPTION

CLAYEY SAND (ML): *Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.*

Same as above (ML).

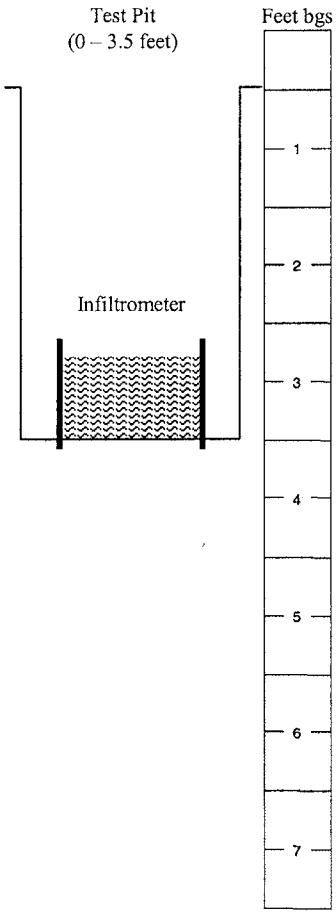
TP-12
(Test Date-08/11/04)

Southwest Ground-water Consultants, Inc.

October 15, 2004 **Project B.859**

TEST PIT LOG
WOODRUFF UNDERGROUND STORAGE FACILITY
Sandia, Pinal County, Arizona

Figure D-6



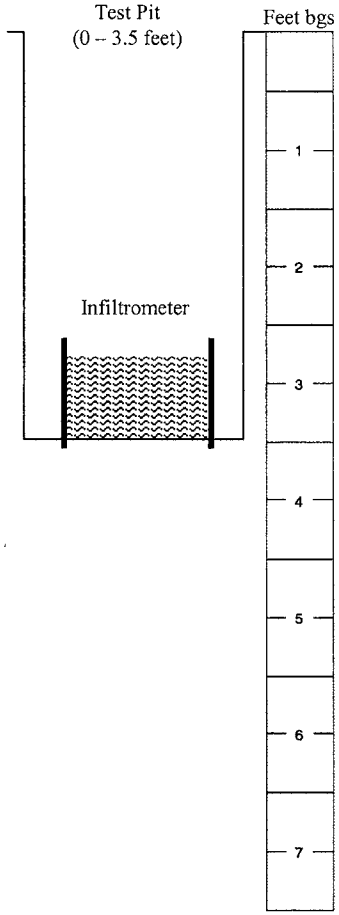
DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.

Same as above (ML).

Not to Scale

TP-13
(Test Date-08/11/04)



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod reaction to HCL.

Same as above (ML).

TP-14
(Test Date-08/11/04)

Southwest Ground-water Consultants, Inc.

October 15, 2004 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure D-7

Southwest Ground-water Consultants, Inc.

March 14, 2005

Mr. Bill King
Pivotal Group
2555 East Camelback Road, Suite 700
Phoenix, Arizona 85016

SUBJECT: ADDENDUM TO PRELIMINARY RECHARGE CHARACTERIZATION REPORT, WOODRUFF UNDERGROUND STORAGE FACILITY, PINAL COUNTY, ARIZONA

Dear Mr. King:

Southwest Ground-water Consultants, Inc. (SGC) has prepared the following addendum to document additional infiltration testing conducted in the vicinity of the proposed Woodruff Utility Company Wastewater Treatment Plant (WWTP) and the Woodruff Utility Company Underground Storage Facility (USF) (hereinafter referred to as the Study Area). The Study Area location is shown in Figure 1 (Attachment I).

BACKGROUND INFORMATION

From August through September, 2004, SGC personnel documented the drilling and sampling of 7 boreholes and conducted infiltration testing at 14 test pits at the site to evaluate infiltration rates of the subsurface soil. The infiltration tests were performed in test pits excavated to a depth of approximately 3 feet below grade. Soil layers exhibiting weak to moderate cementation were encountered at various depths in most of the excavations. The previous field activities conducted at the Site are documented in the SGC Preliminary Recharge Characterization report dated November 16, 2004.

Results of the infiltration study indicated that the saturated hydraulic conductivity (Ksat) based on infiltration measurements ranged from 0.02 to 1.34 ft/day and averaged approximately 0.59 ft/day. SGC estimated a recharge rate of approximately 1,270 acre-ft/year (1.1 mgd) over 6 acres of effective area using the average infiltration rate of 0.59 ft/day.

SCOPE OF ADDITIONAL WORK

The additional work scope included infiltration testing at two test pits that were excavated to depths of approximately 12 feet. The objective of the additional tests was to evaluate whether the rates of infiltration at a deeper depth would be greater than the rates of infiltration observed in the shallower soil. The results of the two additional infiltration tests are summarized in the following sections.

3900 East Camelback Road, #200
Phoenix, Arizona 85018-2636
(602) 955-5547 Fax (602) 955-7585

WWC-40
Admitted

INFILTRATION TESTING

SGC conducted percolation testing using the single-ring infiltrometer testing method with corrections for lateral divergence (see Bouwer et al, 1999 for method and data analysis details). Infiltration rate measurements were recorded at two additional locations (DP-1 and DP-2) at the Study Area on January 10, 2005 (Figure 2, Attachment I).

The test pits were excavated to a depth of approximately 12 feet below grade using a 580-B back-hoe. The area of each excavation was sufficiently ramped to provide safe access and egress to accommodate equipment and staff during testing.

Infiltrometers used for the tests consisted of steel rings that are approximately 12 inches in height and 20 inches in diameter. At each testing location, the steel cylinders were driven approximately 3 to 4 inches into the ground. Soil was packed against the inside and outside of the cylinder to obtain a seal between the cylinder and soil in order to minimize preferential flow at the soil-ring contact. During the filling of each cylinder, water was poured onto plastic bubble wrap inside the cylinder to minimize erosion of the interior soil surface. As the cylinder filled with water, the bubble wrap floated to the surface and was removed from the cylinder. As soon as the cylinder was filled, starting clock time was recorded and the test was started. Water level drops over time were monitored inside each cylinder and the change in water level was measured with a ruler fixed to the inside of the cylinder. Following the recording of each water level drop and corresponding time increment, the cylinder was re-filled to the top. This process was repeated for approximately four hours or until cumulative infiltration had reached at least 15 inches, whichever came first.

Following completion of the test at each location, a shovel was used to dig outside the cylinder to measure the distance of lateral divergence. A hand auger was used to bore beneath the center of the cylinder to determine the depth of the wetting front. This measurement was used to estimate soil porosity. The lithology encountered at each test pit was logged by SGC field staff and is summarized in Figure 3 (Attachment I).

The saturated hydraulic conductivity for the test pits was calculated based on the results of the testing data. The recorded data and results of the calculations are provided in Table 1 (Attachment II).

As shown in Table 1, calculations of saturated hydraulic conductivity (Ksat) based on infiltration measurements conducted in test pits DP-1 and DP-2 are 0.71 and 1.79 ft/day, respectively and average approximately 1.25 ft/day. The average infiltration rate (1.25 ft/day) of test pits DP-1 and DP-2 is slightly over twice the average infiltration rate (0.59 ft/day) of the previous test pits TP-1 through TP-14. The increased infiltration rate is probably related to the coarser-grained lithology and the lack of cemented layers encountered in test pits DP-1 and DP-2 as compared to test pits TP-1 through TP-14.

If you have any questions or require additional information, please call.

Sincerely,

Southwest Ground-water Consultants, Inc.

Kevin D. Hebert, P.G.

Project Manager

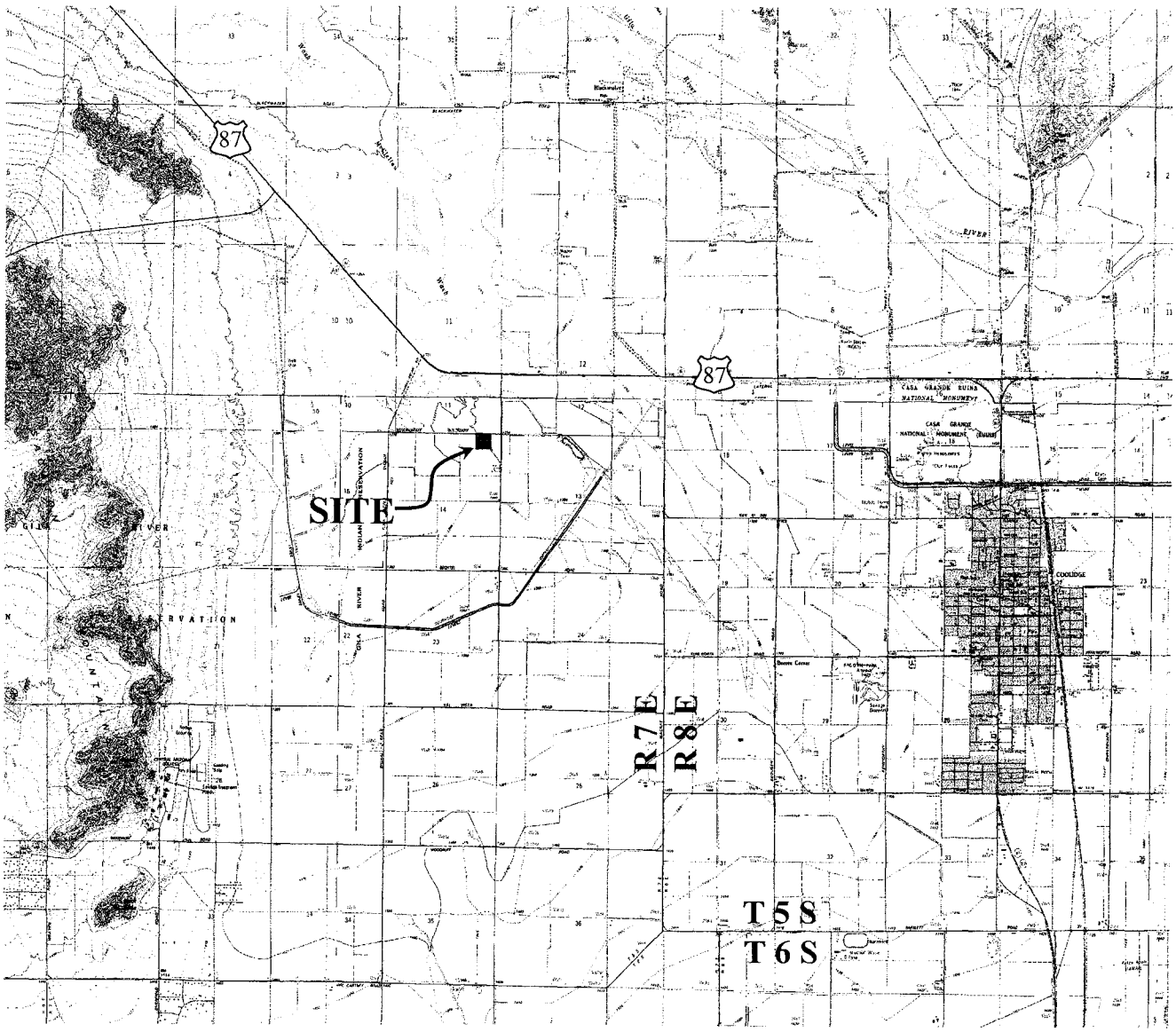
Attachments: I & II

REGISTERED GEOLOGIST
CERTIFICATE NO.
26388
KEVIN D.
HEBERT
Date Signed
ARIZONA U.S.A.

ATTACHMENTS

ATTACHMENT I

Figures 1 through 3



Source: QuadsUSA, Inc.

EXPLANATION

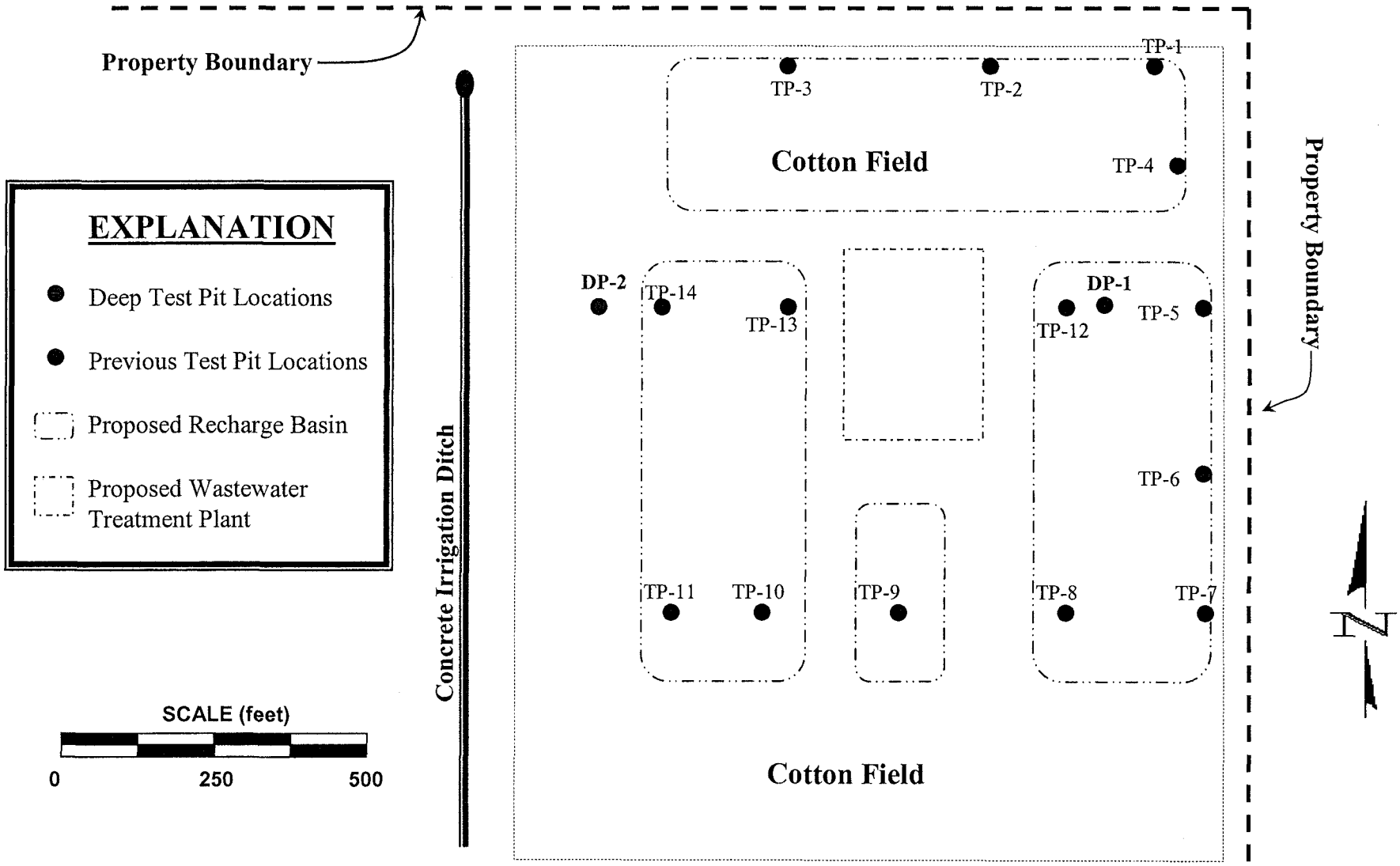
■ Site Location

APPROXIMATE SCALE (miles)

0 1 2 3

N

Southwest Ground-water Consultants, Inc. **March 14, 2005 Project B.859**	**SITE VICINITY MAP** **WOODRUFF UNDERGROUND STORAGE FACILITY** **Pinal County, Arizona**	**Figure 1**



Southwest Ground-water Consultants, Inc.

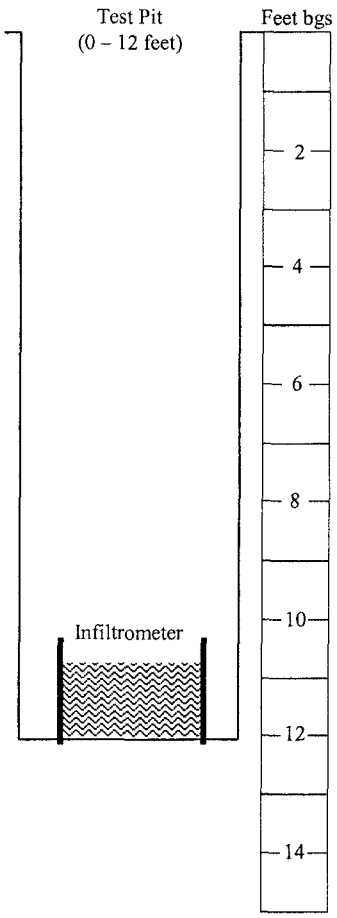
March 14, 2005 Project B.859

SITE MAP

WOODRUFF UNDERGOUND STORAGE FACILITY

Pinal County, Arizona

Figure 2



DESCRIPTION

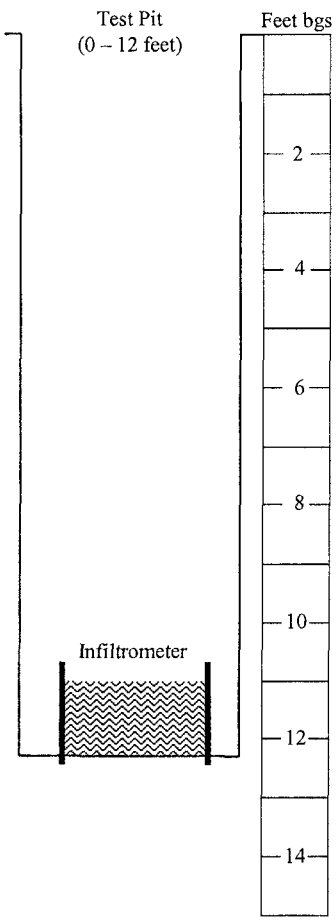
CLAYEY SAND (ML): Brown, dry, 70% v. fine to fine sand. 30% fines w/ low dry strength, med plasticity and toughness. Weak cementation. Mod reaction to HCL.

Same as above (ML).

GRAVELLY SAND (SW): Yellowish Red, moist, fine to coarse grained angular to sub-rounded sand, with some medium to coarse gravel.

Not to Scale

DP-1
(Test Date-01/10/05)



DESCRIPTION

CLAYEY SAND (ML): Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod to strong reaction to HCL.

Same as above (ML).

SILTY SAND (ML): Yellowish Brown, dry, 70% v. fine to med sand, 30% low plasticity fines. Weak cementation. Mod to strong reaction to HCL.

DP-2
(Test Date-01/10/05)

Southwest Ground-water Consultants, Inc.

March 11, 2005 **Project B.859**

TEST PIT LOG

WOODRUFF UNDERGROUND STORAGE FACILITY

Sandia, Pinal County, Arizona

Figure 3

ATTACHMENT II

Table 1

TABLE 1

INFILTRATION TESTING RESULTS

Location	Soil Type	L, Wetting Depth Measured (cm)	L, Wetting Depth Estimated (cm)	x Lateral Divergence (cm)	y_l Sum of Water Level Drops (cm)	n Porosity Computed	n Porosity Estimated	y_n, Last Water Level Drop (cm)	Δt_n, Last Time Interval (min)	I_n, Infiltration Rate (cm/min)	I_w (cm/min)	z, Average Height of Water During Last Drop (cm)	h_{we} Water Entry*	K, Hydraulic Conductivity (cm/min)	K (ft/day)
TP-1	Clayey Sand/Clayey Silt	22.0		17	24.8	0.00		4.7	54	0.09	0.03	18.6	-5	0.0149	0.71
TP-2	Clayey Sand/Clayey Silt	38.0	0.0	18	38.3		0.00	8.3	44	0.19	0.06	11.2	-15	0.0379	1.79

*Journal of Hydrologic Engineering, October 1989. Water entry value for Gravelly Sand and Silty Sand.

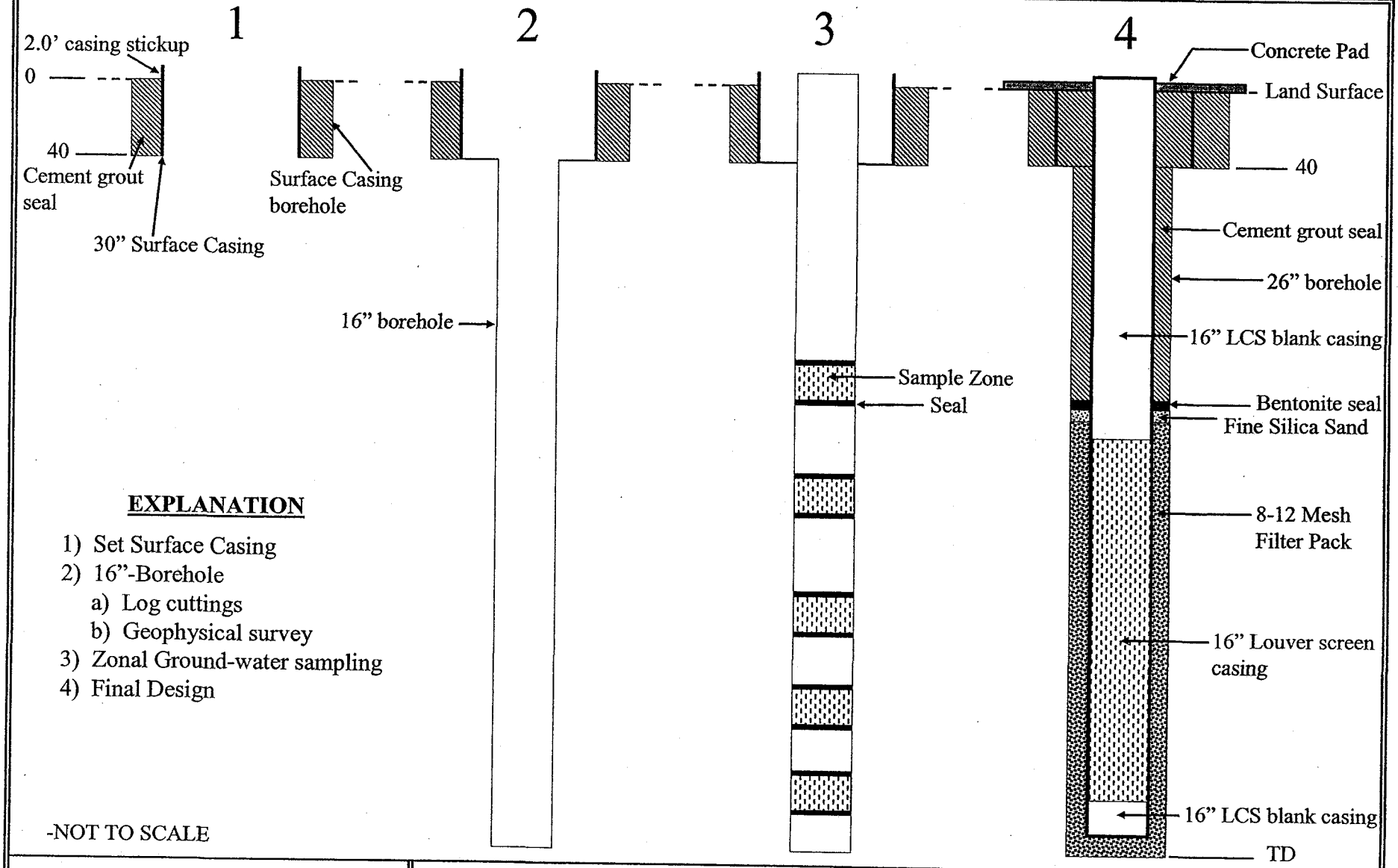
AVERAGE DP-1 and DP-2 **1.25**

TABLE 1
ANALYTICAL RESULTS FOR COMPOSITE GROUND-WATER SAMPLES COLLECTED AT SUNDANCE FARMS

SAMPLE ID (ADWR WELL No.) [Cadastral Location]	SAMPLE DATE	WELL PERFORATED INTERVAL (feet)	WELL DEPTH (feet)	PUMP RATE (gpm)	NITRATE-N USEPA METHOD 300.0 (mg/l)	FLUORIDE USEPA METHOD 300.0 (mg/l)	ARSENIC USEPA METHOD 200.8 (mg/l)	TOTAL DISSOLVED SOLIDS METHOD SM2540C (mg/l)
Well 1065** (55-621828) [D(5-7)14dcd]	4/02/04	Holes@456, 538, 581, and 625 Mills Knife@840-1223	1270	1768	1.3	{3.3}	0.012	{620}
Well 1100 (55-621804) [D(5-7)24aaa]	4/02/04	Unknown	470 1500***	1917	3.4	**{4.4}**	0.025	{570}
Well 1110 (55-621805) [D(5-7)24abb]	1/28/04	950-1200	1230	1768	2.4	**{6.0}**	0.039	{550}
Well 1096 (55-621844) [D(5-7)13a]	4/02/04	Unknown	Unknown 1400***	0	8.8	**{4.4}**	0.018	{1500}
Well 905 (55-621826) [D(5-7)24dcc]	4/02/04	1260-1420 1545-1555	1315	800	**13**	{3.2}	0.018	{2000}
Well 1075 (55-621834) [D(5-7)14add]	4/02/04	110-440	466	0	**20**	{2.0}	0.0063	{3400}
Arizona Maximum Contaminant Levels (MCLs)					**10**	**4.0**	**0.05***	NL
USEPA Secondary Drinking Water Standard					NL	{2.0}	NL	{500}

mg/l = milligrams per liter
Bold = Analytical result is equal to or greater than the MCL
NL =MCL or Secondary Drinking Water Standard is not listed for this constituent
{570} = Analytical result is equal to or greater than Secondary Drinking Water Standard
* = MCL for Arsenic will be reduced to 0.01 ug/l effective January, 2006
** = Well analyzed for new source parameters
*** = Well depth provided by well owner

WWC-41
Admitted



Southwest Ground-water Consultants, Inc.

