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Station: PW-18

WATER USE PERMIT APPLICATION
and
SUPPLEMENTARY ENGINEERING REPORT
for
ACME IMPROVEMENT DISTRICT

#50-00464-W

GEE & JENSON ENGINEERS · ARCHITECTS · PLANNERS, INC.

2019 OKEECHOBEE BLVD. WEST PALM BEACH, FLORIDA

WATER USE PERMIT APPLICATION
and
SUPPLEMENTARY ENGINEERING REPORT
for
ACME IMPROVEMENT DISTRICT

December 8, 1980

79-183

GEE & JENSON ENGINEERS · ARCHITECTS · PLANNERS, INC.

2019 OKEECHOBEE BLVD. WEST PALM BEACH, FLORIDA

GEE & JENSON
2019 OKEECHOBEE BOULEVARD, WEST PALM BEACH, FLORIDA . . . 33409 . . . 305 - 683-3301

FRED A. GREENE, P.E.
RICHARD M. MILLER, P.E.
WALTER D. STEPHENS, JR., P.E.
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JOHN C. WISE, P.E.
Director Emeritus
H.C. GEE, P.E.
THEODORE B. JENSON, P.E.

December 8, 1980

Dr. Patrick Gleason
South Florida Water Management District
Post Office Box V
West Palm Beach, Florida

Re: Water Use Permit Application
for Acme Improvement District

Dear Pat:

Four copies of the above-referenced Application and Supplemental Engineering Report are being submitted as required by SFWMD on this date.

Generally, it was found that the proposed wellfield in Section 25 would produce water of adequate quantity and quality, without causing adverse impacts, to meet 1988 projected demands.

If you or your staff have any questions regarding this application, please contact me at your earliest convenience. As described in the report, Acme is in urgent need of supplementing their existing raw water supply system and obtaining the necessary approvals to do so.

Your cooperation and assistance in this matter is appreciated.

Yours sincerely,

GEE & JENSON
Engineers-Architects-Planners, Inc.

Heidi Vandor

Heidi Vandor
Hydrogeologist

HV/de

cc: Edward C. Lowder
Fred A. Greene
Cotter Christian

APPLICATION FOR WATER USE PERMIT
ACME IMPROVEMENT DISTRICT

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Gee & Jenson, November 1980 "Water Supply Development - Section 25 for the Acme Improvement District."

PART I

APPLICATION FOR WATER USE PERMIT

for

ACME IMPROVEMENT DISTRICT

December 8, 1980

CHECKLIST FOR INDIVIDUAL PERMITS

This checklist is for use under either of two conditions: a) for either existing or proposed water usage in excess of 100,000 gpd in most areas of the District except those designated under (b); b) for either existing or proposed water usage greater than 10,000 gpd on an average day or greater than 20,000 gpd on a maximum day in two distinct geographic areas. These two areas are, first, in the vicinity of the City of Stuart comprising the peninsular land area north of Indian Street, and, second, the land areas of Sanibel and Captiva Islands.

A. General

1. Name, address and telephone number of corporation, individual or municipality requesting a permit. Name of person responsible for obtaining a permit.

2. Name, address and telephone number of Engineering Firm submitting the application (if applicable). Name of engineer responsible for obtaining the permit.

3. Describe the purpose of the application.

4. Indicate the quantity of water applied for as an annual allocation (gals/year). This quantity may equal the annual quantity which will be pumped at a future point in time, or may equal the applicant's existing pumpage if no future increases in pumpage are anticipated. The requested allocation should equal average daily pumpage multiplied by 365 days.

   The most common mistake made in applying for an allocation is that the maximum daily pumpage is multiplied by either 365 days/year or the number of days per year pumpage is performed. The requested allocation applied for is based on an average daily withdrawal. Make sure that the allocation you requested is equal to your projected average day pumpage multiplied by 365 days per year.

   Example: A new utility is presently serving 5000 persons at an average use of 100 GPCD.* Current average daily use is therefore 500,000 gallons per day.

   *GPCD - Gallons per Capita Day.

   In 1987 this utility expects to serve 15,000 persons at 100 GPCD which is equal to an average day use of 1.5 MGD. Thus the requested annual allocation is:

   1.5 MGD x 365 days = 548 MG/year

5. Explain briefly the derivation of annual allocation.

   a. Indicate the projected population used in determining the annual allocation.

   b. Indicate the per capita consumption used in determining the annual allocation.

6. Indicate the maximum daily pumpage associated with your projected average day pumpage.

   The applicant should note that the water treatment capacity that is capable of treating the maximum day should be described as part of the answer to "3. Proposed Treatment Facilities" in Section C.

7. Indicate the maximum day to average day demand ratio used in calculating the projected maximum day pumpage. Explain briefly the basis for using this number.

8. List the future year in which the quantity of water applied for will be used.

9. Indicate if SFWMD permits for water use have been issued (Yes or No).

10. Map Location of Existing Facilities: Attach a (or a copy of a) USGS Topographic Map (use additional maps if all of the information cannot be clearly indicated) showing:

    a. the location of all wells.

    b. the area served by the applicant's wells.

    c. location of existing water treatment facilities and wastewater treatment facilities.

11. Map Location of Proposed Facilities: Attach a (or a copy of a) USGS Topographic map (use additional maps if all of the information cannot be clearly indicated) showing:

    a. additional land area, if any, which will be served.

    b. proposed well locations.

    c. location of proposed water treatment facilities.

12. Indicate on a map or sketch of the applicant's property and surrounding area:

    a. Location of other wells not owned by the applicant including domestic wells, irrigation wells, etc. within 300' of the applicant's wells.

    b. Location of pollution sources within 300' of the applicant's wells such as percolation ponds, sewage mains, etc. (septic tanks excluded).

    c. Location of nearest saline water or salinity control structure (if the distance is less than one mile).

    d. Location of any existing or proposed wastewater treatment and disposal facilities that will recharge the aquifer in the vicinity of the applicant's wellfield(s).

13. If the applicant is a private corporation, attach an affidavit of incorporation.

B. Existing Facilities and Pumpage

1. EXISTING FACILITIES DESCRIPTION:

   a. Describe existing wells: fill out Table A as complete as possible; attach driller's log, specific capacity data or aquifer performance test data, if available.

   b. Describe existing treatment plant: treatment plant capacity (potential capacity and capacity as rated by DER), and method of treatment.

   c. For surface water systems, indicate source of water, and the name, address and telephone number of either the local drainage or local water management district having jurisdiction over maintenance of the surface water system.

   d. Describe existing fire flow and standby well capacity. Calculate the existing capacity for each.

   e. Describe the existing well or wellfield operation schedule. Include in the description:

      i. Which wells are primary.

      ii. Which wells are stand-by.

      iii. Well rotation schedule, if any.

      iv. Which wells will be pumped simultaneously, if any.

      v. The order of preference in turning-on wells.

   f. Describe the location of existing flow meters, i.e., on individual wells, before treatment, after treatment and/or at customer's connections.

2. POPULATION: Indicate the number of people and number of connections served by existing wells at the present time.

3. SERVICE AREA: Indicate size of area served in acres.

4. IRRIGATION: Estimate the percentage of existing withdrawals used for irrigation.

5. INTERCONNECTIONS: Explain in detail any interconnections with other suppliers. Indicate maximum amount of water which can be supplied via the interconnect.

6. INTERFERENCE: Describe any interference between existing wells or interference with a well on an adjacent landowner's property.

7. PAST WATER USE: Fill out Table B with data, if available, on water use during the past 10 years.

8. MOST RECENT WATER USE: Fill out Table C using the most recent 12 months of daily pumpage records, if available. If possible, obtain data from DER's monthly operating reports. Attach a list of the ten largest users of water that are currently served by the applicant. Indicate maximum monthly water usage for each user.

9. RAW WATER QUALITY: Attach raw water quality information.

10. SERVICE AREA: Indicate number of Public Service Commission (PSC) certificate if applicant is regulated by the PSC.

11. WATER PROBLEMS: Explain any problems the utility is currently experiencing or causing as a consequence of withdrawals, such as drawdowns of adjacent water bodies, saline water intrusion, adverse impact on adjacent land use, water quality problems, etc.

C. Future Facilities and Pumpage

1. PROJECTED ANNUAL ALLOCATION: Show how projected annual pumpage was determined if different from existing pumpage.

2. INSTALLED CAPACITY:

   a. Detail the installed capacity which will be required to supply the quantity of water requested above.

   b. Give details on location, size (diameter), length of casing, and total depth of proposed wells, if information available.

   c. Explain choice of well sites.

   d. Describe proposed fire flow and stand-by well capacity.

3. PROPOSED WATER TREATMENT FACILITIES: The annual allocation requested within this application should equal the sum of the capacity of existing and proposed treatment facilities. Therefore, the sum of the capacities of existing and proposed treatment plants should not be less than the maximum day withdrawals associated with the projected annual allocation.

   a. Describe additional treatment plant construction (include treatment capacities).

   b Projected completion date of proposed construction.

4. PER CAPITA DAILY USE: Indicate proposed consumption of water per capita (on a permanent population basis) or per equivalent residential connection; give estimated number of persons/unit. If proposed per capita consumption is greater than existing per capita consumption then explain difference.

5. POPULATION PROJECTION: Project population for the future service area for the next ten years, and explain source for information. Fill in Table D with the projected populations for each year of the next ten years.

6. WATER USE PROJECTION: Fill out Table D. The origin of the projection should be explained.

7. EXTRAPOLATION OF PAST WATER USE: Extrapolate past total annual pumpages to a date which is ten years into the future on semi-log paper.

8. IRRIGATION: If any of the projected water use will be for irrigation of golf courses or park areas, please indicate the following:

   a. Area in acres which will be irrigated.

   b. Type of vegetation which will be irrigated, i.e., grasses, etc.

   c. Approximate maximum monthly water use.

   d. Approximate average annual water use.

   e. Show irrigated area on USGS Topographic map.

   Withdrawal may be calculated by multiplying pump size (gpm) by the amount of time the pump is run.

9. SERVICE AREA EXPANSION:

   a. For Public Utilities - If the service area will be expanded in the future by annexation, attach a copy of expansion plans.

   b For Private Utilities - If the service area will be expanded in the future, attach a copy of any correspondence to the Public Service Commission (PSC) concerning an expanded service area if the utility is located in a County regulated by the PSC.

   c. For County Franchised Service Areas - If the service area is franchised by county government, then attach any correspondence with the county regarding a proposed expansion of the service area.

   d. For Dade County Utilities - Submit a letter from the Miami-Dade Water and Sewer Board approving any proposed increase in service area.

10. IMPACT ON OTHER USES OF WATER: Indicate any possible interference with other wells not owned by the applicant (including domestic and irrigation wells) as a result of increases in withdrawals.

11. SURFACE WATER IMPACT: Detail any impact on surface water bodies (such as ponds, lakes, etc.) that the increased withdrawals may have.

12. ENVIRONMENTAL IMPACT: Describe any possible adverse environmental impact on environmentally sensitive areas that the increased withdrawals may cause.

13. WASTEWATER RECYCLING: Describe plans to recycle wastewater and indicate volumes with time.

D. Surface Water Use

1. Describe existing system including pumps, intakes, and location.

2. Describe proposed facilities.

3. Show locations of existing and proposed facilities on a (or a copy of a) USGS Topographic Map.

4. Indicate any requirement for water from District canals or other works.

E. Reverse Osmosis Treatment

1. Indicate:

   a. Withdrawal capacity.

   b. Potable water supply capacity.

   c. Reject water discharge capacity.

2. Treatment plant process:

   a. Indicate the treatment efficiency ratio.

   b. Indicate the amount of raw water that can be blended with the R. O. permeate.

   c. Attach correspondence from the appropriate regulatory agency giving approval of raw water/R.O. permeate blending.

   d. Indicate the highest level of total dissolved solids (TDS) or chlorides that can be efficiently and economically treated using the currently installed membranes.

3. Indicate the level of chloride ions of both the reject water and the receiving water body.

4. Show location of effluent discharge on a USGS topographic map. Will effluent be discharged through a manifold? Show outlets of manifold.

5. Indicate any environmental impact that effluent discharge may have.

F. New Wellfield

1. If a new wellfield is proposed, please explain:

   a. Why new wellfield is needed.

   b. Choice of the specific site.

   c. Hydrogeologic information on the site.

   d. Ownership of the site.

   e. Distance from nearest saline water source and nearest inland salinity control structure.

G. Affidavit for Proposed Facilities

The applicant should attach an affidavit indicating that the applicant has obtained a legal right to use the proposed sites for wells, treatment plants, and facilities in the locations designated within the application.

ANSWERS TO CHECKLIST FOR WATER USE PERMIT

A. GENERAL

1. Acme Improvement District
   P. O. Box 248
   Loxahatchee, Fl 33470
   Person Responsible: Edward C. Lowder, Business Manager
   Phone 305/793-0866

2. Gee & Jenson Engineers-Architects-Planners, Inc.
   2019 Okeechobee Boulevard
   West Palm Beach, Fl 33409
   Person Responsible: Heidi Vandor, Hydrogeologist,
   Phone 305/683-3301

3. The purpose of the application is to obtain an increase in allocation to the existing Water Use Permit for Acme Improvement District for a public water supply system through 1991.

4. The quantity of water applied for as an annual allocation is 910 mgy. (2.49 mgd).

5. The requested annual allocation is based on the available projected demands to the year 1988, using data for residential, under-construction, and commercial units. See Table 1.

   a. The projected population for 1988 is 15,746.
   b. The per capita consumption used in determining the annual allocation is 158 gpcd.

6. Projected maximum daily pumpage is 3.76 mgd.

7. Maximum day to average day ratio is 1.51, based upon existing pumpage records for the 12-month period, November 1979 through October 1980. See Table 2.

8. The quantity of water applied for will be used in 1988.

9. Acme Improvement District has an existing Water Use Permit and Surface Water Management Permit.

10. See Figure 1 for the following information:

    a. Location of existing supply wells.
    b. Present service area.
    c. Existing raw water and wastewater treatment facilities.

11. See Figure 1 for the following information:

    a. Additional service area.
    b. Proposed well locations.
    c. Proposed water treatment facilities (Expansion II).

12. Not applicable.

13. Not applicable.

B. EXISTING FACILITIES AND PUMPAGE

1. Existing facilities description:

   a. See Table 3 for well construction data.
   See Appendix A for step-drawdown data.
   See Supplemental Engineering Report for aquifer performance test data.

   b. The existing water treatment plant serving the Acme Improvement District has the capability of producing 1,650,000 gallons of treated water daily. This includes Expansion I. The facility also provides storage for 1,250,000 gallons. It utilizes the lime softening treatment process in addition to aeration, chlorination, and filtration before distribution.

   c. Acme Improvement District has an existing Surface Water Management Permit.

   d. A minimum fire flow of 500 gpm can be provided in the single-family residential areas, 1000 gpm can be provided in the vicinity of high density apartments, and 2000 gpm can be provided in major commercial areas.

   e. Of the 14 existing supply wells, 9 were in service as of November 14, 1980. At present, wells are pumped on a demand basis. Additional supply wells are needed to implement an efficient wellfield operating program.

   f. Each well is equipped with a totalizing flowmeter and a Clayton control valve. A telemetering control system is also provided so that the operators at the treatment plant can start and stop all well pumps in accordance with water requirements. Individual meters are present at each customer's connection.

2. A population of approximately 4,000 is served at present, with 2,466 connections in service as of the end of October 1980.

3. Acme Improvement District covers an area of approximately 18,200 acres. The present Water Use Permit serves an area of 7,375 acres (Unit Development 1-Wellington). Future development will include an additional 1,694 acres at the Landings (west of the existing service area) and 958 acres at Country Place (south of the existing service area). See Figure 1.

4. An estimated 10% of the existing withdrawals is used for irrigation.

5. There are no interconnections with other suppliers.

6. There is no known interference to adjacent wells.

7. See Table 4 for past water use data.

8. See Table 2 for most recent water use data.

9. See attached Supplemental Engineering Report for raw water quality information for Section 25 (Appendix C), and a previous report prepared by Gee & Jenson, October 1979, "Summary Report for Acme Improvement District Test Well Program" for available water quality data on Wells 1 through 17.

10. Not applicable.

11. Acme Improvement District is currently experiencing severe problems with their existing raw water supply wells (Wells 1 to 17). These include water quality problems, short life expectancy of wells, diminishing pumping rates, and inadequate capacity and low pumping rates from the existing wellfield locations.

    The existing areas (Wells 1 to 6, 7 to 17) are prone to natural saltwater contamination at shallow depths due to the existence of connate sea water in the region. This problem led to the necessity of extensive exploration for a better raw water supply. The proposed Section 25 wellfield, described in depth in the attached Supplementary Engineering Report, proved to be an area most likely to supply a reliable long-term supply of adequate quality water to Acme Improvement District. Extensive testing of Test Well No. 18 verified this.

    The present pumping capacity is 1.03 mgd when all wells are pumping (Table 3). The present average day and maximum day demand is about 0.7 mgd and 1.07 mgd, respectively. This data shows that immediate action needs to be taken to supplement the existing raw water supply.

C. FUTURE FACILITIES AND PUMPAGE

1. The projected annual allocation, 910 mgy, was determined using unit projections for residential, builder-owned, and commercial units and their corresponding consumption rates for 1988. See Table 1.

2. Installed capacity:

   a. Listed below is a summary of requirements:

1988 maximum day demand	3.76 mgd
1980 maximum day demand	1.07 mgd
Additional required demand	2.69 mgd
For an efficient wellfield operating program 100% standby capacity is required =	2.69 mgd
Total capacity required for meet 1988 demands	5.38 mgd

   b. Proposed sites for new supply wells are located in Section 25, Township 44 South, Range 41 East. The 10 proposed wells will be constructed similiarly to Test Supply Well No. 18 already drilled in this area. See table 3 and Supplemental Engineering Report (Figure 4) for construction details. It is estimated each proposed well will have a capacity of about 750 gpm (about 1 mgd).

   c. After an extensive site selection process and test well drilling program, Section 25 was selected as the most feasible in terms of water quality, water availability, location, and legal aspects. The Supplementary Engineering Report provides additional details. Gee & Jenson also prepared a Summary Report for the Test Well Program, 1979, that provides additional background data.

   d. The recommended wellfield operation program for Section 25 wellfield would have 5 of the 10 proposed wells operating at any one time, alternating with the other 5 every 24 hours. See the Supplemental Engineering Report for recommendations and further details.

3. Proposed Water Treatment Facilities:

   a. Construction is underway for Expansion II, which will provide an additional capacity of 2.0 mgd, for a total plant capacity of 3.65 mgd.

b. The projected completion date for Expansion II is October 1981.

4. The proposed per capita daily use is 158 gpcd. The estimated number of persons per unit is 2.61, based upon data from Gee & Jenson, March 1980., "Water and Wastewater Facilities Expansion Program." See also Table 1.

5. Population Projection: See Table 1.

6. Water Use Projection: See Table 1.

7. Not applicable. Past water use was used primarily for construction and only five complete years of pumpages are available.

8. Not applicable.

9. Not applicable.

10. Impact on other users of water: An in-depth hydrogeologic analysis was performed on Test Supply Well No. 18 in Section 25 to determine aquifer parameters and impacts associated with pumping. The Supplementary Engineering Report discusses this in detail. In summary, no noticeable impact was found to occur as a result of pumping on shallow wells in the area. Aquifer coefficients of T=32,000 gpd/ft and S=0.1 were used for design purposes. A minimum spacing of 1600 feet between wells and a pumping rate of 750 gpm was found to cause neglible impact under a proper wellfield operation and management program.

11. None

12. None

13. None

D. SURFACE WATER USE

Not Applicable.

E. RESERSE OSMOSIS TREATMENT

Not Applicable.

F. NEW WELLFIELD

1. a. New wellfield is needed to supplement existing raw water supply system. Refer to the following for additional information:

Section C. 2.a.
Section C. 2.c.
Supplementary Engineering Report

b. Choice of Specific Site:

See: Section C. 2.c.
Supplementary Engineering Report

c. Hydrogeologic information on the site is contained in the Supplymentary Engineering Report

d. The site is located within Acme Improvement District boundaries.

e. The site is located at least 10 miles from the intracoastal waterway.