May 9, 2005 Project B.859

WELL CONSTRUCTION SEQUENCE

Sandia Development, Pinal County, Arizona

Figure 1

WWC-42
Adm. Hal

CAP ALLOCATIONS AND AVERAGE DEMANDS IN AWC WESTERN GROUP

	Casa Grande		Coolidge		White Tank, etc	
	Demand	CAP	Demand	CAP	Demand	CAP
	1,000 gallons		1,000 gallons		1,000 gallons	
2002	4,314,915.90		481,652.10		290,235.40	
2003	4,197,963.50		492,925.90		300,150.70	
2004	4,267,797.40		468,708.30		327,335.40	
	AF	AF	AF	AF	AF	AF
2002	13,241.99	8,884	1,478.14	2,000	890.70	968
2003	12,883.08	8,884	1,512.73	2,000	921.13	968
2004	13,097.39	8,884	1,438.41	2,000	1,004.56	968
Average	13,074.15	8,884	1,476.43	2,000	938.79	968
CAP +/-	(4,190.15)		523.57		29.21	
Net System Deficiency	(3,637.37)					

WWC-43
Admitted

CAP ALLOCATIONS AND AVERAGE DEMANDS IN AWC WESTERN GROUP

	Casa Grande		Coolidge		White Tank, etc	
	Demand	CAP	Demand	CAP	Demand	CAP
	1,000 gallons		1,000 gallons		1,000 gallons	
2002	4,314,916		481,652		290,235	
2003	4,197,964		492,926		300,151	
2004	4,267,797		468,708		327,335	
	AF	AF	AF	AF	AF	AF
2002	13,242	8,884	1,478	2,000	891	968
2003	12,883	8,884	1,513	2,000	921	968
2004	13,097	8,884	1,438	2,000	1,005	968
Average	13,074	8,884	1,476	2,000	939	968
CAP +/-	(4,190)		524		29	
Net System Deficiency	(3,637)					

PENGAD-Bayonne, N.J.
EXHIBIT
WWC-43A
Admitted

Sandia Water Supply, Treatment & Distribution

Design Parameter Comparison - Woodruff Water Co & Arizona Water Co

GENERAL COMPARISON

Description	AZ-American Water Co. (for comparison)	Woodruff Water Co. (Proposed)	Arizona Water Co. (Proposed)	Page/Reference, AWC Application for Extension of CC&N	Deviation / Non Compliance
Waterline Looping / Redundancy?	—	Yes	No	—	—
Adequate Redundency Provided In the Event of Primary Water Main Break?	—	Yes	No	—	Under the AWC configuration, water customers may be at risk in the event the primary supply main from the Coolidge System fails.
Ave. Day Demand (Design), Initial Phase	—	386 gpm	425 gpm	P.8	—
Peak Day (Max Day) Demand (Design), Initial Phase	—	695 gpm	637 gpm	P.8	—
Peak Hour Demand (Design), Initial Phase	—	1,352 gpm	unknown	—	—
Ave. Day Demand (Design), Full Buildout	—	2,676 gpm	2,547 gpm	P.8	—
Peak Day (Max Day) Demand (Design), Full Buildout	—	4,816 gpm	3,821 gpm	P.8	—
Peak Hour Demand (Design), Full Buildout	—	9,365 gpm	—	—	The Peak Hour demand at full buildout used for design exceeds Max Day + Fire Flow demand, and was not considered by AWC.
Proposed On-Site Water Supply Capacity, Initial Phase (with largest pump out of service)	—	4,000 gpm	0 gpm	P.3	—
Proposed On-Site Water Supply Capacity, Full Buildout (with largest pump out of service)	—	9,500 gpm	4,500 gpm	A-6	AWC Capacity = 750 x 6 wells = 4,500 gpm
Longest Non-Looped Pipe Segment in Conceptual Backbone Water System (approx.)	—	2,000 ft	38,000+ ft	—	—
Groundwater Well Discharge Destination	—	Arsenic Treatment Systems; Storage Tanks	Arsenic Treatment Systems; Directly into Distribution System	—	—
Initial Phase Supply & Conveyance System	—	Looped system with on-site storage and backup well	Several thousand feet of off-site supply piping.	—	—
Conceptual Capacity of On-Site Wells, Initial Phase, Largest Well out of Service	—	1.73 MGD	0 MGD	—	—
Conceptual Capacity of On-Site Wells, Full Buildout, Largest Well Out of Service	—	8.0 MGD	5.4 MGD	—	—
On-Site Storage Capacity, Initial Phase	—	2.5 MG	0 MGD	—	—
On-Site Storage Capacity, Full-Buildout	—	5.0 MG	1.0 MGD	—	—
Designated Raw-Water Piping System?	—	Yes	No	—	—
Ability to Fill Tanks While Delivering Peak Water Demands?	—	Yes	Unknown	—	—
Disinfection System Proposed	—	Chlorination	Unknown	—	—
Arsenic Treatment Addressed?	—	Yes	Yes	—	—
Potential High Levels of Fluoride Considered?	—	Yes	No	—	—
Potential High Levels of Nitrates Considered?	—	Yes	No	—	—
Hydraulic Model Calibrated?	—	Not applicable to non-existing systems	Unknown	—	—
On-Site Pump Station Capacity w/ Largest Pump Out of Service, Initial Phase	—	4,000 gpm	Unknown	—	—
On-Site Pump Station Capacity w/ Largest Pump Out of Service, Full Buildout	—	9,500 gpm	Unknown	—	—
Probable Number of Arsenic Treatment Facilities	—	1 (Centralized System)	6 (Well-Head Treatment)	—	—

WWC-44
Admitted

Sandia Water Supply, Treatment & Distribution

Design Parameter Comparison - Woodruff Water Co & Arizona Water Co

DESIGN CRITERIA

Description	AZ-American Water Co. (for comparison)	Woodruff Water Co. (Proposed)	Arizona Water Co. (Proposed)	Page/Reference, AWC Application for Extension of CC&N	Notes
Required Fire Flow, Residential	1500 gpm	1,500 gpm	1,000 gpm	P. 8	---
Required Fire Flow, Commercial	3,000 gpm	3,000 gpm	1,000 gpm	P. 8	1,500 gpm (min.) required for commercial areas per International Fire Code
Hazen-Williams Roughness Coefficient	C=130	C=130	C=140	P.8	A 'C' coefficient of 140 is acceptable per AWWA, but we believe a coefficient of 130 is better suited for design purposes. The 'C' coefficient varies with pipe diameter and age of pipe.
Max-Day Demand Multiplier	1.8 x Ave Day	1.8 x Ave Day	1.2 x Ave Day	P.8	---
Peak-Hour Demand Multiplier	3.0 x Ave Day	3.5 x Ave Day	None	---	---
Min. Resid. Pressure, Ave. Day Demand	---	40 psi	---	---	---
Min. Resid. Pressure, Max. Day Demand	---	40 psi	Unknown. 29.48 psi is listed on P. 10	P.8	Normal working pressure range should be approx. 75 psi, and not less than 40 psi per ADEQ Bulletin No. 10
Min. Resid. Pressure, Max. Day Demand + Fire Flow	20 psi	20 psi	20 psi	P.8	---
Min. Resid. Pressure, Peak Hour Demand	40 psi	40 psi	---	---	---
Max. Head Loss, Max Day Demand	---	8 ft loss per 1000 ft of pipe	---	---	---
Max. Head Loss, Peak Hour Demand	10 ft loss per 1000 ft of pipe	10 ft loss per 1000 ft of pipe	---	---	---
Max. Velocity, Fire Flows	10 ft/s	10 ft/s	---	---	---

ORIGINAL

20

MEMORANDUM

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AZ CORP COMMISSION
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DOCKETED BY

TO: THE COMMISSION

FROM: Utilities Division

DATE: June 29, 2001

RE: WATER TASK FORCE OF THE ARIZONA CORPORATION COMMISSION
(DOCKET NO. W-00000C-98-0153)
(DECISION NO. 62993)

On November 3, 2000, the Commission issued Decision No. 62993. This decision approved Staff's recommendations regarding the Commission's Water Task Force. The Commission directed Staff to work with interested parties to develop policy statements, some of which are due by June 30, 2001. Staff has had a number of meetings with interested parties to discuss the issues and resolve parties' concerns on many occasions, as noted below. The reports addressing specific subjects reflect a consensus of the working groups. In only one working group did Staff disagree with a portion of the group's resolution of an issue, which is also discussed below. The reports address the following issues:

Finding of Fact No. 9 from Decision No. 62993 ordered Staff to develop a policy statement regarding Certificates of Convenience and Necessity for water systems. Attachment A to this memorandum is a proposal for this policy developed in a meeting with interested parties.

Finding of Fact No. 11 ordered Staff to develop a policy statement regarding acquisition adjustments and rate of return premiums for water systems. Attachment B to this memorandum is a proposal for this policy, which was developed based on several meetings with interested parties

Finding of Fact No. 29 ordered Staff to develop a policy statement regarding tiered rates. Attachment C to this memorandum is Staff's proposal for this policy, which was developed after several meetings with interested parties.

Finding of Fact No. 31 ordered Staff to develop a policy statement regarding recovery of costs related to the Central Arizona Project. Attachment D is Staff's proposal for this policy, which was developed after several meetings with interested parties. Staff is in agreement with this proposal, except for the portion which deals with the definition of the term "use." The attached policy defines "use" as those methods considered as "use" by the Arizona Department of Water Resources (ADWR). The current regulations of ADWR allow a water company to be in compliance with its requirements as long as the water system uses its CAP water anywhere within the same Active Management Area (AMA) in which the water system is located. This approach is contrary to the position the Commission took in a recent Vail Water Company (Vail) rate case.

WWC-45
Admitted

In Decision No. 62450, the Commission approved Vail's cost recovery of its CAP costs with specific mandates regarding Vail's long-term plans for the CAP water. At present Vail is using its CAP water in an "in lieu recharge project". Vail's CAP water is being used by a farm in Red Rock in lieu of the farm using groundwater. Because the farm in Red Rock is in the same AMA (Tucson AMA) as Vail, Vail gets credit for this use by the farm and therefore, is in compliance with ADWR requirements, even though the farm is approximately 60 miles from Vail. Staff believes that the water being recharged in Red Rock will never actually directly benefit the aquifer in Vail and therefore, never benefit the customers of Vail. This was the basis for the Staff recommendations that were adopted by the Commission in Decision No. 62450. The Commission ordered Vail to submit, within 10 years of the Decision, a plan to use it CAP water directly in its certificated area. Decision No. 62450 also ordered Vail to actually begin using its CAP water within its certificated area within 15 years of the Decision.

For these reasons, Staff recommends that the Commission slightly, but significantly, modify the definition of "use" contained in Attachment D by adding the condition that the water system would have to use its CAP water within its certificated area.

Staff recommends that these policy statements be discussed at an Open Meeting at the Commission's convenience.

Deborah R. Scott
Director
Utilities Division

DRS:SMO:

ORIGINATOR: Steven M. Olea

ATTACHMENT A

Proposed Policy
for
Water Certificates of Convenience and Necessity

The Commission has established a policy goal of ensuring Arizona's water consumers are served by viable utilities. In Decision No. 62993, the Commission required Staff to develop a policy statement on Certificates of Convenience and Necessity (CC&N) for water systems which conforms to the general principles of Staff's recommendation as contained in the Water Task Force Report of October 28, 1999.

The Arizona Constitution, Article 15, Section 3, provides in part: "The corporation commission shall have full power to, and shall... make reasonable rules, regulations and orders, by which such corporations shall be governed in the transaction of business within the state.... Provided further that...rules, regulations, orders and forms...may from time to time be amended or repealed by such commission. "

State law on CC&Ns requires, in part, that a public service corporation shall not begin construction of any plant or system without first obtaining a CC&N from the Commission. (See A.R.S. 40-281) In processing a CC&N the Commission is performing a judicial function, (See A.R.S. 40-282), Staff, as a party to the case, is charged with developing, and making a recommendation on the application to develop the record for the hearing on which the Commissioners base their final decision.

The Arizona Administrative Code R14-2-402, Certificate of Convenience and Necessity for water utilities, is used by Staff to guide the development of their recommendation on the application. The rule requires the Applicant to provide the following information:

a. Proper name and address of the utility and its owners,
b. Articles of Incorporation and Corporate Bylaws,
c. Type of plant and facilities to be constructed,
d. Complete description of facilities to be constructed, with preliminary engineering specifications to describe the principle systems and components to meet the needs of the health department, and final engineering drawings when they are available.
e. The proposed rates,
f. Estimated total cost of the facilities,
g. Manner of capitalization, method of financing the utility,
h. Financial condition of Applicant,
i. Estimated annual operating revenue and expenses from the proposed construction,
j. Estimated starting and completion dates of the proposed construction,
k. Maps of the proposed service area,
l. Appropriate city, county and/or state agency approvals,
m. Estimated number of customers to be served for each of the first 5 years of operation, including documentation to support estimates.

Staff also requires the Applicant to provide: the request for service initiating the "necessity" of the request for a CC&N, appropriate approvals from the Arizona Department of Water Resources (ADWR) and the Arizona Department of Environmental Quality (ADEQ), and compliance status information from the ADEQ and ADWR.

In order to assist the Commission in its goal to eliminate the proliferation of non-viable water systems, it is recommended that in addition the above, the following should be required:

1. Unless the Applicant is an existing public water utility in Arizona or is an affiliate of an Arizona public water utility, an Applicant for a new CC&N (i.e., not an extension to an existing CC&N) must demonstrate that existing water utilities have refused to extend their territories to include the requested area. This demonstration shall be made by the Applicant providing all the following:
   a. A copy of the Applicant's request for service from all Class A* water utilities in the State as well as the refusal to serve from all those Class A water utilities, and
   b. A copy of the Applicant's request for service from all or at least five (5), whichever is less, of the Class B* water utilities serving within fifty (50) miles of the Applicant's requested area as well as the refusal to serve from all those Class B water utilities, and
   c. A copy of the Applicant's request for service from all water utilities* serving within five (5) miles of the Applicant's requested area as well as the refusal to serve from all those water utilities.
   * Any utility willing to serve must respond to the Applicant within thirty (30) days of the Applicant's request and must meet item #3 below.

2. If the Applicant has received an affirmative response to a request for service within thirty (30) days of its request from any of the above water utilities, but believes that such service would not be cost-effective nor in the public interest, the Applicant shall submit detailed information and cost data that clearly and convincingly demonstrates such an opinion and that the granting of a CC&N to the Applicant is in the public interest.

3 The Applicant must demonstrate that it and all its affiliates and associated management or operations personnel are in compliance with all applicable Commission, ADEQ, and ADWR requirements. In the event, the utility, any affiliate, or associated management or operations personnel are not in compliance with Commission, ADEQ or ADWR requirements, the Applicant must demonstrate that the non-compliance is related to the recent acquisition or affiliation with a deficient utility. With regard to ADE, the Applicant shall be considered in compliance if it, or any of its affiliates, does not have or has not had within the 12 months prior to the application, any major deficiencies with regard to physical facilities, operation and maintenance requirements, or monitoring requirements.

4. Initial rates for a new CC&N should be designed such that the utility would have the opportunity to break even (zero percent rate of return) at the end of its third year of operation. These rates should also provide the utility the opportunity to earn a reasonable rate of return by the end of its fifth year of operation. Rate levels and the rate of return would be based on the Applicants reasonable projections of customer growth and the rate base required to properly and adequately serve the customers.

5. For new CC&Ns that are not being served by an existing utility, the following charges shall be set as follows:
   a. Establishment (normal) -- $20.00
   b. Establishment (after hours) -- $35.00
   c. Reconnection -- $20.00
   d. Meter Test (if correct) -- $25.00
   e. Deposit -- 2 times the monthly minimum plus 15,000 gallons
   f. NSF Check -- $25.00
   g. Service Call (after hours) -- $40.00
   h. Meter Re-read -- $35.00
   i. Late Payment Fee -- 1.5 percent after 15 days

   The above charges shall be reviewed annually by Staff and adjusted if necessary.

6. Once the CC&N is granted, the utility shall be required to file a rate case no later than 120 days after the fifth anniversary of serving its first customer.

ATTACHMENT B

Proposed Policy
for
Class D and E Water System Acquisitions

The purpose of the acquisition policy is to try to encourage acquisition and consolidation of small water utilities operating in the state. For purposes of this policy, small water utilities are limited to Class D and E water utilities, i.e., less than $250,000 of operating revenue in the most recent calendar year. Acquisition of small water utilities should result in improved water quality and/or service for the customers.

Decision No. 62993, dated November 3, 2000, established six general conditions a water company must meet to qualify for an acquisition adjustment or rate of return premium. Per that Decision, the acquisition incentive may be granted in one of two ways: (1) recovery of an amount paid in excess of the book value of the acquired company's assets (acquisition adjustment), or (2) a rate of return premium, but not both. This policy develops criteria and procedures for determining the amount of acquisition incentive that will be eligible for recovery in rates following acquisition of a small water utility.

The purchase price for a small water utility could exceed the book value of its plant in service, resulting in a positive acquisition adjustment. This policy applies exclusively to positive acquisition adjustments, and negative acquisition adjustments shall not be recognized for rate-making purposes.

In certain cases, a rate of return premium may be allowed instead of an acquisition adjustment. Once the rate of return percentage is determined, a premium amount will increase that percentage. The premium percentage will be allowed in rates for a period of time that the Commission determines is appropriate to provide an acquisition incentive.

Following is the list of six conditions a company must prove by a preponderance of the evidence in order to obtain an acquisition adjustment or rate of return premium in rates, as well as criteria to meet those conditions.

1. **THE ACQUIRED COMPANY IS A CLASS D OR E.**

- This policy is to be applied to the acquisition of Class D and E water utilities, i.e., those having less than $250,000 of operating revenue in the most recent calendar year.

2. **THE ACQUISITION WILL NOT NEGATIVELY AFFECT THE VIABILITY OF THE ACQUIRER.**

- The acquiring company shall provide documentation that satisfactorily demonstrates its continued financial viability subsequent to the acquisition. Staff will not recommend approval of a proposed acquisition that would be potentially detrimental to an acquirer's financial viability.

3. **THE ACQUIRED SYSTEM'S CUSTOMERS WILL RECEIVE IMPROVED SERVICE IN A REASONABLE TIMEFRAME.**

- The acquiring company shall submit a plan for improving service to the customers of the acquired system. The plan shall include, but not be limited to, a detailed listing of the current violations and deficiencies of the water company to be acquired, as well as the acquirer's proposed solutions and the related costs. Additionally, the plan must also include a proposal for how the rates of the small water utility's customers will be affected. The acquirer's plan should also provide estimated implementation dates for each system or service improvement. A service improvement plan might include, but is not limited to, the following:

    a. Delivering water to customers that meets the quality standards of the Arizona Department of Environmental Quality ("ADEQ") and the Safe Drinking Water Act.
    b. Satisfactory resolution of outstanding violations with ADEQ and the Arizona Department of Water Resources ("ADWR").
    c. Developing a reliable source of water supply.
    d. Developing appropriate water storage capacity.
    e. Improved water pressure, either higher or lower, within the distribution system.
    f. Replacement of inadequate, insufficient, deteriorated, and/or inefficient infrastructure.
    g. Improving billing procedures, customer complaint resolution, and service response times.

4. **THE PURCHASE PRICE IS FAIR AND REASONABLE (EVEN THOUGH THAT PRICE MAY BE MORE THAN THE ORIGINAL COST LESS DEPRECIATION BOOK VALUE) AND CONDUCTED THROUGH AN ARM'S LENGTH NEGOTIATION.**

- One factor that would contribute to recommending an acquisition incentive is if the net plant value is either very small or zero, due to substantially or fully depreciated assets that require replacement. Although the water company assets may reflect zero net book value on the records, the assets in theory still have value due to the fact that they generate a future revenue stream. To determine if the purchase price and resulting acquisition incentive amount is fair and reasonable, Staff's evaluation shall include, but not be limited to, the following criteria:

    a. The purchase price must be the result of good faith negotiations between the two transacting entities.

    b. The acquisition must be conducted through an arm's length transaction, and the two parties must not be affiliates as defined by A.A.C. R14-2-801.1.

    c. Present value of future cash flows.

5. **THE RECOVERY PERIOD FOR THE ACQUISITION ADJUSTMENT SHOULD BE FOR A SPECIFIC MINIMUM TIME.**

- Staff will evaluate the acquisition adjustment recovery period to be fair and reasonable to both the acquirer, and the customers of the small water utility. The specific recovery period shall be set on a case-by-case basis and shall be consistent with the period over which customers are expected to benefit, as well as mitigate the impact of cost recovery on rates.

- If a rate of return premium is sought by the acquiring company, Staff will determine the premium percentage and recovery period on a case-by-case basis. Recovery via the rate of return premium will be calculated to recoup only the excess of the purchase price over the book value of the plant in service.

6. **THE ACQUISITION IS IN THE PUBLIC INTEREST**

Staff will investigate the acquirer's compliance history with the ADEQ and the ADWR to determine if it is a fit and proper entity to acquire a small water utility. Acquisition incentives will not be granted to entities that are currently in violation of rules set forth by ADEQ and/or ADWR.

The acquisition of a small water utility would comply with the standard of public interest if the above detailed five conditions are met, and no ADEQ and/or ADWR rule violations are pending. Additionally, the following circumstances may further demonstrate how an acquisition could be in the public interest:

- The small water utility is insolvent, defined as "unable or having ceased to pay debts as they fall due in the usual course of business".

- The small water utility will have increased opportunities to obtain short-term financing as a result of the acquisition. This will enable the company to make improvements to, and correct deficiencies within its water system that would enable it to serve water that meets the quality standards set forth in the Safe Drinking Water Act.

- Short-term and long-term cost savings can be demonstrated as a result of the acquisition, as well as efficiencies and economies of scale.

- As a result of the acquisition, delinquent remittance of transaction privilege tax and/or property tax by the small water utility to the Arizona Department of Revenue will be satisfied.

PROPOSED PROCEDURE

Once the two entities enter into a transfer/purchase agreement, they will submit a joint application to the Commission pursuant to Arizona Administrative Code Section R14-2-103. The joint application should include the following information:

a) A Commission approved rate application for water companies with annual gross operating revenues of less than $250,000 for the small water utility to be acquired as of the most recent fiscal year end, or all the information required in such a rate case application along with a request for a Commission accounting order delineating how the acquisition incentive will be treated.
b) Financial statements of the acquirer as of the most recent fiscal year end.
c) Disclosure of transaction as either an asset purchase and Certificate of Convenience and Necessity transfer, or stock purchase.
d) A copy of the purchase agreement/sale document including the proposed purchase price.
e) A detailed explanation and supporting evidence to demonstrate how the acquisition meets the six conditions to be eligible for recovery of an acquisition adjustment in rates.
f) A list and explanation of current known deficiencies of the system to be acquired as well as the acquirer's proposed solutions to remedy the deficiencies, along with the costs, and timeframe for implementing the solutions.
g) Reconstruction Cost New (RCN) for the small water utility to be acquired or adequate information for an RCN study to be performed.
h) A detailed calculation of the proposed acquisition adjustment requested to be eligible for recovery in rates, a proposal for its method of recovery, and a calculation of its effect on rates.

Upon submission of the application, Staff will analyze the documentation to determine whether the acquisition meets the six conditions identified in Decision No. 62993, by:

1. Analyzing the company's financial information to determine that it is a Class D or E water utility.

2. Assessing the acquiring entity's financial resources to determine if sufficient financial resources are available to acquire a small water utility without jeopardizing the acquirer's good financial standing.

3. Evaluating the acquirer's proposed actions to assess whether customers of the acquired small water utility will receive improved service within a reasonable timeframe.

4. Evaluating the original cost of the existing plant assets on the acquired utility's books, as well as RCN amounts. Staff will then compare those two amounts with the proposed purchase price to determine if the purchase price is fair and reasonable; if the purchase price was negotiated, and if the sale will be conducted, through an arms length transaction; and what amount of acquisition adjustment or rate of return premium, if any, will be allowed.

5. Classifying the acquisition incentive as either a regulatory asset (acquisition adjustment) or a rate of return premium, to be recovered over a specific time.

6. Reviewing the documentation provided in response to the five conditions set forth, as well as other potential benefits identified by the acquirer and determine if the acquisition meets the criteria of public interest. Staff will also evaluate whether the acquirer is a "fit and proper" entity to purchase a small water utility.

7. Requesting and analyzing other information/data that Staff and/or the Commission deems necessary for a particular case.

ATTACHMENT C

Proposed Policy
For
Water System Tiered Rate Design

Pricing/rate design is the Commission's primary means of encouraging conservation. The Commission can do this by implementing inverted block rates, i.e., tiered rates. Tiered rates may not be appropriate in all circumstances. Staff will consider the appropriateness of an inverted three-tiered commodity rate structure for all water company rate cases, and if appropriate, will recommend such a tiered rate structure to encourage conservation. The tiers should be designed in a manner that customers who conserve will recognize cost savings, while high water users will pay a greater portion of the costs that increased usage places on the water system. Criteria for evaluating the appropriateness and/or type of tiered rate structure on a case-by-case basis shall include, but not be limited to, the following:

1. Number of service connections on the system.

2. Number of high usage customers on the system.

3. Gallons of average water usage per connection per month.

4. Gallons of median water usage per connection per month.

5. Source of supply.

ATTACHMENT D

Proposed Policy
For
Central Arizona Project (CAP) Cost Recovery

The consensus of the CAP Working Group is that the Arizona Corporation Commission (Commission) should encourage water companies to retain their Central Arizona Project (CAP) water allocation. The purpose is to allow water companies to accomplish long term planning of their water resource needs for the benefit of their customers. The consensus of the group was that the Commission should accomplish this encouragement as follows:

1. A water company would be allowed to recover CAP costs if it could demonstrate that it needed the CAP allocation to properly serve its customers.

2. The water company must demonstrate that the need would occur by the year 2025.

3. The water company must demonstrate that it will actually be using a reasonable amount of its CAP allocation by 2025.

4. The water company must demonstrate that it will be using all of its CAP allocation by 2034.

5. "Use" will be those methods of using CAP water that are defined as "use" by the Arizona Department of Water Resources.

6. In order to obtain cost recovery, a water company must file a rate case and provide evidence demonstrating items 1 though 4 above.

7. At the time that cost recovery is approved for a water company, cost recovery will depend on how much of company's CAP allocation is actually being used –
   a. If none of the CAP allocation is actually being used, the company will be allowed to recover dollar for dollar its appropriate CAP expenses, without earning a rate of return. The cost recovery will be split between a charge in the commodity portion of the rate and a CAP Hook-up Fee. The charge in the commodity will be that amount needed to pay the M&I portion of the expense for that amount of CAP water equal to the amount of groundwater actually being used by the current customers. The CAP Hook-up Fee will be calculated as that portion needed to pay the remainder of the M&I charges. This is similar to the method used in the Vail Water Company rate case (Decision No. 62450). If the CAP Hook-up Fee is determined by the Commission to have to be excessive in order to recover all the CAP costs, the

remainder should be deferred and collected later as the company grows and adds additional customers and/or the rate of growth increases to allow the collection of additional CAP Hook-up Fees.

b. If only a portion of the CAP allotment is being used, cost recovery will be split. For that portion of the CAP allotment not being used, cost recovery will be allowed as explained above (#7a). For that portion of the CAP allotment actually being used, cost recovery will be as with any other used and useful item in a rate case, i.e., the plant needed will be included in rate base and earn a rate of return, while the M&I and OM&R expenses for that portion of the CAP allotment will be recovered as any other expense.

c. When all the CAP allotment is being used, cost recovery will be as described in the second half above (#7b), i.e., just like any other plant and expense item that is used and useful.

d. For those water companies that have not obtained a specific accounting order from the Commission that details how CAP costs incurred up to this time would be treated and meet items 1 through 4 above, the actual amount of direct costs incurred (i.e., no rate of return or cost of money) should be recovered in rates by some method determined in a rate case, as long as such an allowance is not somehow improper (e.g., retroactive rate making, contrary to some mandatory accounting/rate making principle, etc.).

8. Within 5 years of obtaining approval for cost recovery of the CAP costs, the water company must submit a detailed engineering plan outlining how the water will be put to use.

9. If a water company that has obtained cost recovery from the Commission is not using its total CAP allotment by 2034, that portion not being used shall be sold. If a water company has recovered from ratepayers the cost for retaining that portion of the CAP allocation it sells, all net proceeds shall be refunded to ratepayers in a manner to be determined by the Commission at that time. Similarly, if a water company sells all or any portion of its CAP allocation after recovering from ratepayers the cost to retain the portion it sells, all net proceeds shall be refunded to ratepayers.

A-T

WWC-47A

EXHIBIT

PENGAD-Bayonne, N.J.

WWC-47A

Admitted

ARIZONA WATER COMPANY

Docket No. W-01445A-04-_____

2004 RATE HEARING EXHIBIT NO. ___

For Test Year Ending 12/31/03

PREPARED

DIRECT TESTIMONY & EXHIBITS

OF

William M. Garfield

---

exceed $6.3 million annually for the total Company and $2.1 million annually for the Western Group.

Michael J. Whitehead, the Company's Vice President of Engineering, will provide more detailed capital cost information and a schedule of treatment plant construction in his direct testimony. Likewise, Ralph J. Kennedy, the Company's Vice President and Treasurer, will provide information concerning the revenue requirements arising from new treatment plant additions to comply with the new arsenic MCL and also the methods of recovering the costs of the required treatment in his direct testimony.

Q. HOW WILL WATER TREATMENT TO REMOVE ARSENIC IMPACT RATES FOR AN AVERAGE RESIDENTIAL CUSTOMER?

A. In a September 6, 2000 letter to the EPA, the Company estimated that in water systems in the Western Group where one or more sources of supply exceed the EPA's arsenic MCL of 10 PPB, rates would have to increase by an average of 40% for an average residential customer to cover the cost of constructing and operating treatment facilities to comply with the new MCL.

Q. WHEN WILL THE COMPANY BE REQUIRED TO COMPLY WITH THE EPA'S NEW ARSENIC MCL?

A. All community water systems and non-transient non-community water systems, including the Company's water systems, must comply with the new arsenic MCL by January 23, 2006. To meet this deadline for the Western Group water systems, the Company must begin constructing treatment facilities no later than year-end 2004 in order to complete the construction of the treatment facilities before the

Arizona Water Company's Rates with Treated CAP Water Compared to Woodruff Water Company's Rates

Exhibit 51B
Schedule
Page 1
Witness: Kozoman

Line No.			(a) Units of Water Used (in 1,000's Gallons Per Month		
10	Arizona Water Company's Proposed Rates for Coolidge:				
11	Monthly Minimum			$	14.79
12	Commodity Rates	$ 2.634	10		26.34
13	(Above Data from Arizona Water Company's Rate Filing				
14	for Western Division, Schedule H-3, Page 3 of 3)				
15					
16	CAP Treatment Plant Charges	**$ 0.7493**	10		7.49
17	(Computed from Revenue Requirement for CAP				
18	Treatment Plant)				
19					
20	Total Monthly Bill **(b)**			$	48.62
21					
22	Woodruff Water Company's Proposed Rates				
23				$	24.00
24	Commodity Rates	$ 2.00	7		14.00
25	Commodity Rates	$ 3.00	3		9.00
26	Total Monthly Bill			$	47.00
27					

28 **(a)** Total Water Usage of 10,000 gallons per month from Woodruff Water
29 Company's CC&N Filing. Kozoman's Schedule 2a.
30
31 **(b)** There would be some decrease in Expenses associated with less use
32 of Pumped Ground Water if CAP Water Were Used.
33
34

PENGAD-Bayonne, N.J.
EXHIBIT
WWC-51B
Admitted

Arizona Water Company's
Revenue Requirement for CAP Water Treatment Plant Only
and Cost Per 1,000 gallons Treated
(Assuming 10,000,000 Gallon Capacity Treatment Plant)

Exhibit 51B
Schedule
Page 2
Witness: Kozoman

Line No.				
1	**Revenue Requirement**		$	4,665,980
2				
3	**Expenses**			
4	Operation & Maintenance, at $0.15 per 1,000 gallons		$	531,984
5	(Source of Data: Response to Woodruff Water Data Request 3.15)			
6	Depreciation (CAP Treatment Plant Only) at 3.33% **(a)**			666,000
7	Depreciation on Transmission Mains from Treatment Plant to			
8	to service areas. (Dollar Value of Mains Not Available)			
9	Property Tax (Property Tax Rate Used = **(b)**	14.17%		330,648
10	Income Tax **(c)**			1,037,549
11	Total Expense **(1)**			2,566,182
12	Operating Income			2,099,798
13	Interest Expense at 8.43% Cost on $20,000,000 x Debt			
14	Percentage from Schedule D-1 (In Arizona Water Company's			
15	Rate Filing for Western Division, Schedule D-1)			
16	($20,000,000 x 26.65% x 8.43%) **(d)**			449,319
17	Net Income ($20,000,000 x 73.35% x 11.25%)			1,650,479
18				
19	Rate of Return on $20,000,000 Investment in CAP			
20	Treatment Plant **(e)**			10.50%
21	Maximum Water Which could be produced, assuming 100%			14,670,916
22	Capacity (in Gallons = 10,000,000 gpd x 365 Days)			3,650,000,000
23	Water Produced in a Year (in 1,000's Gallons = Line 22 / 1,000)			3,650,000
24	CAP Water Allocation for 2,000 AF for Coolidge & 8,884 AF for			
25	Casa Grande expressed in 1,000's of Gallons			3,546,562
26	Cost of Water Treatment Per 1,000 Gallons (Line 1 / Line 25)		**$**	**1.3156**
27	**Coolidge Expense Allocation based on 2000 AF CAP Allocation**		$	1,050,423
28	Estimated Demand in Five Years in 1,000's of Gallons from Page 4			1,401,834
29	**Revenue Requirement per 1,000 Gallons Sold**		**$**	**0.7493**
30				
31	**(1) Does Total Cost of CAP Water Charges or Reduction of Pumping.**			
32				
33	**(a)** Arizona Corporation Commission Staff Depreciation Rate for Treatment Equipment.			
34	**(b)** Average Property Tax for Western Division Used. Data on revenues and			
35	property taxes from Arizona Water Company's Rate Filing for Western Division,			
36	Schedule F-1.			
37	**(c)** Income Tax Computed Using Income Tax Rates of:			
38	6.968% Arizona Income Tax Rate on All Taxable Income			
39	Federal Income Taxes Rates, After Deduction for Arizona State Income Taxes			
40	15% On First of Taxable Income	$ 50,000		
41	25% On Taxable Income from $50,001 to $75,000	75,000		
42	34% On Taxable Income from $75,001 to $100,000	100,000		
43	34% On Taxable Income from $100,001 to $335,000	335,000		
44	34% on Taxable Income Over	335,001		
45	Taxable Income for Federal Purposes is Taxable Income After Deduction for State of			
46	Arizona Income Tax			
47				
48	**(d)** Assuming Financing of CAP Treatment Plant in same ratio of debt & equity as shown			
49	on Arizona Water Company's Rate Filing for Western Division, Schedule D-1			
50				
51	**(e)** Rate of Return from Arizona Water Company's Rate Filing for Western Division			
52	Schedule D-1.			

Arizona Water Company's
Estimate of Property Tax Rate
Data from Schedule F-1 of Rate Filing, titled
Projected Income Statements

Exhibit 51B
Schedule
Page 3
Witness: Kozoman

Line No.			
1	Test Year Revenues	$	10,567,761
2	Adjusted Test Year Revenues		10,791,504
3	Proposed Revenues		13,445,504
4	Average of 3 Years of Revenue (Lines (1 + 2 + 3) / Three)		11,601,590
5			
6	Average Revenues multiplied by Two (Line 4 x Two)	$	23,203,179
7	Plus:		
8	10% of Construction Work in Progress		
9	(Value not Shown in Arizona Water Company's Rate Filing		
10	for Western Division) **(a)**		
11	Less:		
12	Book Value of Transportation Equipment		
13	(Value not Shown in Arizona Water Company's Rate Filing		
14	for Western Division) **(b)**		
15	Full Cash Value (Line 6 + Line 8 - Line 12)		23,203,179
16	Assessment Ratio		25.00%
17	Assessed Value (Line 15 x Line 16)		5,800,795
18	Property Tax Per Rate Filing (From Schedule F-1)		822,131
19			
20	Property Tax Rate (Line 18 / Line 17)		14.17%
21			
22	**(a)** Addition of 10% of Construction Work in Progress would Lower the		
23	Property Tax Rate		
24			
25	**(b)** Deduction of Book Value of Transportation Equipment would increase the		
26	Property Tax Rate		
27			

Arizona Water Company's
CAP Allocations & And Estimated Demand at
Coolidge System

Exhibit 51B
Schedule
Page 4
Witness: Kozoman

Line No.		In Acre Feet	In Gallons	In 1,000's of Gallons	Percent of Total Water
1					
2					
3					
4					
5	Coolidge	8,884	2,894,860,284	2,894,860	81.62%
6	Casa Grande	2,000	651,702,000	651,702	18.38%
7	Totals	10,884	3,546,562,284	3,546,562	100.00%
8					
9	Estimated Demand at Coolidge				
10					In 1,000's
11					of Gallons
12	Coolidge 2004 Demand **(a)**				495,971
13	Estimated Growth at Arizona Water Company's Coolidge System				
14	1,000 Customers at 10,100 Gallons per month for Five Years				606,000
15					
16	Estimated Sandia Demand in 5 Years				299,863
17	Total Estimated Demand				1,401,834
18					
19	Estimated Revenue Requirement for CAP Treatment Plant				$ 1,050,423
20	From page 2.				
21	**Cost Per 1,000 Gallons**				**$ 0.7493**
22					
23	**(a)** Arizona Water Company response to Woodruff Water Data Request.				
24	Question 3.2				
25					Totals
26		Well # 7	Well # 9	Well # 10	Totals In 1,000's
27		In AF	In AF	In AF	In AF of Gallons
28	Jan.	-	-	89.88	89.88 29,287.49
29	Feb.	-	0.12	86.09	86.21 28,091.61
30	March	0.10	14.14	97.78	112.02 36,501.83
31	April	6.78	78.94	31.46	117.18 38,183.22
32	May	23.58	78.66	34.25	136.49 44,475.40
33	June	14.27	129.46	41.10	184.83 60,227.04
34	July	15.20	70.89	75.87	161.96 52,774.83
35	August	14.08	62.30	83.50	159.88 52,097.06
36	Sept.	29.63	81.26	46.08	156.97 51,148.83
37	Oct.	1.13	41.37	79.19	121.69 39,652.81
38	Nov.	29.40	25.22	50.74	105.36 34,331.66
39	Dec.	0.88	65.11	23.62	89.61 29,199.51
40	Totals	135.05	647.47	739.56	1,522.08 495,971.29
41					

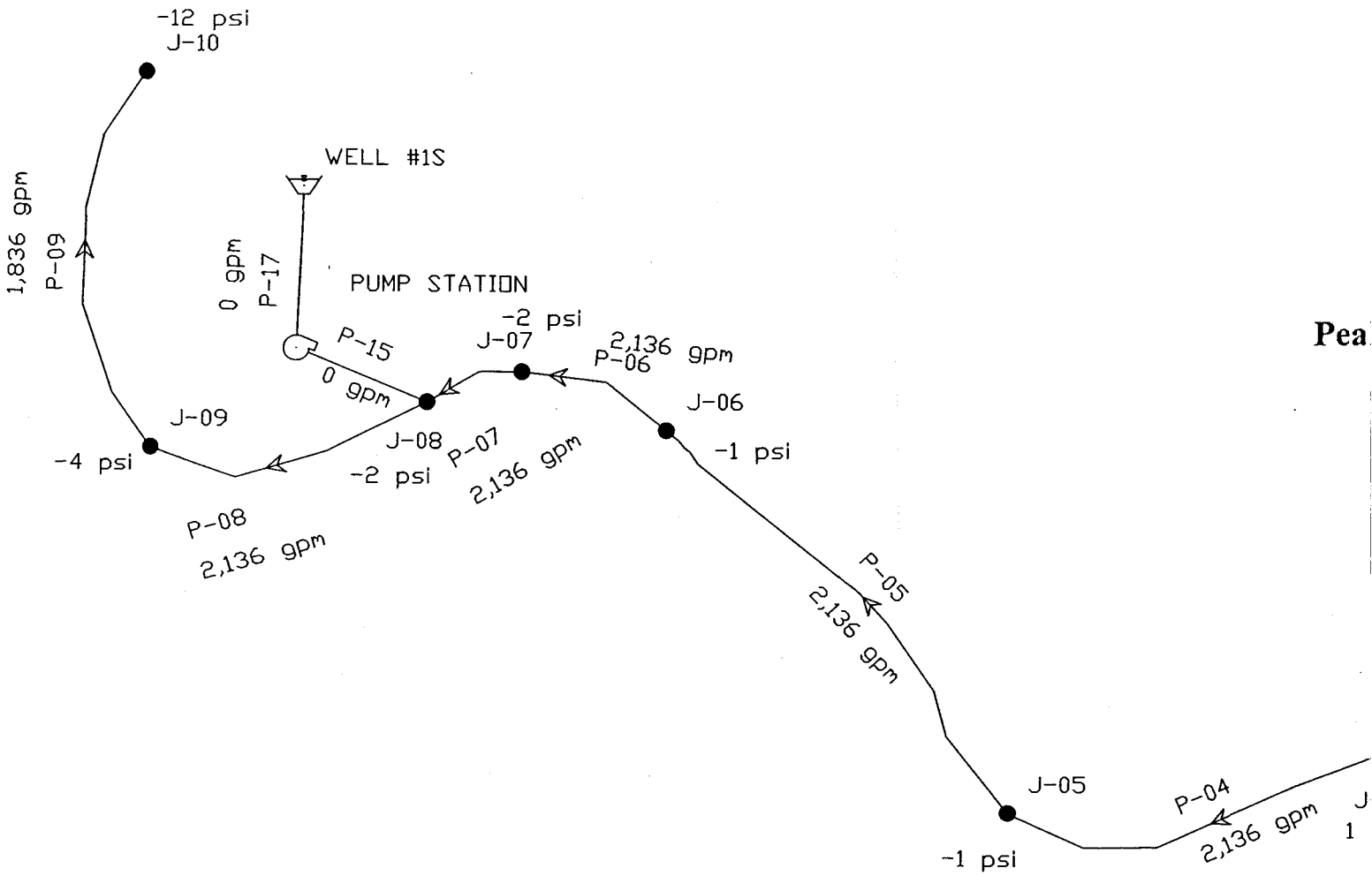
Arizona Water Company's
Data for Water Treatment Plant

Exhibit 51B
Schedule
Page 5
Witness: Kozoman

Line No.			
1	Estimated Cost of CAP Treatment Plant	$	20,000,000
2	(Source of Cost Estimate: Michael J. Whitehead Rebuttal Testimony, Page 11, Line 7, And Response		
3	to Woodruff Water Data Request 3.4)		
4	Depreciation Rate Normally Used by ACC Staff		3.33%
5	Annual Depreciation Expense	$	666,000
6			
7			
8	Estimated Capacity of CAP Treatment Plant, in gallons per day		10,000,000
9			
10	Operation & Maintenance Cost Per 1,000 Gallons	$	0.15
11	(Source of Data: Response to Woodruff Water Data Request 3.15)		
12	CAP Allocation in 1,000's of Gallons		3,546,562
13	Operation & Maintenance Cost Per Year	$	531,984
14			
15	Assumed Requested Rate of Return from Arizona Water Company		
16	(Source of Data from Schedule D-1 of Arizona Water Company's Rate Filing, Western Region)		
17			

18			Dollar	Percent	Cost	Composite	Projected
19			Amount	of Total	Rate	Cost	costs
20	Long-Term Debt	$	7,838,181	26.65%	8.43%	2.25%	449,242
21	Equity		21,578,434	73.35%	11.25%	8.25%	1,650,478
22	Totals	$	29,416,615	100.00%		10.50%	

23
24 Assume that Cost of CAP Treatment Plant is Financed with above mix of Debt and Equity
25
26
27
28
29
30
31



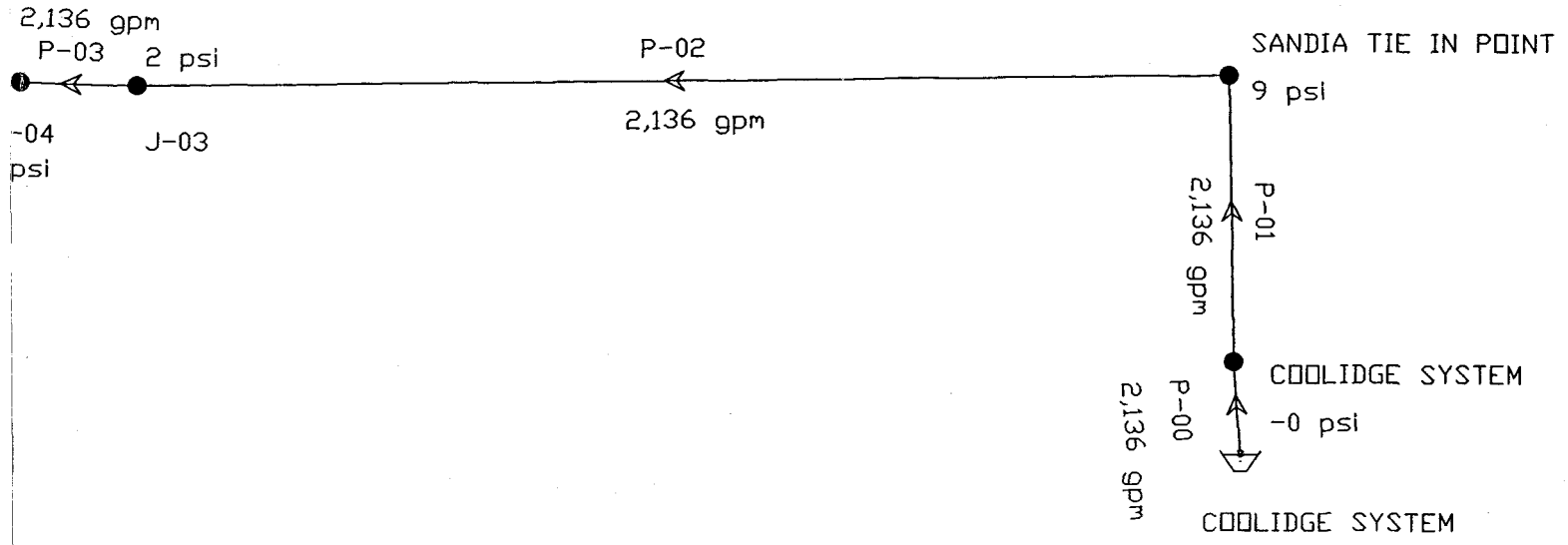
Pea

EXHIBIT
WUC-53A
Admitted

AWC MODEL
PEAK DAY + 1500 GPM
F.F.