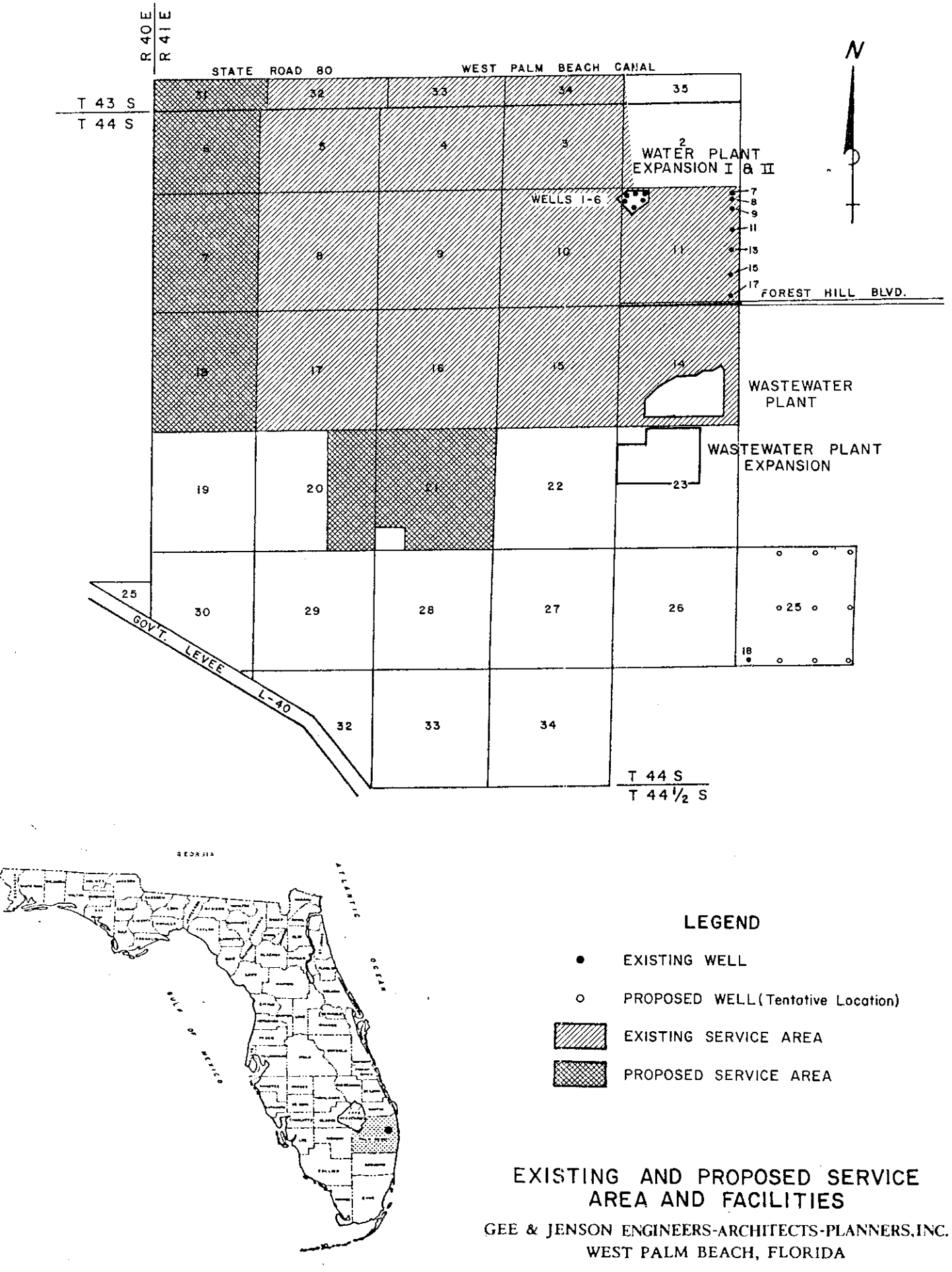
G. AFFIDAVIT FOR PROPOSED FACILITIES

Not Applicable.

REFERENCES

Gee & Jenson, October 1979, "Summary Report for Acme Improvement District Test Well Program."

Gee & Jenson, Revised March 1980, "Water and Wastewater Facilities Expansion Program."



EXISTING AND PROPOSED SERVICE AREA AND FACILITIES

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.
WEST PALM BEACH, FLORIDA

FIGURE 1

TABLE 1

PROJECTED WATER USE

YEAR	RESIDENTIAL			UNDER CONSTRUCTION		COMMERCIAL		TOTAL WATER USE (7)	
	ACTIVE (1) DWELLING UNITS	(2) POPULATION	(3) WATER USE	(4) UNITS	(5) WATER USE	(1) UNITS	(6) WATER USE	AVERAGE DAY	YEARLY
1980	1,533	4,001	600	300	79	23	22	0.701	255.9
1981	2,133	5,567	835	300	79	28	26	0.940	343.1
1982	2,733	7,133	1,070	300	79	33	31	1.180	430.7
1983	3,333	8,699	1,305	300	79	38	36	1,420	518.3
1984	3,933	10,265	1,540	300	79	43	40	1.659	605.5
1985	4,533	11,831	1,775	300	79	48	45	1.899	693.1
1986	5,133	13,397	2,010	300	79	53	50	2.139	780.7
1987	5,733	14,963	2,244	300	79	54	51	2.374	866.5
1988	6,033	15,746	2,362	300	79	55	52	2.493	909.9

(1) Gee & Jenson, March 1980, "Water & Wastewater Facilities Expansion Program." (Growth rate data supplied by Developer.)
(2) Based upon 2.61 persons per unit.
(3) In thousands of gallons for an average day, based upon an average daily consumption of 150 gpcd.
(4) Includes builder owned and under construction, Gee & Jenson, March 1980.
(5) In thousands of gallons for an average day, based upon an average daily consumption of 263 gpd, Gee & Jenson, March 1980.
(6) In thousands of gallons for an average day, based upon an average daily consumption of 940 gpd, Gee & Jenson, March 1980.
(7) In millions of gallons.

TABLE 2

RECENT WATER USE

NOV. 1979 TO OCT. 1980

Year	Month	Raw Water Pumpage Average Day *	Raw Water Pumpage Maximum Day*	Total Raw Water Pumpage *	Total Water Treated*
1979	November	567	931	17,002	16,582
1979	December	611	1,011	18,947	19,346
1980	January	728	1,045	22,572	24,267
1980	February	703	955	20,379	21,428
1980	March	923	1,413	28,626	29,909
1980	April	834	1,280	25,030	25,746
1980	May	993	1,481	30,797	30,428
1980	June	1,135	1,579	34,062	32,378
1980	July	851	1,482	26,376	26,727
1980	August	878	1,315	27,223	27,105
1980	September	795	1,273	23,863	23,234
1980	October	840	1,132	26,034	27,678
	Total	9,848		300,911	304,828
	Average	821		25,076	25,402

* In thousands of gallons

Ratio of water pumped to water treated 0.99.

Maximum day pumpage was 1.579 mgd and occurred on June 16, 1980.

Ratio of maximum day pumpage to average day pumpage was 1.51.

TABLE 3

DESCRIPTION OF EXISTING SUPPLY WELLS

Well No.	Total Depth (feet)	Casing Diameter (inches)	Casing Depth (feet)	Year Drilled	Design Pumping Rate (gpm)	Present Pumping Rate(3) (GPM)	Remarks
1	35	6	20	1972	100	71	
2	45	6	20	1972	100	64	
3	45	6	20	1972	100	52	
4	50	6	25	1972	100	-	Out of service.
5	45	6	20	1972	100	-	Out of service.
6	45	6	20	1972(2)	100	-	Out of service.
7	40	14/6(1)	20	1978	125	67	
8	80	14/6	20	1978	250	107	
9	40	14/6	20	1978	125	77	
11	40	14/6	20	1978	75	51	
13	40	14/6	20	1978	100	98	
15	40	14/6	20	1978	100	126	
17	80	14/6	20	1978	250	-	Temp. out of service
18*	90	18/12	70	1980	N/A	N/A	New test supply well
				TOTAL	1,625	713	
					(2.34 mgd)	(1.03 mgd)	

(1) Outer casing/inner casing.
(2) Put in service in 1978.
(3) As of November 14, 1980.
N/A Not applicable.
* Lithology log included in Supplementary Engineering Report.

TABLE 4

PAST WATER USE

Year	Number of Connections[1]	Average Day[2]	Maximum Day[2]	Total Annual[2]
1973	Records not available			
1974	Records not available			
1975	87	52.1	231.8	19,030
1976	270	135.0	544.7	49,291
1977	540	221.5	486.5	80,860
1978	994	381.5	699.6	139,255
1979	1,966	638.9	1,250.0	233,201

NOTE: 1973-1976 water used primarily for construction.

(1) Total metered services at end of year.

(2) In thousands of gallons.

PART II

SUPPLEMENTARY ENGINEERING REPORT

WATER SUPPLY DEVELOPMENT

SECTION 25

for

ACME IMPROVEMENT DISTRICT

November 1980

GEE & JENSON ENGINEERS · ARCHITECTS · PLANNERS, INC.

2019 OKEECHOBEE BLVD. WEST PALM BEACH, FLORIDA

WATER SUPPLY DEVELOPMENT
SECTION 25

FOR THE

ACME IMPROVEMENT DISTRICT

NOVEMBER 1980

79-183

GEE & JENSON ENGINEERS · ARCHITECTS · PLANNERS, INC.

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Director Emeritus
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THEODORE B. JENSON, P.E.

November 17, 1980

Acme Improvement District
Post Office Box 248
Loxahatchee, Florida 33470

Attention: Mr. Edward C. Lowder
Business Manager

Re: Acme Test Supply Well #18 - Section 25

Gentlemen:

The report entitled "Water Supply Development - Section 25" for Acme Improvement District is being submitted at this time. It is to act as a required supplementary engineering report for the forthcoming Water Use Permit Application to be submitted to the South Florida Water Management District.

The results of the testing indicated a sustained yield of about 5 mgd may be attainable from Section 25 as described in the report.

Yours sincerely,

GEE & JENSON
Engineers-Architects-Planners, Inc.

Heidi Vandor

Heidi Vandor
Hydrogeologist

HV/de
80-196

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EXECUTIVE SUMMARY

The following report was prepared to supplement the application for modification of the existing Water Use Permit to be issued by the South Florida Water Management District (SFWMD).

Gee and Jenson Engineers-Architects-Planners, Inc., contracted with Acme Improvement District on July 30, 1979 to provide professional services in connection with hydrologic testing of a test supply well and preparation of SFWMD Water Use Permit.

Acme Improvement District is in urgent need of supplementing its existing raw water supply. After a lengthy site selection process, Section 25 was selected as being the most feasible.

A test well program defining the geology and water quality was performed to verify the feasibility of Section 25 prior to implementing the more costly Test Supply Well No. 18 Program described in this report. These studies provided the necessary lithologic and hydrogeologic data necessary for the interpretation of the subsurface strata.

An aquifer test was conducted to define the aquifer parameters necessary for the planning and management of the water

resources of the area. A transmissivity and storage coefficient of 34,000 gpd/ft and 0.1, respectively, was used as a conservative estimate for design purposes.

It was found that based on these estimates, Section 25 could support ten wells, each with a capacity in the range of 750 gpm, causing negligible impact. That is, approximately 5 MGD could be withdrawn from the area under a wellfield operating program where five wells would be pumped at any one time.

Recommendations

1. A network of ten supply wells should be constructed in Section 25 of the Acme Improvement District generally in the locations specified. These wells should be spaced approximately 1,600 feet apart. Recommended withdrawal rates are 750 gpm per well which will be dependent upon site specific variations in lithology and hydrology. It is recommended that implementation of well construction be phased starting with the southern wells first.

2. A wellfield operating and management program for these wells is required to minimize withdrawal impacts and retain the integrity of the well construction. The recommended operating program is:

    a. Pump only five wells at a time using alternately spaced wells.

    b. Duration of pumping each bank of wells should not exceed 24 hours.

3. A specific capacity test should be performed on each supply well on completion of construction.

4. A monitoring program should be instituted in Section 25 to determine the sustained yield. The data generated from the monitoring may indicate the potential for increased withdrawals from Section 25 or may indicate a reduction in withdrawals. The monitoring should include recording rainfall, groundwater levels in observation wells, pumping water levels in supply wells, well withdrawals and canal stage.

5. Additional potable water supply of comparable quantity and quality can be anticipated to the

south of Section 25 and to the east of SR 7 as stated in Gee and Jenson's Test Well Summary Report, 1979.

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LIST OF FIGURES

1.0 INTRODUCTION

The following report was prepared to supplement the application for modification of the existing Water Use Permit to be issued by the South Florida Water Management District (SFWMD). The results and conclusions generated are based upon prior discussions with SFWMD staff on the feasibility of implementing a program as described in this report. The staff was in agreement that the proposed use would be reasonable and not cause significant impact on adjacent users.

2.0 PURPOSE AND SCOPE

Gee and Jenson Engineers-Architects-Planners, Inc., contracted with Acme Improvement District on July 30, 1979 to provide professional services in connection with hydrologic testing of a test supply well and preparation of SFWMD Water Use Permit.

Acme Improvement District is in urgent need of supplementing its existing raw water supply. After a lengthy site selection process, Section 25 was selected as being the most feasible. Most other areas under consideration were found to have inadequate water quality, could not be developed quickly enough, or had legal problems associated with their development.

A test well program defining the geology and water quality was performed to verify the feasibility of Section 25 prior to implementing the more costly Test Supply Well No. 18 Program described in this report.

The three test wells constructed as part of Test Well Program - Section 25, in addition to the four observation wells and test supply well of the Test Supply Well No. 18 program provided the necessary lithologic and hydrogeologic data necessary for the interpretation of the subsurface strata. In addition, they can serve as permanent observation wells for water levels and water quality.

The location of the aquifer test is in the southwest quarter of Section 25, T 44 S, R 16 E in Palm Beach County (Figure 1). Additional locations of test wells and observation wells are shown in Figures 2 and 3.

3.0 WELL CONSTRUCTION SCOPE AND METHODOLOGY

A total of seven observation wells and one test supply well were constructed within the Acme Improvement District Section 25 between July 28 and September 18, 1980.

The first three wells drilled were TW 13, TW 14 and TW 15, as part of Test Well Program - Section 25. They were drilled on July 28th, 30th and 31st, respectively.

On August 15, 1980, construction of Test Supply Well No. 18 was commenced and finished on September 10, 1980. Upon completion, one shallow and three deep observation wells were drilled. They were 18-1S, 18-1D, 18-2D and 18-3D (also designated as 1S, 1D, 2D and 3D). Locations of the observation wells and Test Supply Well No. 18 (PW #18) are shown in Figures 2 and 3. Refer to Table 1 and Figure 4 for a summary of well construction specifications.

All wells were constructed using the mud rotary drilling method. During construction of each well, cutting samples were collected at five feet intervals and described according to lithology. These descriptions can be found in Appendix A.

3.1 Test Well and Observation Well Construction

A total of seven, 2 inch P.V.C. wells were constructed. A 7-7/8 inch hole was drilled to the designated well depth. Well construction consisted of 2 inch Schedule 40 P.V.C. casing from land surface to the designated casing depth.

Two inch Schedule 40, #40 slot P.V.C. screen was installed below the casing to the bottoms of the wells. Silica sand (0.75 mm) was installed as annular gravel pack between the casing and the formation from the base of the screens up to approximately ten feet above the screen. The remaining annulus was backfilled with native sediments. The wells were developed by pumping compressed air at a rate of 100 cfm through an air line until a sediment free sample was obtained. On completion of development, a 30 inch x 30 inch x 4 inch reinforced concrete pad was constructed around each well and finished with threaded caps.

3.2 Test Supply Well (PW #18) Construction

Construction began by drilling a 7-7/8 inch pilot hole to act as a guide for the larger 24 inch bit and also to provide information as to the optimum depth for setting the casing in the formation. The hole was then reamed out to a diameter of 24 inches from the surface down to 71 feet followed by the installation of 18 inch diameter steel casing. The annulus was grouted with cement to 71 feet. After the cement had hardened, a nominal 18 inch diameter hole was drilled from the bottom of the steel casing to a depth of 90 feet. Due to the abundance of unconsolidated carbonate sand surrounding the limestone, 20 feet of 12 inch telescope size

#100 slot stainless steel well screen was installed from 70 to 90 feet and 12 inch Schedule 40 P.V.C. inner casing from 70 feet to the surface. The annular space from 90 feet up to the surface was gravel packed with 1/8 to 1/4 inch graded silica gravel. The well was then developed by air lifting with a 600 cfm compressor until the discharge was clear of sediment and mud. A 6 feet x 6 feet x 12 inch concrete pad was constructed around the well. A 4 inch gravel tube for addition of gravel to the annulus was welded onto the outer casing. The well was finished by capping and welding a steel plate between the outer and inner casing.

4.0 LITHOLOGY

Detailed lithologic descriptions are provided in Appendix A of the report. In general, the upper five feet are composed of silica sand. It is white, fine to very fine-grained, with a trace of shell and organics. From 5 to 15 feet, a lithified, intrasparite limestone is encountered. It is composed of a high percentage of medium to fine-grained silica sand with abundant shell fragments and varies from light grey to light brown. Underlying the limestone is a silica sand unit of about 45 to 55 feet thick. It is phosphatic, fine to very fine-grained, and varies from light brown to light grey. At about 60 to 65 feet, a well-lithified

limestone occurs as thin, discontinuous lenses interlayered with a silty grey carbonate sand. The limestone is a intra-biosparite which is grey to dark grey in color and contains silica sand, shell fragments and phosphate. The unit ranges in thickness from 40 to 55 feet. A silty grey carbonate clayey sand unit starts at 100 to 130 feet below the surface. This unit was only fully penetrated in two wells (TW 13 and TW 8) and its thickness was 10 feet. This unit appears to act as a confining or semi-confining bed. Above this unit potable water exists, below the unit highly mineralized water under artesian pressure is encountered. A micritic limestone was encountered at 110 feet. It is light brown with abundant shell fragments, poorly lithified and contains some silty clay and highly mineralized water. This information supplements a previous report prepared by Gee and Jenson in defining the areas with water supply development potential (Gee and Jenson, October 1979, Summary Report for Acme Improvement District, Test Well Program).

5.0 AQUIFER TEST

5.1 General Description

An aquifer test was conducted for Acme Improvement District to determine aquifer parameters necessary for the planning

and management of the water resources of the area. The test was started on September 24, 1980. It involved pumping one well at a constant rate of 900 gpm for a duration of 72 hours and observing resulting drawdowns and changes in water levels in nearby observation wells and canals. The site of the aquifer test was in the southwest corner of Section 25 as shown in Figure 1. Figure 3 shows the configuration of the wells and instrumentation used, and Figure 5 the distances between wells. The pumping well (PW #18) was 12 inches in diameter and screened from 70 to 90 feet. Four 2 inch diameter wells were installed as observation wells of which three were deep (18-1D, 182D, 18-3D) and one shallow (18-1S). Methods of well construction are described in Section 3.0 and generally depicted in Figure 5. Staff gages were installed in nearby canals (SG-1, SG-2, SG-3) to measure stages (Figure 3). A temporary rain gage was installed at the site to measure any rainfall. Water was discharged from the site into a canal flowing away from the site about 450 feet from the pumped well. The data from the test was analyzed using analytical techniques to obtain aquifer parameters. The conjunctive use of drilling data and analytical solutions of the test results were used to determine the values of these aquifer parameters and to interpret the results. The Boulton Method for aquifer analysis has been utilized and included in this report as the methods of

analysis to determine the coefficients of transmissivity and storage. After trying several methods of analysis and comparing the underlying assumptions associated with each method with field conditions, the Boulton Method was found to be the most representative. The coefficients of transmissivity and storage are essential in determining the characteristics of the aquifer in this region.

Transmissivity (T) is defined as the rate of flow of water at prevailing water temperature, in gallons per day per foot through a vertical strip of aquifer one foot wide extending the full saturated thickness of the aquifer under a hydraulic gradient of 100 percent. A hydraulic gradient of 100 percent means a one foot drop of water level in one foot of flow distance.

The coefficient of storage (S) of an aquifer is the volume of water released from storage per unit of surface area of the aquifer, per unit change in head. In water table aquifers, the storage coefficent is the same as the specific yield of the material dewatered during pumping. In confined aquifers it is the result of compression of the aquifer and expansion of the contained water when the head (pressure) is reduced during pumping.

5.2 Method of Data Analysis

The Boulton Delayed Yield method has been utilized and included in this report as the primary method of analysis since the subsurface conditions most closely resemble the basic assumptions.

Boulton Method of Analysis

Boulton (1963) produced a semi-empirical solution that reproduces all three segments of the time-drawdown curve in an unconfined aquifer. During the first segment, covering a short period of pumping, an unconfined aquifer reacts in the same manner as a confined aquifer. Water is released instantaneously from storage by the compaction of the aquifer and by the expansion of water. This portion of the curve is identical to the Theis-type curve. During the second segment, the effects of gravity drainage are felt. The slope of the time-drawdown curve decreases relative to the Theis curve due to dewatering of the falling water table which is greater than that which would be delivered by an equal decline in a confined potentiometric surface. The third segment occurring at later times once again conforms to the Theis-type curve.

Boulton's solution required the definition of an empirical "delay index" that is related to the vertical components of flow that are induced in the flow system and is a function of radius and time.

The following assumptions apply when using the Boulton Method:

- aquifer has seemingly infinite areal extent
- the aquifer is homogenous, isotropic, and of uniform thickness over the area influenced by the pumping test.
- prior to pumping, the phreatic surface is horizontal over the area influenced by the pumping test.
- the discharge rate is constant from the pumped well.
- the pumped well penetrates the entire thickness of the aquifer and receives water by horizontal flow.
- the aquifer is unconfined but showing delayed yield phenomena or the aquifer is semi-unconfined.
- the flow to the well is in an unsteady state.
- the diameter of the well is small, ie. the storage in the well can be neglected.

To calculate the aquifer parameters, drawdown is plotted against time on double logarithmic graph paper. By curve matching the Boulton Delayed Yield Type Curves, match points are determined allowing the following equations to be used to calculate the transmissivity and storage coefficient for early time and late time data:

$$T = \frac{114.6Q}{s} W(u_{AY}, r/B) \qquad \text{and} \quad S = \frac{Tt}{2693r^2} u_{AY}$$

where:

T = transmissivity (gpd/ft)

S = storage coefficient (dimensionless)

Q = discharge from pumping well (gpm)

r = distance of observation wells from pumped well (ft)

s = drawdown in the observation well (ft)

t = time since pumping started (min)

W (u, r/B) = "well function of Boulton"

subscript A = early time

subscript Y = late time

This method permits analysis for semi-unconfined and unconfined aquifers with delayed yield from storage. It was found that the results generated by the Boulton Method is most representative of actual subsurface conditions and is therefore the method included in this report.

5.3 Results

Observed water levels in the observation wells were collected, reduced and plotted on double logarithmic drawdown vs. time plots for matching the Boulton type curves (Figures 6, 7, and 8). All raw field data has been included in Appendix B. Transmissivity and storage coefficient determinations were made for each of the deep observation wells. Table 2 summarizes the results. Early time results show confined and semi-confined storage coefficient values with an average value of 5.4×10^{-2} due to incomplete dewatering. During this early period of pumping, water is released instantaneously from storage by the compaction of the water and the curve conforms to the Theis curve. During the second segment, the effects of gravity drainage are felt and the slope of the curve decreases relative to the Theis curve due to dewatering of the falling water table. The third segment occurring at later times, once again conforms to the Theis curve. Late time data gave average storage coefficient values of 0.23 which is as expected for an unconfined system. The average transmissivity value for all analyses is about 46,000 gpd/ft. It must be recognized that a considerable range may exist, between 34,000 gpd/ft and 50,000 gpd/ft depending on specific conditions and the method of analysis utilized.

Drawdowns can be calculated based upon the calculated values of T = 46,000 gpd/ft and S = 0.23. These drawdowns were found to be a poor match with the actual drawdowns measured in the field. The lithology in the area indicated water table conditions (refer to Section 4.0 and Appendix A for descriptions). In designing well field systems, conservative values for the aquifer parameters are generally chosen. In this case T = 34,000 gpd/ft and S = 0.1 were found to give reasonably close approximations to field data after three days of pumping. Table 3 shows a comparison of the calculated vs. field drawdowns.

Carrying the analysis further, drawdowns for various intervals of time were calculated. The intervals used were 1 day, 3 days and 30 days, assuming continuous pumping at 900 gpm and no recharge to the system. This extrapolated data is used in a later section to design the wellfield and determine impacts. The drawdown vs. distance data is then plotted in Figure 9 giving a graphical representation of the cone of influence at 900 gpm. In Table 3 it should be noted that although the calculated data after three days of pumping closely resembles the field drawdown data, the system appears to have reached near equilibrium after one day of pumping according to the field data. This is further indication that the projected drawdowns are very conservative and represent worst case conditions for design purposes.

6.0 WATER QUALITY

Four test wells (Test Wells 8, 13, 14 and 15) had been drilled in Section 25 prior to construction of Test Supply Well No. 18. Each of these wells showed potable water extending to a depth of approximately 120 feet. Below 120 feet, these test wells produced highly mineralized water under artesian pressure. A low permeability clayey sand (at 100 to 120 feet below lsd appears to act as a confining or semi-confining bed, maintaining this highly mineralized water below it. To avoid vertical migration of this saline water, each of these wells were plugged with grout to 100 feet. Conductivities of 500 to 700 umhos/cm was produced from each of these wells after plugging.

PW 18 was constructed with screen from 70 to 90 feet. Water quality samples were collected from the discharge during the 72 hour aquifer performance test and analyzed for standard potable mineral concentrations (Appendix C). One sample was taken one hour after pumping began at a rate of 900 gpm.

The second sample was taken after 72 hours of pumping, just prior to cessation of the test. These water quality analyses showed no significant change in water quality during the test. Vertical migration of the highly mineralized water below 120 feet of depth was not evident in the production well. Wells in Section 25 can be expected to produce hard water (in the 300 mg/l range) with high concentrations of dissolved solids (500 mg/l range), excessive potable color (30 to 40 NTU's), and fluoride (0.21 mg/l). Concentrations of chloride, sulfate and nitrate are low (60 mg/l, 6 mg/l, <0.1 mg/l, respectively). The chloride concentrations are in the same range as the test wells constructed along Lake Worth Road as presented in Gee and Jenson's report "Summary Report for Acme Improvement District Test Well Program", October 1979. Groundwater of potable quality is present in Section 25. Thickness of potable water ranges from a low of 100 feet in the northwest corner (TW 15) to 120 feet along the south border (TW 13 and TW 14), and to a high of 130 feet in the northeast corner (TW 8).

7.0 WATER SUPPLY DEVELOPMENT POTENTIAL FOR SECTION 25

Development of water supply from the aquifer underlying Section 25 involves determining impacts that the proposed system will have on the water resources and users in the area.

7.1 Projected Cone of Depression

The cone of depression around a pumping well is dependent upon the transmissivity, storage coefficient and pumping rate. Given these variables, the shape and extent of the cone of depression may be predicted. Maintaining T = 34,000 gpd/ft and S = 0.1, and varying the pumping rate, the drawdown with distance from the pumped well is determined. The drawdown versus distance graph for selected pumping rates after 30 days of continuous pumping is shown in Figure 10. The distance of the one foot drawdown contour from the pumping well at varying pumping rates may be determined from the graphs. For example, at a pumping rate of 750 gpm, the one foot drawdown contour would extend a distance of about 1,600 feet from the pumping well after 30 days of continuous pumping and no recharge. See Figure 11 for a schematic representation of the cones of influence. It is felt that the calculated cones of influence are a sufficiently conservative estimate for wellfield design and planning.

7.2 Wellfield Design

The geology, hydrology and water quality of the aquifer indicate that Section 25 of Acme Improvement District has

the capability to support a total of ten supply wells, each with a pumping capacity of about 750 gpm. These locations have been established in Section 25 as indicated in the tentative wellfield configuration shown in Figure 12. A well spacing of at least 1,600 feet should be maintained between wells at the suggested pumping rate of 750 gpm. The exact location and capacity of each well will be subject to site-specific variations in the lithology and hydrology of each location. This is determined during supply well construction and specific capacity testing at each site. It should be noted that a wellfield operating program should be developed as stated in the recommendations.

8.0 RECOMMENDATIONS

1. A network of ten supply wells should be constructed in Section 25 of the Acme Improvement District generally in the locations specified. These wells should be spaced approximately 1,600 feet apart. Recommended withdrawal rates are 750 gpm per well which will be dependent upon site specific variations in lithology and hydrology. It is recommended that implementation of well construction be phased starting with the southern wells first.

2. A wellfield operating and management program for these wells is required to minimize withdrawal impacts and retain the integrity of the well construction. The recommended operating program is:

    a. Pump only five wells at a time using alternately spaced wells.

    b. Duration of pumping each bank of wells should not exceed 24 hours.

3. A specific capacity test should be performed on each supply well on completion of construction.

4. A monitoring program should be instituted in Section 25 to determine the sustained yield. The data generated from the monitoring may indicate the potential for increased withdrawals from Section 25 or may indicate a reduction in withdrawals. The monitoring should include recording rainfall, groundwater levels in observation wells, pumping water levels in supply wells, well withdrawals and canal stage.

5. Additional potable water supply of comparable quantity and quality can be anticipated to the south of Section 25 and to the east of SR 7 as stated in Gee and Jenson's Test Well Summary Report, 1979.

TABLES

TABLE 1

WELL CONSTRUCTION DATA

Well No.	Diameter (in.)	Cased Depth (ft.)	Screened Interval (ft.)	Total Depth (ft.)	Date Drilled
TW 13	2	60	60-130	100*	7-28-80
TW 14	2	60	60-130	100*	7-30-80
TW 15	2	55	55-130	100*	7-31-80
18-1S	2	10	10-60	60	9-12-80
18-1D	2	70	70-90	90	9-11-80
18-2D	2	70	70-90	90	9-15-80
18-3D	2	70	70-90	90	9-16-80
PW-18	outer 18 inner 12	outer 71 inner 70	70-90	90	9-10-80

* grouted up to 100 feet

TABLE 2

SUMMARY OF AQUIFER PARAMETERS

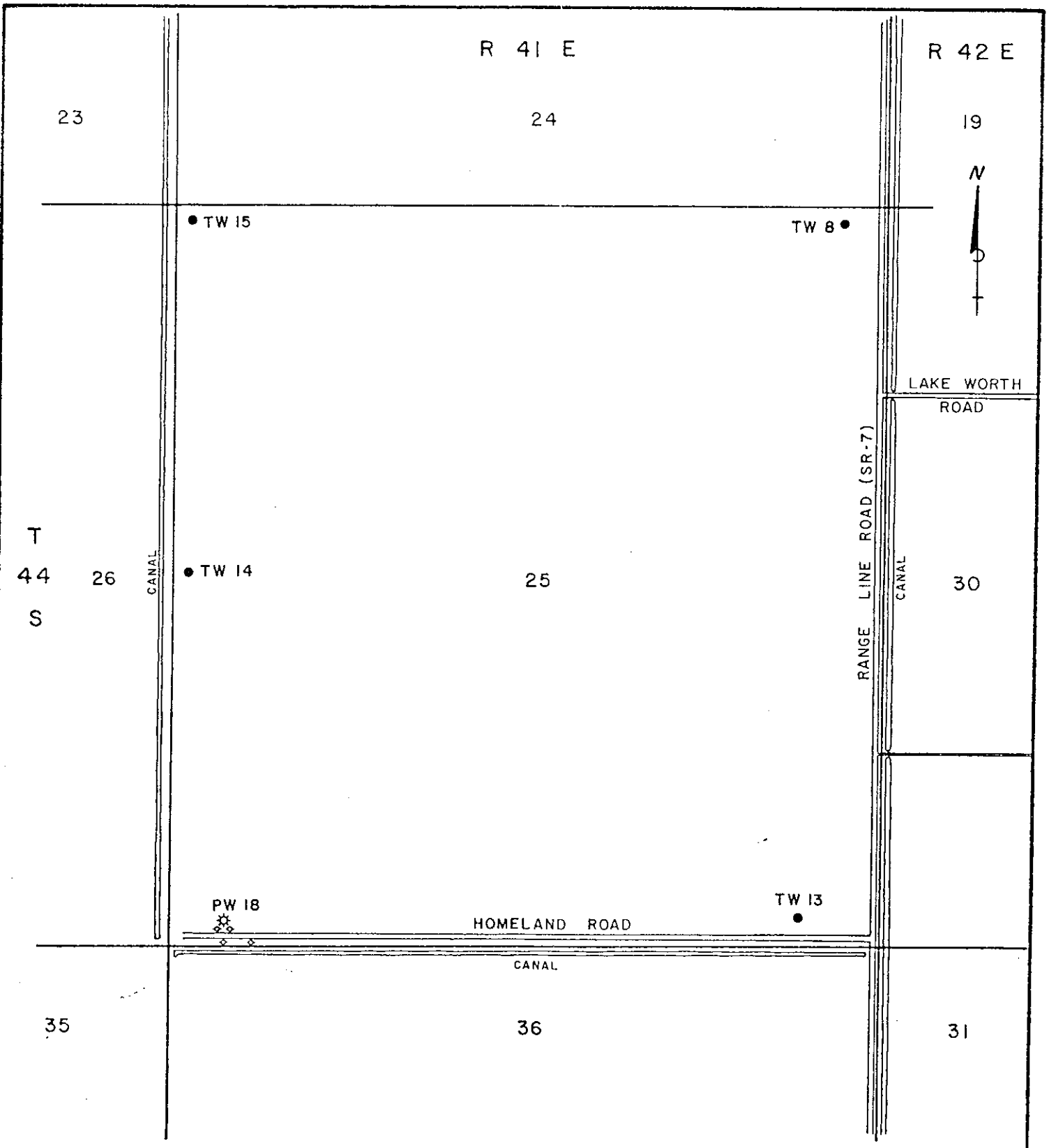
Boulton Method of Analysis

	Early Time	
Well No.	Transmissivity (gpd/ft)	Storage Coefficient
18-1D	33,816	1.6×10^{-2}
18-2D	49,114	2.5×10^{-4}
18-3D	49,114	1.1×10^{-5}
Average	44,015	5.4×10^{-3}

	Late Time	
Well No.	Transmissivity (gpd/ft)	Storage Coefficient
18-1D	*	*
18-2D	46,881	0.26
18-3D	49,114	0.21
Average	47,998	0.23

Average transmissivity (Early Time and Late Time) = 46,000 gpd/ft

*Late Time could not be calculated



EXISTING WELL LOCATIONS
IN SECTION 25

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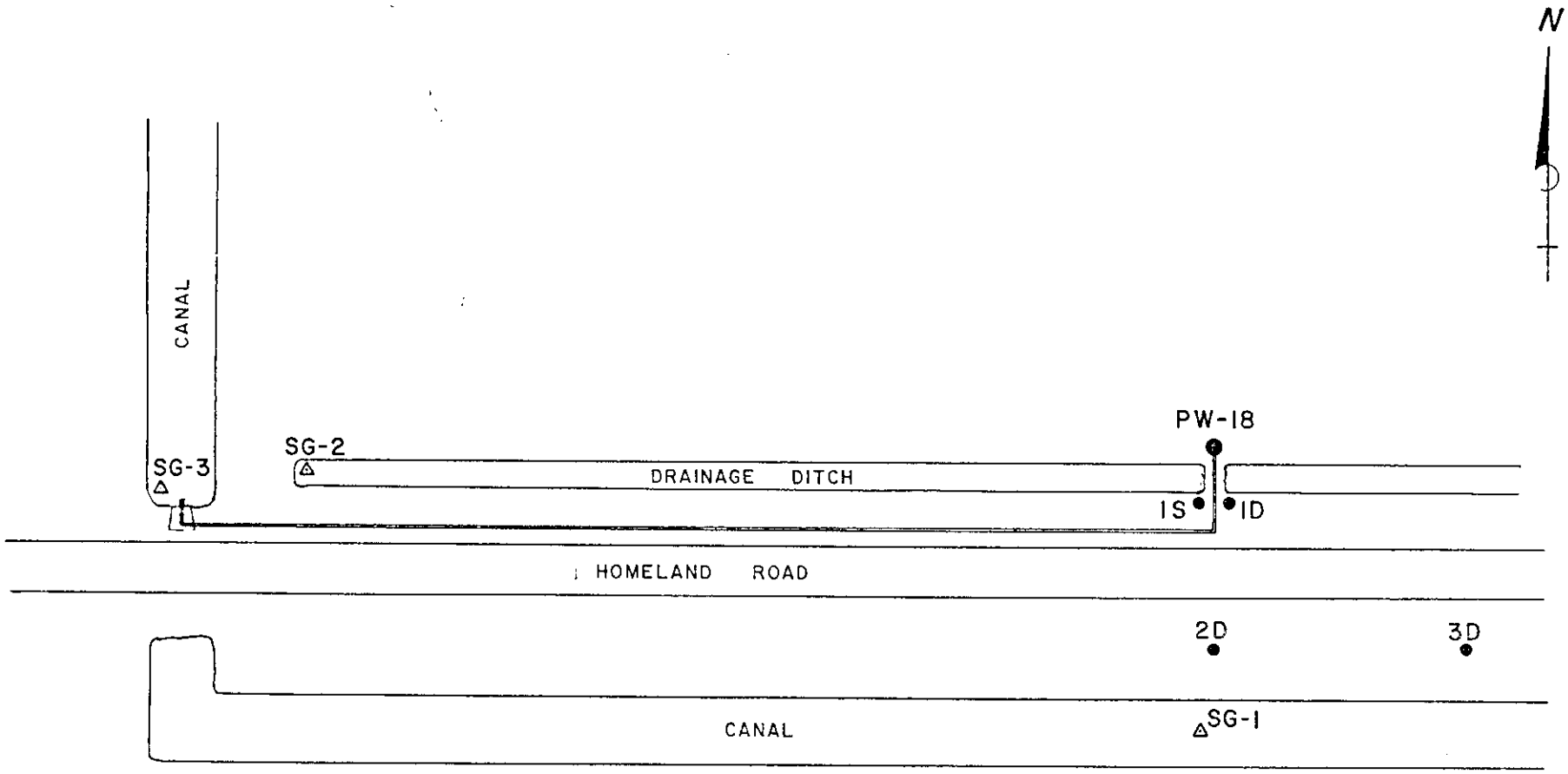
FIGURE 2



LEGEND

- ● DISCHARGING WELL
- ● OBSERVATION WELL (D=DEEP, S=SHALLOW)
- △ STAFF GAGE
- ═ DISCHARGE LINE

SCALE IN FEET

0 100 200

AQUIFER TEST INSTRUMENTATION LAYOUT - PLAN VIEW

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FIGURE 3

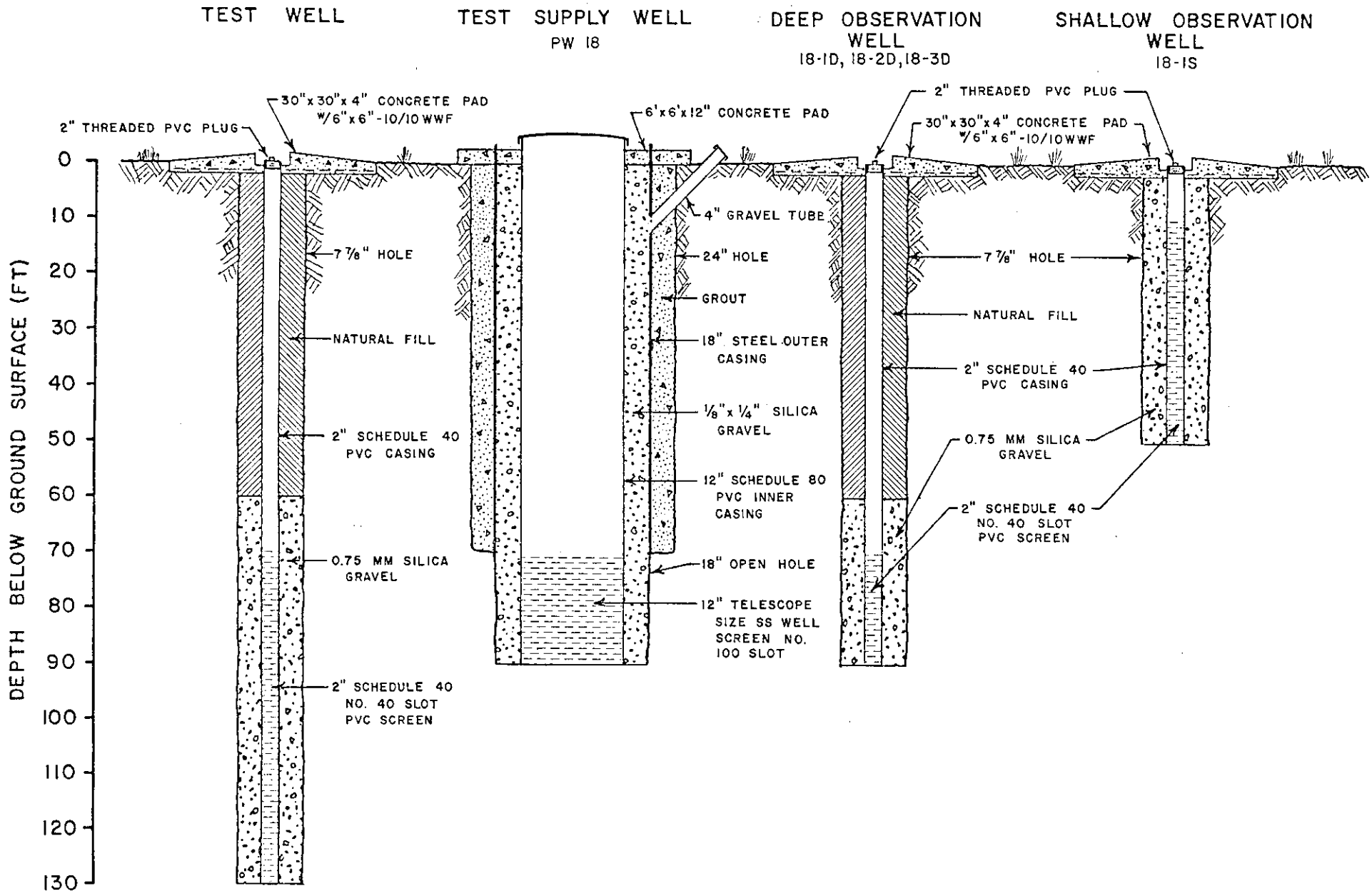

FIGURE 4

TYPICAL WELL CONSTRUCTION

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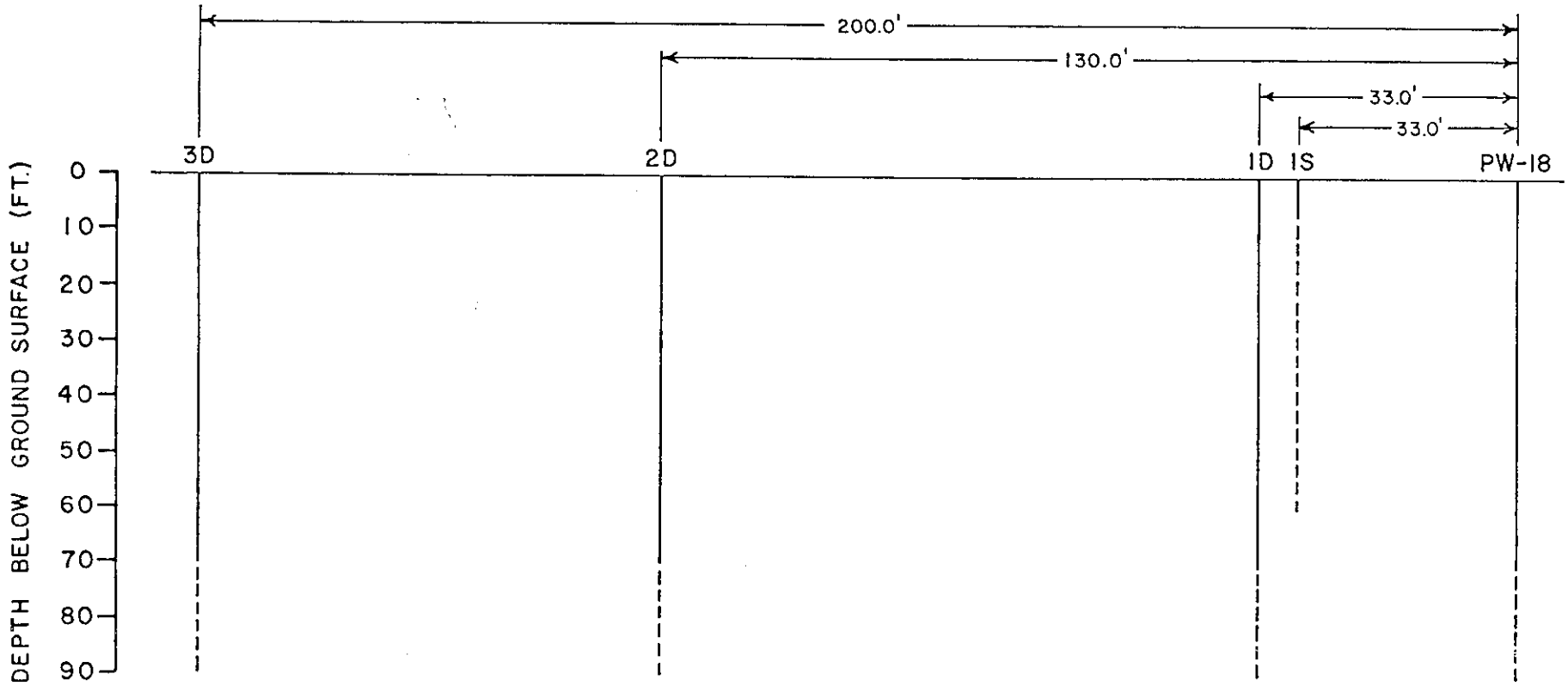

LEGEND

2D WELL NO.