SANDIA Phase 1

k Day Demand Conditions with Fire Flow
(All Wells Off)



AWC 53A

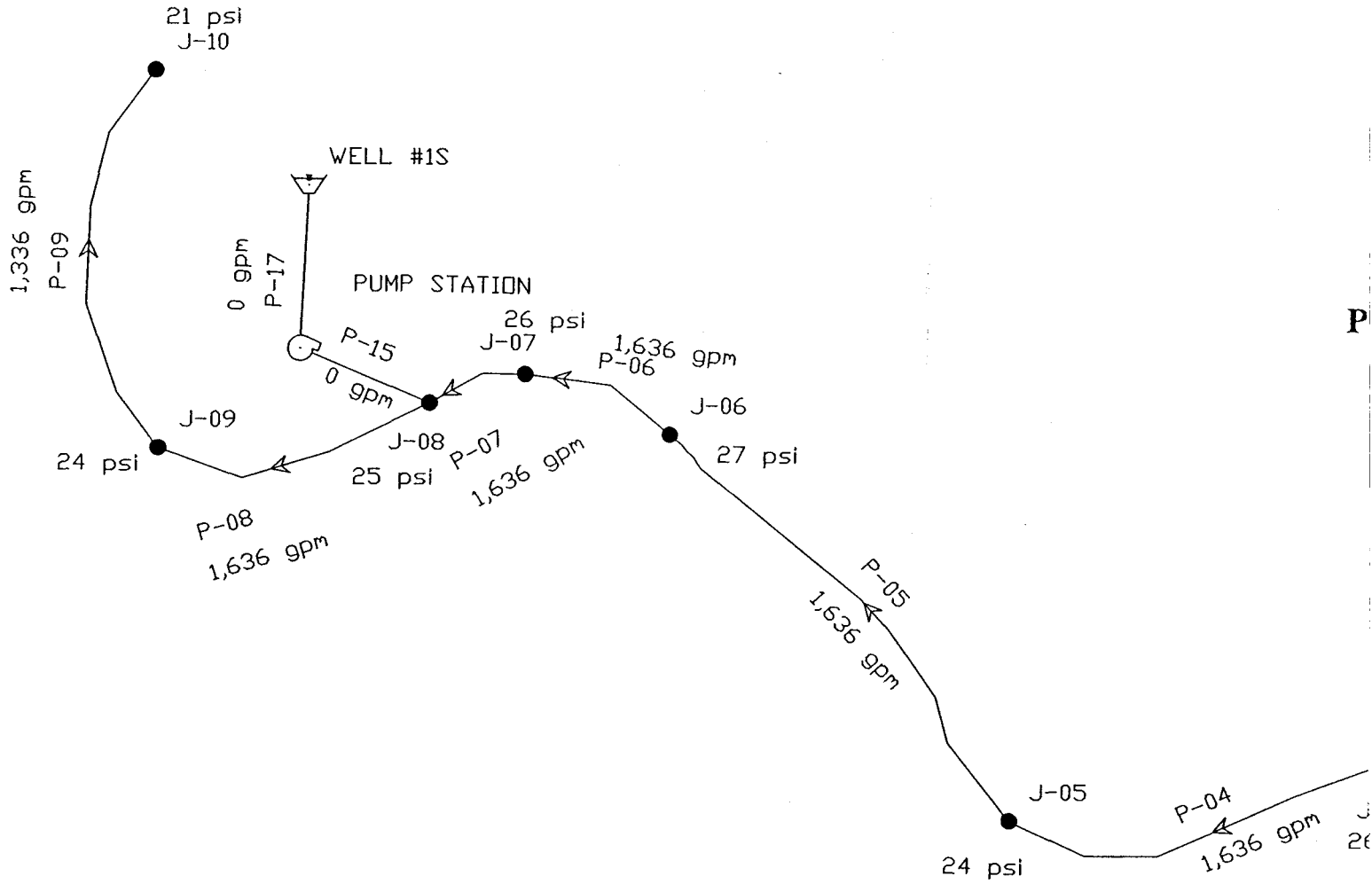
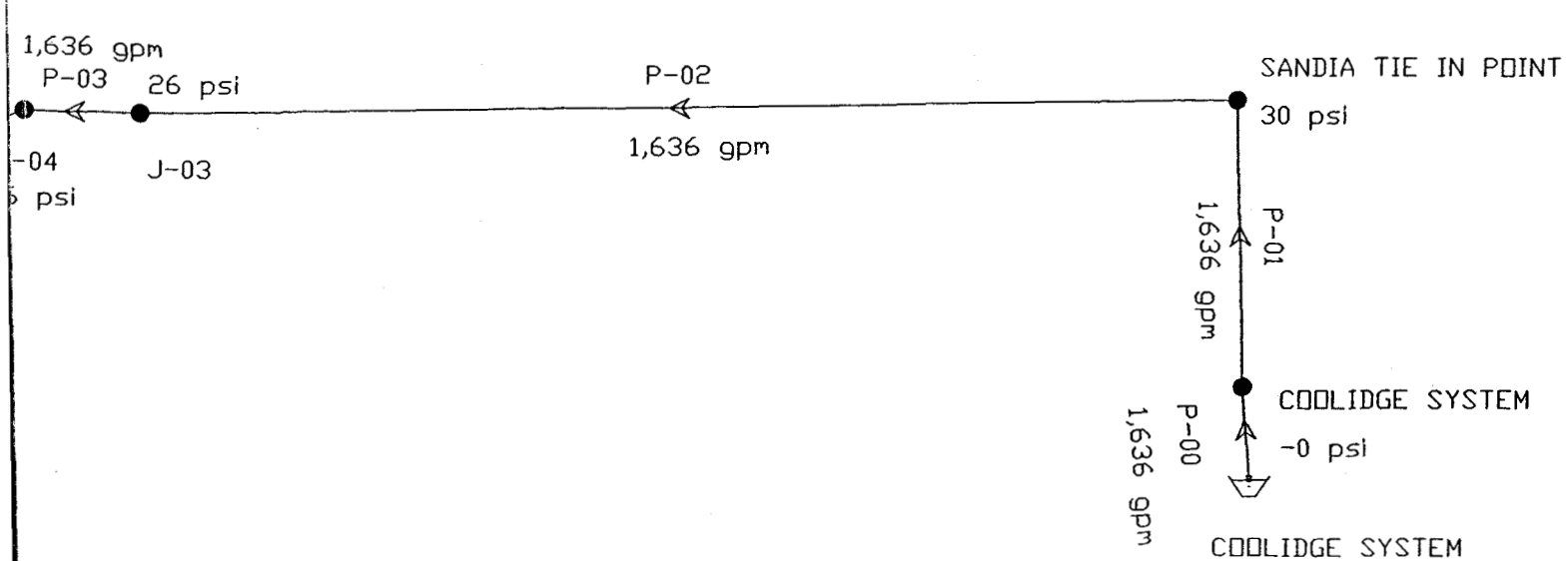


EXHIBIT
WWC-53B
Admitted

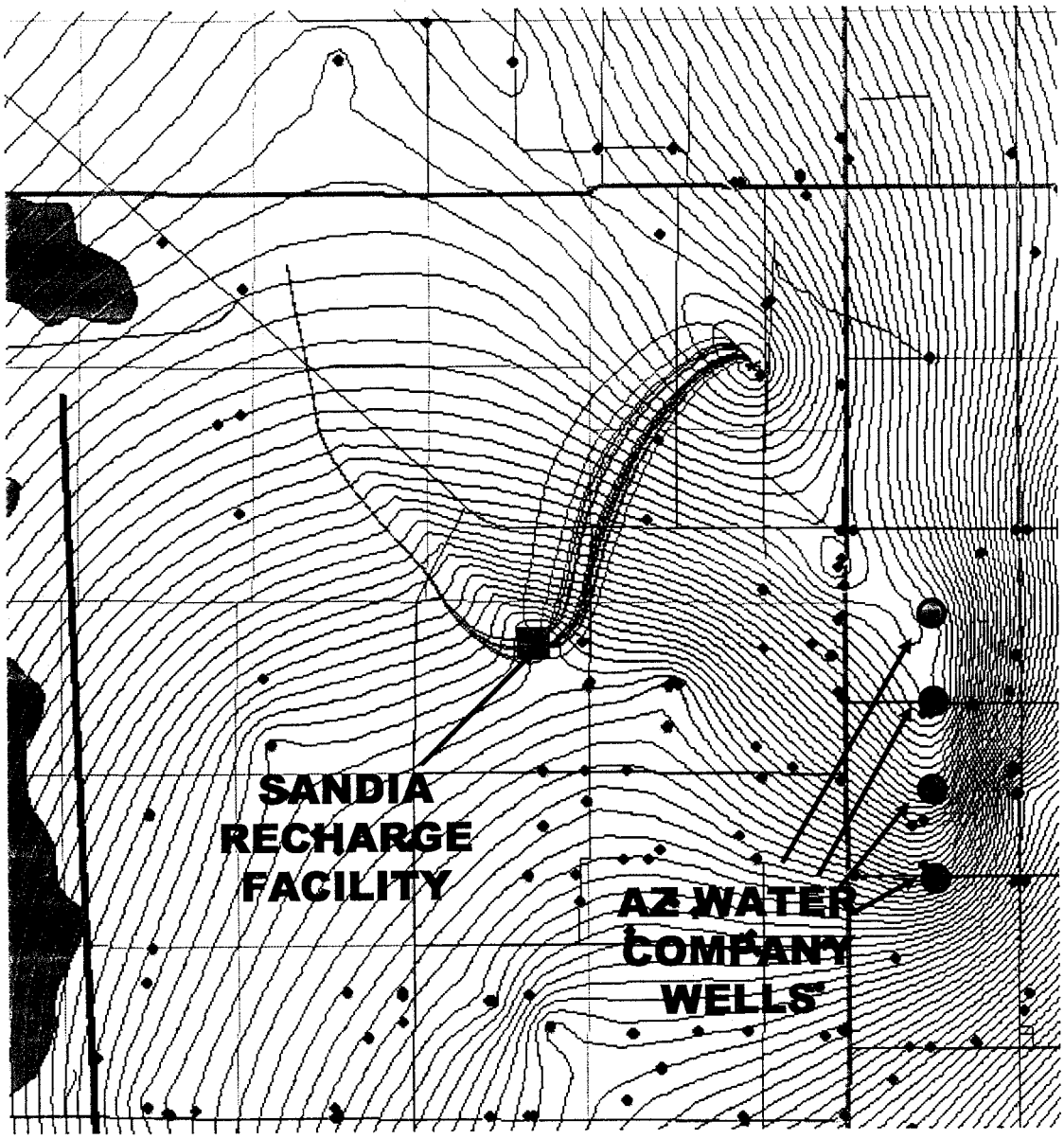
AWC MODEL
PEAK DAY + 1000 GPM F.F.

SANDIA Phase 1

eak Day Demand Conditions with Fire Flow
(All Wells Off)



WWC 53B



SANDIA RECHARGE AT 89.4 AF/MONTH

AZ WATER CO. PUMPING AT 1264.6 GPM
PER WELL (8,159 AC-FT/YR TOTAL)

Southwest Ground-water Consultants, Inc. May 24, 2005 Project B.859	40-YEAR PARTICLE TRACES Sandia, Pinal County, Arizona	Figure 1

EXHIBIT
WWC-54
Admitted

Library References

States ⚷67.
Westlaw Topic No. 360.
C.J.S. States §§ 121, 136 to 138, 140.

ARTICLE 9. SUBSTANTIVE POLICY STATEMENTS

Article 9, Substantive Policy Statements, consisting of § 41-1091, was added by Laws 1995, Ch. 251, § 13, effective July 13, 1995.

§ 41-1091. Substantive policy statements; directory

A. An agency shall file substantive policy statements pursuant to § 41-1013, subsection B.

B. An agency shall ensure that the first page of each substantive policy statement includes the following notice:

> This substantive policy statement is advisory only. A substantive policy statement does not include internal procedural documents that only affect the internal procedures of the agency and does not impose additional requirements or penalties on regulated parties or include confidential information or rules made in accordance with the Arizona administrative procedure act. If you believe that this substantive policy statement does impose additional requirements or penalties on regulated parties you may petition the agency under Arizona Revised Statutes § 41-1033 for a review of the statement.

C. The agency shall publish at least annually a directory summarizing the subject matter of all currently applicable rules and substantive policy statements. The agency shall keep copies of this directory and all of its substantive policy statements at one location. The directory, rules and substantive policy statements and any materials incorporated by reference in the rules or substantive policy statements shall be open to public inspection at the office of the agency director.

D. On or before June 30 of each year, the agency head shall certify to the council that the agency is in compliance with this section.

Added by Laws 1995, Ch. 251, § 13. Amended by Laws 1998, Ch. 57, § 56; Laws 2002, Ch. 334, § 14.

Historical and Statutory Notes

Reviser's Notes:

2002 Note. Pursuant to authority of § 41-1304.02, in the section heading "; directory" was added.

Library References

States ⚷73.
Westlaw Topic No. 360.
C.J.S. States §§ 130 to 136, 140.

EXHIBIT
tabbies
WWC-55
Admitted

COMMISSIONERS
MARC SPITZER - Chairman
JIM IRVIN
WILLIAM A. MUNDELL
JEFF HATCH-MILLER
MIKE GLEASON

JAMES G. JAYNE
Interim Executive Secretary

ARIZONA CORPORATION COMMISSION

June 29, 2004

Greetings:

This directory of rule summaries and policy statements in intended to help you to become familiar with and understand the currently applicable rules and policies of the Arizona Corporation Commission.

The Commission has published this directory pursuant to A.R.S. § 41-1091(B), which states:

> B. The agency shall publish at least annually a directory summarizing the subject matter of all currently applicable rules and substantive policy statements. At he agency shall keep copies of this directory and all of its substantive policy statements at one location. The directory, rules, substantive policy statements and any materials incorporated by reference in the directory, rules or substantive policy statements shall be open to public inspection at the office of the agency director.

I hope you will find this directory helpful. If you have any questions about how to use it, or suggestions about how to improve it, please address them to:

Brian C. McNeil
Executive Secretary
Arizona Corporation Commission
1200 West Washington
Phoenix, AZ 85007-2996

Sincerely,

Brian C. McNeil
Executive Secretary

POLICY STATEMENT SUMMARIES

Arizona Corporation Commission

Decision No. 50795, dated 4-8-80

In this decision, the Commission adopted a resolution regarding the procedures for acceptance and docketing of an application by public service corporations. The resolution details procedures that will be implemented if incomplete applications are received by the Commission.

Decision No. 52814, dated 2-11-82

In this Decision, the Commission resolved to use certain elements of PURPA's innovative rates cost of service information as a standard practice in rate cases whenever possible.

Decision No. 53032, dated 5-10-82

In this decision, the Commission set a hearing date to gather information from affected electric and gas public service corporations about how the corporations would implement the Commission's proposed policy of requiring the corporations to provide residential energy audits to customers. Information about costs of implementation, effects on accounting and ratemaking procedures, and effects on the utilities' general operations was sought.

Decision No. 53463, dated 2-16-83

In this decision, the Commission directed the Utilities Division to assert the state's jurisdiction over master meter operators, recommend rules to govern master meter operators regarding gas pipeline safety, and establish a program for master meter operators to comply with applicable State and Federal requirements.

Decision No. 53538, dated 4-29-83

In this decision, the Commission ordered that for purposes of the Residential Utility Consumer Assessment, a covered public service corporation shall consider the term "residential consumer" to be synonymous with the term "residential customers" as presently used by said public service corporations in the filing of their 1982 Annual Reports to the Commission. The Commission further ordered that this definition of "residential consumer" shall be subject to further modification by the Commission with regard to subsequent calendar years.

Decision No. 55450, dated 3-4-87

In this decision, the Commission declared the subject of Decision No. 53032 (above) moot, because no state alternative to the Federal Energy Conservation Plan had been adopted by January 1, 1983. Therefore, Decision No. 55450 closed Decision No. 53032.

Decision No. 55568, dated 5-7-87

In this decision, the Commission determined that the evaluation of applications from companies who wished to be adjudicated "not a public service corporation" needed clarification. The Commission therefore directed the Utilities Division to investigate and review all such applications (following guidelines given in the Decision) and to report to the Commission on its findings.

Decision No. 55774, dated 10-21-87

In this Decision, the Commission resolved issues regarding the Tax Reform Act of 1986 effect on a utility's accounting treatments of contributions and advances received through line extension agreements. The Commission permits utilities to collect such funds subject to certain accounting procedures. The Decision states how the Utilities Division will treat such funds in the ratemaking process as well as how such agreements will be monitored.

Decision No. 57680, dated 1-8-92

In this Decision, the Commission asserted that it would consider possible costs of conservation measures in rate proceedings, to encourage water-providing public service corporations to comply with the water management plans adopted by the Department of Water Resources pursuant to A.R.S. §§ 45-564 and 45-565. Recoverability of these costs would depend on specified factors and would be evaluated on a company-specific basis.

~~**Securities Division Policy Statement - CCH BSLR ¶ 9601, dated 9-17-86**~~

~~This policy statement clarifies that publication or distribution to the public of identifying statements pursuant to rule 134, and of preliminary prospectuses pursuant to rules 430 and 431 of the U.S. Securities and Exchange Commission under the Securities Act of 1933, is permitted in Arizona, provided an application has been previously filed with the Securities Division. A legend required to appear on every preliminary prospectus is specified in the policy statement.~~

REPEALED 3-23-04

Securities Division Policy Statement No. 9602, dated 4-22-85

This policy statement states that all registered issuers must file an annual sales report within 60 days after a registration's expiration date or termination of the offering. The policy statement sets forth the acceptable forms for such reporting.

Securities Division Policy Statement No. 9603, no date given

This policy statement details Division policy regarding applications to register convertible securities, assessment options, warrants, or other rights to subscribe to securities. It also details the method of fee calculation for such securities

Securities Division Policy Statement No. 9605, dated 11-27-84

This policy statement affirms that the Securities Division subscribes to statements of policy adopted by the North American Securities Administrators Association, Inc. (NASAA) relating to the registration of securities in Arizona except where in conflict with a state rule or regulation.

Securities Division Policy Statement No. 9607, dated Fall, 1983

This policy statement clarifies the jurisdiction of the Commission over sales of commodities. The sales of certain commodities that do not require delivery to the purchaser within 28 days of the payment of any portion of the purchase price are defined as securities under Arizona law. When determining what constitutes a security, the Division views transactions in the context of their economic substance, rather than their specific form.

Securities Division Policy Statement No. 9610, dated Spring, 1985

This policy statement notes that the use of zero coupon bonds as sales incentives may constitute a "sale within the meaning of the Arizona Securities Act. A merchant who uses zero coupon bonds as a sales incentive may need to be registered as a securities dealer or salesman unless a proper exemption is obtained.

Securities Division Policy Statement No. 9612, dated Winter, 1986

This policy statement clarifies amendments to Rules R14-4-101 through R14-4-103, as effective July 18, 1985.

Securities Division Policy Statement No. 9614, dated 9-18-91

This policy statement announces that questions regarding pending securities, broker-dealer and salesman applications will be accepted between the hours of 8:00 A.M. and 5:00 P.M. MST. The policy statement also provides that the Division will respond to no action requests. Fees for no action letters are set by A.R.S. § 44-1861(L). No action letter requests are public records and requests for them, whether granted or not, may be published at the Divisions discretion.

Securities Division Policy Statement No. 9616, dated 4-3-87

This policy statement states that the Division will require a completed Form U-1 application for any registration by qualification or description, and for any additional or oversale registrations.

Securities Division Policy Statement No. 9617, dated 4-3-87

This policy statement announces that advertising materials submitted for review will not be acknowledged unless the filing is accompanied by a copy of the submission cover letter for date stamping and return, along with a self addressed stamped envelope. If the Division finds the submitted advertising noncompliant with R14-4-103, a letter will be sent to the issuer within three business days of receipt of the materials indicating the areas of such noncompliance. These areas must be corrected before any of the materials may be used in Arizona.

Securities Division Policy Statement No. 9618, dated 1-21-91

This policy statement states the Division's position regarding a guarantee/letter of credit that is an integral part of an underlying security, that is not separable from the underlying security, and that has no value apart from the underlying security. Such guarantee/letter of credit combined with its underlying security will be considered a single security. No dual filing of registration or exemption materials is necessary.

Securities Division Policy Statement No. 9620, dated 8-22-91

This policy statement concerns shelf registrations. Effective June 18, 1991, issuers using SEC Rule 415 relating to shelf registrations, who desire to register these securities by qualification in Arizona, are required to file a single Form U-1 with the Division at the time of filing the initial application with the SEC. The Divisions previous policy of requiring a separate registration upon each "takedown from the "shelf is rescinded by this announcement.

A.A.C. R4-30-221

Ariz. Admin. Code R4-30-221

EXHIBIT
WWC-56C
Admin. Notice

ARIZONA ADMINISTRATIVE CODE
TITLE 4. PROFESSIONS AND OCCUPATIONS
CHAPTER 30. BOARD OF TECHNICAL REGISTRATION
ARTICLE 2. REGISTRATION PROVISIONS

Current through September 30, 2004(Supp. 04-3)

R4-30-221. Engineering Branches Recognized

A. The Board shall recognize the branches of engineering described below for review of experience, selection of examination, definition of examination areas, and definition of demonstrated proficiency areas to be inscribed on the seal. The branches do not limit the areas of a registrant's practice of engineering. (See R4-30-301(18))

1. Agriculture: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for agricultural machinery, drainage, irrigation, terracing, farm electricity or water pumps and wells for the maintenance of adequate potable water supplies for crops, people, animals, and industry.

2. Chemical: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for chemical enterprises, chemical and biological processes, plant layout, production of pilot plants, water, wastewater and pollution control plants, piping and distribution systems, heat exchanges, energy production management and distribution systems, process instrumentation and control systems, biomedical equipment, mining and minerals benefication, corrosion retardation, heat, mass and momentum transfer systems, reaction kinetics, thermodynamics, quality assurance controls, and systems for heat transmission.

3. Civil: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for highways, streets, transportation systems, drainage and flood control structures, surface and subsurface hydrologics, sewers, tunnels, railroads, geotechnical analysis, waterfronts, water and wastewater systems, water power and supply apparatus, wells, pumps, bridges, dams, irrigation structures, water purification apparatus, incinerators or site fire protection systems.

4. Control Systems: Consultation, investigation, evaluation, planning, design, location, development, and review of construction of control systems and their constituent devices including, but not limited to, dynamic stability and the application of instrumentation and feedback control principles to regulate and operate chemical plants, petroleum refineries, food processing plants, water and waste treatment plant, power plants, pollution abatement system, transportation system, and other dynamic processes and systems.

5. Electrical: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for use in power systems, electronic and transmission equipment, electric service and supply systems, lighting systems, communication service and supply systems, fire alarm and detection systems, control systems or electrical installations.

6. Environmental: Consultation, investigation, evaluation, planning, design, location, development, and review of construction of water and wastewater systems, both domestic and process (industrial/commercial) solid waste and hazardous materials system, air quality system, and health, safety, and environmental protection including, but not limited to, emergency response, risk analysis, radiation protection, noise toxicology, and industrial hygiene.

7. Fire Protection: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for building exiting and life safety systems, fire suppression systems and devices, fire detection and alarm systems and devices, smoke exhaust and smoke management systems, fire resistance for building components and assemblies, water supplies and pumping systems for fire protection, including the hydraulic analysis of such systems, and the reduction and control of fire hazards due to processes subject to fire or explosion.