CASED INTERVAL

SCREENED INTERVAL

SCALE IN FEET

0 20 40

SCHEMATIC OF AQUIFER TEST WELL LOCATIONS AND CONSTRUCTION CROSS SECTION

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FIGURE 5

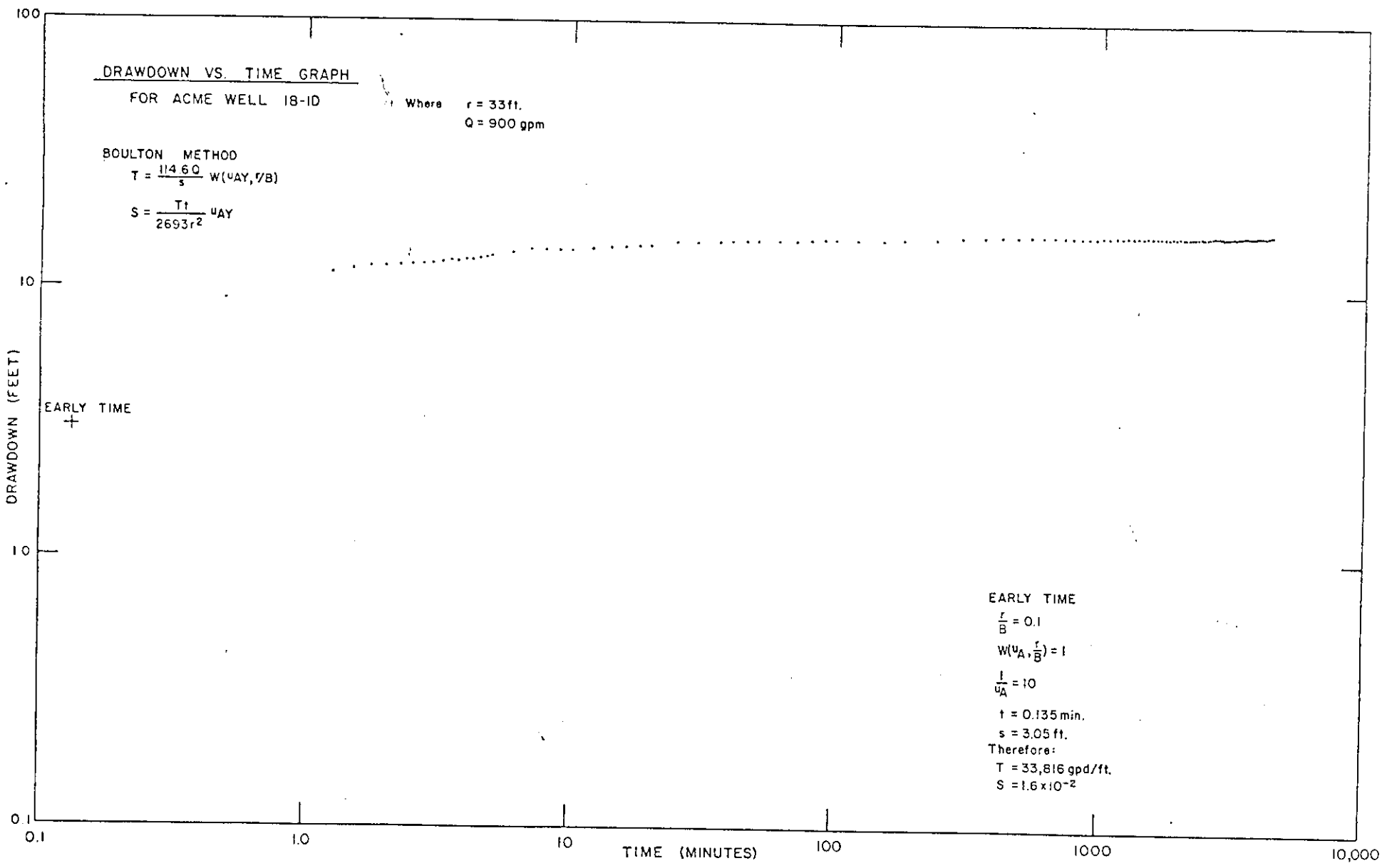

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FIGURE 6

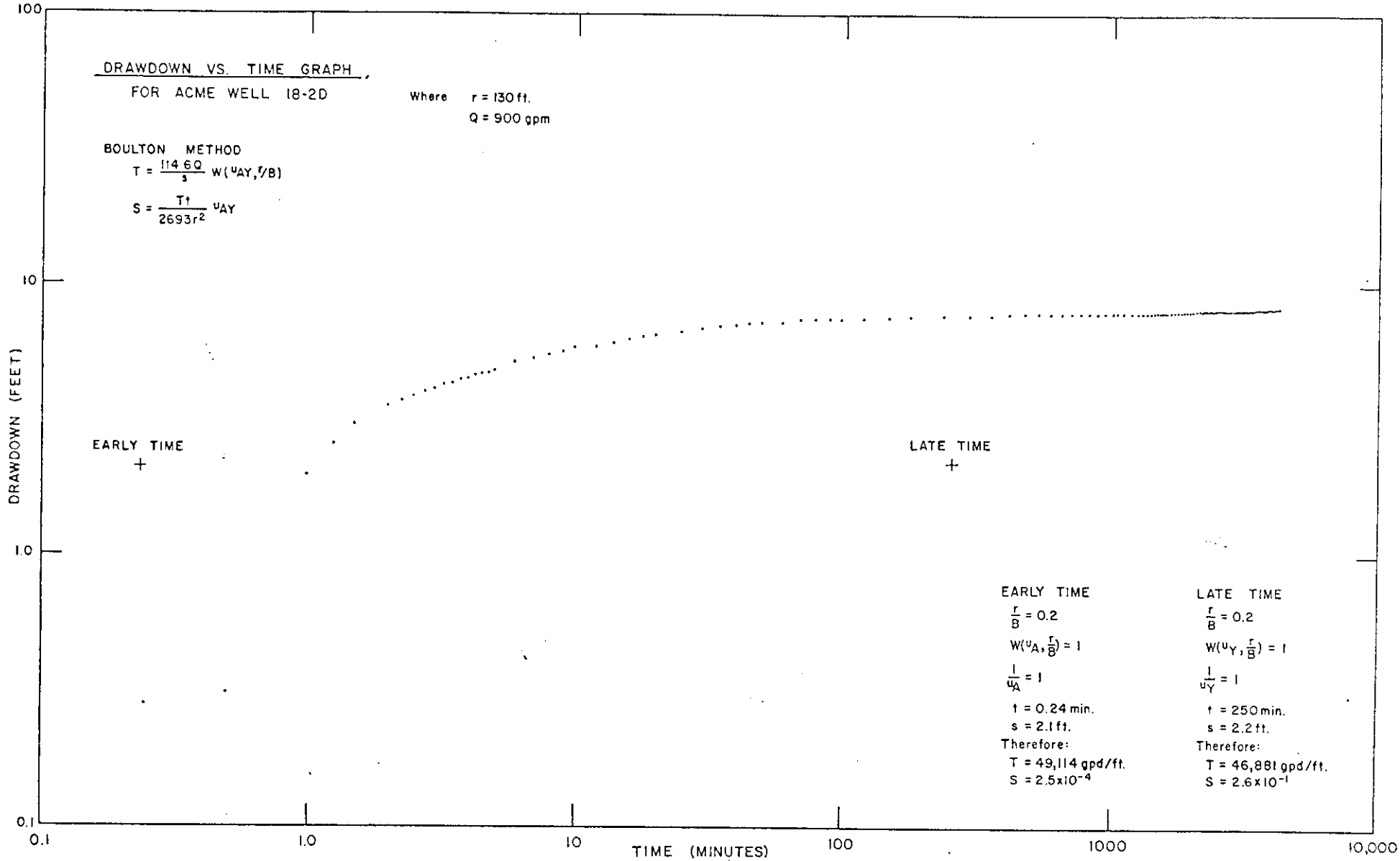

FIGURE 7

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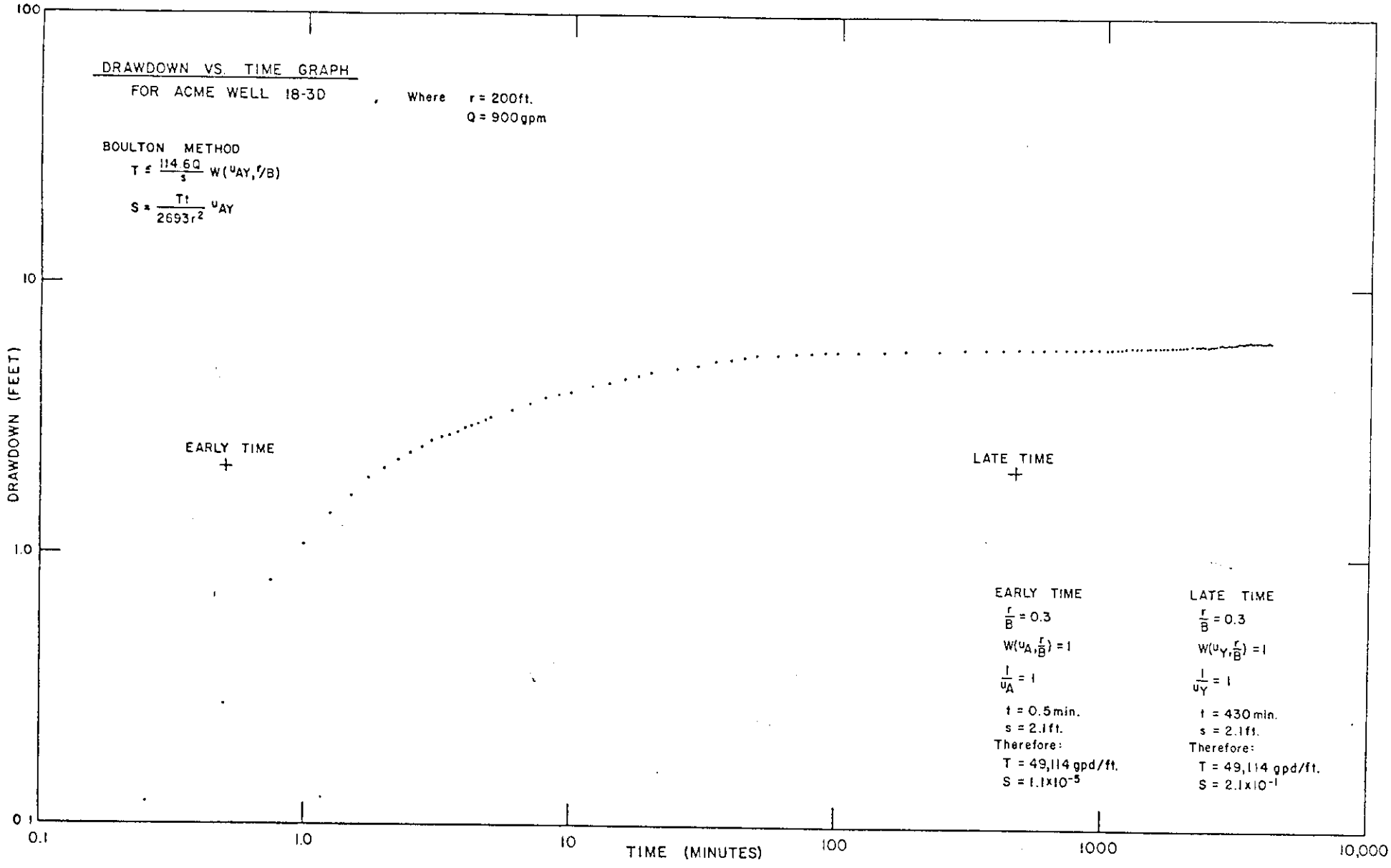

FIGURE 8

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WEST PALM BEACH, FLORIDA

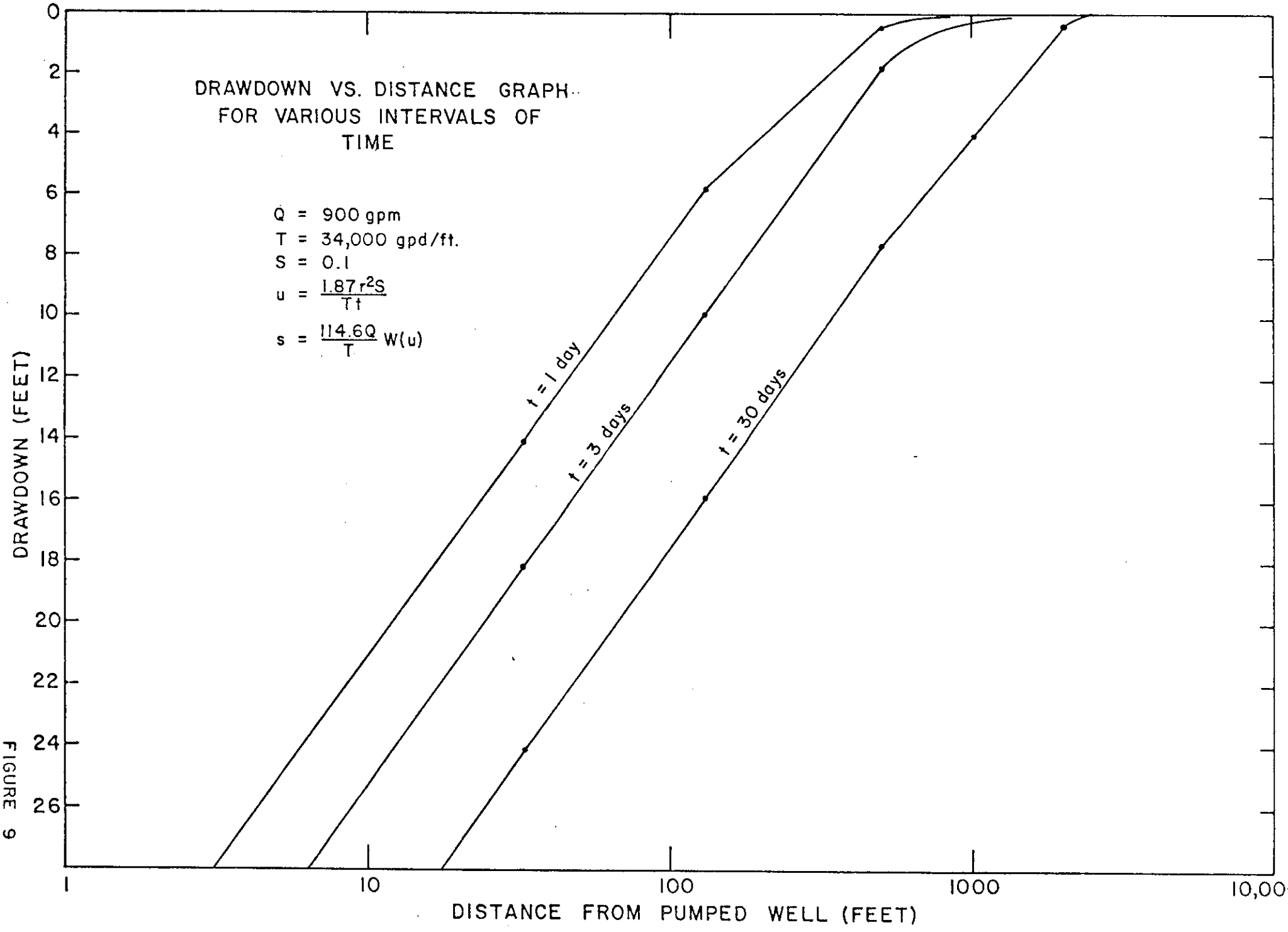
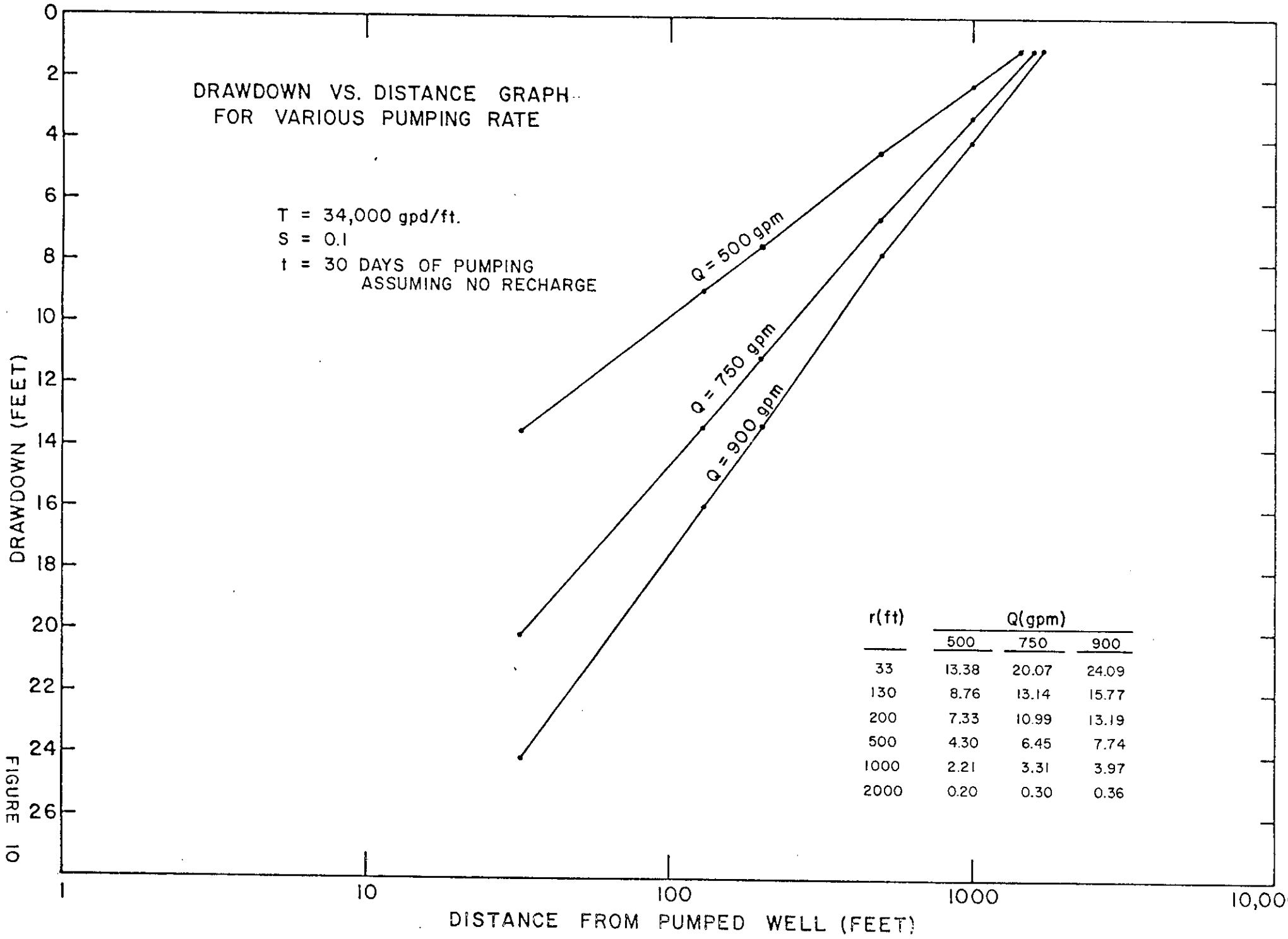
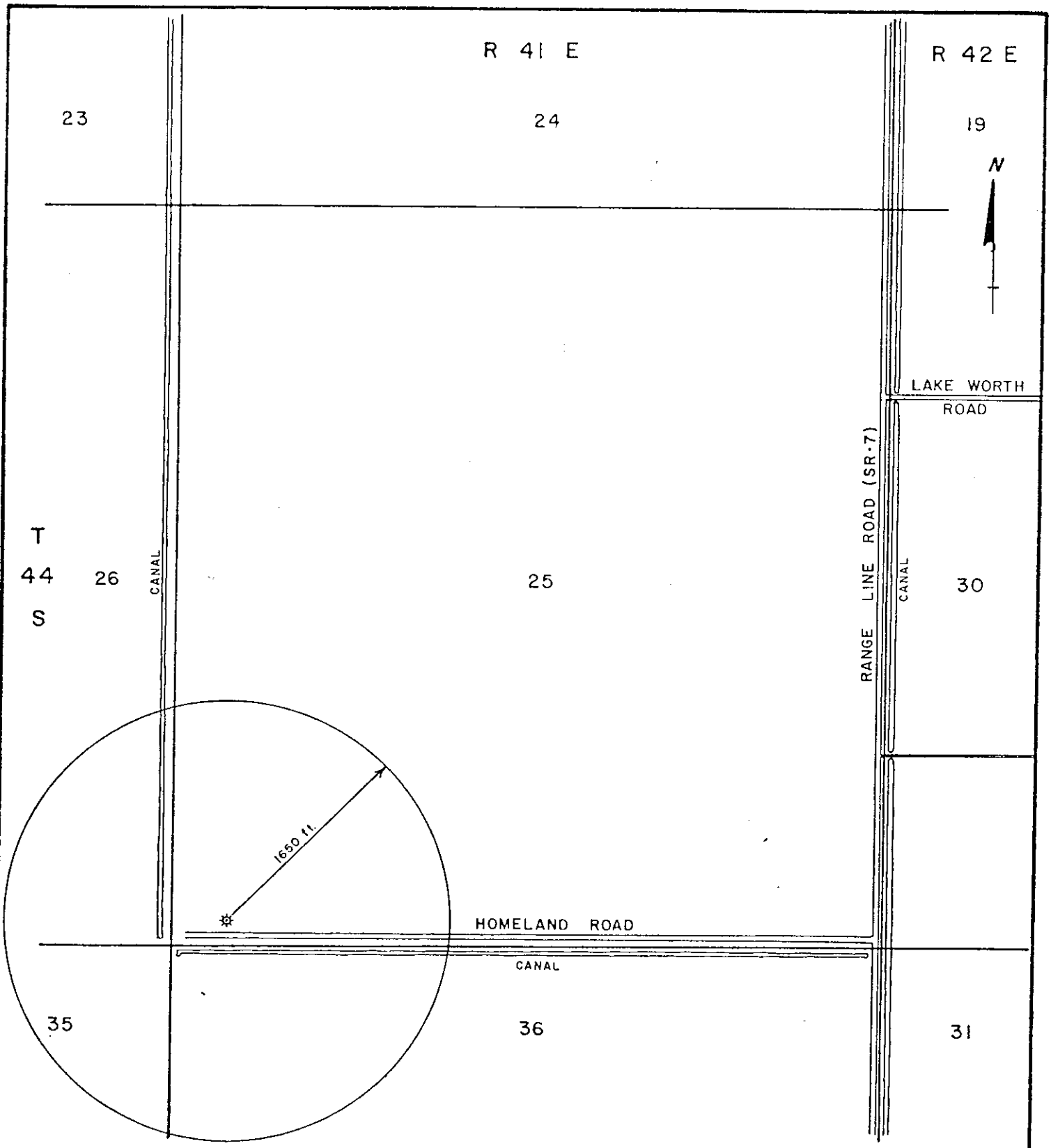