8. Geological: Consultation, investigation, evaluation, planning, design, location, development, and review of construction or geological studies related to surface and subsurface excavations and foundations, stability of slopes, groundwater locations, geological material age and strength determinations near surface or deep subsurface geological structure determinations, and geophysical mapping of geological formations and groundwater locations.

9. Industrial: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for factory layouts, tools and fixtures, factory planning, time and motion study systems, rate plans, production plans, quality control systems and analysis, work simplification systems, methods studies and cost, production control, organizational, operational and labor needs, or safety analysis.

10. Mechanical: Consultation, investigation, evaluation, planning, design, location, development, and review

of construction for air conditioning, refrigeration, ventilation, combustion, heat transfer, energy, power, fuels, propulsion, machinery, tools, manufacturing, fluids, plumbing, fire suppression systems and devices, water supplies and pumping systems for fire protection, including the hydraulic analysis of such systems.
11. Metallurgical: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for projects in the production of metals or metal objects, testing procedures, metal processing, failure analysis procedures, mining and mineral benefication or the development of metal alloys.
12. Mining: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for projects concerning the construction of plants, shaft and bottom layouts, ventilation and hoisting systems, head frames, washery or concentration mills, mining methods and testing procedures or metallurgical works and production procedures.
13. Nuclear: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for nuclear waste management, alternative waste management systems, disposal criteria and risk evaluation, transportation, packaging, decontamination, handling, welding evaluation, site stabilization, recovery techniques, water and air quality control systems, waste volume management, evaporation systems, reactor safety methods, health safety systems, cycle analysis or nuclear fuels.
14. Petroleum: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for drilling equipment, pipelines, refinery plants, gathering systems, handling and storage systems, exploitation and selection methods, gas measurement and core analysis, phase behavior studies, reserve calculations or the development of petroleum products.
15. Sanitary: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for water treatment and sewage disposal plants, water systems, sewers, incinerators, distribution systems, sewage and industrial waste treatment plants, pollution reduction systems, sanitary facilities or public health systems.
16. Structural: Consultation, investigation, evaluation, planning, design, location, development, and review of construction for force-resisting and load-bearing members and their connections for structures such as foundations, bridges, walls, columns, slabs, beams, trusses or similar members used singly or as part of a larger structure.
B. An applicant shall submit a separate application and application fee for each branch for which application is made. An applicant who wishes to change the branch of application after the application has been evaluated shall submit the request in writing and pay an additional application fee.

<General Materials (GM) - References, Annotations, or Tables>

HISTORICAL NOTE

Adopted effective August 3, 1983 (Supp. 83-4). Amended effective December 18, 1991 (Supp. 91-4). Amended effective July 6, 1993 (Supp. 93-3). Amended effective May 1, 1995 (Supp. 95-2). Amended effective December 18, 1997 (Supp. 97-4). Amended by final rulemaking at 6 A.A.R. 1018, effective February 25, 2000 (Supp. 00-1). Amended by final rulemaking at 10 A.A.C. 2798, effective August 7, 2004 (Supp. 04-2).
AZ ADC R4-30-221

END OF DOCUMENT

(C) 2005 Thomson/West. No Claim to Orig. U.S. Govt. Works.

A.A.C. R4-30-224

Ariz. Admin. Code R4-30-224

EXHIBIT
WWC-56D
Admin. Notice

ARIZONA ADMINISTRATIVE CODE
TITLE 4. PROFESSIONS AND OCCUPATIONS
CHAPTER 30. BOARD OF TECHNICAL REGISTRATION
ARTICLE 2. REGISTRATION PROVISIONS

Current through September 30, 2004(Supp. 04-3)

R4-30-224. Engineer Registration

A. Work experience credited toward the eight-year active engagement requirement shall be directly related to the applicant's branch of engineering and of a character satisfactory to the Board and attained as described in R4- 30-222, except that work experience for specific branches of engineering as described in R4-30-221 shall be for the purpose of qualifying an applicant for registration only and shall not be construed to restrict or confine the work practices of or engineering engagements accepted by a registrant.
B. An applicant shall successfully complete the professional engineer examinations offered in the applicant's branch of engineering designated by the Board.

<General Materials (GM) - References, Annotations, or Tables>

HISTORICAL NOTE

Adopted effective August 3, 1983 (Supp. 83-4). Amended effective December 18, 1991 (Supp. 91-4). Amended effective July 6, 1993 (Supp. 93-3). Amended effective May 1, 1995 (Supp. 95-2). Amended by final rulemaking at 6 A.A.R. 1018, effective February 25, 2000 (Supp. 00-1). Amended by final rulemaking at 9 A.A.R. 791, effective February 12, 2003 (Supp. 03-1). Amended by final rulemaking at 10 A.A.C. 2798, effective August 7, 2004 (Supp. 04-2).
AZ ADC R4-30-224

END OF DOCUMENT

(C) 2005 Thomson/West. No Claim to Orig. U.S. Govt. Works.

EXHIBIT
PENGAD-Bayonne, N.J.
WWC-56E
Admin. Notice

R4-30-304. Use of Seals

A. A permanently legible imprint of the registrant's seal and signature shall appear on the following:
   1. Each sheet of drawings or maps;
   2. Each of the master sheets when reproduced into a single set of finished drawings or maps;
   3. Either the cover, title, index page, or first sheet of each set of project specifications;
   4. The cover, index page, or first sheet of addenda or change orders to specifications;
   5. The cover, index page, or first sheet of bound details when prepared to supplement project drawings or maps;
   6. The cover, index, table of contents page, or first sheet of reports, specifications, and other professional documents prepared by a registrant or the registrant's bona fide employee; and
   7. Shop drawings requiring professional services or work as described in the Act. Examples of shop drawings not requiring seals are those showing only:
      a. Sizing and dimensioning information for fabrication purposes;
      b. Construction techniques or sequences;
      c. Components with previous approvals or designed by the registrant of record; or
      d. Modifications to existing installations not affecting the original design parameters and which do not require additional computations.

B. A label describing the name of the project and an original imprint of the registrant's seal and signature shall be applied to all video cassettes containing copies of professional documents.

C. If a professional document is stored, filed, or provided to a client, regulatory body or any other person for any reason by computer disk, tape, cd, or any other electronic form, the registrant shall mark each professional document "electronic copy of final document, original sealed document with" and identify the registrant's name and registration number.

D. A registrant shall sign, date and seal a professional document:
   1. Before the document is submitted to a client, contractor, any regulatory or review body, or any other person, unless the document is marked "preliminary," "draft," or "not for construction"; and
   2. In all cases, if the document is prepared for the purpose of dispute resolution, litigation, arbitration, or mediation.

E. For purposes of subsection (A) all original documents shall include:
   1. An original seal imprint or a computer-generated seal that matches the seal on file at the Board's office;
   2. An original signature that does not obscure either the registrant's printed name or registration number; and
   3. The date the document was sealed.

F. Methods of transferring a seal other than an original seal imprint or a computer-generated seal are not acceptable.

G. An electronic signature, as an option to a permanently legible signature, in accordance with A.R.S. Title 41 and Title 44, is acceptable for all professional documents. The registrant shall provide adequate security regarding the use of the seal and signature.

Historical Note

Adopted effective August 3, 1983 (Supp. 83-4). Amended effective December 18, 1991 (Supp. 91-4). Amended effective May 1, 1995 (Supp. 95-2). Amended by final rulemaking at 6 A.A.R. 1018, effective February 25, 2000 (Supp. 00-1). Amended by final rulemaking at 9 A.A.R. 791, effective February 12, 2003 (Supp. 03-1).

R4-30-305. Drug Laboratory Site Remediation Best Standards and Practices

ARIZONA DEPARTMENT OF WATER RESOURCES, 500 NORTH THIRD STREET, PHOENIX, AZ 85004-3921

A 1
F 1
W1 2

CL

ANNUAL WATER WITHDRAWAL AND USE REPORT
PROVIDER SUMMARY 2004

EXHIBIT WWC-57 Admitted

OWNER OF GROUNDWATER RIGHT

ARIZONA WATER COMPANY
C/O WILLIAM GARFIELD
P.O. BOX 29006
PHOENIX AZ 85038-9006

RECEIVED
MAR 31 2005
Information Management

TYPE OF RIGHT
MUNICIPAL PROVIDER (GW ONLY)

RIGHT / PERMIT NO.
56-001308.0000

REPORTING PARTY
56-001308.0000
ARIZONA WATER COMPANY
C/O WILLIAM GARFIELD
P.O. BOX 29006
PHOENIX AZ 85038-9006

PINAL AMA (520) 836-4857

If any of the information preprinted on this report is incorrect, please make the necessary changes.

PART I GROUNDWATER WITHDRAWN

From Box 14, Schedule A attached

1600.91 x $ 3.00 = $4802.73

ACRE - FEET X Withdrawal Fee =

PART II WATER DELIVERED TO OTHER RIGHTS

From Box 24 Schedule D attached

Ø ACRE - FEET

PART III WATER RECEIVED FROM OTHER RIGHTS

Total from Schedule E attached

Ø ACRE - FEET

PART IV LATE FEES

Complete if filing after March 31. NOTE: A portion of a month after March 31 is counted as a full month.

1) Enter number of months late (Maximum of 6)

2) Calculate Late Report Fee ($25.00 X number of months late) $

3) Calculate Late Payment Fee (10 % X number of months late X withdrawal fee calculated in Part I $

PART V TOTAL FEES DUE

Add amounts from Parts I and IV

$ 4802.73

Mail or hand deliver this report, together with the appropriate schedules, worksheets and fees to the Arizona Department of Water Resources. If mailed, the report must be postmarked no later than March 31, 2005. If hand delivered, the report must be received by the Department's Records Management Unit or local AMA office no later than 5:00 PM on March 31, 2005.

REPORTS FILED AFTER MARCH 31, 2005 ARE SUBJECT TO LATE FEES (A.R.S. § 45-632) AND PAYMENT OF PREVIOUSLY WAIVED MONETARY PENALTIES ASSOCIATED WITH PRIOR GROUNDWATER CODE VIOLATIONS.

I hereby certify, under penalty of perjury, that the information contained in this report is, to the best of my knowledge and belief, true, correct and complete.

X Richard W. Henderson — AUTHORIZED SIGNATURE
VP OPERATIONS — TITLE
3-30-05 — DATE

RICHARD W. HENDERSON — PRINTED NAME
602-240-6860 — TELEPHONE NUMBER

NOTE: THIS REPORT MUST BE FILED EVEN IF NO WATER WAS DELIVERED PURSUANT TO THIS RIGHT.

WWC57

ARIZONA DEPARTMENT OF WATER RESOURCES

SCHEDULE A

REPORT OF PUMPING

ANNUAL REPORT 2004

Owner
ARIZONA WATER COMPANY

1 **RIGHT/PERMIT/BMP Farm Unit NO.**
56-001308.0000

Note: Pumpage for each well must be shown on the attached worksheet.
Information for up to four wells may be shown on each worksheet.

2 DWR WELL REGISTRATION NO.						3 Depth to Static Water Level (Designated Providers Only)			4 Ground-water Pumped	RECOVERED WATER PUMPED				PUMPED WATER RECEIVED IN EXCHANGE				13 Total Pumped
10 Q	40 Q	160 Q	LOCATION SEC	TWN	RNG	Date # 1 / Date # 2	Msmt # 1 / Msmt # 2	Well Running? (Y/N)		5 CAP	6 SW	7 EFF/ IN	8 EFF/ OUT	9 GW	10 CAP	11 SW	12 EFF	
55-616606 #7						4/04	126	N										
NE	NE	SW	22	5.0S	8.0E	10/04	109	N	135.11									135.11
55-616607						NOT IN SERVICE												
NW	SE	NW	15	5.0S	8.0E													
55-616608 #9						4/04	185	N										
NE	SW	NW	10	5.0S	8.0E	10/04	217	N	647.53									647.53
55-616609 #10						4/04	181	N										
NE	SW	NW	10	5.0S	8.0E	10/04	196	N	739.62									739.62
55-616686 + 616687						4/04	255	N										
SW	SE	SW	17	5.0S	9.0E	10/04	242	N	78.65									78.65
55-616687						INCLUDED IN 55-616686												
SW	SE	SW	17	5.0S	7.0E													
14 TOTAL GROUNDWATER WITHDRAWN (acre-feet)									1600.91									

ENTER TOTAL ACRE-FEET OF GROUNDWATER WITHDRAWN IN PART I OF THE SUMMARY PAGE.

ARIZONA DEPARTMENT OF WATER RESOURCES
2004 ANNUAL USE WATER REPORT
SCHEDULE F-1
LARGE WATER PROVIDER

RIGHT NUMBER: 56-001308.0000
PROVIDER NAME: AWC - COOLIDGE
CONTACT PERSON: Richard Henderson
PHONE NUMBER: 602-240-6860

Pursuant to Section 5-114 of theThird Mangement Plan (TMP) for the Pinal Active Management Area, large municipal water providers (those serving more than 250 AF/year) are required to supply the following information.
Please contact the Pinal AMA at 520-836-4857 if asssistance is needed.

PART 1 - DELIVERIES TO USER GROUPS

a) Deliveries to fire uses, individual multifamily units, mobile homes in mobile home parks and construction uses do not have to be individually metered. All other uses must be metered (Section 5-114, TMP, Pinal AMA). Please indicate the quantity of water delivered monthly to each of the following user groups for calendar year 2003. Do not include effluent deliveries in this table.

MONTH	DELIVERIES IN ACRE-FEET (AF)								
	RESIDENTIAL		NON-RESIDENTIAL						
	Single Family	Multi Family	Comm'l	Indust	Gov't	Const./ Other	Turf Facilities	TOTAL	Agric. Irrig.
Jan-04	57.63	14.84	14.43	0.45	0.00	1.59	0.98	89.92	0.00
Feb-04	49.52	13.81	18.32	0.20	0.00	2.07	1.45	85.37	0.00
Mar-04	47.51	11.89	18.22	0.15	0.00	0.42	1.76	79.95	0.00
Apr-04	71.31	15.19	19.10	0.27	0.00	1.02	2.07	108.96	0.00
May-04	85.42	17.28	20.33	0.34	0.00	2.52	2.53	128.42	0.00
Jun-04	95.08	19.55	22.69	0.48	0.00	0.94	4.04	142.78	0.00
Jul-04	109.32	22.66	26.57	0.46	0.00	3.41	7.55	169.97	0.00
Aug-04	89.74	19.61	24.76	0.32	0.00	2.83	11.05	148.31	0.00
Sep-04	83.90	19.18	29.16	0.32	0.00	6.27	12.09	150.92	0.00
Oct-04	80.75	16.58	25.51	0.44	0.00	7.95	6.05	137.28	0.00
Nov-04	61.68	12.46	17.57	0.47	0.00	3.79	1.29	97.26	0.00
Dec-04	52.70	11.07	17.53	0.56	0.00	2.02	3.71	87.59	0.00
TOTAL	**884.56**	**194.12**	**254.19**	**4.46**	**0.00**	**34.83**	**54.59**	**1,426.75**	**0.00**

b) Total effluent deliveries (not included in per-capita or lost water calculations): **0.00 AF**
c) Total deliveries, excluding effluent deliveries (from shaded box above): **1,426.75 AF**

2002 Schedule F-1, Page 2
Right Number:
Provider Name:

PART 2 - LOST AND UNACCOUNTED FOR WATER

Lost and unaccounted for water is calculated by subtracting total deliveries from total water used. Effluent and deliveries to irrigation rights or other service area rights should not be included in the calculation.

a) Total quantity used (*Part V of the Annual Report Summary Page MINUS EFFLUENT*): 1600.91 acre-feet

b) Total metered and unmetered (estimated) deliveries (*Part 1c above*) 1426.75 acre-feet

c) Lost and unaccounted for water (*subtract Part 2b from 2a above*): 174.16 acre-feet

d) Percent of lost and unaccounted for water:

174.16 AF / 1600.91 AF x 100 = 10.88 Percent

lost and unaccounted for water (Part 2c) — total used (Part 2a)

PART 3 - HOUSING UNITS SERVED

A housing unit means a group of rooms or a single room occupied as separate living quarters. Housing unit includes a single family home, a patio home, a townhouse, a condominium, an apartment, a permanently setup mobile home or a unit in a multifamily complex. Housing unit does not include a mobile home in an overnight or limited-stay mobile home park or a unit in a campground, motel, hotel, or other temporary lodging facility.

a) A Single family housing unit means a detached dwelling, including permanently setup mobile homes not in mobile home parks.

Indicate net change in single family housing units *(not service connections)* in your service area between July 1, 2003 and July 1, 2004: +66 units

b) A multifamily housing unit means a mobile home in a mobile home park and any permanent housing unit having one or more common walls with another housing unit located in a multifamily residential structure, and includes a unit in a duplex, triplex, fourplex, condominium development , townhome development or apartment complex.

Indicate net change in multifamily housing units *(not service connections)* in your service area between July 1, 2003 and July 1, 2004: <3> units

c) Group quarters means living quarters occupied by one or more people under care or custody, such as orphanages, nursing homes and prisons, or quarters such as college dormitories, fraternity or sorority houses, nurses dormitories, rooming houses, hotels with permanent residents and congregate housing for the elderly.

Indicate net change in group quarters in your service area between July 1, 2003 and July 1, 2004: Ø units

EXHIBIT
WWC-60
Admitted

ARIZONA WATER COMPANY's
Responses to
WOODRUFF WATER COMPANY'S AND WOODRUFF UTILITY COMPANY'S
FOURTH SET OF DATA REQUESTS
(DOCKET NOS. W-04264A-04-0438; SW-04265A-04-0439;W-01445A-04-0755)
June 16, 2005

Q. 4-1 In Woodruff Water Company's and Woodruff Utility Company's (collectively, "Woodruff") Data Request Q.3-1 to Arizona Water Company, Woodruff requested information regarding the "wells near Sandia" referred to on page 5 of the Arizona Water Company March 23, 2005 objections to Staff's March 3, 2005 Report. In its response to Q.3-1, Arizona Water Company referred to "proposed wells that will be drilled to serve the Master Planned Communities along the west boundary of Coolidge" as depicted on the exhibit identified as "Response to Woodruff 3-9, Pinal Valley Water System Master Plan. Arizona Water Company further states in its response that three of the wells will be drilled in 2005.

(A) Please identify which three wells depicted on the Pinal Valley Water System Master Plan (Exhibit 3-9) will be drilled in 2005.

(B) Please describe the current status of construction of the three wells that will be drilled in 2005.

(i) If construction of the three wells has not commenced, please state when construction of each of the three wells will commence and when construction of each of the three wells will be completed.

(C) Has Arizona Water Company, or any contractor or agent of Arizona Water Company, prepared a written analysis, assessment, report or study regarding any one or all of the three wells (including the groundwater underlying the three wells) to be drilled in 2005?

(i) If the answer to this subpart "C" is yes, please provide a copy of the analysis, assessment, report or study.

(D) Has Arizona Water Company, or any contractor or agent of Arizona Water Company, prepared a written analysis, assessment, report or study regarding any of the proposed wells (including the groundwater underlying the proposed wells) depicted on the Pinal Valley Water System Master Plan (Exhibit 3-9)?

(i) If the answer to this subpart "D" is yes, please provide a copy of the analysis, assessment, report or study.

WWC60

COPY

Response to Q. 4-1

(A) The three wells are identified as 1, 2 & 3 on the Pinal Valley Water System Master Plan ("Master Plan"), attached hereto.

(B) Wells 1 & 3 are out to bid. The developer will drill Well 2. All three wells are to be completed by the end of 2005.

(C) Yes. Please see Attachment 1 hereto.

(D) Yes. Please see Attachment 1 hereto (letters on Attachment 1 correspond to well letters on Master Plan).

Responder(s): Whitehead

Q. 4-2 In its response to Woodruff's Data Request Q.3-14, Arizona Water Company stated, "wells that will serve the contested CC&N Service Area do not require arsenic treatment."

(A) Please explain the basis for Arizona Water Company's conclusion that the wells that will serve the contested CC&N Service Area do not require arsenic treatment.

(B) Has Arizona Water Company or its contractor or agent performed any tests, analyses or studies to determine arsenic levels in the vicinity of the wells that will serve the contested CC&N Area?

(i) If the answer to this subpart "B" is yes, please provide a copy of any written reports or written results of such tests, analyses and/or studies.

(ii) If the answer to this subpart "B" is yes, please state when the tests, analyses and/or studies were performed and who performed them.

COPY

Response to Q. 4-2

(A) The wells that will initially serve the contested CC&N Service area are six existing wells which do not require arsenic treatment as the water quality of each well meets today's and the 2006 arsenic standard. These six wells are identified as A, B, C, D, E, and F on the Master Plan.

(B) Yes.

(i) Please see Attachment 1 hereto.

(ii) Please see Attachment 1 hereto.

Responder(s): Whitehead

COPY

ATTACHMENT I

LEGEND Technical Services, Inc.
www.legend-group.com

17631 North 25th Avenue • Phoenix, AZ • 85023
(602) 324-6100 • F (602) 324-6161 • ADHS# AZ0004

4837 East 6th St., Ste 103 • Tucson, AZ • 85711
(520) 327-1234 • F (520) 327-0518 • ADHS# AZ0004

Arizona Water Company
448 West Central Avenue
P.O. Box 1558
Coolidge, AZ 85228
Attn: Coolidge/11014 Jerry Dexel

Received: 12/02/04
Reported: 0/00/00
Invoice No: 000000

Project Name: Special Samples

Matrix: Drinking Water
Sample No: 0412-14041-001 C
Sample ID: Bechtel #1 (Special)
Time Sampled: 14:00
Date Sampled: 12/01/2004

PARAMETER	METHOD	RESULTS	UNITS	PQL	DATE ANALYZED
Nitrogen as Nitrite	SM4500NO2B	<0.1	mg/L	0.1	12/02/04
Nitrogen as Nitrate	CALC.	8.8	mg/L	0.1	12/06/04
Nitrate plus Nitrite	SM 4500-NO3 F	8.8 M2	mg/L	0.1	12/03/04
Fluoride	SM 4500-FC	1.8	mg/L	0.1	12/06/04
Total Dissolved Solids	SM 2540C	913.	mg/L		12/06/04
Arsenic	EPA 200.9	0.006	mg/L	0.002	12/09/04
Sulfate	EPA 300.0	456.	mg/L	50	12/09/04

M1 = Matrix spike recovery was high. The method control sample recovery was acceptable.
M2 = Matrix spike recovery was low. The method control sample recovery was acceptable.

Matrix: Water
Sample No: 0412-14041-002 B
Sample ID: Bechtel #2 (Special)
Time Sampled: 14:10
Date Sampled: 12/01/2004

Nitrogen as Nitrite	SM4500NO2B	<0.1	mg/L	0.1	12/02/04
Nitrogen as Nitrate	CALC.	7.6	mg/L	0.1	12/06/04
Nitrate plus Nitrite	SM 4500-NO3 F	7.6	mg/L	0.1	12/03/04
Fluoride	SM 4500-FC	0.9	mg/L	0.1	12/06/04
Total Dissolved Solids	SM 2540C	1080.	mg/L		12/06/04
Sulfate	EPA 300.0	304.	mg/L	50	12/09/04
Arsenic	EPA 200.9	0.005	mg/L	0.002	12/09/04

Matrix: Water
Sample No: 0412-14041-003 A
Sample ID: Bechtel #3 (Special)
Time Sampled: 14:40
Date Sampled: 12/01/2004

Nitrogen as Nitrite	SM4500NO2B	<0.1	mg/L	0.1	12/02/04
Nitrogen as Nitrate	CALC.	7.7	mg/L	0.1	12/06/04
Nitrate plus Nitrite	SM 4500-NO3 F	7.7	mg/L	0.1	12/03/04

COPY

ATTACHMENT I

ARIZONA WATER CO
AZWaterCoolidge

LEGEND
Technical Services, Inc.
www.legend-group.com

17631 North 25th Avenue • Phoenix, AZ • 85023
(602) 324-6100 • F (602) 324-6101 • ADHS# AZ0004

4837 East 5th St., Ste 103 • Tucson, AZ • 85711
(520) 327-1234 • F (520) 327-0818 • ADHS# AZ0004

PARAMETER	METHOD	RESULTS	UNITS	PQL	DATE ANALYZED
Matrix: Water					
Sample No: 0412-14041-003		A (con't)		Time Sampled: 14:40	
Sample ID: Bechtel #3 (Special)				Date Sampled: 12/01/2004	
Fluoride	SM 4500-FC	1.4	mg/L	0.1	12/06/04
Total Dissolved Solids	SM 2540C	1250.	mg/L		12/06/04
Sulfate	EPA 300.0	291.	mg/L	50	12/15/04
Arsenic	EPA 200.8	0.005	mg/L	0.002	12/09/04

Authorized Signatory

COPY

ATTACHMENT I

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

DRINKING WATER INORGANIC CHEMICAL ANALYSIS REPORT

*** SAMPLES TO BE TAKEN AT P.O.E. ONLY***

>>>> PUBLIC WATER SYSTEM INFORMATION <<<< SENT TO DIV. 4-8-03

>>>> TO BE FILLED OUT BY SYSTEM PERSONNEL <<<< SENT TO DEQ 4-8-03

POSTED JAN 20 '04

11-014 — System ID

Arizona Water Company -Coolidge — System Name

03/24/2003 — Sample date

09:30 (24 hr clock) — Sample time

D and E

Jerry Dexel — Owner / Contact Person Name

520-723-3081 — Owner / Contact Fax Number

520-723-5346 — Owner / Contact Person Phone Number

SAMPLE TYPE

☒ Compliance Monitoring

SAMPLE COLLECTION POINT/ID

☒ Point of Entry# 002

11014 (POE 002)

SAMPLE SITE ID

FOR MCL EXCEEDANCE OR COMPOSITE TRIGGER

Original Violating Specimen Number

SAMPLE TYPE

☐ CONFIRMATION

☐ CONFIRMATION FOR COMPOSITE TRIGGER

*** INORGANIC CHEMICAL ANALYSIS ***

To be filled out by laboratory personnel

Analysis Method	MCL Value	Trigger Value	Contaminant Name	Cont. Code	Test Start Date/Time	Analysis Run Date/Time	Results *	Exceeds MCL	Exceeds Trigger
	0.05		Arsenic	1005				☐	
	2		Barium	1010				☐	
	0.005		Cadmium	1015				☐	
	0.1		Chromium	1020				☐	
	4.0		Fluoride	1025				☐	
	0.002		Mercury	1035				☐	
CALC.	10	5	Nitrate (as N)	1040	03/25/2003 16:00	03/25/2003 16:00	4.7	☐	☐
SM4500NO2B	1	0.5	Nitrite (as N)	1041	03/25/2003 16:00	03/25/2003 16:00	≤0.1	☐	☐
	0.05		Selenium	1045				☐	
	0.006		Antimony	1074				☐	
	0.004		Beryllium	1075				☐	
	0.2		Cyanide (as free cyanide)	1024				☐	
	0.1		Nickel	1036				☐	
	0.002		Thallium	1085				☐	
	No MCL		Sulfate	1055				☐	
	No MCL		Sodium	1052				☐	

15
150
15
1500
750
2250

2250
9000

D & E
660 TDS

F
1040 TDS

0303025790011

SPECIMEN NUMBER

>>>>> **LABORATORY INFORMATION** <<<<<

To be filled out by laboratory personnel

ID Number AZ0004 Name: Legend Technical Services of Arizona

Comments:

Authorized Signature: Dawn R Crawford

Date Public Water System Notified:

* All units must be reported in milligrams per liter.

RECEIVED APR 07 2003 ARIZONA WATER COMPANY PHOENIX - OPERATIONS

COPY

ATTACHMENT I

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

DRINKING WATER INORGANIC CHEMICAL ANALYSIS REPORT

SAMPLES TO BE TAKEN AT P.O.E ONLY

>>>>PUBLIC WATER SYSTEM INFORMATION<<<<

>>>> TO BE FILLED OUT BY SYSTEM PERSONNEL <<<<

SENT TO DIV. 5-20-03
SENT TO DEQ 5-20-03
POSTED JAN 20 04

[11-014] System ID

AZ WATER CO-COOLIDGE - Annual — System Name

[03/26/03] Sample date

[7:35] (24 hr clock) Sample time

Richard A. Schaar, Sr Serviceman — Owner/Contact Person Name

Owner/Contact Fax Number

928-240-6860 — Owner/Contact Person Phone Number

D

2nd

E

SAMPLE TYPE

[X] Compliance Monitoring

SAMPLE COLLECTION POINT/ID

[X] Point of Entry# [002]

002 — SAMPLING SITE ID

FOR MCL EXCEEDANCE OR COMPOSITE TRIGGER

[ ]

Original Violating Specimen Number

SAMPLE TYPE

[ ] CONFIRMATION

[ ] CONFIRMATION FOR COMPOSITE TRIGGER

INORGANIC CHEMICAL ANALYSIS

>>> TO BE FILLED OUT BY THE LABORATORY PERSONNEL <<<

Analysis Method	MCL Value	Trigger Value	Contaminant Name	Cont. Code	Test Start Date/Time	Analysis Run Date/Time	Results*	Exceeds MCL	Exceeds Trigger
200.8	0.05		Arsenic	1005		04/02/03	0.0051		
200.8	2		Barium	1010		04/02/03	0.052		
200.8	0.005		Cadmium	1015		04/02/03	<0.0005		
200.8	0.1		Chromium	1020		04/02/03	<0.010		
SM4500F-C	4.0		Fluoride	1025		04/02/03	1.31		
245.2	0.002		Mercury	1035		04/02/03	<0.0002		
300.0	10	5	Nitrate (as N)	1040					
SM4500NO2B	1	0.5	Nitrite (as N)	1041	3/27/03 14:55	3/27/03 15:25	<0.01		
200.8	0.05		Selenium	1045		04/02/03	0.006		
200.8	0.006		Antimony	1074		04/02/03	<0.0030		
200.8	0.004		Beryllium	1075		04/02/03	<0.0005		
335.4	0.2		Cyanide (as free cyanide)	1024		04/02/03	<0.005		
200.8	0.1		Nickel	1036		04/02/03	<0.010		
200.8	0.002		Thallium	1085		04/02/03	<0.0010		
300	NO MCL		Sulfate	1055					
200.7	NO MCL		Sodium	1052		04/03/03	210		

>>>>LABORATORY INFORMATION<<<<

To be filled out by laboratory personnel

SPECIMEN NUMBER

[032703-02I]

ID Number [AZ 0/0/0/9] Name:[AQUA TECH ENVIRONMENTAL LABORATORIES, INC.

Comments: [Nitrite analyzed by Aqua Tech Environmental Laboratories of Tucson, AZ.]

[All others analyzed by Aqua Tech Environmental Laboratories of Marion, OH]

Authorized Signature:[R Mosher]

Date Public Water System Notified: [ ]

*All units must be reported in milligrams per liter (mg/l)

RECEIVED MAY 19 2003

MAP2003

COPY

ATTACHMENT I

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

DRINKING WATER INORGANIC CHEMICAL ANALYSIS REPORT

SAMPLES TO BE TAKEN AT P.O.E ONLY

>>>>PUBLIC WATER SYSTEM INFORMATION<<<<

>>>> TO BE FILLED OUT BY SYSTEM PERSONNEL <<<<

SENT TO DIV. 5-20-03
SENT TO DEQ 5-20-03
POSTED JAN 20 04 (01/20/04)

[11-014] System ID

AZ WATER CO-COOLIDGE - Annual — System Name

[03/26/03] Sample date

[7:14] (24 hr clock) Sample time

Richard A. Schaar, Sr Serviceman — Owner/Contact Person Name

F

Owner/Contact Fax Number

928-240-6860 — Owner/Contact Person Phone Number

SAMPLE TYPE

[X] Compliance Monitoring

SAMPLE COLLECTION POINT/ID

[X] Point of Entry# [001]

001 — SAMPLING SITE ID

FOR MCL EXCEEDANCE OR COMPOSITE TRIGGER

[ ]

Original Violating Specimen Number

SAMPLE TYPE

[ ] CONFIRMATION

[ ] CONFIRMATION FOR COMPOSITE TRIGGER

INORGANIC CHEMICAL ANALYSIS

>>> TO BE FILLED OUT BY THE LABORATORY PERSONNEL <<<

Analysis Method	MCL Value	Trigger Value	Contaminant Name	Cont. Code	Test Start Date/Time	Analysis Run Date/Time	Results*	Exceeds MCL	Exceeds Trigger
200.8	0.05		Arsenic	1005		04/02/03	0.0054		
200.8	2		Barium	1010		04/02/03	0.068		
200.8	0.005		Cadmium	1015		04/02/03	<0.0005		
200.8	0.1		Chromium	1020		04/02/03	<0.010		
SM4500F-C	4.0		Fluoride	1025		04/02/03	0.80		
245.2	0.002		Mercury	1035		04/02/03	<0.0002		
300.0	10	5	Nitrate (as N)	1040					
SM4500NO2B	1	0.5	Nitrite (as N)	1041	3/27/03 14:55	3/27/03 15:25	<0.01		
200.8	0.05		Selenium	1045		04/02/03	0.0073		
200.8	0.006		Antimony	1074		04/02/03	<0.0030		
200.8	0.004		Beryllium	1075		04/02/03	<0.0005		
335.4	0.2		Cyanide (as free cyanide)	1024		04/02/03	<0.005		
200.8	0.1		Nickel	1036		04/02/03	<0.010		
200.8	0.002		Thallium	1085		04/02/03	<0.0010		
300	NO MCL		Sulfate	1055					
200.7	NO MCL		Sodium	1052		04/03/03	240		

>>>>LABORATORY INFORMATION<<<<

To be filled out by laboratory personnel

SPECIMEN NUMBER

[032703-01I]

ID Number [AZ 0/0/0/9] Name:[AQUA TECH ENVIRONMENTAL LABORATORIES, INC.]

Comments: [Nitrite analyzed by Aqua Tech Environmental Laboratories of Tucson, AZ.]

[All others analyzed by Aqua Tech Environmental Laboratories of Marion, OH]

Authorized Signature:[R Mosher]

Date Public Water System Notified: [ ]

*All units must be reported in milligrams per liter (mg/l)

RECEIVED MAY 19 2003

MAP2003

COPY

ATTACHMENT I

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

DRINKING WATER INORGANIC CHEMICAL ANALYSIS REPORT

*** SAMPLES TO BE TAKEN AT P.O.E. ONLY***

>>>> PUBLIC WATER SYSTEM INFORMATION <<<<

>>>> TO BE FILLED OUT BY SYSTEM PERSONNEL <<<<

RECEIVED SEP - 8 2003 ARIZONA WATER COMPANY PHOENIX OPERATIONS

11-014 — System ID

Arizona Water Company(Coolidge) — System Name

08/18/2003 — Sample date

12:15 (24 hr clock) — Sample time

Jerry Dexel — Owner / Contact Person Name

F

520-723-3081 — Owner / Contact Fax Number

520-723-5346 — Owner / Contact Person Phone Number

SAMPLE TYPE

☒ Compliance Monitoring

SAMPLE COLLECTION POINT/ID

☒ Point of Entry# 001

Point of Entry 001

SAMPLE SITE ID

FOR MCL EXCEEDANCE OR COMPOSITE TRIGGER

Original Violating Specimen Number

SAMPLE TYPE

☐ CONFIRMATION

☐ CONFIRMATION FOR COMPOSITE TRIGGER

*** INORGANIC CHEMICAL ANALYSIS ***

To be filled out by laboratory personnel

Analysis Method	MCL Value	Trigger Value	Contaminant Name	Cont. Code	Test Start Date/Time	Analysis Run Date/Time	Results *	Exceeds MCL	Exceeds Trigger
	0.05		Arsenic	1005				☐	
	2		Barium	1010				☐	
	0.005		Cadmium	1015				☐	
	0.1		Chromium	1020				☐	
	4.0		Fluoride	1025				☐	
	0.002		Mercury	1035				☐	
CALC.	10	5	Nitrate (as N)	1040	08/19/2003 16:00	08/19/2003 16:00	7.5	☐	☒
SM4500NO2B	1	0.5	Nitrite (as N)	1041	08/19/2003 16:00	08/19/2003 16:00	<0.1	☐	☐
	0.05		Selenium	1045				☐	
	0.006		Antimony	1074				☐	
	0.004		Beryllium	1075				☐	
	0.2		Cyanide (as free cyanide)	1024				☐	
	0.1		Nickel	1036				☐	
	0.002		Thallium	1085				☐	
	No MCL		Sulfate	1055				☐	
	No MCL		Sodium	1052				☐	

>>>>> **LABORATORY INFORMATION** <<<<<

To be filled out by laboratory personnel

030807693002I

SPECIMEN NUMBER

ID Number AZ0004 Name: Legend Technical Services of Arizona

Comments:

Authorized Signature: Karen Maxwell

Date Public Water System Notified:

* All units must be reported in milligrams per liter.

COPY

WWC-80

EXHIBIT
WWC-80
Admitted

Mickey McHugh
Fire Chief
Station: 103 W. Pinkley Ave.
Mail: 130 W. Central Ave.
Coolidge, Arizona 85228
(520) 723-5311

July 21,2005

Michael Whitehead, Arizona Water Company
Karl Polen, Woodruff Water Company

Gentlemen,
I have been advised that both Arizona Water Company and Woodruff Water Company have applied for the Certificate of Convenience and Necessity for the water system that will service the Sandia Project by Pivotal to be located in Coolidge.

This letter will serve as notice that the City of Coolidge has adopted the 2000 Edition of the International Fire Code and that all requirements of the 2000 IFC, such as fire flows, fire hydrant spacing, etc. shall apply to the water system provider for the Sandia Project.

If you have any questions please feel free to call me at (520) 723-5361

Sincerely,

Mickey McHugh
Fire Chief

xc: Robert Flatley, City Manager
Troy Bontrager, Wood Patel

SMOKE DETECTORS SAVE LIVES

RECEIVED
JUL 26 2005
Arizona Water Company
Plan - Engineering

The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: 1000 GPM
2. Minimum required fire flow duration: 2 HOURS

(Public Fire Protection Agency)

By: [illegible]

Title: FIRE CHIEF

Date: 6-9-04

j. The developer must specify, in writing, the date on which the Company will be required to put the project out to bid. Any requirements regarding time constraints, construction completion deadlines, etc., must be noted in the request to bid so that they may be specified in the bid documents. All necessary approvals from regulatory agencies having jurisdiction over project construction must be received prior to bidding. Please note that the estimated time required from the initial invitation to bid to the start of construction can be eight (8) weeks, or longer. This time is dependent on, but not limited to, material procurement, highway permits, contractor mobilization, etc. An option is available to the developer to make payment for materials in advance of construction. If the developer desires to add qualified contractors to Company's bid list for obtaining labor bids for the project, the developer must so inform the Company prior to the date the project is put out to bid and any such contractors must meet the due date of the bid.

k. If this project includes 2" or larger meters or private fire service taps, those services will begin to be billed for monthly service charges immediately after installation. It is the responsibility of the developer or his agent to contact the local office to provide the information needed for monthly billing.

l. The Company will request, in conjunction with providing water service to this proposed project, the Irrigation and Type 1 Non-Irrigation Grandfathered Rights appurtenant to the property to be transferred to the Company.

Indicate in the space provided whether the property that is being proposed for project has appurtenant Irrigation or Type 1 Non-Irrigation Grandfathered Rights:

☐ Yes ☐ No

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, ARIZONA 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6878 • WWW.AZWATER.COM

February 10, 2005

Mr. Terry Lewis
Coe & Van Loo
4550 N. 12th Street
Phoenix, AZ 85014

Re: Preliminary Water Plan

Dear Mr. Lewis:

Enclosed is a copy of your Preliminary Water Plan for Heartland Unit II located in Coolidge, with the required changes and comments of Arizona Water Company (the "Company") shown in red.

Please use this letter to guide you in your preparation of the Formal Water Plan. When the plan is completed, please send us one mylar/vellum or the original and one recorded subdivision plat and drawing indicating the location of all other utilities (gas, electric, telephone, cable television, sewer, etc.) as well as paving and profile.

We will then review your plans and, if everything meets with our approval, we will sign the sepia or the original and return it to you for submittal to the plan review section of the appropriate state and/or county health department with a signed *Application for Approval to Construct* and *Water Service Agreement.*

The following items should be understood by the developer:

a. The Formal Water Plan is to be prepared by the developer's consulting engineer following the Company's Design Policy and System Planning criteria (copy attached).

b. The plans and *Application for Approval to Construct* must **both** be approved and signed by the Company prior to submittal to the state and/or county health department.

c. The Company will not participate in the cost of any facilities required for extending service to a new project.

d. Any reports to the Arizona Department of Water Resources ("ADWR"), Real Estate Department, etc., are the responsibility of the developer and/or his agent.

e. Prior to bidding, roads must be prepared to rough grade and waterline locations surveyed and staked by the developer so that the actual waterline locations correspond with the water plan.

f. The funds for the water system addition including any off-site improvements that may be required will be advanced by the developer prior to construction. **The bidding, contracting, installation and inspection will be performed by the Company**.

g. The developer must obtain a Certificate of Assured Water Supply for the project and furnish a copy of it to the Company before the Company will sign a contract for installation of the water system. If the project is located in an area outside an active management area established by the Arizona Groundwater Code, the developer must submit plans for the water supply for the project and demonstrate the adequacy thereof to the ADWR. The developer must submit a copy of the report received from the ADWR on the developer's plan.

h. The ADWR has adopted its Third Management Plan which establishes mandatory conservation programs. These conservation programs require that all projects must report the size of "turf-related facilities" associated with the proposed project. ("Turf-related watering" means the application of water from any source to grow landscaping plants on the grounds of the turf-related facility and the use of water from any source to fill or refill any bodies of water, including lakes, ponds or lagoons, that are an integral part of the landscaped area of a turf-related facility. Bodies of water used primarily for swimming purposes are not an integral part of the landscaped area of a turf-related facility.) Indicate in the space provided the total area of this proposed project that will be developed as "turf-related facilities."

Total turf-related facilities: 49.1 acre(s)

All turf-related facilities ten (10) acres or larger in size must be metered separately pursuant to the provisions of the Second Management Plan.

Projected annual water usage: _____ acre feet (non-residential)

i. When the project involves fire hydrants, the legally recognized public fire protection agency that has the responsibility for fire protection will determine the number and location of the fire hydrants, the minimum required fire flow rate (gpm) and flow duration (hours).
The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: 1000 GPM
2. Minimum required fire flow duration: 2 HOURS

_____
(Public Fire Protection Agency)

By: [signature]

Title: FIRE CHIEF

Date: 3-9-05

j. The developer must specify, in writing, the date on which the Company will be required to put the project out to bid. Any requirements regarding time constraints, construction completion deadlines, etc., must be noted in the request to bid so that they may be specified in the bid documents. All necessary approvals from regulatory agencies having jurisdiction over project construction must be received prior to bidding. Please note that the estimated time required from the initial invitation to bid to the start of construction can be eight (8) weeks, or longer. This time is dependent on, but not limited to, material procurement, highway permits, contractor mobilization, etc. An option is available to the developer to make payment for materials in advance of construction. If the developer desires to add qualified contractors to Company's bid list for obtaining labor bids for the project, the developer must so inform the Company prior to the date the project is put out to bid and any such contractors must meet the due date of the bid.

k. If this project includes 2" or larger meters or private fire service taps, those services will begin to be billed for monthly service charges immediately after installation. It is the responsibility of the developer or his agent to contact the local office to provide the information needed for monthly billing.

l. The Company will request, in conjunction with providing water service to this proposed project, the Irrigation and Type 1 Non-Irrigation Grandfathered Rights appurtenant to the property to be transferred to the Company.

Indicate in the space provided whether the property that is being proposed for project has appurtenant Irrigation or Type 1 Non-Irrigation Grandfathered Rights:

☐ Yes ☒ No

Please provide the information requested and sign this document where indicated, retain a copy, and return the original to the Company. **This project will not be approved until the Company receives this signed document.**

Very truly yours,

Mike Loggins
engineering@azwater.com

kd
Enclosures
c: Jerry Dexel - CL

~~Developer~~ CONSTRUCTION MANAGER

By: _____

Title: MANAGER

Date: 3-8-05

October 3, 2003

Mr. John Fox
PF&E Consultants, L.L.C.
428 E. THunderbird Road, #234
Phoenix, Arizona 85022

Re: Preliminary Water Plan

Dear Mr. Fox:

Enclosed is a copy of your Preliminary Water Plan for Sundance Unit II & III located in Coolidge with the required changes and comments of Arizona Water Company (the "Company") shown in red.

Please use this letter to guide you in your preparation of the Formal Water Plan. When the plan is completed, please send us one mylar/vellum or the original and one recorded subdivision plat and drawing indicating the location of all other utilities (gas, electric, telephone, cable television, sewer, etc.) *as well as paving and profile.*

We will then review your plans and, if everything meets with our approval, we will sign the sepia or the original and return it to you for submittal to the plan review section of the appropriate state and/or county health department with a signed *Application for Approval to Construct* and *Water Service Agreement.*

The following items should be understood by the developer:

a. The Formal Water Plan is to be prepared by the developer's consulting engineer following the Company's Design Policy and System Planning criteria (copy attached).

b. The plans and *Application for Approval to Construct* must **both** be approved and signed by the Company prior to submittal to the state and/or county health department.

c. The Company will not participate in the cost of any facilities required for extending service to a new project.

d. Any reports to the Arizona Department of Water Resources ("ADWR"), Real Estate Department, etc., are the responsibility of the developer and/or his agent.

✓ e. Prior to bidding, roads must be prepared to rough grade and waterline locations surveyed and staked by the developer so that the actual waterline locations correspond with the water plan.

f. The funds for the water system addition including any off-site improvements that may be required will be advanced by the developer prior to construction. **The bidding, contracting, installation and inspection will be performed by the Company.**

FILE COPY

ARIZONA WATER COMPANY

PF&E Consultants, L.L.C.
Sundance Unit II & III

October 3, 2003
Page 2

g. The developer must obtain a Certificate of Assured Water Supply for the project and furnish a copy of it to the Company before the Company will sign a contract for installation of the water system. If the project is located in an area outside an active management area established by the Arizona Groundwater Code, the developer must submit plans for the water supply for the project and demonstrate the adequacy thereof to the ADWR. The developer must submit a copy of the report received from the ADWR on the developer's plan.

h. The ADWR has adopted its Second Management Plan which establishes mandatory conservation programs. These conservation programs require that all projects must report the size of "turf-related facilities" associated with the proposed project. ("Turf-related watering" means the application of water from any source to grow landscaping plants on the grounds of the turf-related facility and the use of water from any source to fill or refill any bodies of water, including lakes, ponds or lagoons, that are an integral part of the landscaped area of a turf-related facility. Bodies of water used primarily for swimming purposes are not an integral part of the landscaped area of a turf-related facility.) Indicate in the space provided the total area of this proposed project that will be developed as "turf-related facilities."

Total turf-related facilities: -0- acre(s)

All turf-related facilities ten (10) acres or larger in size must be metered separately pursuant to the provisions of the Second Management Plan.

Projected annual water usage: -0- acre feet (non-residential)

i. When the project involves fire hydrants, the legally recognized public fire protection agency that has the responsibility for fire protection will determine the number and location of the fire hydrants, the minimum required fire flow rate (gpm) and flow duration (hours). The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: 1000 GPM
2. Minimum required fire flow duration: 2 HOURS

COOLIDGE F.D.
(Public Fire Protection Agency)

By: [signature]

Title: FIRE CHIEF

Date: 2-9-04

ARIZONA WATER COMPANY

PF&E Consultants, L.L.C.
Sundance Unit II & III

October 3, 2003
Page 3

j. The developer must specify, in writing, the date on which the Company will be required to put the project out to bid. Any requirements regarding time constraints, construction completion deadlines, etc., must be noted in the request to bid so that they may be specified in the bid documents. All necessary approvals from regulatory agencies having jurisdiction over project construction must be received prior to bidding. Please note that the estimated time required from the initial invitation to bid to the start of construction can be eight (8) weeks, or longer. This time is dependent on, but not limited to, material procurement, highway permits, contractor mobilization, etc. An option is available to the developer to make payment for materials in advance of construction. If the developer desires to add qualified contractors to Company's bid list for obtaining labor bids for the project, the developer must so inform the Company prior to the date the project is put out to bid and any such contractors must meet the due date of the bid.

k. If this project includes 2" or larger meters or private fire service taps, those services will begin to be billed for monthly service charges immediately after installation. It is the responsibility of the developer or his agent to contact the local office to provide the information needed for monthly billing.

l. The Company will request, in conjunction with providing water service to this proposed project, the Irrigation and Type 1 Non-Irrigation Grandfathered Rights appurtenant to the property to be transferred to the Company.