DRAWDOWN VS. DISTANCE GRAPH FOR VARIOUS INTERVALS OF TIME
Q = 900 gpm
T = 34,000 gpd/ft.
S = 0.1
u = 1.87r²S / Tt
s = 114.6Q/T W(u)
t = 1 day
t = 3 days
t = 30 days
DRAWDOWN (FEET)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
1
10
100
1000
10,000
DISTANCE FROM PUMPED WELL (FEET)

FIGURE 9



r(ft)	Q(gpm)		
	500	750	900
33	13.38	20.07	24.09
130	8.76	13.14	15.77
200	7.33	10.99	13.19
500	4.30	6.45	7.74
1000	2.21	3.31	3.97
2000	0.20	0.30	0.36

FIGURE 10



SCALE IN FEET

0 1000 2000

CONE OF INFLUENCE

ASSUMING: Pumping Rate Of 750 gpm
Continuous Pumping For
30 Days - No Recharge

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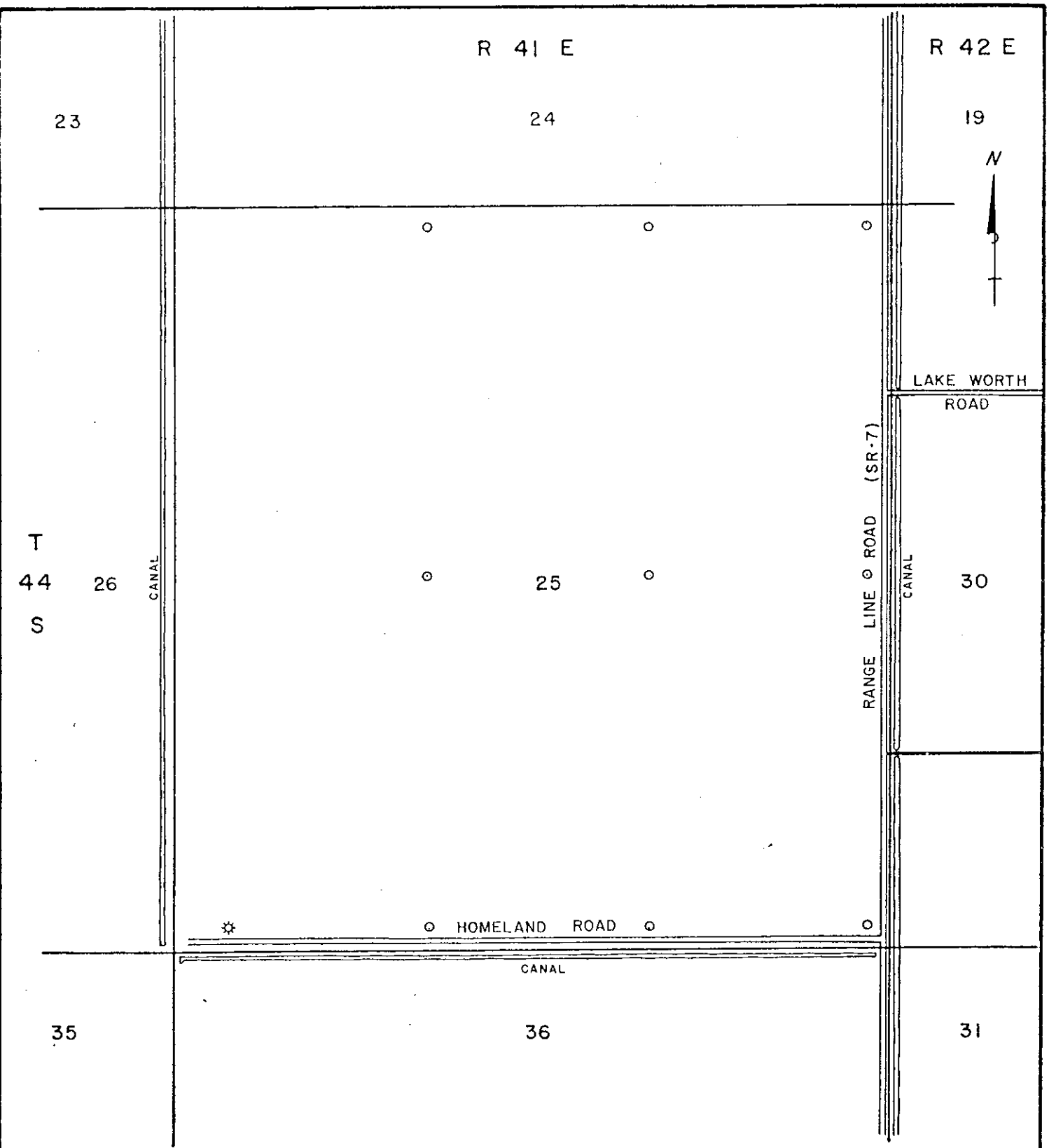
FIGURE 11



LEGEND

☼ EXISTING WELL

○ PROPOSED WELL

SCALE IN FEET

0 1000 2000

PROPOSED SUPPLY WELL LOCATIONS

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FIGURE 12

APPENDIX A

WELL CONSTRUCTION

Well No. PW 18 (Test Supply Well #18)
Location: Acme Improvement District
Driller: Alsay-Pippin
Recorded by: GR
Samples: Cuttings X, Core
Date Drilled: August 15, 1980
Casing: Depth 70 feet
Diameter Outer - 18 inches, Inner - 12 inches
Material Outer - Steel, Inner - Schedule 80 PVC
Screen: Depth 70-90 feet
Diameter 12 inches
Material Telescope Size SS, #100 Slot

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-5	Sand-silica, white, very fine to silt sized grains, trace of organics, unconsolidated.
5-10	Limestone-intrasparite, light gray, cemented fine grained silica sand with pelecypod fragments, abundant, consolidated.
10-15	Limestone-same as above but increase in unconsolidated sand fraction and calcite crystals.
15-20	Sand-silica light brown very fine grained, abundant white pelecypod shellds, 15% intraspartie limestone.
20-25	Same as above.
25-60	Sand-silica, light brown, fine to silt sized grains, trace of white shell fragments, unconsolidated.
60-62	Sand-silica, and intramicritic limestone, white, consolidated and unconsolidated layers.
62-66	Limestone-intrabiosparite, gray, phosphatic, trace of shell fragments, well lithified.
66-68	Limestone-intrabiosparite, gray, mixed with a intra-micrite, much softer, poorly lithified.
68-85	Limestone-intrabiosparite, gray, phosphatic, hard, trace of shell fragments, trace of dolomitic lime-stone, increase in hardness at 80 feet, well lithified.
85-90	Limestone and shell-intrabiosparite, gray with shell lenses, shell is composed of pelecypods and gastropods, trace of medium grained silica sand, limestone is lithified and shell if poorly consolidated.

WELL CONSTRUCTION

Well No. Observation Well 18-1D
Driller: Alsay-Pippin
Samples: Cuttings X, Core
Casing: Depth 70 feet
Diameter 2 inches
Material Schedule 40 PVC

Location: Acme Improvement District
Recorded by: GR
Date Drilled: September 15, 1980
Screen: Depth 70-90 feet
Diameter 2 inches
Material Schedule 40 PVC,#40 S

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-2	Sand-silica, light brown, fine grained, trace of very fine grained shell fragments, unconsolidated.
2-10	Limestone-intrabiomicrite, grayish brown, fine grained silica sand and micritic cement matrix surrounding abundant pelecypods and gastropods, poorly lithified.
10-20	Sand-silica, brown, fine to very fine grained, subangular, unconsolidated, 70%. Shell-white pelecypods and gastropods, large to small, whole and fragmented, 30%.
20-35	Sand-silica, light brown, fine to very fine grained, subangular, abundant pelecypod fragments, unconsolidated.
35-60	Sand-silica, very light brown, fine to very fine grained, subangular to subrounded, trace of white shell fragments, unconsolidated.
60-65	Sand-silica, very light gray brown, fine to very fine grained, subangular to subrounded, trace of black fine grained phosphate particles, unconsolidated.
65-70	Limestone-intrabiosparite, dark gray, pelecypod fragments incorporated in limestone, very fine grained phosphate particles present in silica sand matrix, lithified.
70-85	Limestone-intrabiosparite, same as above but minor large (less than 1 mm) calcite crystals present.
85-90	Limestone-intrabiosparite, light gray, same as 65-70 but surrounded by a matrix of pelecypod and gastropod fragments and carbonate sand, the limestone occurs as individual concretionary bodies, limestone is lithified but the sand and shell matrix is consolidated.

WELL CONSTRUCTION

Well No. Observation 18-2D
Driller: Alsay-Pippin
Samples: Cuttings X, Core
Casing: Depth 70 feet
Diameter 2 inches
Material Schedule 40

Location: Acme Improvement District
Recorded by: GR
Date Drilled: September 15, 1980
Screen: Depth 70-90 feet
Diameter 2 inches
Material Schedule 40,PVC #40 Slot

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-15	Shell-white, gastropods and pelecypods, whole fragmental, poorly consolidated, 80%.
	Sand-silica, light brown, fine grained, 10%.
	Limestone-intrabiosparite, light gray to gray, composed of medium to fine grained silica sand and shell fragments, lithified, 10%.
15-45	Sand-silica, light brown, fine to very fine grained, trace of fine fragmented white shell fragments, unconsolidated.
45-62	Sand-silica, brownish white, fine grained to silt sized grains, trace of black fine grained phosphate particles, unconsolidated.
62-80	Limestone-intrabiosparite, dark gray, composed of fine grained silica sand and white shell fragments, lithified concretions, 60%.
	Sand-silica and carbonate, very fine to fine grained, abundant, very fine grained, black phosphate particles, unconsolidated, 40%.
80-90	Limestone-intrabiosparite, dark gray, composed of fine grained silica sand and white shell fragments with a sparry calcite cement, lithified, 70%.
	Sand and Shell-fine grained silica and carbonate sand, and light brown pelecypod fragments, unconsolidated, 30%.

WELL CONSTRUCTION

Well No. Observation Well 18-3D
Driller: Alsay-Pippin
Samples: Cuttings X, Core
Casing: Depth 70 feet
Diameter 2 inches
Material Schedule 40 PVC

Location: Acme Improvement District
Recorded by: GR
Date Drilled: September 16, 1980
Screen: Depth 70-90 feet
Diameter 2 inches
Material Schedule 40 PVC, #40

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-15	Shell-white, gastropods and pelecypods, whole and fragmental, poorly consolidated, 80% Sand-silica, light brown, fine grained, 10%. Limestone - intrabiosparite, light gray to gray, composed of medium to fine grained silica and shell fragments, lithified , 10%.
15-45	Sand-silica, light brown, fine to very fine grained, trace of fine fragmented white shell fragments, unconsolidated.
45-62	Sand-silica, brownish white, fine grained to silt sized grains, trace of black fine grained phosphate particles, unconsolidated.
62-80	Limestone-intrabiosparite, dark gray, composed of fine grained silica sand and white shell fragments, lithified concretions, 60%. Sand-silica and carbonate, very fine to fine grained abundant very fine grained black phosphate particles, unconsolidated 40%.
80-90	Limestone-intrabiosparite, dark gray, composed of fine grained silica sand and white shell fragments with a sparry calcite cement, lithified 70%. Sand and Shell-fine grained silica and carbonate sand and light brown pelecypod fragments, unconsolidated 30%.

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WELL CONSTRUCTION

Well No. Test Well #13 (TW-13)

Location: Acme Improvement District

Driller: Alsay-Pippin

Recorded by: GR

Samples: Cuttings _____, Core _____

Date Drilled: July 28, 1980

Casing: Depth 130 filled to 100 feet

Screen: Depth 60-130 feet

Diameter 2 inches

Diameter 2 inches

Material Schedule 40 PVC

Material Schedule 40 PVC #40 Slot

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-20	Sand-silica, brown, fine grained, abundant white pelecypods and gastropods, some small limestone fragments, unconsolidated.
20-30	Sand-silica, light brown, fine to medium grained, 70 percent fines, trace of white shell fragments, unconsolidated.
30-50	Sand-silica, very fine to fine grained, light brown, trace of white shell fragments, unconsolidated.
50-62	Sand-silica, very fine to fine grained, light brown, off white shell fragments, unconsolidated, trace of very fine grained phosphate sand.
62-68	Limestone-phosphatic intrabiosparite with lenses of micrite, dark gray to very light brown, some recrystalization and trace of white shell fragments, lithified.
68-79	Limestone-phosphatic intrabiosparite, dark gray abundant recrystalization, abundant pelecypod and gastropod fragments, well lithified.
79-95	Limestone-same as above, but no gastropods and more dense.
95-110	Limestone-phosphatic intrabiosparite, dark gray, abundant recrystalization, abundant pelecypod and gastropod fragments, well lithified, with lens of micrite (3') at 100 feet and an increase in recrystallization of pelecypods.

WELL CONSTRUCTION

Well No. Test Well 13 (TW-13)
Driller: Alsay-Pippin
Samples: Cuttings_____, Core_____
Casing: Depth 130 filled to 100 feet
Diameter 2 inches
Material Schedule 40 PVC

Location: Acme Improvement District
Recorded by: GR
Date Drilled: July 28, 1980
Screen: Depth 60-130 feet
Diameter 2-inches
Material Schedule 40 PVC #40

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
110-120	Limestone-dark gray intrabiosparite interbedded with micrite, abundant shell and silty white clay, barnacle fragments, coral polyps and Echinoderm spines.
120-130	Silty clay, lime mud, carbonate sand, grayish white, trace of phosphate particles with some sparite and micrite.

80-196

WELL CONSTRUCTION

Well No. Test Well #14 (TW-14)
Location: Acme Improvement District
Driller: Alsay-Pippin
Recorded by: GR
Samples: Cuttings _____, Core _____
Date Drilled: July 30, 1980
Casing: Depth 130 filled to 100 feet
Screen: Depth 60-130 feet
Diameter 2 inches
Diameter 2 inches
Material Schedule 40 PVC
Material Schedule 40 PVC #40 Slot

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-26	Sand-silica, shell, white, fine grained, abundant carbonate sand, 60 percent pelecypods, minor gastropods, fill from adjacent ditch, unconsolidated.
26-40	Sand-silica, brown, fine to very fine grained, minor fine grained shell fragments, unconsolidated.
40-67	Sand-silica, light brown, fine to very fine grained, minor fine grained shell fragments, unconsolidated.
67-69	Dolomitic limestone and limestone, brown and gray, some silica sand.
69-75	Limestone-intrabiosparite, gray, phosphatic grains, hardness increases, well lithified.
75-80	Limestone-same as above, but calcite crystals and calcite replacement in pelecypods is minor, also had an increase in fluid loss.
80-85	Limestone-same as above, but harder and fluid loss.
85-90	Limestone-same as above, but hit a 2 foot seam of micrite.
90-109	Limestone-same as above, but a little darker due to phosphate in a few spots.
109-120	Limestone-biosparite, shell fragments and Echinoderm fragments lithified with a sparite/calcite cement, white, density increases and much less fluid loss; abundant white silty clay and micrite.
120-130	Sand-silty, lime mud, shell fragments (mainly pelecypods) minor phosphate and micrite and sparite, loosely consolidated, in places.

WELL CONSTRUCTION

Well No. Test Well #15 (TW-15)
Location: Acme Improvement District
Driller: Alsay-Pippin
Recorded by: GR
Samples: Cuttings _____, Core _____
Date Drilled: July 31, 1980
Casing: Depth 130 filled to 100 feet
Diameter 2 inches
Material Schedule 40 PVC
Screen: Depth 60-130 feet
Diameter 2 inches
Material Schedule 40 PVC #40 Slot

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
0-14	Sand-silica, dolomitic limestone and micrite and abundant shell, light brown, (fill from adjacent canal).
14-50	Sand-silica, light brown, fine to very fine grained, trace of fine to medium grained shell fragments, unconsolidated.
50-56	Sand-silica, light gray, fine to very fine grained, abundant fine grained phosphate, trace of shell fragments, unconsolidated.
56-70	Limestone-gray intrabiosparite, phosphatic, trace of micritic limestone, (bio), lithified.
70-79	Limestone-gray intrabiosparite, phosphatic, trace micritic limestone (bio), lithified; trace of silty white clay and micrite.
80-	Shell-lense, gastropods, pelecypods and abundant clay.
81-90	Limestone: gray intrabiosparite, phosphatic, trace of micritic limestone lithified, with a trace of shell fragments.
90-98	Same as above with an increase in shell fragments, pelecypods and gastropods.
98-100	Sand-silica, carbonate sand, fine grained shell fragments, abundant phosphate, light gray, trace of silty clay, unconsolidated.
100-107	Sand-silica, some carbonate, fine grained shell fragments, abundant phosphate, light gray, trace of silty clay, unconsolidated.
107-110	Shell-white to light brown, pelecypod and gastropod fragments, poorly consolidated.

WELL CONSTRUCTION

Well No. Test Well #15 (TW-15)
Driller: Alsay-Pippin
Samples: Cuttings _____, Core _____
Casing: Depth 130 filled to 100 feet
Diameter 2 inches
Material Schedule 40 PVC

Location: Acme Improvement District
Recorded by: GR
Date Drilled: July 31, 1980
Screen: Depth 60-130 feet
Diameter 2 inches
Material Schedule 40 PVC #30

DEPTH BELOW LAND SURFACE (FEET)	LITHOLOGY DESCRIPTION
110-120	Limestone-biointramicrite, light brown, abundant pelecypods and gastropods, abundant silty clay, poorly lithified, trace of phosphate.
120-132	Limestone-intrabiomicrite, light gray, abundant phosphate and silty white clay, trace of pelecypods, poorly lithified.

80-196

APPENDIX B

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.
2019 OKEECHOBEE BOULEVARD, WEST PALM BEACH, FLORIDA . . . 33409 . . . 305 - 683-3301

FRED A. GREENE, P.E.
RICHARD M. MILLER, P.E.
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H. C. GEE, P.E.
THEODORE B. JENSON, P.E.

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Location Homeland Road

Elevation _____ MSL Measuring Point Top of Casing

Distance to Pumped Well 0 feet Discharge 900 GPM

Total Depth 90 feet Cased Depth 0-70 feet Diameter 12 IN

Starting Date of Test 9/24/80 @ 1000

Time		Water Level (ft)			Draw-Down (ft)	Measured by	Adjustments			Remarks
(hr)	(min)	Held	Wet	Below MP			De-watering	Back-ground Levels		
7:	50			4.20						M-Scope
				4.23						Tape
9:	17			4.20						
9:	47			4.21						
9:	59			4.21		KD	STATIC			
	.25									
	.50			30.46	26.25	KD				
	.75			36.20	31.99	KD				
	1.00									
	1.25			37.20	32.99	KD				
	1.50			37.70	33.49	KD				
	1.75			37.05	32.84	KD				
	2.00			36.40	32.19	KD				
	2.25			36.35	32.14	KD				
	2.50			36.40	32.19	KD				
	2.75			36.48	32.27	KD				

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels		Remarks
	3.00									
	3.25			36.58	32.37	KD				
	3.50			36.66	32.45	KD				
	3.75			36.72	32.51	KD				
	4.00			36.84	32.63	KD				
	4.25			36.86	32.65	KD				
	4.50			36.92	32.71	KD				
	4.75			37.02	32.81	KD				
	5			37.12	32.91	KD				
	6			39.20	34.99	KD				
	7			39.10	34.89	KD				
	8			38.54	34.33	KD				
	9			38.33	34.12	KD				
	10			38.44	34.23	KD				
	12			38.68	34.51	KD				
	14			38.94	34.73	KD				
	16			39.08	34.87	KD				
	18			39.30	35.09	KD				
	20			39.44	35.23	KD				
	25			39.64	35.43	KD				
	30			39.79	35.58	KD				
	35			40.18	35.97	KD				

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS INC

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Adjustments Back-ground Levels		Remarks
	40			40.26	36.05	KD				
	45			40.26	36.05	KD				
	50			40.23	36.02	KD				
1	60			40.46	36.25	KD				
	70			40.51	36.30	KD				
	80			40.59	36.38	KD				
	90			40.70	36.49	KD				
	100			40.64	36.43	KD				
2	120			40.74	36.53	KD				
	150			40.87	36.66	KD				
3	180			40.87	36.66	JE				
4	240			40.97	36.76	JE				
5	300			41.14	36.93	JE				
6	360			41.23	37.02	JE				
7	420			41.46	37.25	JE				
8	480			41.47	37.26	KD/JE				
9	540			41.47	37.26	KD/JE				
10	600			41.45	37.24	KD/JE				
11	660			41.50	37.29	KD/JE				
12	720			41.54	37.33	KD/JE				
13	780			41.66	37.35	KD/JE				
14	840			41.69	36.38	KD/JE				

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels		Remarks
15	900			41.73	37.52	KD/JF				
16	960			41.55	37.34	KD/JF				
17	1020			41.62	37.41	KD/JF				
18	1080			41.64	37.43	KD/JF				
19	1140			41.70	37.49	KD/JF				
20	1200			41.80	37.59	KD/JF				
21	1260			41.91	37.70	GR				
22	1320			41.82	37.61	GR				
23	1380			41.98	37.77	GR				
24	1440			41.72	37.51	GR				
25	1500			41.94	37.73	GR				
26	1560			41.93	37.72	GR				
27	1620			41.99	37.78	GR				
28	1680			41.97	37.76	GR				
29	1740			42.18	37.97	GR				
30	1800			42.23	38.02	GR				
31	1860			42.04	37.83	GR				
32	1920			42.05	37.84	GR				
33	1980			42.07	37.86	JF/KD				
34	2040			42.20	37.99	JF/KD				
35	2100			45.40	41.19	JF/KD				
36	2160			42.31	38.10	JF/KD				

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. ~~PW-18~~

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels		Remarks
37	2220			42.32	38.11	JF/KD				
38	2280			42.20	37.99	JF/KD				
39	2340			42.22	38.01	JF/KD				
40	2400			42.27	38.06	JF/KD				
41	2460			42.30	38.09	JF/KD				
42	2520			42.31	38.10	JF/KD				
43	2580			42.37	38.16	JF/KD				
44	2640			42.40	38.19	JF/KD				
45	2700			42.87	38.66	JF/KD				
46	2760			42.50	38.29	JF/KD				
47	2820			42.52	38.31	JF/KD				
48	2880			42.30	38.09	JF/KD				
49	2940			42.40	38.19	JF/KD				
50	3000			42.47	38.26	JF/KD				
51	3060			42.48	38.27	JF/KD				
52	3120			42.54	38.33	JF/KD				
53	3180			42.59	38.38	JF/KD				
54	3240			42.61	38.40	JF/KD				
55	3300			42.56	38.35	JF/KD				
56	3360			42.45	38.24	JF/KD				
57	3420			42.53	38.32	GR/MK				
58	3480			42.65	38.44	GR/MK				

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Adjustments Background Levels		Remarks
59	3540		42.73	38.52	GR/MK					
60	3600		42.88	38.67	GR/MK					
61	3660		42.63	38.42	GR/MK					
62	3720		42.42	38.21	GR/MK					
63	3780		42.62	38.41	GR/MK					
64	3840		42.71	38.50	GR/MK					
65	3900		42.68	38.47	GR/MK					
66	3960		42.65	38.44	GR/MK					
67	4020		42.73	38.52	GR/MK					
68	4080		42.82	38.61	GR/MK					
69	4140		42.73	38.52	GR/MK					
70	4200		42.66	38.45	GR/MK					
71	4260		42.80	38.59	GR/MK					
72	4320		42.73	38.52	GR/MK					

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Adjustments Back-ground Levels		Remarks
	9:58 RECOVERY			42.73	38.52	JF				
	.25			13.90	9.69	JF				
	.50									
	.75			11.65	7.44	JF				
	1.00			11.50	7.29	JF				
	1.25									
	1.50			10.28	6.07	JF				
	1.75									
	2.00									
	2.25			9.26	5.05	JF				
	2.50									
	2.75			8.70	4.49	JF				
	3.00			8.47	4.21	JF				
	3.25			8.30	4.09	JF				
	3.50			8.16	3.95	JF				
	3.75			8.02	3.81	JF				
	4.00			7.92	3.71	JF				
	4.25			7.86	3.65	JF				
	4.50			7.77	3.56	JF				
	4.75			7.68	3.47	JF				
	5.00			7.59	3.38	JF				

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels		Remarks
	RECOVERY									
	6			7.30	3.09	JF				
	7			7.08	2.87	JF				
	8			6.90	2.69	JF				
	9			6.75	2.54	JF				
	10			6.60	2.39	JF				
	12			6.41	2.20	JF				
	14			6.24	2.63	JF				
	16			6.17	1.96	JF				
	18			6.04	1.83	JF				
	21			5.91	1.70	JF				
	25			5.75	1.54	JF				
	30			5.61	1.40	JF				
	35			5.50	1.29	JF				
	40			5.41	1.20	JF				
	45			5.34	1.13	JF				
	50			5.29	1.08	JF				
1	60			5.13	0.92	JF				
	70			5.10	0.89	JF				
	80			5.10	0.89	JF				
	90			5.04	0.83	JF				
	100			5.00	0.79	JF				
2	120			4.95	0.74	JF				
	150			4.88	0.67	JF				
3	180			4.85 4.91	0.64	JF				M-Scope 2 Tape

GEE & JENSON ENGINEERS·ARCHITECTS·PLANNERS,INC

RECORD OF WATER LEVELS

Well No. PW-18

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels		Remarks
4	240			4.82	0.55	JF				
26	1560			4.74	0.47	JF				
0.5	3030			4.74	0.47	JF				

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Director Emeritus
H. C. GEE, P.E.
THEODORE B. JENSON, P.E.

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Location Homeland Road

Elevation _____ MSL Measuring Point Top of Casing

Distance to Pumped Well _____ feet Discharge 900 GPM

Total Depth 60 feet Cased Depth 0-10 feet Diameter 2 IN

Starting Date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
755				3.83						M-Scope B
				3.85						Tape
0915				3.83						
0946				3.84						
0959				3.83		HV				
	.25			3.86	0.03	HV				
	.50			3.91	0.08	HV				
	.75			3.99	0.16	HV				
	1.00			4.04	0.21	HV				
	1.25			4.10	0.27	HV				
	1.50			4.14	0.31	HV				
	1.75			4.18	0.35	HV				
	2.00			4.22	0.39	HV				
	2.25			4.25	0.42	HV				
	2.50			4.27	0.44	HV				
	2.75			4.29	0.46	HV				

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
	3.00			4.33	0.50	HV				
	3.25			4.36	0.53	HV				
	3.50			4.37	0.54	HV				
	3.75			4.39	0.56	HV				
	4.00			4.41	0.58	HV				
	4.25			4.42	0.59	HV				
	4.50			4.44	0.61	HV				
	4.75			4.46	0.63	HV				
	5			4.48	0.65	HV				
	6			4.53	0.70	HV				
	7			4.59	0.76	HV				
	8			4.64	0.81	HV				
	9			4.67	0.84	HV				
	10			4.70	0.87	HV				
	12			4.75	0.92	HV				
	14			4.80	0.97	HV				
	16			4.83	1.00	HV				
	18			4.86	1.03	HV				
	20			4.89	1.06	HV				
	25			4.95	1.12	HV				
	30			4.99	1.16	HV				
	35			5.02	1.19	HV				

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS INC

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Adjustments Back-ground Levels	Corrected Drawdown (ft.)	Remarks
	40			5.05	1.22	HV				
	45			5.07	1.24	HV				
	50			5.09	1.26	HV				
1	60			5.11	1.28	HV				
	70			5.14	1.31	HV				
	80			5.16	1.33	HV				
	90			5.17	1.34	HV				
	100			5.18	1.35	HV				
2	120			5.20	1.37	HV				
	150			5.23	1.40	GR				
3	180			5.25 5.27	1.42	JE/KD	-0.01		1.41	M-Scope Tape
4	240			5.31	1.46	JE	-0.01		1.45	
5	300			5.34	1.49	JE	-0.01		1.48	
6	360			5.37	1.52	JE	-0.01		1.51	
7	420			5.40	1.55	JE	-0.01		1.54	
8	480			5.42	1.57	JF/KD	-0.01		1.56	
9	540			5.42	1.57	JF/KD	-0.01		1.56	
10	600			5.46	1.61	JF/KD	-0.01		1.60	
11	660			5.50	1.65	JF/KD	-0.01		1.64	
12	720			5.51	1.66	JF/KD	-0.01		1.65	
13	780			5.51	1.66	JF/KD	-0.01		1.65	
14	840			5.52	1.67	JF/KD	-0.01		1.66	

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
15	900			5.54	1.69	JF/KD	-0.01		1.68	
16	960			5.54	1.69	JF/KD	-0.01		1.68	
17	1020			5.55	1.70	JF/KD	-0.01		1.69	
18	1080			5.56	1.71	JF/KD	-0.01		1.70	
19	1140			5.55	1.70	JF/KD	-0.01		1.69	
20	1200			5.56	1.71	JF/KD	-0.01		1.70	
21	1260			5.57	1.72	GR	-0.01		1.71	
22	1320			5.59	1.74	GR	-0.01		1.73	
23	1380			5.59	1.74	GR	-0.01		1.73	
24	1440			5.60	1.75	GR	-0.01		1.74	
25	1500			5.60	1.75	GR	-0.01		1.74	
26	1560			5.61	1.76	GR	-0.01		1.75	
27	1620			5.62	1.77	GR	-0.01		1.76	
28	1680			5.63	1.78	GR	-0.01		1.77	
29	1740			5.64	1.79	GR	-0.01		1.78	
30	1800			5.64	1.79	GR	-0.01		1.78	
31	1860			5.62	1.77	GR	-0.01		1.76	
32	1920			5.65	1.80	GR	-0.01		1.79	
33	1980			5.66	1.81	JF/KD	-0.01		1.80	
34	2040			5.68	1.83	JF/KD	-0.01		1.82	
35	2100			5.72	1.87	JF/KD	-0.01		1.86	
36	2160			5.70	1.85	JF/KD	-0.01		1.84	

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
37	2220			5.69	1.84	JF/KD	-0.01		1.83	
38	2280			5.70	1.85	JF/KD	-0.01		1.84	
39	2340			5.72	1.87	JF/KD	-0.01		1.86	
40	2400			5.73	1.88	JF/KD	-0.01		1.87	
41	2460			5.72	1.87	JF/KD	-0.01		1.86	
42	2520			5.72	1.87	JF/KD	-0.01		1.86	
43	2580			5.73	1.88	JF/KD	-0.01		1.87	
44	2640			5.75	1.90	JF/KD	-0.02		1.88	
45	2700			5.76	1.91	JF/KD	-0.02		1.89	
46	2760			5.75	1.90	JF/KD	-0.02		1.88	
47	2820			5.78	1.93	JF/KD	-0.02		1.91	
48	2880			5.78	1.93	JF/KD	-0.02		1.91	
49	2940			5.78	1.93	JF/KD	-0.02		1.91	
50	3000			5.78	1.93	JF/KD	-0.02		1.91	
51	3060			5.80	1.95	JF/KD	-0.02		1.93	
52	3120			5.79	1.94	JF/KD	-0.02		1.92	
53	3180			5.80	1.95	JF/KD	-0.02		1.93	
54	3240			5.81	1.96	JF/KD	-0.02		1.94	
55	3300			5.81	1.96	JF/KD	-0.02		1.94	
56	3360			5.81	1.96	JF/KD	-0.02		1.94	
57	3420			5.81	1.96	GR/MK	-0.02		1.94	
58	3480			5.83	1.98	GR/MK	-0.02		1.96	

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
59	3540			5.83	1.98	GR/MK	-0.02		1.96	
60	3600			5.83	1.98	GR/MK	-0.02		1.96	
61	3660			5.83	1.98	GR/MK	-0.02		1.96	
62	3720			5.83	1.98	GR/MK	-0.02		1.96	
63	3780			5.83	1.98	GR/MK	-0.02		1.96	
64	3840			5.83	1.98	GR/MK	-0.02		1.96	
65	3900			5.84	1.99	GR/MK	-0.02		1.97	
66	3960			5.85	2.00	GR/MK	-0.02		1.98	
67	4020			5.85	2.00	GR/MK	-0.02		1.98	
68	4080			5.85	2.00	GR/MK	-0.02		1.98	
69	4140			5.85	2.00	GR/MK	-0.02		1.98	
70	4200			5.86	2.01	GR/MK	-0.02		1.99	
71	4260			5.86	2.01	GR/MK	-0.02		1.99	
72	4320			5.85 5.87	2.02	GR/MK	-0.02		2.00	M-Scope #A Tape

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-83 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels	Corrected Recovery (ft)	Remarks
RECOVERY										
				5.85	2.02	HV	-0.02		2.00	M-Scope #A
	.25			5.91	2.04	HV	-0.02		2.02	
	.50			5.84	1.97	HV	-0.02		1.95	
	.75			5.76	1.89	HV	-0.01		1.88	
	1.00			5.68	1.81	HV	-0.01		1.80	
	1.25			5.62	1.75	HV	-0.01		1.74	
	1.50			5.58	1.71	HV	-0.01		1.70	
	1.75			5.52	1.65	HV	-0.01		1.64	
	2.00			5.48	1.61	HV	-0.01		1.60	
	2.25			5.44	1.57	HV	-0.01		1.56	
	2.50			5.42	1.55	HV	-0.01		1.54	
	2.75			5.39	1.52	HV	-0.01		1.51	
	3.00			5.37	1.50	HV	-0.01		1.49	
	3.25			5.35	1.48	HV	-0.01		1.47	
	3.50			5.33	1.46	HV	-0.01		1.45	
	3.75			5.31	1.44	HV	-0.01		1.43	
	4.00			5.30	1.43	HV	-0.01		1.42	
	4.25			5.28	1.41	HV	-0.01		1.40	
	4.50			5.27	1.40	HV	-0.00			
	4.75			5.25	1.38	HV				
	5.00			5.24	1.37	HV				

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels		Remarks
	RECOVERY									
	6			5.20	1.33	HV				
	7			5.17	1.30	HV				
	8			5.14	1.27	HV				
	9			5.11	1.24	HV				
	10			5.09	1.22	HV				
	12			5.07	1.20	HV				
	14			5.03	1.16	HV				
	16			5.01	1.14	HV				
	18			4.99	1.12	HV				
	20			4.96	1.09	HV				
	25			4.91	1.04	HV				
	30			4.88	1.01	HV				
	35			4.85	0.98	HV				
	40			4.83	0.96	HV				
	45			4.80	0.93	HV				
	50			4.77	0.90	HV				
1	60			4.73	0.86	HV				
	70			4.69	0.82	HV				
	80			4.65	0.78	HV				
	90			4.62	0.75	HV				
	100			4.59	0.72	HV				
2	120			4.54	0.67	HV				
	150			4.48	0.61	HV				
3	180			4.41 4.46	0.61	HV				M-Scope A

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS,INC.

RECORD OF WATER LEVELS

Well No. 18-1S

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels		Remarks
4	240			4.33	0.48	HV				
26	1560			4.20	0.35	HV				
50.5	3030			4.20	0.35	HV				

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.
2019 OKEECHOBEE BOULEVARD, WEST PALM BEACH, FLORIDA. . . 33409. . . 305 - 683-3301

FRED A. GREENE, P.E.
RICHARD M. MILLER, P.E.
WALTER O. STEPHENS, JR., P.E.
WILLIAM G. WALLACE, JR., P.L.S.
PHILIP A. CRANNELL JR., A.I.A.
JOHN C. WISE, P.E.

Director Emeritus
H. C. GEE, P.E.
THEODORE B. JENSON, P.E.

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Location Homeland Road

Elevation _____ MSL Measuring Point Top of Casing

Distance to Pumped Well 33.0 feet Discharge 900 GPM

Total Depth 90 feet Cased Depth 0-70 feet Diameter 2" IN

Starting Date of Test 9/24/80 @1000

Time		Water Level (ft)			Draw-Down (ft)	Measured by	Adjustments			Remarks
(hr)	(min)	Held	Wet	Below MP			De-watering	Back-ground Levels	Corrected Drawdown (ft)	
7:53	a.m.			3.30						Tape
				3.27						M-Scope A
9:15	a.m.			3.27						
9:45	a.m.			3.28						
9:49	a.m.			3.28						
	.25									
	.50			12.82	9.59		-0.47		9.07	
	.75									
	1.00									
	1.25			15.55	12.27		-0.79		11.48	
	1.50			16.10	12.82		-0.87		11.95	
	1.75			16.33	13.05		-0.90		12.15	
	2.00			16.36	13.08		-0.91		12.17	
	2.25			16.45	13.17		-0.92		12.25	
	2.50			16.57	13.29		-0.94		12.35	
	2.75			16.68	13.40		-0.95		12.45	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
	3.00			16.82	13.54	JF/KD	-0.98		12.56	
	3.25			16.92	13.64	JF/KD	-0.99		12.65	
	3.50			17.03	13.75	JF/KD	-1.01		12.74	
	3.75			17.13	13.85	JF/KD	-1.02		12.83	
	4.00			17.22	13.94	JF/KD	-1.04		12.90	
	4.25			17.32	14.04	JF/KD	-1.05		12.99	
	4.50			17.38	14.10	JF/KD	-1.06		13.04	
	4.75			17.47	14.19	JF/KD	-1.08		13.11	
	5			17.54	14.26	JF/KD	-1.09		13.17	
	6			18.27	14.89	JF/KD	-1.19		13.70	
	7			18.53	15.31	JF/KD	-1.26		14.05	
	8			18.54	15.30	JF/KD	-1.26		14.04	
	9			18.56	15.28	JF/KD	-1.25		14.03	
	10			18.67	15.39	JF/KD	-1.27		14.12	
	12			18.91	15.63	JF/KD	-1.31		14.32	
	14			19.12	15.84	JF/KD	-1.35		14.49	
	16			19.28	16.00	JF/KD	-1.38		14.62	
	18			19.45	16.17	JF/KD	-1.41		14.76	
	20			19.58	16.30	JF/KD	-1.43		14.87	
	25			19.79	16.51	JF/KD	-1.47		15.04	
	30			19.98	16.70	JF/KD	-1.51		15.19	
	35			20.20	16.89	JF/KD	-1.54		15.35	Steel tape

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Wells 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
	41			20.30	16.99	JF	-1.56		15.43	
	46			20.33	17.02	JF	-1.57		15.45	
	51			20.37	17.06	JF	-1.57		15.49	
1	61			20.58	17.27	JF	-1.61		15.66	
	71			20.58	17.27	JF	-1.61		15.66	
	81			20.65	17.34	JF	-1.63		15.71	
	90			20.71	17.40	JF	-1.64		15.76	
	100			20.72	17.41	JF	-1.64		15.77	
2	120			20.78	17.47	JF	-1.65		15.82	
	150			20.84	17.53	JF	-1.67		15.86	
3	180			20.86	17.55	JE/KD	-1.67		15.88	
4	240			20.95	17.64	JE	-1.69		15.95	
5	300			21.05	17.74	JE	-1.71		16.03	
6	360			21.11	17.80	JE	-1.72		16.08	
7	420			21.22	17.91	JE	-1.74		16.17	
8	480			21.23	17.92	JF/KD	-1.74		16.18	
9	540			21.23	17.92	JF/KD	-1.74		16.18	
0	600			21.22	17.91	JF/KD	-1.74		16.17	
1	660			21.24	17.93	JF/KD	-1.74		16.19	
2	720			21.27	17.96	JF/KD	-1.75		16.21	
3	780			21.29	17.98	JF/KD	-1.75		16.23	
4	840			21.32	18.01	JF/KD	-1.76		16.25	

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
15	900			21.36	18.05	KD/JF	-1.77		16.28	
16	960			21.27	17.96	KD/JF	-1.75		16.11	
17	1020			21.30	17.99	KD/JF	-1.76		16.23	
18	1080			21.33	18.02	KD/JF	-1.76		16.26	
19	1140			21.37	18.06	KD/JF	-1.77		16.29	
20	1200			21.37	18.06	KD/JF	-1.77		16.29	
21	1260			21.43	18.12	GR	-1.78		16.34	
22	1320			21.41	18.10	GR	-1.78		16.32	
23	1380			21.48	18.17	GR	-1.79		16.38	
24	1440			21.43	18.12	GR	-1.78		16.34	
25	1500			21.48	18.17	GR	-1.79		16.38	
26	1560			21.48	18.17	GR	-1.79		16.38	
27	1620			21.52	18.21	GR	-1.80		16.41	
28	1680			21.51	18.20	GR	-1.80		16.40	
29	1740			21.58	18.27	GR	-1.81		16.46	
30	1800			21.61	18.30	GR	-1.82		16.48	
31	1860			21.57	18.26	GR	-1.81		16.45	
32	1920			21.59	18.28	GR	-1.82		16.46	
33	1980			21.65	18.34	JF/KD	-1.83		16.51	
34	2040			21.62	18.31	JF/KD	-1.82		16.49	
35	2100			22.89	19.58	JF/KD	-2.09		17.49	
36	2160			21.63	18.31	JF/KD	-1.82		16.49	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
37	2220			21.70	18.39	JF/KD	-1.84		16.55	
38	2280			21.70	18.39	JF/KD	-1.84		16.55	
39	2340			21.73	18.42	JF/KD	-1.84		16.58	
40	2400			21.76	18.45	JF/KD	-1.85		16.60	
41	2460			21.75	18.44	JF/KD	-1.85		16.59	
42	2520			21.72	18.42	JF/KD	-1.84		16.58	
43	2580			21.75	18.44	JF/KD	-1.85		16.59	
44	2640			21.82	18.51	JF/KD	-1.86		16.65	
45	2700			21.83	18.52	JE	-1.86		16.66	
46	2760			21.83	18.52	JE	-1.86		16.66	
47	2820			21.86	18.55	JE	-1.87		16.68	
48	2880			21.78	18.47	JE	-1.85		16.62	
49	2940			21.80	18.49	JE	-1.86		16.63	
50	3000			21.88	18.57	JE	-1.88		16.69	
51	3060			21.86	18.55	JE	-1.87		16.68	
52	3120			21.85	18.54	JE	-1.87		16.67	
53	3180			21.88	18.57	JE	-1.88		16.69	
54	3240			21.90	18.59	JE	-1.88		16.71	
55	3300			21.91	18.60	JE	-1.88		16.72	
56	3360			21.89	18.58	JE	-1.88		16.70	
57	3420			21.90	18.59	GR/MK	-1.88		16.71	
58	3480			21.92	18.61	GR/MK	-1.88		16.73	