Indicate in the space provided whether the property that is being proposed for project has appurtenant Irrigation or Type 1 Non-Irrigation Grandfathered Rights:

☐ Yes ☐ No

Please provide the information requested and sign this document where indicated, retain a copy, and return the original to the Company. **This project will not be approved until the Company receives this signed document.**

Very truly yours,

JW

James T. Wilson
Engineer
engineering@azwater.com

ala
Enclosure
ec: Engineering Staff
Jerry Dexel - CL

Sun Craft Dev. Inc.
Developer

By: [signature]

Title: President

Date: 2/9/04

ARIZONA WATER COMPANY

E-6-1

DESIGN POLICY AND SYSTEM PLANNING CRITERIA FOR WATER DISTRIBUTION SYSTEMS

The following guidelines will be used for main extensions or new subdivisions (the "addition(s)") that will be connected to and served from Arizona Water Company's existing water distribution systems:

A. Whenever possible, water mains shall be looped or of circulating configuration.

B. The proposed additions shall be designed, and constructed, to maintain a minimum pressure of 20 p.s.i. at all points in the existing water distribution system and the addition under normal conditions of flow whenever possible and practical.

C. The water distribution system design shall satisfy both of the following design criteria:

1. The water distribution system design for the new addition shall use the peak domestic demand[1] of the system expressed in gallons per minute. For the purpose of water distribution system design and analysis, the peak domestic demand shall be distributed evenly throughout the water system, unless more accurate information is available concerning the actual distribution of water system demand.

2. When the proposed addition is to serve fire flows from the existing distribution system, the water system design will use system demands computed by adding the minimum required fire flows expressed in gallons per minute to the average peak domestic demand[2] of the system expressed in gallons per minute. For the purpose of water distribution design and analysis one fire hydrant will be designed to flow the minimum fire flow requirement within the addition. The analysis will also place the average peak domestic demand distributed evenly throughout the water system, unless more accurate information is available concerning the actual domestic demand distribution.

D. The required fire flows and fire flow duration relating to any new addition will be specified by the local fire authority and reported to the Company on the Company's Form E-3-5 prior to final design and Company approval of the addition.

E. Water storage shall be designed to meet peak domestic demands and fire protection where possible and practical. The water storage design shall be based upon a 24 hour system study, with peak domestic demands and fire flow storage requirements, with the assumption that the largest source of supply is removed from the analysis.

---

[1]Definition—peak domestic demand: This number shall be calculated using available water system peak production records. The peak demand shall be calculated by multiplying the peak daily production by 2.0. The peak per customer demand shall be calculated by dividing the peak demand by the current customer count and expressed as gallons per minute per customer. Where maximum daily production numbers are not available, the peak domestic demand shall be the peak domestic demand as indicated by ADEQ Engineering Bulletin No. 10.

[2]Definition—average peak domestic demand: The number shall be calculated by multiplying the peak domestic demand by 0.30 and expressed as gallons per minute per customer.

L-3510

g. The developer must obtain a Certificate of Assured Water Supply for the project and furnish a copy of it to the Company before the Company will sign a contract for installation of the water system. If the project is located in an area outside an active management area established by the Arizona Groundwater Code, the developer must submit plans for the water supply for the project and demonstrate the adequacy thereof to the ADWR. The developer must submit a copy of the report received from the ADWR on the developer's plan.

h. The ADWR has adopted its Second Management Plan which establishes mandatory conservation programs. These conservation programs require that all projects must report the size of "turf-related facilities" associated with the proposed project. ("Turf-related watering" means the application of water from any source to grow landscaping plants on the grounds of the turf-related facility and the use of water from any source to fill or refill any bodies of water, including lakes, ponds or lagoons, that are an integral part of the landscaped area of a turf-related facility. Bodies of water used primarily for swimming purposes are not an integral part of the landscaped area of a turf-related facility.) Indicate in the space provided the total area of this proposed project that will be developed as "turf-related facilities."

Total turf-related facilities: _____ acre(s)

All turf-related facilities ten (10) acres or larger in size must be metered separately pursuant to the provisions of the Second Management Plan.

Projected annual water usage: _____ acre feet (non-residential)

i. When the project involves fire hydrants, the legally recognized public fire protection agency that has the responsibility for fire protection will determine the number and location of the fire hydrants, the minimum required fire flow rate (gpm) and flow duration (hours). The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: FH1-1000,FH 2-700,FH 3-100 &FH 4-400 GPM
2. Minimum required fire flow duration: ____2_____ HOURS

____Coolidge Fire Department_____
(Public Fire Protection Agency)

**- Fire Hydrants are being installed on an existing water system. The original water system was not required to meet fire flow requirements. Coolidge Fire Department will accept the available-Existing flows and duration.

By: [signature]

Title: FIRE CHIEF

Date: 10-23-03

2-3728

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, ARIZONA 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6878

August 6, 2003

Mr. Larry Hansen, P.E., R.L.S.
Hansen Engineering
P.O. Box 235
Coolidge, AZ 85228

RECEIVED
AUG 19 2003
ARIZONA WATER COMPANY
PHOENIX - ENGINEERING

Re: Preliminary Water Plan

Dear Mr. Hansen:

Enclosed is a copy of your Preliminary Water Plan for Mark Brinton Water Line located in Coolidge, with the required changes and comments of Arizona Water Company (the "Company") shown in red.

Please use this letter to guide you in your preparation of the Formal Water Plan. When the plan is completed, please send us one mylar/vellum or the original and one recorded subdivision plat and drawing indicating the location of all other utilities (gas, electric, telephone, cable television, sewer, etc.) as well as paving and profile.

We will then review your plans and, if everything meets with our approval, we will sign the sepia or the original and return it to you for submittal to the plan review section of the appropriate state and/or county health department with a signed *Application for Approval to Construct* and *Water Service Agreement.*

The following items should be understood by the developer:

a. The Formal Water Plan is to be prepared by the developer's consulting engineer following the Company's Design Policy and System Planning criteria (copy attached).

b. The plans and *Application for Approval to Construct* must **both** be approved and signed by the Company prior to submittal to the state and/or county health department.

c. The Company will not participate in the cost of any facilities required for extending service to a new project.

d. Any reports to the Arizona Department of Water Resources ("ADWR"), Real Estate Department, etc., are the responsibility of the developer and/or his agent.

e. Prior to bidding, roads must be prepared to rough grade and waterline locations surveyed and staked by the developer so that the actual waterline locations correspond with the water plan.

f. The funds for the water system addition including any off-site improvements that may be required will be advanced by the developer prior to construction. **The bidding, contracting, installation and inspection will be performed by the Company**.

g. The developer must obtain a Certificate of Assured Water Supply for the project and furnish a copy of it to the Company before the Company will sign a contract for installation of the water system. If the project is located in an area outside an active management area established by the Arizona Groundwater Code, the developer must submit plans for the water supply for the project and demonstrate the adequacy thereof to the ADWR. The developer must submit a copy of the report received from the ADWR on the developer's plan.

h. The ADWR has adopted its Second Management Plan which establishes mandatory conservation programs. These conservation programs require that all projects must report the size of "turf-related facilities" associated with the proposed project. ("Turf-related watering" means the application of water from any source to grow landscaping plants on the grounds of the turf-related facility and the use of water from any source to fill or refill any bodies of water, including lakes, ponds or lagoons, that are an integral part of the landscaped area of a turf-related facility. Bodies of water used primarily for swimming purposes are not an integral part of the landscaped area of a turf-related facility.) Indicate in the space provided the total area of this proposed project that will be developed as "turf-related facilities."

Total turf-related facilities: _____ acre(s) N/A

All turf-related facilities ten (10) acres or larger in size must be metered separately pursuant to the provisions of the Second Management Plan.

Projected annual water usage: _____ acre feet (non-residential) N/A

i. When the project involves fire hydrants, the legally recognized public fire protection agency that has the responsibility for fire protection will determine the number and location of the fire hydrants, the minimum required fire flow rate (gpm) and flow duration (hours). The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: 500 GPM
2. Minimum required fire flow duration: 2 HOURS

COOLIDGE F.D.
(Public Fire Protection Agency)

By: [signature]

Title: FIRE CHIEF

Date: 8-15-03

j. The developer must specify, in writing, the date on which the Company will be required to put the project out to bid. Any requirements regarding time constraints, construction completion deadlines, etc., must be noted in the request to bid so that they may be specified in the bid documents. All necessary approvals from regulatory agencies having jurisdiction over project construction must be received prior to bidding. Please note that the estimated time required from the initial invitation to bid to the start of construction can be eight (8) weeks, or longer. This time is dependent on, but not limited to, material procurement, highway permits, contractor mobilization, etc. An option is available to the developer to make payment for materials in advance of construction. If the developer desires to add qualified contractors to Company's bid list for obtaining labor bids for the project, the developer must so inform the Company prior to the date the project is put out to bid and any such contractors must meet the due date of the bid.

k. If this project includes 2" or larger meters or private fire service taps, those services will begin to be billed for monthly service charges immediately after installation. It is the responsibility of the developer or his agent to contact the local office to provide the information needed for monthly billing.

l. The Company will request, in conjunction with providing water service to this proposed project, the Irrigation and Type 1 Non-Irrigation Grandfathered Rights appurtenant to the property to be transferred to the Company.

Indicate in the space provided whether the property that is being proposed for project has appurtenant Irrigation or Type 1 Non-Irrigation Grandfathered Rights:

☐ Yes ☐ No

Please provide the information requested and sign this document where indicated, retain a copy, and return the original to the Company. **This project will not be approved until the Company receives this signed document.**

Very truly yours,

Theresa Witmer

for James T. Wilson
Engineer
engineering@azwater.com

tmw

Mark D. Brinton
Developer

By: _____

Title: _____

Date: 8/14/03

2-3465

ARIZONA WATER COMPANY

3805 N. BLACK CANYON HIGHWAY, PHOENIX, ARIZONA 85015-5351 • P.O. BOX 29006, PHOENIX, ARIZONA 85038-9006
PHONE: (602) 240-6860 • FAX: (602) 240-6878

May 14, 2002

RECEIVED
MAY 20 2002
TRABUE, HANSEN & HINSHAW, INC.

Mr. Paul Hansen
Trabue, Hansen & Hinshaw, Inc.
1901 Pennsylvania Dr.
Columbia, MO 65702

Re: Preliminary Water Plan

Dear Mr. Hansen:

Enclosed is a copy of your Preliminary Water Plan for Cota Ranch located in Coolidge, with the required changes and comments of Arizona Water Company (the "Company") shown in red.

Please use this letter to guide you in your preparation of the Formal Water Plan. When the plan is completed, please send us one mylar/vellum or the original and one recorded subdivision plat and drawing indicating the location of all other utilities (gas, electric, telephone, cable television, sewer, etc.) as well as paving and profile.

We will then review your plans and, if everything meets with our approval, we will sign the sepia or the original and return it to you for submittal to the plan review section of the appropriate state and/or county health department with a signed *Application for Approval to Construct* and *Water Service Agreement.*

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a. The Formal Water Plan is to be prepared by the developer's consulting engineer following the Company's Design Policy and System Planning criteria (copy attached).

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c. The Company will not participate in the cost of any facilities required for extending service to a new project.

d. Any reports to the Arizona Department of Water Resources ("ADWR"), Real Estate Department, etc., are the responsibility of the developer and/or his agent.

e. Prior to bidding, roads must be prepared to rough grade and waterline locations surveyed and staked by the developer so that the actual waterline locations correspond with the water plan.

f. The funds for the water system addition including any off-site improvements that may be required will be advanced by the developer prior to construction. The bidding, contracting, installation and inspection will be performed by the Company.

g. The developer must obtain a Certificate of Assured Water Supply for the project and furnish a copy of it to the Company before the Company will sign a contract for installation of the water system. If the project is located in an area outside an active management area established by the Arizona Groundwater Code, the developer must submit plans for the water supply for the project and demonstrate the adequacy thereof to the ADWR. The developer must submit a copy of the report received from the ADWR on the developer's plan.

h. The ADWR has adopted its Second Management Plan which establishes mandatory conservation programs. These conservation programs require that all projects must report the size of "turf-related facilities" associated with the proposed project. ("Turf-related watering" means the application of water from any source to grow landscaping plants on the grounds of the turf-related facility and the use of water from any source to fill or refill any bodies of water, including lakes, ponds or lagoons, that are an integral part of the landscaped area of a turf-related facility. Bodies of water used primarily for swimming purposes are not an integral part of the landscaped area of a turf-related facility.) Indicate in the space provided the total area of this proposed project that will be developed as "turf-related facilities."

Total turf-related facilities: 1.5 acre(s)

All turf-related facilities ten (10) acres or larger in size must be metered separately pursuant to the provisions of the Second Management Plan.

Projected annual water usage: 2.3 acre feet (non-residential)

i. When the project involves fire hydrants, the legally recognized public fire protection agency that has the responsibility for fire protection will determine the number and location of the fire hydrants, <u>the minimum required fire flow rate (gpm) and flow duration (hours)</u>.

The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: 1000 GPM
2. Minimum required fire flow duration: 2 HOURS

(Public Fire Protection Agency)

By: [illegible]

Title: FIRE CHIEF

Date: 4-22-02

j. The developer must specify, in writing, the date on which the Company will be required to put the project out to bid. Any requirements regarding time constraints, construction completion deadlines, etc., must be noted in the request to bid so that they may be specified in the bid documents. All necessary approvals from regulatory agencies having jurisdiction over project construction must be received prior to bidding. Please note that the estimated time required from the initial invitation to bid to the start of construction can be eight (8) weeks, or longer. This time is dependent on, but not limited to, material procurement, highway permits, contractor mobilization, etc. An option is available to the developer to make payment for materials in advance of construction. If the developer desires to add qualified contractors to Company's bid list for obtaining labor bids for the project, the developer must so inform the Company prior to the date the project is put out to bid and any such contractors must meet the due date of the bid.

k. If this project includes 2" or larger meters or private fire service taps, those services will begin to be billed for monthly service charges immediately after installation. It is the responsibility of the developer or his agent to contact the local office to provide the information needed for monthly billing.

l. The Company will request, in conjunction with providing water service to this proposed project, the Irrigation and Type 1 Non-Irrigation Grandfathered Rights appurtenant to the property to be transferred to the Company.

Indicate in the space provided whether the property that is being proposed for project has appurtenant Irrigation or Type 1 Non-Irrigation Grandfathered Rights:

☐ Yes ☒ No

Please provide the information requested and sign this document where indicated, retain a copy, and return the original to the Company. **This project will not be approved until the Company receives this signed document.**

Very truly yours,

Mike Loggins

Mike Loggins
Engineer
engineering@azwater.com

tmw
Enclosures

Developer

By: ELOY COTA

Title: OWNER

Date: 4-22-02

DESIGN POLICY AND SYSTEM PLANNING CRITERIA FOR WATER DISTRIBUTION SYSTEMS

The following guidelines will be used for main extensions or new subdivisions (the "addition(s)") that will be connected to and served from Arizona Water Company's existing water distribution systems:

A. Whenever possible, water mains shall be looped or of circulating configuration.

B. The proposed additions shall be designed, and constructed, to maintain a minimum pressure of 20 p.s.i. at all points in the existing water distribution system and the addition under normal conditions of flow whenever possible and practical.

C. The water distribution system design shall satisfy both of the following design criteria:

1. The water distribution system design for the new addition shall use the peak domestic demand[1] of the system expressed in gallons per minute. For the purpose of water distribution system design and analysis, the peak domestic demand shall be distributed evenly throughout the water system, unless more accurate information is available concerning the actual distribution of water system demand.

2. When the proposed addition is to serve fire flows from the existing distribution system, the water system design will use system demands computed by adding the minimum required fire flows expressed in gallons per minute to the average peak domestic demand[2] of the system expressed in gallons per minute. For the purpose of water distribution design and analysis one fire hydrant will be designed to flow the minimum fire flow requirement within the addition. The analysis will also place the average peak domestic demand distributed evenly throughout the water system, unless more accurate information is available concerning the actual domestic demand distribution.

D. The required fire flows and fire flow duration relating to any new addition will be specified by the local fire authority and reported to the Company on the Company's Form E-3-5 prior to final design and Company approval of the addition.

E. Water storage shall be designed to meet peak domestic demands and fire protection where possible and practical. The water storage design shall be based upon a 24 hour system study, with peak domestic demands and fire flow storage requirements, with the assumption that the largest source of supply is removed from the analysis.

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[1]Definition—peak domestic demand: This number shall be calculated using available water system peak production records. The peak demand shall be calculated by multiplying the peak daily production by 2.0. The peak per customer demand shall be calculated by dividing the peak demand by the current customer count and expressed as gallons per minute per customer. Where maximum daily production numbers are not available, the peak domestic demand shall be the peak domestic demand as indicated by ADEQ Engineering Bulletin No. 10.

[2]Definition—average peak domestic demand: The number shall be calculated by multiplying the peak domestic demand by 0.30 and expressed as gallons per minute per customer.

2-3691

ARIZONA WATER COMPANY

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PHONE: (602) 240-6860 • FAX: (602) 240-6878 • WWW.AZWATER.COM

March 11, 2004

Mr. Paul Hansen
Trabue, Hansen, and Hinshaw, Inc.
115 South Main Street
Coolidge, AZ 85228

Re: Preliminary Water Plan

Dear Mr. Hansen:

Enclosed is a copy of your Preliminary Water Plan for Cota Ranch Phase 2-4 located in Coolidge, with the required changes and comments of Arizona Water Company (the "Company") shown in red.

Please use this letter to guide you in your preparation of the Formal Water Plan. When the plan is completed, please send us one mylar/vellum or the original and one recorded subdivision plat and drawing indicating the location of all other utilities (gas, electric, telephone, cable television, sewer, etc.) as well as paving and profile.

We will then review your plans and, if everything meets with our approval, we will sign the sepia or the original and return it to you for submittal to the plan review section of the appropriate state and/or county health department with a signed *Application for Approval to Construct* and *Water Service Agreement.*

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Total turf-related facilities: 0 acre(s) (PHASES 2-4)

All turf-related facilities ten (10) acres or larger in size must be metered separately pursuant to the provisions of the Second Management Plan.

Projected annual water usage: 0 acre feet (non-residential) (PHASES 2-4)

i. When the project involves fire hydrants, the legally recognized public fire protection agency that has the responsibility for fire protection will determine the number and location of the fire hydrants, the minimum required fire flow rate (gpm) and flow duration (hours). The fire protection authority must specify the required fire flow rate and duration.

1. Minimum required fire flow rate: 1000 GPM
2. Minimum required fire flow duration: 2 HOURS

COOLIDGE F.D.
(Public Fire Protection Agency)

By: [signature]

Title: FIRE CHIEF

Date: 3-18-04

j. The developer must specify, in writing, the date on which the Company will be required to put the project out to bid. Any requirements regarding time constraints, construction completion deadlines, etc., must be noted in the request to bid so that they may be specified in the bid documents. All necessary approvals from regulatory agencies having jurisdiction over project construction must be received prior to bidding. Please note that the estimated time required from the initial invitation to bid to the start of construction can be eight (8) weeks, or longer. This time is dependent on, but not limited to, material procurement, highway permits, contractor mobilization, etc. An option is available to the developer to make payment for materials in advance of construction. If the developer desires to add qualified contractors to Company's bid list for obtaining labor bids for the project, the developer must so inform the Company prior to the date the project is put out to bid and any such contractors must meet the due date of the bid.

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Indicate in the space provided whether the property that is being proposed for project has appurtenant Irrigation or Type 1 Non-Irrigation Grandfathered Rights:

☐ Yes ☒ No

Please provide the information requested and sign this document where indicated, retain a copy, and return the original to the Company. **This project will not be approved until the Company receives this signed document.**

Very truly yours,

Mike Loggins
Engineer
engineering@azwater.com

kd
Enclosure
c: Jerry Dexel

Developer

By: ELOY COTA

Title: OWNER

Date: 3.18.04

EXHIBIT
WWC-81
Admitted

Material Safety Data Sheet

Revision Issued: 7/06/2000 Supercedes: 5/11/95 First Issued: 9/24/92

Section I - Chemical Product And Company Identification

Product Name: Ferric Chloride

CAS Number: 7705-08-0 HBCC MSDS No. CF01000

HILL BROTHERS Chemical Co.

1675 NORTH MAIN STREET • ORANGE, CALIFORNIA 92867-3499
(714) 998-8800 • FAX: (714) 998-6310
http://hillbrothers.com

1675 No. Main Street, Orange, California 92867
Telephone No: 714-998-8800 | Outside Calif: 800-821-7234 | Chemtrec: 800-424-9300

Section II - Composition/Information On Ingredients

			Exposure Limits (TWAs) in Air		
Chemical Name	CAS Number	%	ACGIH TLV	OSHA PEL	STEL
Ferric (III) Chloride	7705-08-0	38.7-42.7	1 mg/m³	1 mg/m³	N/A
Hydrochloric Acid	7647-01-0	1	5 ppm	5 ppm	N/A

Section III - Hazard Identification

Routes of Exposure: Ferric Chloride can affect the body if it is ingested or if it comes in contact with the eyes or skin.

Summary of Acute Health Hazards

Ingestion: This material is toxic by ingestion.

Inhalation: May cause irritation of the upper respiratory tract.

Skin: This product may cause irritation to the skin.

Eyes: This product may cause irritation; repeated or prolonged exposure may cause conjunctivitis.

Signs and Symptoms of Exposure: Repeated exposure to large amounts or Ferric Chloride may increase irritation.

Effects of Overexposure: Symptoms of Ingestion: Abdominal pain, and prolonged vomiting may begin up to one hour after ingestion of excessive quantities of soluble iron salts. Hematemesis, dehydration, shock, pallor, cyanosis, hypothermia, vasomotor instability, and coma may follow. If death is not immediate, it may occur 1-3 days later, survivors may develop reversible hemorrhagic necrosis. Gastric scarring may occur after 4 weeks. Pyloric stenosis and mild hepatic cirrhosis may persist.

Medical Conditions Generally Aggravated by Exposure: N/A

Note to Physicians: N/A

Section IV - First Aid Measures

Ingestion: If ingested give 1 or 2 glasses of water or milk. DO NOT INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IMMEDIATELY.
Inhalation: Remove to fresh air. Keep warm and quiet. Consult physician.
Skin: Flush with water for 30 minutes. Remove contaminated clothing.
Eyes: Immediately, flush with large amounts of water for at least 15 minutes while holding eyelids apart. Washing within one minute is essential to achieve maximum effectiveness. Get immediate medical attention after flushing.

Section V - Fire Fighting Measures

Flash Point: N/A **Autoignition Temperature:** N/A

Lower Explosive Limit: N/A **Upper Explosive Limit:** N/A

Unusual Fire and Explosion Hazards: Closed containers exposed to heat may explode

Extinguishing Media: Use extinguishing media appropriate for surrounding fire

Special Firefighting Procedures: Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in a positive pressure mode. Move exposed containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

Section VI - Accidental Release Measures

Steps To Be Taken In Case Material Is Released Or Spilled: [Spills may need to be reported to the National Response Center (800/424-8802) CERCLA Reportable Quantity (RQ) is 1000 pounds (454 Kilograms)] Material that cannot be vacuumed up and reclaimed should be diked and covered with sodium bicarbonate or soda ash. The neutralized waste should be packaged in a closed container.