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
59	3540			21.94	18.63	GR/MK	-1.89		16.74	
60	3600			21.97	18.66	GR/MK	-1.89		16.77	
61	3660			21.92	18.61	GR/MK	-1.88		16.73	
62	3720			21.92	18.61	GR/MK	-1.88		16.73	
63	3780			21.91	18.60	GR/MK	-1.88		16.72	
64	3840			21.90	18.59	GR/MK	-1.88		16.71	
65	3900			21.93	18.62	GR/MK	-1.89		16.73	
66	3960			21.95	18.64	GR/MK	-1.89		16.75	
67	4020			21.96	18.65	GR/MK	-1.89		16.76	
68	4080			21.97	18.66	GR/MK	-1.89		16.77	
69	4140			21.97	18.66	GR/MK	-1.89		16.77	
70	4200			22.00	18.69	GR/MK	-1.90		16.79	
71	4260			22.02	18.71	GR/MK	-1.90		16.81	22.04 Tape 22.11 M-Scope
72	4320			22.08	18.70	GR/MK	-1.90		16.80	M-Scope B

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Adjustments Background Levels	Corrected Drawdown (ft.)	Remarks
RECOVERY		9/27/80 @		1000		MK				M-Scope B
				22.08	18.70	MK	- 1.90		16.80	@ 0955
	.25			14.29	10.91	MK	- 0.62		10.29	
	.50			12.26	8.88	MK	- 0.40		8.48	
	.75			10.65	7.27	MK	- 0.26		7.01	
	1.00			10.10	6.72	MK	- 0.22		6.50	
	1.25			9.38	6.00	MK	- 0.17		5.83	
	1.50			8.98	5.60	MK	- 0.15		5.45	
	1.75			8.60	5.22	MK	- 0.13		5.09	
	2.00			8.38	5.00	MK	- 0.11		4.89	
	2.25			8.26	4.88	MK	- 0.11		4.77	
	2.50			8.09	4.71	MK	- 0.10		4.61	
	2.75			7.85	4.47	MK	- 0.09		4.38	
	3.00			7.60	4.22	MK	- 0.08		4.14	
	3.25			7.51	4.13	MK	- 0.07		4.06	
	3.50			7.35	3.97	MK	- 0.07		3.90	
	3.75			7.24	3.86	MK	- 0.06		3.80	
	4.00			7.16	3.78	MK	- 0.06		3.72	
	4.25			7.03	3.65	MK	- 0.06		3.59	
	4.50			6.96	3.58	MK	- 0.05		3.53	
	4.75			6.88	3.50	MK	- 0.05		3.45	
	5.00			6.77	3.39	MK	- 0.05		3.34	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-1D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Adjustments Background Levels	Corrected Recovery (ft)	Remarks
	RECOVERY									
	6			6.52	3.14	MK	-0.04		3.10	
	7			6.30	2.92	MK	-0.03		2.89	
	8			6.09	2.71	MK	-0.03		2.68	
	9			5.93	2.55	MK	-0.02		2.53	
	10			5.82	2.44	MK	-0.02		2.42	
	12			5.61	2.23	MK	-0.02		2.21	
	14			5.43	2.05	MK	-0.01		2.04	
	16			5.29	1.91	MK	-0.01		1.90	
	18			5.15	1.77	MK	-0.01		1.76	
	20			5.00	1.62	MK	-0.01		1.61	
	25			4.83	1.45	MK				
	30			4.68	1.30	MK				
	35			4.59	1.21	MK				
	40			4.50	1.12	MK				
	45			4.43	1.05	MK				
	50			4.36	0.98	MK				
1	60			4.28	0.90	MK				
	70			4.21	0.83	MK				
	80			4.16	0.78	MK				
	90			4.12	0.74	MK				
	100			4.10	0.72	MK				
2	120			4.02	0.64	MK				
	150			3.99	0.61	MK				
3	180			3.94 3.93	0.55	MK				M-Scope B Tape

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS,INC.

RECORD OF WATER LEVELS

Well No. 18-1D

roject 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

ime		Water Level (ft.)				Mea-	Adjustments			
hr)	(min)	Held	Wet	Below MP	Recovery	sured by	De-watering	Back-ground Levels		Remarks
4	240			3.85	0.54					
26	1560			3.77	0.46					
50.5	3030			3.78	0.47					

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.
2019 OKEECHOBEE BOULEVARD, WEST PALM BEACH, FLORIDA. . . 33409. . . 305 - 683-3301

FRED A. GREENE, P.E.
RICHARD M. MILLER, P.E.
WALTER D. STEPHENS, JR., P.E.
WILLIAM G. WALLACE, JR., P.L.S.
PHILIP A. CRANNELL JR., A.I.A.
JOHN C. WISE, P.E.

Director Emeritus
H. C. GEE, P.E.
THEODORE B. JENSON, P.E.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Location Homeland Road

Elevation _____ MSL Measuring Point Top of Casing

Distance to Pumped Well 130.0 feet Discharge 900 GPM

Total Depth 90 feet Cased Depth 0-70 feet Diameter 2 IN

Starting Date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Downdraw (ft.)	Remarks
740				3.22		JF				Tape
				3.24		JF				M-Scope #4
0913				3.24		JF				
0943				3.24		JF				
				3.25		GR				
	.25			3.53	0.28	GR	0.00		0.28	
	.50			3.56	0.31	GR	0.00		0.31	
	.75									
	1.00			5.25	2.00	GR	-0.01		1.99	
	1.25			5.84	2.59	GR	-0.02		2.57	
	1.50			6.36	3.11	GR	-0.04		3.07	
	1.75									
	2.00			6.90	3.65	GR	-0.06		3.59	
	2.25			7.05	3.80	GR	-0.06		3.74	
	2.50			7.20	3.95	GR	-0.07		3.88	
	2.75			7.37	4.12	GR	-0.07		4.05	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
	3.00			7.49	4.24	GR	-0.08		4.16	
	3.25			7.61	4.36	GR	-0.08		4.28	
	3.50			7.71	4.46	GR	-0.09		4.37	
	3.75			7.80	4.55	GR	-0.09		4.46	
	4.00			7.89	4.64	GR	-0.10		4.54	
	4.25			7.98	4.73	GR	-0.10		4.63	
	4.50			8.06	4.81	GR	-0.11		4.70	
	4.75			8.12	4.87	GR	-0.11		4.76	
	5			8.21	4.96	GR	-0.11		4.85	
	6			8.50	5.25	GR	-0.13		5.12	
	7			8.79	5.54	GR	-0.14		5.40	
	8			8.97	5.72	GR	-0.16		5.56	
	9			9.09	5.84	GR	-0.16		5.68	
	10			9.23	5.98	GR	-0.17		5.81	
	12			9.42	6.17	GR	-0.18		5.99	
	14			9.62	6.37	GR	-0.20		6.17	
	16			9.77	6.52	GR	-0.21		6.31	
	18			9.91	6.66	GR	-0.22		6.44	
	20			10.03	6.78	GR	-0.23		6.55	
	25			10.25	7.00	GR	-0.24		6.76	
	30			10.46 10.44	7.19	GR	-0.26		6.93	M-Scope #4 Tape
	35			10.53	7.28	GR	-0.26		7.02	

GEE & JENSON ENGINEERS·ARCHITECTS·PLANNERS INC.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
	40			10.64	7.39	GR	-0.27		7.12	
	45			10.74	7.49	GR	-0.28		7.21	
	50			10.77	7.52	GR	-0.28		7.24	
1	60			10.88	7.63	GR	-0.29		7.34	
	70			10.96	7.71	GR	-0.30		7.41	
	80			11.00	7.75	GR	-0.30		7.45	
	90			11.04	7.79	GR	-0.30		7.49	
	100			11.08	7.83	GR	-0.31		7.52	
2	120			11.12	7.87	GR	-0.31		7.56	
	150			11.18	7.93	GR	-0.32		7.61	
3	180			11.21	7.96	JE/KD	-0.32		7.64	
4	240			11.24	7.99	JE	-0.32		7.67	
5	300			11.32	8.07	JE	-0.33		7.74	
6	360			11.35	8.10	JE	-0.33		7.77	
7	420			11.39	8.14	JE	-0.33		7.81	
8	480			11.41	8.16	JF/KD	-0.34		7.82	
9	540			11.41	8.16	JF/KD	-0.34		7.82	
.0	600			11.43	8.18	JF/KD	-0.34		7.84	
.1	660			11.42	8.17	JF/KD	-0.34		7.83	
.2	720			11.43	8.18	JF/KD	-0.34		7.84	
.3	780			11.44	8.19	JF/KD	-0.34		7.85	
.4	840			11.46	8.21	JF/KD	-0.34		7.87	

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
15	900			11.48	8.23	JF/KD	-0.34		7.89	
16	960			11.41	8.16	JF/KD	-0.34		7.82	
17	1020			11.44	8.19	JF/KD	-0.34		7.85	
18	1080			11.46	8.21	JF/KD	-0.34		7.87	
19	1140			11.47	8.22	JF/KD	-0.34		7.88	
20	1200			11.50	8.25	JF/KD	-0.34		7.91	
21	1260			11.51	8.26	GR	-0.34		7.92	
22	1320			11.52	8.27	GR	-0.35		7.92	
23	1380			11.53	8.28	GR	-0.35		7.93	
24	1440			11.56	8.31	GR	-0.35		7.96	
25	1500			11.55	8.30	GR	-0.35		7.95	
26	1560			11.53	8.28	GR	-0.35		7.93	
27	1620			11.56	8.31	GR	-0.35		7.96	
28	1680			11.57	8.32	GR	-0.35		7.97	
29	1740			11.58	8.33	GR	-0.35		7.98	
30	1800			11.61	8.36	GR	-0.35		8.01	
31	1860			11.60	8.35	GR	-0.35		8.00	
32	1920			11.59	8.34	GR	-0.35		7.99	
33	1980			11.63	8.38	GR	-0.36		8.02	
34	2040			11.62	8.37	GR	-0.35		8.02	
35	2100			12.14	8.89	GR	-0.40		8.49	
36	2160			11.73	8.48	GR	-0.36		8.12	

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft.)	Remarks
37	2220			11.65	8.40	JF/KD	-0.36		8.04	
38	2280			11.67	8.42	JF/KD	-0.36		8.06	
39	2340			11.68	8.43	JF/KD	-0.36		8.07	
40	2400			11.69	8.44	JF/KD	-0.36		8.08	
41	2460			11.68	8.43	JF/KD	-0.36		8.07	
42	2520			11.68	8.43	JF/KD	-0.36		8.07	
43	2580			11.69	8.44	JF/KD	-0.36		8.08	
44	2640			11.71	8.46	JF/KD	-0.36		8.10	
45	2700			11.75	8.50	JE	-0.37		8.13	
46	2760			11.73	8.48	JE	-0.36		8.12	
47	2820			11.75	8.50	JE	-0.37		8.13	
48	2880			11.73	8.48	JE	-0.36		8.12	
49	2940			11.73	8.48	JE	-0.36		8.12	
50	3000			11.76	8.51	JE	-0.37		8.14	
51	3060			11.75	8.50	JE	-0.37		8.13	
52	3120			11.74	8.49	JE	-0.37		8.12	
53	3180			11.76	8.51	JE	-0.37		8.14	
54	3240			11.77	8.52	JE	-0.37		8.15	
55	3300			11.79	8.54	JE	-0.37		8.17	
56	3360			11.78	8.53	JE	-0.37		8.16	
57	3420			11.78	8.53	GR/MK	-0.37		8.16	
58	3480			11.82	8.57	GR/MK	-0.37		8.20	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft)	Remarks
59	3540			11.82	8.57	GR/MK	-0.37		8.20	
60	3600			11.83	8.58	GR/MK	-0.37		8.21	
61	3660			11.82	8.57	GR/MK	-0.37		8.20	
62	3720			11.82	8.57	GR/MK	-0.37		8.20	
63	3780			11.82	8.57	GR/MK	-0.37		8.20	
64	3840			11.81	8.56	GR/MK	-0.37		8.19	
65	3900			11.81	8.56	GR/MK	-0.37		8.19	
66	3960			11.81	8.56	GR/MK	-0.37		8.19	
67	4020			11.81	8.56	GR/MK	-0.37		8.19	
68	4080			11.82	8.57	GR/MK	-0.37		8.20	
69	4140			11.83	8.58	GR/MK	-0.37		8.21	
70	4200			11.84	8.59	GR/MK	-0.37		8.22	
71	4260			11.83	8.58	GR/MK	-0.37		8.21	
72	4320			11.88 11.84	8.59	GR/MK	-0.37		8.22	M-Scope #4 - Tape

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels	Corrected Recovery (ft.)	Remarks
RECOVERY				11.88						M-Scope #4
001.	10			11.88	8.59		-0.37		8.22	
	.25			11.66	8.37	GR	-0.35		8.02	
	.50			10.79	7.50	GR	-0.28		7.22	
	.75			10.10	6.81	GR	-0.23		6.58	
	1.00			9.59	6.30	GR	-0.19		6.11	
	1.25			9.16	5.87	GR	-0.16		5.71	
	1.50			8.83	5.54	GR	-0.14		5.40	
	1.75			8.53	5.24	GR	-0.13		5.11	
	2.00			8.26	4.97	GR	-0.11		4.86	
	2.25			8.04	4.75	GR	-0.10		4.65	
	2.50			7.85	4.56	GR	-0.09		4.47	
	2.75			7.70	4.41	GR	-0.09		4.47	
	3.00			7.54	4.25	GR	-0.08		4.17	
	3.25			7.39	4.10	GR	-0.07		4.03	
	3.50			7.28	3.99	GR	-0.07		3.92	
	3.75			7.17	3.88	GR	-0.06		3.82	
	4.00			7.08	3.79	GR	-0.06		3.73	
	4.25			6.96	3.67	GR	-0.06		3.61	
	4.50			6.89	3.60	GR	-0.05		3.55	
	4.75			6.82	3.53	GR	-0.05		3.48	
	5.00			6.70	3.41	GR	-0.05		3.36	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Adjustments Background Levels	Corrected Recovery (ft.)	Remarks
	RECOVERY									
	6			6.44	3.15	GR	-0.04		3.11	
	7			6.24	2.95	GR	-0.03		2.92	
	8			6.05	2.76	GR	-0.03		2.73	
	9			5.89	2.60	GR	-0.02		2.58	
	10			5.75	2.46	GR	-0.02		2.44	
	12			5.54	2.25	GR	-0.02		2.23	
	14			5.36	2.07	GR	-0.01		2.06	
	16			5.27	1.98	GR	-0.01		1.97	
	18			5.15	1.86	GR	-0.01		1.85	
	20			5.03	1.74	GR	-0.01		1.73	
	25			4.77	1.48	GR				
	30			4.61	1.32	GR				
	35			4.50	1.21	GR				
	40			4.40	1.11	GR				
	45			4.34	1.05	GR				
	50			4.24 4.28	0.98	GR				M-Scope #4 Tape
1	60			4.20	0.95	GR				
	70			4.11	0.86	GR				
	80			4.06	0.81	GR				
	90			4.01	0.76	GR				
	100			3.98	0.73	GR				
2	120			3.82	0.57	GR				
	150									
3	180									

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-2D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels		Remarks
2.5	150			3.87 3.88	0.62	HV				Tape M-Scope
3	180			3.81	0.56	HV				
4	240			3.73	0.48	JF				
26	1560			3.67	0.42	JF				
50.5	3030			3.78	0.53	JF				

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.
2019 OKEECHOBEE BOULEVARD, WEST PALM BEACH, FLORIDA . . . 33409 . . . 305 - 683-3301

FRED A. GREENE, P.E.
RICHARD M. MILLER, P.E.
WALTER D. STEPHENS, JR., P.E.
WILLIAM G. WALLACE, JR., P.L.S.
PHILIP A. CRANNELL, JR., A.I.A.
JOHN C. WISE, P.E.

Director Emeritus
H. C. GEE, P.E.
THEODORE B. JENSON, P.E.

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Location Homeland Road

Elevation _____ MSL Measuring Point Top of Casing

Distance to Pumped Well 200.0 feet Discharge 900 GPM

Total Depth 90 feet Cased Depth 0-70 feet Diameter 2 IN

Starting Date of Test 9/24/80 @ 1000

Time		Water Level (ft)			Draw-Down (ft)	Measured by	Adjustments			Remarks
(hr)	(min)	Held	Wet	Below MP			De-watering	Back-ground Levels	Corrected Drawdown (ft)	
0745				3.08		JF				Tape
				3.15		JF				M-Scope
0911				3.15		JF				
0944				3.15		JF				
				3.16						
	.25			3.28	0.12	JE			0.12	
	.50			3.95	0.28	JE			0.28	
	.75			3.45	0.79	JE			0.79	
	1.00			4.25	1.09	JE			1.09	
	1.25			4.56	1.40	JE			1.40	
	1.50			4.81	1.65	JE	-0.01		1.64	
	1.75			5.08	1.92	JE	-0.01		1.91	
	2.00			5.25	2.09	JE	-0.01		2.08	
	2.25			5.41	2.25	JE	-0.02		2.23	
	2.50			5.54	2.38	JE	-0.02		2.36	
	2.75			5.66	2.50	JE	-0.02		2.48	

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft)	Remarks
	3.00			5.81	2.65	JE	-0.03		2.62	
	3.25			5.89	2.73	JE	-0.03		2.70	
	3.50			5.98	2.82	JE	-0.03		2.79	
	3.75			6.05	2.89	JE	-0.03		2.86	
	4.00			6.15	3.00	JE	-0.03		2.97	
	4.25			6.19	3.04	JE	-0.04		3.00	
	4.50			6.27	3.12	JE	-0.04		3.08	
	4.75			6.35	3.20	JE	-0.04		3.16	
	5			6.40	3.25	JE	-0.04		3.21	
	6			6.65	3.50	JE	-0.05		3.45	
	7			6.88	3.73	JE	-0.06		3.67	
	8			7.04	3.89	JE	-0.06		3.83	
	9			7.17	4.02	JE	-0.07		3.95	
	10			7.27	4.12	JE	-0.07		4.05	
	12			7.46	4.31	JE	-0.08		4.23	
	14			7.63	4.48	JE	-0.09		4.39	
	16			7.78	4.63	JE	-0.10		4.53	
	18			7.90	4.75	JE	-0.10		4.65	
	20			8.02	4.88	JE	-0.11		4.77	
	25			8.23	5.09	JE	-0.12		4.97	
	30			8.41	5.27	JE	-0.13		5.14	
	35			8.53	5.39	JE	-0.14		5.25	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS INC.

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Adjustments Back-ground Levels	Corrected Drawdown (ft)	Remarks
	40			8.62	5.48	JE	- 0.14		5.34	
	45			8.70	5.56	JE	- 0.15		5.41	
	50			8.82	5.68	JE	- 0.15		5.53	
1	60			8.85	5.71	JE	- 0.15		5.56	
	70			8.91	5.77	JE	- 0.16		5.61	
	80			8.98	5.83	JE	- 0.16		5.67	
	90			9.00	5.86	JE	- 0.16		5.70	
	100			9.02	5.88	JE	- 0.16		5.72	
2	120			9.06	5.92	JE	- 0.17		5.75	
	150			9.10	5.96	JE	- 0.17		5.79	
3	180			9.15 9.10	6.01	JE	- 0.17		5.84	M-Scope Tape
4	240			9.14	6.05	JE	- 0.18		5.87	
5	300			9.20	6.11	JE	- 0.18		5.93	
6	360			9.22	6.13	JE	- 0.18		5.95	
7	420			9.25	6.16	JE	- 0.18		5.98	
8	480			9.30	6.14	JF/KD	- 0.18		5.96	
9	540			9.30	6.14	JF/KD	- 0.18		5.96	
10	600			9.30	6.14	JF/KD	- 0.18		5.96	
11	660			9.28	6.12	JF/KD	- 0.18		5.94	
12	720			9.28	6.12	JF/KD	- 0.18		5.94	
13	780			9.31	6.15	JF/KD	- 0.18		5.97	
14	840			9.31	6.15	JF/KD	- 0.18		5.97	

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft)	Remarks
15	900			9.33	6.17	JF/KD	-0.18		5.99	
16	960			9.30	6.14	JF/KD	-0.18		5.96	
17	1020			9.32	6.16	JF/KD	-0.18		5.98	
18	1080			9.33	6.17	JF/KD	-0.18		5.99	
19	1140			9.34	6.18	JF/KD	-0.18		6.00	
20	1200			9.37	6.21	JF/KD	-0.19		6.02	
21	1260			9.36	6.20	GR	-0.19		6.01	
22	1320			9.37	6.21	GR	-0.19		6.02	
23	1380			9.37	6.21	GR	-0.19		6.02	
24	1440			9.37	6.21	GR	-0.19		6.02	
25	1500			9.40	6.24	GR	-0.19		6.05	
26	1560			9.40	6.24	GR	-0.19		6.05	
27	1620			9.41	6.25	GR	-0.19		6.06	
28	1680			9.43	6.27	GR	-0.19		6.08	
29	1740			9.43	6.27	GR	-0.19		6.08	
30	1800			9.45	6.29	GR	-0.19		6.10	
31	1860			9.45	6.29	GR	-0.19		6.10	
32	1920			9.45	6.29	GR	-0.19		6.10	
33	1980			9.48	6.32	JF/KD	-0.19		6.13	
34	2040			9.48	6.32	JF/KD	-0.19		6.13	
35	2100			9.85	6.69	JF/KD	-0.22		6.47	
36	2160			9.58	6.42	JF/KD	-0.20		6.22	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Mea-sured by	Adjustments De-water-ing	Back-ground Levels	Corrected Drawdown (ft)	Remarks
37	2220			9.52	6.36	JF/KD	-0.20		6.16	
38	2280			9.53	6.37	JF/KD	-0.20		6.17	
39	2340			9.53	6.37	JF/KD	-0.20		6.17	
40	2400			9.53	6.37	JF/KD	-0.20		6.17	
41	2460			9.53	6.37	JF/KD	-0.20		6.17	
42	2520			9.53	6.37	JF/KD	-0.20		6.17	
43	2580			9.53	6.37	JF/KD	-0.20		6.17	
44	2640			9.56	6.40	JF/KD	-0.20		6.20	
45	2700			9.58	6.42	JE	-0.20		6.22	
46	2760			9.56	6.40	JE	-0.20		6.20	
47	2820			9.56	6.40	JE	-0.20		6.20	
48	2880			9.57	6.41	JE	-0.20		6.21	
49	2940			9.56	6.40	JE	-0.20		6.20	
50	3000			9.58	6.42	JE	-0.20		6.22	
51	3060			9.59	6.43	JE	-0.20		6.23	
52	3120			9.59	6.43	JE	-0.20		6.23	
53	3180			9.59	6.43	JE	-0.20		6.23	
54	3240			9.60	6.44	JE	-0.20		6.24	
55	3300			9.62	6.46	JE	-0.20		6.26	
56	3360			9.62	6.46	JE	-0.20		6.26	
57	3420			9.61	6.45	GR/MK	-0.20		6.25	
58	3480			9.63	6.47	GR/MK	-0.20		6.27	