Section VII - Handling and Storage

Keep container tightly closed. Store in corrosion-proof area. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

Section VIII - Exposure Controls/Personal Protection

Respiratory Protection: NIOSH/MSHA approved respirator if exposure may, or does exceed occupational exposure limits. Generally, a dust/mist respirator may be worn in areas where the tlv is exceeded up to ten times. Alternatively, a supplied air full facepiece respirator or air-lined hood may be worn.
Ventilation: A system of local exhaust is recommended to keep employee exposure below the airborne exposure limits. Local exhaust is usually preferred because it controls the emission at its source, preventing dispersion of it into the general work area. Refer to the ACGIH document "Industrial Ventilation, a Manual of Recommended Practices" for details.
Protective Clothing: Rubber gloves.
Eye Protection: Chemical splash goggles or face shield. Contact lenses should not be worn when working with this material.

Other Protective Clothing or Equipment: Rubber boots, rain suit or rubber apron, face shield.
Work/Hygienic Practices: An eye wash and safety shower should be readily accessible. Wash hands thoroughly after handling.

Section IX - Physical and Chemical Properties

Physical State: Liquid

pH: 2

Melting Point/Range: 30.2°F

Boiling Point/Range: 230°C (446°F)

Appearance/Color/Odor: Yellow-Brown

Solubility in Water: Miscible

Vapor Pressure(mmHg): 20mm @ 60°C (of HCL only)

Specific Gravity(Water=1): 1.41 (solution)

Molecular Weight: 162.24

Vapor Density(Air=1): Only water vaporizes

% Volatiles: 65% by weight

How to detect this compound : N/A

Section X - Stability and Reactivity

Stability: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid: N/A

Materials to Avoid: Most common metals, aluminum strong bases, strong oxidizing agents, potassium

Hazardous Decomposition Products: When heated to decomposition, emits toxic hydrogen chloride or chlorine.

Section XI - Toxicological Information

N/A

Section XII - Ecological Information

N/A

Section XIII - Disposal Considerations

Dispose of in an approved chemical waste landfill with applicable federal, state, and local regulations.

Section XIV - Transport Information

DOT Proper Shipping Name: Ferric Chloride, Solution
DOT Hazard Class/ I.D. No.: 8, UN2582, III
DOT Reportable Quantity: 1000 Pounds (454 Kilograms)

Section XV - Regulatory Information

CALIFORNIA PROPOSITION 65: WARNING
This product may contain a chemical known to the State of California to cause cancer, or birth defects, and/or other reproductive harm.
Reportable Quantity: 1000 Pounds (454 Kilograms)
NFPA Rating: Health - 1; Fire - 0; Reactivity - 1
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
Carcinogenicity Lists: No **NTP:** No **IARC Monograph:** No **OSHA Regulated:** No

Section 313 Supplier Notification: This product contains the following toxic chemcial(s) subject to the reporting requirements of SARA TITLE III Section 313 of the Emergency Planning and Community Right-To Know Act of 1986 and of 40 CFR 372:

CAS #	Chemical Name	% By Weight
7647-01-0	Hydrochloric Acid	1

Section XVI - Other Information

Synonyms/Common Names: Ferric Chloride, Iron (III) Solution, Ferric Trichloride
Chemical Family/Type: Ferric Chloride
Section changed since last revision: II, V, VI, VII, IX, X, XIV

IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This MSDS has been prepared according to the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The MSDS information is based on sources believed to be reliable. However, since data, safety standards, and government regulations are subject to change and the conditions of handling and use, or misuse are beyond our control, **Hill Brothers Chemical Company** makes no warranty, either expressed or implied, with respect to the completeness or continuing accuracy of the information contained herein and disclaims all liability for reliance thereon. Also, additional information may be necessary or helpful for specific conditions and circumstances of use. It is the user's responsibility to determine the suitability of this product and to evaluate risks prior to use, and then to exercise appropriate precautions for protection of employees and others.

EXHIBIT
WWC-83
Admitted

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: PPG Calcium Hypochlorite Tablets
PRODUCT ID: 0122c
SYNONYMS: Calcium Hypochlorite Tablets; Cal Hypo Tablets; Ca(OCl)2 ; MSDS No. 0122
ISSUE DATE: 01/02/2004
EDITION NO.: 10

PPG Industries, Inc.
One PPG Place, Pittsburgh, PA 15272, USA
24-hour Emergency Telephone Number: 1-304-843-1300
For Product Information (8am-5pm Eastern time):
1-800-245-2974 (Cal Hypo)

PREPARER: Product Safety, Chemicals

2. COMPOSITION/INFORMATION ON INGREDIENTS

Material/CAS Number	Percent
Calcium Hypochlorite 7778-54-3	>65
Calcium Chlorate 10137-74-3	<2
Calcium Carbonate 471-34-1	<2
Calcium Hydroxide 1305-62-0	<2

Note: Minimum 65% Available Chlorine. 35% inert ingredients (includes 5.5-8.5% water).

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

DANGER! Corrosive - Causes severe and irreversible burns to eye and skin. Harmful if inhaled. May cause irritation and inflammation to the respiratory tract. Harmful or fatal if swallowed. Strong Oxidizing Agent! Mix only with water. Never add water to product. Always add the product to large quantities of water. Do not mix with any other chemicals. Contamination with moisture, acids, organic materials and other easily combustible materials such as petroleum, paint products, wood or paper

may cause fire or explosion and the liberation of hazardous gases. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause violent reaction leading to fire or explosion. Very toxic to aquatic organisms.

Precautions: Do not get in eyes, on skin, or on clothing. Avoid breathing dust. Irritating to nose and throat. Do not swallow. Do not eat, drink or smoke in work area. Wash hands after handling. Remove and wash contaminated clothing before reuse. Keep out of reach of children.

4. FIRST AID MEASURES

INHALATION: Remove from area to fresh air. If symptomatic, contact a poison control center, emergency room or physician for treatment information.

EYE/SKIN CONTACT: EYE: Remove contact lens and pour a gentle stream of warm water through the affected eye for at least 15 minutes. Contact a poison control center, emergency room or physician right away as further treatment will be necessary. SKIN: Run a gentle stream of water over the affected area for 15 minutes. A mild soap may be used if available. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

INGESTION: Gently wipe or rinse the inside of the mouth with water. Sips of water may be given if person is fully conscious. Never give anything by mouth to an unconscious or convulsing person. Do Not induce vomiting. Contact a poison control center, emergency room or physician right away as further treatment will be necessary.

5. FIRE FIGHTING MEASURES

FLASH POINT: Not Applicable.

EXTINGUISHING MEDIA: Drench with large quantities of water only. Do not use dry chemicals or foams. Product supplies own oxygen, therefore attempts to smother fire with a wet blanket, carbon dioxide, dry chemical extinguisher or other means are not effective.

SPECIAL FIREFIGHTING PROCEDURES: Product decomposes at approximately 338-356°F (170-180°C) releasing oxygen gas. Container may rupture. Fire-fighters must wear NIOSH approved, pressure demand, self-contained breathing apparatus with full face piece for possible exposure to hazardous gases. Emits toxic fumes under fire conditions.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Use extreme caution in handling spilled material. Do not mix with any other chemicals. Contamination with moisture, acids, organics or other easily combustible materials such as petroleum, paint products, wood or paper may cause fire or violent decomposition. If fire or decomposition occurs in area of spill, immediately douse with plenty of water. Otherwise, sweep up all visible material using a clean (new, if possible), dry shovel and broom and dissolve material in water. Spilled material that has been swept up and dissolved in water should be used immediately in the normal application for which this product is being consumed.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:
Store in a cool, dry, well-ventilated place. Keep in original container. Keep container closed when not in use. Keep away from heat, sparks, flames, direct sunlight, and other sources of heat, including lighted tobacco products. Use only a clean (new, if possible), dry scoop made of metal or plastic each time product is taken from the container. Do not add this product to any dispensing device containing remnants of any other product. Such use may cause violent reaction leading to fire or explosion. Add this product only to water. Never add water to product. Always add the product to large quantities of water. May cause fire or explosion if mixed with other chemicals. Fire may result if contaminated with acids, organic materials and other easily combustible materials such as oil, kerosene, gasoline, paint products wood and paper. Do not reuse container. Residual material remaining in empty container can react to cause fire. Thoroughly flush empty container with water then destroy by placing in trash collection. Do not contaminate water, food, or feed by storage or disposal of this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits:
8-hour Time Weighted Average (TWA); 15-minute Short-Term Exposure Limit (STEL)

OSHA: The OSHA exposure limit(s) for Calcium hydroxide: 5 mg/m^3 TWA. Calcium carbonate: 15 mg/m^3 (total dust) 5 mg/m^3 (respirable dust)

ACGIH: The ACGIH exposure limit(s) for Calcium hydroxide: 5 mg/m^3 TWA Calcium carbonate: 10 mg/m^3 (total dust) 3 mg/m^3 (respirable nuisance particulate) TWA.

PPG (IPEL): Calcium hypochlorite: 1 mg/m^3 TWA. 2 mg/m^3 STEL.

RESPIRATORY PROTECTION: Where the potential for exposure to dust exists, use the appropriate regulatory compliant full facepiece air-purifying respirator with acid gas cartridge and particulate prefilter. Carefully read and follow the respirator manufacturer's instructions and information.

VENTILATION: Use local exhaust or general room/dilution ventilation sufficient to maintain employee exposure below permissible exposure limits.

EYE AND FACE PROTECTION: Splashproof goggles and faceshield.

PROTECTIVE GLOVES: Butyl rubber. Neoprene. Nitrile.

OTHER PROTECTIVE EQUIPMENT: Boots, aprons, or chemical suits should be used when necessary to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: Decomposes at approximately 338-356°F (170-180°C)

VAPOUR DENSITY (Air=1):	NA
SPECIFIC GRAVITY (Water=1):	NA
pH:	Alkaline
FREEZING/MELTING POINT:	NA
SOLUBILITY (wt.% in water):	217 g/l @ 27°C
BULK DENSITY:	67-71 lbs./cu.ft.
VOLUME % VOLATILE:	NA
VAPOR PRESSURE:	NA
EVAPORATION RATE:	NA
HEAT OF SOLUTION:	Slightly exothermic
PHYSICAL STATE:	Tablets
ODOR:	Slight chlorine
COLOR:	White

10. STABILITY AND REACTIVITY

STABILITY: Unstable above 338°F (170°C).

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBILITY (CONDITIONS/MATERIALS TO AVOID):
Contamination. Excessive heat above 338°F (170°C). Moisture. Acids. Reducing agents. Organics. Combustible materials. Petroleum products. Paint products. Wood and paper.

HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:
Acid or ammonia contamination will release toxic gases. Excessive heat will cause decomposition resulting in the release of oxygen and chlorine gas.

11. TOXICOLOGICAL INFORMATION

ACUTE INHALATION LC50: No mortality at 3.5 mg/l (rat) (1 hour). Slight to very low toxicity.
ACUTE DERMAL LD50: >1000 mg/kg. (rabbit) Slight to very low toxicity.
SKIN IRRITATION: Corrosive.
EYE IRRITATION: Corrosive.
ACUTE ORAL LD50: 850 mg/kg. (rat) Moderate toxicity.

CARCINOGENICITY STATUS: This product is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, ACGIH, or OSHA.

MEDICAL CONDITIONS AGGRAVATED: None known.

EFFECTS OF OVEREXPOSURE:

ACUTE:

Inhalation: Inhalation of calcium hypochlorite dust and deposition of particles in the respiratory tract

can lead to irritation of the tissue and cause a variety of effects. These effects are dependent on concentration and include: upper respiratory tract irritation, nasal congestion, coughing, sore throat, laryngitis and shortness of breath. In operations where there are high concentrations of respirable particulates, pulmonary edema (fluid in the lung) may be produced. If not treated immediately, pulmonary edema can be life threatening. Since this product is in granular or tablet form, particles of respirable size are not generally encountered.

Eye/Skin: Calcium hypochlorite is corrosive to the eyes. Contact of calcium hypochlorite dust with the eyes, even a minute amount for a short duration, can cause severe irritation and even blindness. Contact with the skin may cause severe irritation, burns, or tissue destruction. In studies utilizing rabbits, the skin irritation score was 8/8 and the eye irritation score was 98.5/110.

Ingestion: Calcium hypochlorite, if swallowed, causes severe burns to the digestive tract and can be fatal.

CHRONIC:

Genotoxicity: Calcium hypochlorite produced positive responses in in-vitro assays using bacterial systems (the Ames test) and chromosomal aberrations in Chinese hamster fibroblasts. In a whole animal experiment (mouse micronucleus test), exposures ranging from 20 to 160 mg/kg produced no compound related chromosomal abnormalities.

Carcinogenisis: Although no study has been conducted with calcium hypochlorite, the carcinogenic potential of sodium hypochlorite was studied in F344 rats. After 104 weeks of drinking water containing up to 2000 ppm sodium hypochlorite, there was no evidence that this chemical produced any carcinogenic response. In addition, this exposure did not result in any adverse effects

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
0.088 mg/l (Bluegill) 96-hour LC50. Extreme toxicity.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:
Spilled material that has been swept up and dissolved in water should be used immediately in the normal application for which this product is being used. If this is not possible, dissolve material in water and carefully neutralize dissolved material by adding hydrogen peroxide (one pint of 35% hydrogen peroxide solution per pound of calcium hypochlorite to be neutralized) then dilute the neutralized material with plenty of water and flush to sewer. Note: Only properly neutralized material should be flushed to sewer. Unneutralized material can cause environmental damage to receiving water or can interfere with treatment plant operation. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the U.S. Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, as well as any other relevant Federal, State, or local laws/regulations regarding disposal.

14. TRANSPORT INFORMATION

Proper Shipping Name: Calcium Hypochlorite, Hydrated
Hazard Class: 5.1 (Oxidizer)
UN Number: UN2880
Packing Group: II
USA-RQ, Hazardous Substance and Quantity: 10 lbs./4.5 kg. (calcium hypochlorite)
Marine Pollutant: None
Additional Information: USA Shipments Only - Hazardous Substances are regulated in the USA when shipped above their Reportable Quantity (RQ).

15. REGULATORY INFORMATION

USA TSCA: All components of this product are listed on the TSCA Inventory.
EUROPE EINECS: All components in this product are listed on EINECS.
CANADA DOMESTIC SUBSTANCES LIST (DSL): This product and/or all of its components are listed on the Canadian DSL.
AUSTRALIA AICS: All components of this product are listed on AICS.
KOREA ECL: All components in this product are listed on the Korean Existing Chemicals Inventory (KECI).
JAPAN MITI (ENCS): All components in this product are listed on the Japanese Existing and New Chemical Substances (ENCS) chemical inventory.
PHILIPPINES PICCS: All of the components in this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS).

SARA TITLE III:
SARA (311, 312) Hazard Class:
Acute Health Hazard. Reactive Hazard. Fire Hazard.
SARA (313) Chemicals:
Not listed.
SARA Extremely Hazardous Substance:
Not listed.

CERCLA Hazardous Substance:
The following materials are listed as CERCLA Hazardous Substances in Table 302.4 of 40 CFR Part 302: Calcium Hypochlorite (7778-54-3) RQ = 10 lbs./4.54 kg.

CANADA REGULATIONS (WHMIS): Class C - Oxidizing material.

FIFRA:
This product is registered with EPA as a pesticide.

16. OTHER INFORMATION

Other Information:
NSF Drinking Water Treatment Chemicals Listing - PPG calcium hypochlorite is certified for

maximum use at 15 mg/L under NSF/ANSI Standard 60.

The following has been revised since the last issue of this MSDS:
Date. Edition. Section 1 has been updated. Section 5 has been updated. Section 8 has been updated. Section 9 has been updated. Section 11 has been updated. Section 12 has been updated. Section 16 has been updated.

Previous revision date: 08/11/2003
Previous edition number: 009

NA = Not Available

EXHIBIT
WWC-84
Admitted

Material Safety Data Sheet

Revision Issued: 12/17/2003 Supercedes: 7/23/2002 First Issued: 6/17/87

Section I - Chemical Product And Company Identification

Product Name: Sodium Hypochlorite

CAS Number: 7681-52-9 HBCC MSDS No. CC17000

HILL BROTHERS Chemical Co.

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(714) 998-8800 • FAX: (714) 998-6310
http://hillbrothers.com

1675 No. Main Street, Orange, California 92867
Telephone No: 714-998-8800 | Chemtrec: 800-424-9300

Section II - Composition/Information On Ingredients

			Exposure Limits (TWAs) in Air		
Chemical Name	CAS Number	%	ACGIH TLV	OSHA PEL	STEL
Sodium Hypochlorite	7681-52-9	5-15	N/A	N/A	2mg/m³
Sodium Hydroxide	1330-73-2	< 1	N/A	N/A	2mg/m³

Section III - Hazard Identification

Routes of Exposure: Sodium hypochlorite may affect the body either through ingestion, inhalation, or contact with the eyes and/or skin.

Summary of Acute Health Hazards

Ingestion: May cause irritation of the membranes of the mouth and throat, stomach pain, and possible ulceration.

Inhalation: May cause burns, cough, pulmonary edema, up to 48 hours after exposure.

Skin: May cause moderate skin irritation and reddening of the skin. Prolonged exposure may cause burns, blistering.

Eyes: May cause severe irritation such as burns, and eye damage.

Carcinogenicity Lists: No **NTP:** No **IARC Monograph:** No **OSHA Regulated:** No

Summary of Chronic Health Hazards: Irritating effects increase with strength of solution and time of exposure.

Medical Conditions Generally Aggravated by Exposure: N/A

Note to Physician: The absence of visible signs of burns does NOT reliably exclude the presence of actual tissue damage.

Section IV - First Aid Measures

Ingestion: Do not give any liquid to an unconscious person. Drink large quantities of gelatin solution or milk. If these are not available, drink large quantities of water. Do NOT give vinegar, baking soda or acidic antidotes. GET MEDICAL ATTENTION

IMMEDIATELY.

Inhalation: If adverse effects occur, remove to fresh air. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. If respiration or pulse has stopped, have a trained person administer Basic Life Support (Cardio-Pulmonary Resuscitation/ Autmotic Dfribillator) and GET MEDICAL ATTENTION IMMEDIATELY.

Skin: Immediately flush contaminated areas with plenty of water. Remove contaminted clothing, jewelry, and shoes immediately. Wash contaminated areas with soap and water. Thoroughly clean and dry contaminated clothing and shoes before reuse. GET MEDICAL ATTENTION IMMEDIATELY.

Eyes: Flush with plenty of water for 15 minutes, lifting the lower and upper lids occasionally. GET MEDICAL ATTENTION IMMEDIATELY. Contact lenses should not be worn when working with this chemical.

Section V - Fire Fighting Measures

Flash Point: Nonflammable

Autoignition Temperature: N/A

Lower Explosive Limit: N/A

Upper Explosive Limit: N/A

Unusual Fire and Explosion Hazards: Heat and acid contamination will produce irritating and toxic fumes. May decompose, generating irritating chlorine gas.

Extinguishing Media: Use extinguishing agents appropriate for surrounding fire.

Special Firefighting Procedures: Wear NIOSH approved positive-pressure self-contained breathing apparatus. Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Section VI - Accidental Release Measures

[Spills may need to be reported to the National Response Center (800/424-8802) DOT Reportable Quantity (RQ) is 100 pounds Ventilate the area of the spill or leak. For large spills, evacuate the hazard area of unprotected personnel. Wear appropriate protective clothing. Dike and contain. Neutralize with sodium sulfite, bisulfite or thiosulfite. Remove with vacuum trucks or pump to storage vessels. Soak up residue with an absorbent such as clay, sand or other suitable material; place in non-leaking containers for proper disposal. Flush area with water to remove trace residue; dispose of flush solutions as above. For small spills, take up with an absorbent material and place in non-leaking containers; seal tightly for proper disposal. This material is alkaline and may raise the pH of surface waters with low buffering capacity.

Section VII - Handling and Storage

Store in vented, closed, clean non-corrosive containers in a cool, dry location away from direct sunlight and not adjacent to chemicals which may react with the bleach if spillage occurs. If closed containers become heated, the containers should be vented to release decomposition products (mainly oxygen under normal decomposition). Do not mix or contaminate with ammonia, hydrocarbons, acids, alcohols or ethers.

Section VIII - Exposure Controls/Personal Protection

Respiratory Protection: Not required under normal use conditions. In the case of a fire use self-contained breathing apparatus. A NIOSH approved respirator with N95 (dust, fume, mist) filters may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits, or when symptoms have been observed that are indicative of overexposure.
When decomposition products exist, acid gas cartridges are also required.
A half-piece air-purifying respirator may be used in concentrations up to 10X the acceptable exposure level and a full facepiece air-purifying respirator may be used in concentrations up to 50X the acceptable exposure level.
Supplied air should be used when the level is expected to above 50X the acceptable level, or when there is a potential for uncontrolled release.
A respiratory program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.
Ventilation: No special ventilation is required unless bleach is exposed to decomposition conditions, i.e. heat or acidic conditions.
Protective Clothing: Avoid contact with the eyes. Wear chemical goggles and/or face shield if there is the likelihood of contact with the eyes. Avoid prolonged or repeated contact with the skin. Wear chemical-resistant gloves and other clothing as required to minimize contact.
Other Protective Clothing or Equipment: Safety showers and eyewash fountains should be available in storage and handling areas.
Work/Hygienic Practices: All employees who handle sodium hypochlorite should wash their hands before eating, smoking, or using the toilet facilities.

Section IX - Physical and Chemical Properties

Physical State: Liquid

pH: 12

Freezing/Melting Point/Range: -5 to -25°C

Boiling Point/Range: 40-76°C (104-169°F) (Decomposes)

Appearance/Color/Odor: Colorless to pale yellow watery liquid with a pungent chlorine odor

Solubility in Water: 100%

Vapor Pressure(mmHg): 12-17 @ 20°C

Specific Gravity(Water=1): 1.07-1.26 @ 20°C

Molecular Weight: 75.45

Vapor Density(Air=1): 2.61

% Volatiles (by volume): Variable-Water plus products of Decomposition

How to detect this compound :
N/A

Section X - Stability and Reactivity

Stability: Unstable above 40°C, in sunlight, or in contact with acid.

Hazardous Polymerization: Will Not Occur

Conditions to Avoid: Stability decreases with concentration, heat, light exposure,

decrease in pH and contamination with heavy metals, such as nickel, cobalt, copper and iron.

Materials to Avoid: Strong acids, oxidizable materials, heavy metals(which act as catalysts), reducing agents, ammonia solutions, ether, and many organic and inorganic chemicals such as paint, kerosene, paint thinners, shellac, grease and oils.

Hazardous Decomposition Products: Chlorine. Additional decomposition products which depend upon pH, temperature and time are sodium chloride, sodium chlorate and oxygen.

Section XI - Toxicological Information

Toxicity Data: By ingestion, Grade 1: oral rat LD_{50} = 8.91 g/kg IDLH Value: Data not available

Section XII - Ecological Information

This material may be harmful to aquatic life in low concentrations.

Section XIII - Disposal Considerations

Can be neutralized with weak reducing agents such as sodium sulfite, bisulfite, or thiosulfite (DO NOT USE SULFATES OR BISULFATES). Dispose of in accordance with all applicable local, county, state and federal regulations.

Section XIV - Transport Information

DOT Proper Shipping Name: Hypochlorite Solutions
DOT Hazard Class/ I.D. No.: 8, UN1791, III

Section XV - Regulatory Information

Reportable Quantity: 100 Pounds (45.4 Kilograms)
NFPA Rating: Health - 3; Fire - 0; Reactivity - 1
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme
Carcinogenicity Lists: No **NTP:** No **IARC Monograph:** No **OSHA Regulated:** No
NSF Standard 60 Maximum Use 210 mg/L

Section XVI - Other Information

Hazardous Ingredients: Sodium hypochlorite is manufactured only in solution form. Industrial grade sodium hypochlorite contains from 10 - 15% by weight NaOCL (10 - 17.8% available chlorine) with about 0.50-1.00% excess NaOH for stability control.
Synonyms/Common Names: Liquid Bleach
Chemical Family/Type: Halogen Compound
Sections changed since last revision: II, III, IV, V, VII, VIII, IX, X, XV

IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure. This MSDS has been prepared according to the OSHA Hazard Communication Standard [29 CFR 1910.1200]. The MSDS information is based on sources believed to be reliable. However, since data, safety standards, and government regulations are subject to change

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