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Draw-Down (ft)	Measured by	Adjustments De-watering	Background Levels	Corrected Drawdown (ft)	Remarks
59	3540			9.65	6.49	GR/MK	-0.20		6.29	
60	3600			9.67	6.51	GR/MK	-0.21		6.30	
61	3660			9.65	6.49	GR/MK	-0.20		6.29	
62	3720			9.64	6.48	GR/MK	-0.20		6.28	
63	3780			9.64	6.48	GR/MK	-0.20		6.28	
64	3840			9.64	6.48	GR/MK	-0.20		6.28	
65	3900			9.64	6.48	GR/MK	-0.20		6.28	
66	3960			9.63	6.47	GR/MK	-0.20		6.27	
67	4020			9.64	6.48	GR/MK	-0.20		6.28	
68	4080			9.65	6.49	GR/MK	-0.20		6.29	
69	4140			9.65	6.49	GR/MK	-0.20		6.29	
70	4200			9.66	6.50	GR/MK	-0.21		6.29	
71	4260			9.66	6.50	GR/MK	-0.21		6.29	
72	4320			9.67 9.73	6.51	GR/MK	-0.21		6.30	Tape M-Scope - 1

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Background Levels	Corrected Recovery (ft)	Remarks
RECOVERY										
9	56			9.73	6.60	JE	-0.21		6.39	
	.25			9.60	6.47	JE	-0.20		6.27	
	.50			9.39	6.26	JE	-0.19		6.07	
	.75			9.10	5.97	JE	-0.17		5.80	
	1.00			8.76	5.63	JE	-0.15		5.48	
	1.25			8.45	5.32	JE	-0.13		5.19	
	1.50			8.18	5.05	JE	-0.12		4.93	
	1.75			8.01	4.88	JE	-0.11		4.77	
	2.00			7.80	4.67	JE	-0.10		4.57	
	2.25			7.60	4.47	JE	-0.09		4.38	
	2.50			7.45	4.32	JE	-0.08		4.24	
	2.75			7.31	4.18	JE	-0.08		4.10	
	3.00			7.16	4.03	JE	-0.07		3.96	
	3.25			7.06	3.93	JE	-0.07		3.86	
	3.50			6.95	3.82	JE	-0.06		3.76	
	3.75			6.85	3.72	JE	-0.06		3.66	
	4.00			6.76	3.63	JE	-0.05		3.58	
	4.25			6.67	3.54	JE	-0.05		3.49	
	4.50			6.60	3.47	JE	-0.05		3.42	
	4.75			6.52	3.39	JE	-0.05		3.34	
	5.00			6.45	3.32	JE	-0.04		3.28	

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GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Adjustments Background Levels	Corrected Recovery (ft)	Remarks
	RECOVERY									
	6			6.21	3.08	JE	-0.04		3.04	
	7			6.02	2.89	JE	-0.03		2.86	
	8			5.86	2.73	JE	-0.03		2.70	
	9			5.70	2.57	JE	-0.02		2.55	
	10			5.59	2.46	JE	-0.02		2.44	
	12			5.37	2.24	JE	-0.02		2.22	
	14			5.22	2.09	JE	-0.01		2.08	
	16			5.17	2.04	JE	-0.01		2.03	
	18			4.96	1.83	JE	-0.01		1.82	
	20			4.86	1.73	JE	-0.01		1.72	
	25			4.66	1.53	JE	-0.00		1.53	
	30			4.51	1.38	JE				
	35			4.40	1.27	JE				
	40			4.31	1.18	JE				
	45			4.24	1.11	JE				
	50			4.18	1.05	JE				
1	60			4.11	0.98	JE				
	70			4.05	0.92	JE				
	80			4.00	0.87	JE				
	90			3.94	0.81	JE				
	100			3.91	0.78	JE				
2	120			3.86	0.73	JE				
	150			3.80	0.67	JE				
3	180			3.77 3.73	0.64	JE				M-Scope - 1 Tape

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.

RECORD OF WATER LEVELS

Well No. 18-3D

Project 79-183 Acme Well 18 Starting date of Test 9/24/80 @ 1000

Time (hr)	Time (min)	Water Level (ft.) Held	Wet	Below MP	Recovery	Measured by	Adjustments De-watering	Back-ground Levels		Remarks
4	240			3.65	0.49	JF				
26	1560			3.57	0.41	JF				
50.5	3030			3.58	0.42	JF				

STAFF GAGE READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	SG-1 (ft)	SG-2 (ft)	SG-3 (ft)	(ft)	Remarks
		7.64	3.97	1.64		@ 0730
		7.64	3.95	1.66		@ 0920
		7.64	3.95	1.67		@ 0941
0	0			1.68		@ 1000 Start of Test.
	10			1.68		
	35	7.65	3.94	1.70		
1	60	7.65		1.70		
2	120	7.66	3.95	1.72		
3	180	7.68	3.94	1.75		
4	240	7.69	3.92	1.76		
5	300	7.70	3.92	1.77		
6	360	7.71	3.92	1.79		
7	420	7.72	3.92	1.80		
8	480	7.73	3.92	1.81		
9	540	7.74	3.92	1.82		
10	600	7.75	3.92	1.83		
11	660	7.76	3.92	1.85		
12	720	7.77	3.92	1.85		
13	780	7.78	3.92	1.85		
14	840	7.78	3.92	1.84		

STAFF GAGE READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	SG-1 (ft)	SG-2 (ft)	SG-3 (ft)	(ft)	Remarks
15	900	7.79	3.92	1.84		
16	960	7.80	3.92	1.85		
17	1020	7.80	3.93	1.85		
18	1080	7.81	3.93	1.86		
19	1140	7.81	3.93	1.86		
20	1200	7.82	3.93	1.86		
21	1260	7.82	3.93	1.86		
22	1320	7.82	3.93	1.87		
23	1380	7.82	3.93	1.87		
24	1440	7.82	3.92	1.85		
25	1500	7.82	3.92	1.85		
26	1560	7.82	3.92	1.84		
27	1620	7.82	3.92	1.84		
28	1680	7.82	3.92	1.83		
29	1740	7.81	3.91	1.82		
30	1800	7.80	3.90	1.82		
31	1860	7.80	3.90	1.81		
32	1920	7.80	3.90	1.80		
33	1980	7.80	3.90	1.80		
34	2040	7.80	3.90	1.79		

STAFF GAGE READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	SG-1 (ft)	SG-2 (ft)	SG-3 (ft)	(ft)	Remarks
35	2100	7.79	3.90	1.80		
36	2160	7.79	3.90	1.79		
37	2220	7.78	3.89	1.79		
38	2280	7.78	3.89	1.78		
39	2340	7.78	3.88	1.77		
40	2400	7.77	3.88	1.77		
41	2460	7.77	3.88	1.77		
42	2520	7.76	3.88	1.76		
43	2580	7.76	3.87	1.76		
44	2640	7.76	3.87	1.76		
45	2700	7.76	3.86	1.75		
46	2760	7.75	3.86	1.75		
47	2820	7.75	3.85	1.75		
48	2880	7.75	3.85	1.75		
49	2940	7.75	3.85	1.74		
50	3000	7.75	3.85	1.74		
51	3060	7.74	3.85	1.73		
52	3120	7.73	3.84	1.73		
53	3180	7.73	3.84	1.73		
54	3240	7.72	3.84	1.72		

STAFF GAGE READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	SG-1 (ft)	SG-2 (ft)	SG-3 (ft)	(ft)	Remarks
55	3300	7.72	3.84	1.72		
56	3360	7.71	3.82	1.71		
57	3420	7.71	3.82	1.73		
58	3480	7.74	3.82	1.74		
59	3540	7.74	3.82	1.74		
60	3600	7.75	3.82	1.75		
61	3660	7.75	3.82	1.76		
62	3720	7.76	3.83	1.76		
63	3780	7.77	3.83	1.76		
64	3840	7.77	3.83	1.76		
65	3900	7.78	3.83	1.77		
66	3960	7.78	3.83	1.77		
67	4020	7.78	3.83	1.78		
68	4080	7.78	3.84	1.78		
69	4140	7.78	3.84	1.78		
70	4200	7.78	3.85	1.78		
71	4260	7.78	3.85	1.79		
72	4320					Pump shut off.

MANOMETER READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

METHOD OF MEASURING 5" x 6" orifice AVERAGE DISCHARGE 900 GPM

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	Inches	Discharge (gpm)	Staff* Gage (ft)	Temp (oC)	Cond. (umhos/cm)	Measured by	Remarks
1000	.5						SN	
	1							
	1.5	53.5	900				SN	
	2							
	2.5	53.0	896				SN	
	3.0	53.5	900				SN	
	3.5	53.5	900				SN	
	4.0	53.0	896				SN	
	4.5	53.0	896				SN	
	5.0	53.5	900				SN	
	6	53.5	900				SN	
	7	53.5	900				SN	
	8	53.5	900				SN	
	9	53.5	900				SN	
	10	53.5	900				SN	
	12	53.5	900				SN	
	14	53.5	900				SN	
	16	53.5	900				SN	
	18	53.5	900				SN	
	20	53.5	900				SN	
	25							
	30	53.5	900				SN	

* See separate sheet for staff gage readings.

MANOMETER READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

METHOD OF MEASURING 5" x 6" orifice AVERAGE DISCHARGE 900 GPM

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	Inches	Discharge (gpm)	Staff Gage (ft)	Temp (oC)	Cond. (umhos/cm)	Measured by	Remarks
	35	53.5	900				SN	
	40	53.5	900				SN	
	45	53.5	900				SN	
	50	53.5	900				SN	
1	60	53.5	900		32.0	780	SN	
	70	53.5	900				SN	
	80	53.5	900				SN	
	90	53.5	900				SN	
	100	53.5	900				SN	
2	120	53.5	900		25.0	780	SN	
	150	53.5	900				JF	
3	180	53.25	898			770	GR	
4	240	53.25	898		27.2	820	JE	
5	300	53.5	900		28.2	820	JE	
6	360	53.5	900		27.3	820	JE	
7	420	54.0	904		26.8	820	JE	
8	480	53.5	900		24.9	815	JF	
9	540	53.5	900		24.1	810	JF/KD	
10	600	53.75	902		24.0	795	JF/KD	
11	660	53.5	900		24.0	795	JF/KD	
12	720	53.75	902		24.0	780	JF/KD	
13	780	53.5	900		23.8	795	JF/KD	

MANOMETER READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

METHOD OF MEASURING 5" x 6" orifice AVERAGE DISCHARGE 900 GPM

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	Inches	Discharge (gpm)	Staff Gage (ft)	Temp (oC)	Cond. (umhos/cm)	Measured by	Remarks
14	840	53.5	900		24.0	750	JF/KD	
15	900	54.0	904		24.0	760	JF/KD	
16	960	53.0	896		24.0	750	JF/KD	
17	1020	53.5	900		23.9	720	JF/KD	
18	1080	53.5	900		23.8	710	JF/KD	
19	1140	53.5	900		23.9	720	JF/KD	
20	1200	53.5	900		23.8	720	JF/KD	
21	1260	53.5	900		23.7	720	GR	
22	1320	54.0	904		24.0	715	GR	
23	1380	53.5	900		25.0	710	GR	
24	1440	53.5	900		25.5	720	GR	
25	1500	53.5	900		26.5	720	GR	
26	1560	53.5	900		27.0	760	GR	
27	1620	53.5	900		27.5	770	GR	
28	1680	53.5	900		26.0	800	GR	
29	1740	53.5	900		26.5	830	GR	
20	1800	53.5	900		26.0	830	GR	
31	1860	53.75	902		26.0	825	GR	
32	1920	53.5	900		25.5	780	GR	
33	1980	54.0	904		25.0	750	GR	
34	2040	53.25	898		24.9	750	GR	
35	2100	58.0	934				GR	

MANOMETER READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

METHOD OF MEASURING 5" x 6" orifice AVERAGE DISCHARGE 900 GPM

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	Inches	Discharge (gpm)	Staff Gage (ft)	Temp (oC)	Cond. (umhos/cm)	Measured by	Remarks
36	2160	54.0	904		24.3	995	JF/KD	
37	2220	53.25	898		24.3	1005	JF/KD	
38	2280	53.5	900		24.1	1000	JF/KD	
39	2340	53.5	900		24.5	830	JF/KD	
40	2400	53.5	900		24.0	805	JF/KD	
41	2460	53.5	900		24.1	795	JF/KD	
42	2520	53.0	896		24.0	800	JF/KD	
43	2580	53.0	896		24.0	800	JF/KD	
44	2640	53.75	902		23.9	740	JF/KD	
45	2700	53.5	900		23.9	790	JE	
46	2760	53.25	898		24.1	770	JE	
47	2820	53.75	902		24.9	770	JE	
48	2880	53.5	900		25.8	800	JE	
49	2940	53.25	898		26.0	800	JE	
50	3000	53.75	902		26.2	800	JE	
51	3060	53.5	900		26.2	800	JE	
52	3120	53.25	898		26.6	810	JE	
53	3180	53.5	900		27.0	810	JE	
54	3240	53.25	898		28.0	810	JE	
55	3300	53.5	900		26.9	810	JE	
56	3360	53.0	896		26.8	800	JF/MK	
57	3420	53.0	896		25.0	790	GR/MK	

MANOMETER READINGS

PROJECT 79-183 Acme Well 18 LOCATION Homeland Road

METHOD OF MEASURING 5" x 6" orifice AVERAGE DISCHARGE 900 GPM

STARTING DATE OF TEST 9/24/80 @ 1000

Time (hr)	Time (min)	Inches	Discharge (gpm)	Staff Gage (ft)	Temp (oC)	Cond. (umhos/cm)	Measured by	Remarks
58	3480	53.5	900		24.0	780	GR/MK	
59	3540	53.5	900		24.0	980	GR/MK	
60	3600	53.5	900		24.0	780	GR/MK	
61	3660	53.5	900		24.0	780	GR/MK	
62	3720	53.5	900		23.5	820	GR/MK	
63	3780	53.5	900		23.8	810	GR/MK	
64	3840	53.25	898		23.5	810	GR/MK	
65	3900	53.5	900		23.5	810	GR/MK	
66	3960	53.5	900		23.5	800	GR/MK	
67	4020	53.5	900		23.5	800	GR/MK	
68	4080	53.5	900		23.5	780	GR/MK	
69	4140	53.5	900		23.5	780	GR/MK	
70	4200	53.5	900		23.8	780	GR/MK	
71	4260	53.0	896		24.9	775	GR/MK	
72	4320	53.5	900				GR/MK	

APPENDIX C

THE WATER WORKS

Complete Water Analysis

634 42nd Street
West Palm Beach, Fl. 33407

Phone 842-3332

October 22, 1980

Frederick C. Bothe
Chemist

Gee & Jenson Engineers
2019 Okeechobee Boulevard
West Palm Beach, Florida

Water Works Job No. 1808

	9-27-80 ACME 0900	9-24-80 ACME 1100
Total Dissolved Solids	488 mg/l	516 mg/l
Total Hardness	302	294
Total Alkalinity	321	322
Non-Cafbonate Hardness	N/D	N/D
Iron	0.26	0.19
Sulfate	6	< 5
Chloride	66	62
Calcium	109	106
Nitrate	< 0.1	< 0.1
Fluoride	0.21	0.21
Magnesium	7	7
Turbidity	0.56	0.52
Color	40 Units	30 Units
Silica	< 10 mg/l	< 10 mg/l
Sodium	38	25
pH	7.3	7.3
Bicarbonate as $CaCO_3$	321	322
Hydroxide as $CaCO_3$	-0-	-0-
Carbonate as $CaCO_3$	-0-	-0-
Carbon Dioxide	24	15
Bicarbonate	392	393

collected after 72 hrs pumping 1 hr pump

Respectfully submitted,

Frederick C. Bothe

FREDERICK C. BOTHE

FCB:lbt

TABLE 3

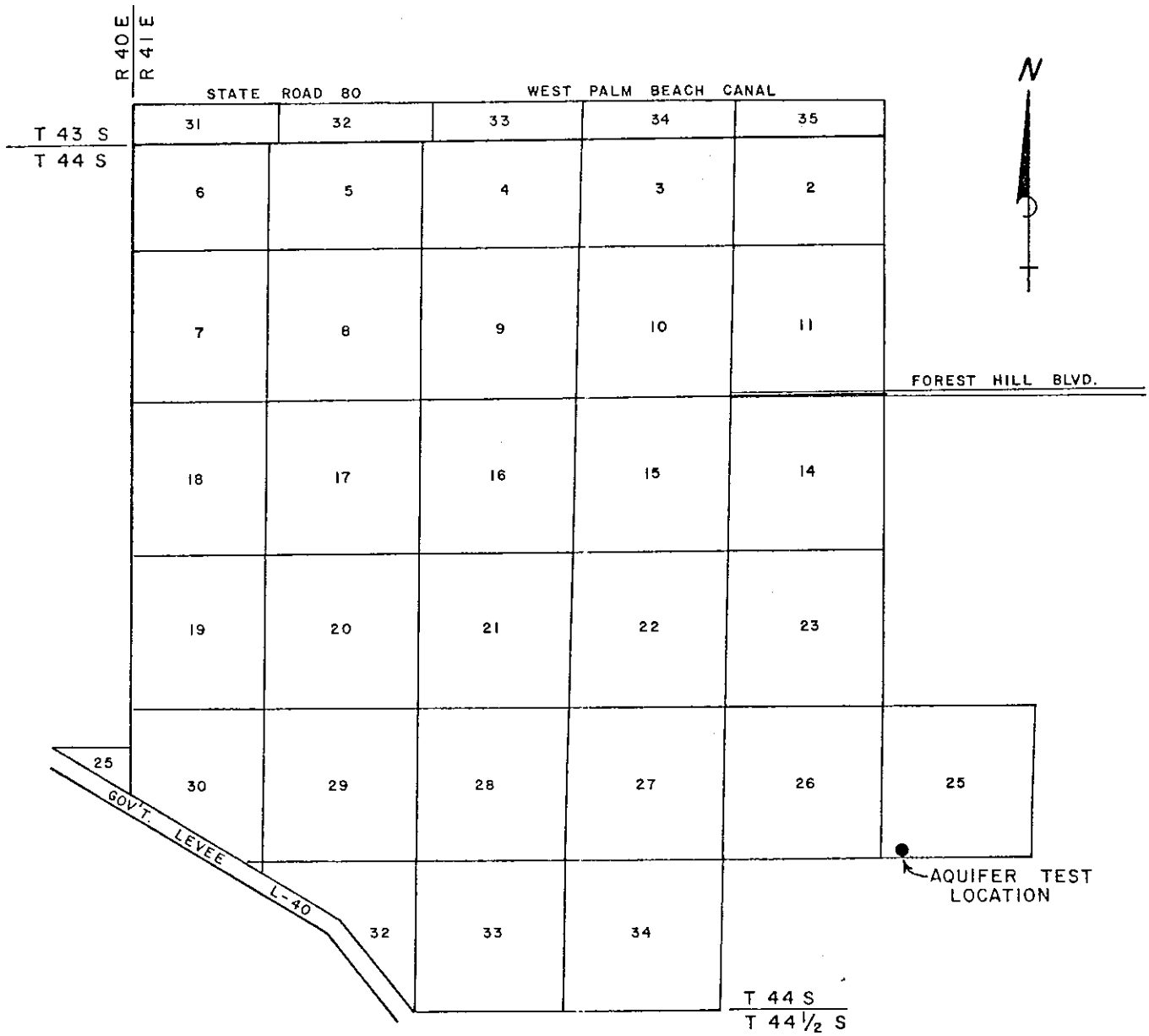
COMPARISON OF CALCULATED
VERSUS FIELD DRAWDOWN DATA

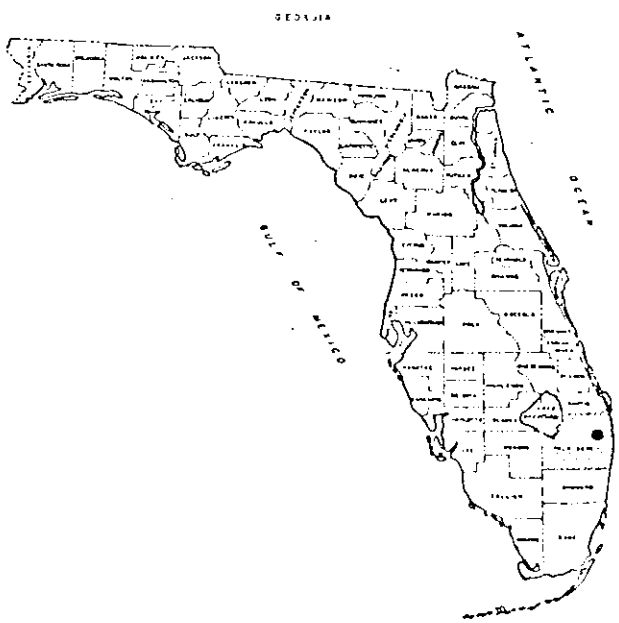
$$u = \frac{1.87^2 S}{Tt} \qquad s = \frac{114.6\ Q}{T}\ W(u)$$

T = 34,000
S = 0.1
Q = 900 gpm

t (days)	18-1D r = 33 ft	18-2D r = 130 ft	18-3D r = 200 ft	r = 500 ft	r = 1,000 ft	r = 2,000 ft
1	$u = 6.0 \times 10^{-3}$ W(u) = 4.55 s = 13.80ft(16.34)*	$u = 9.3 \times 10^{-2}$ W(u) = 1.89 s = 5.73ft(7.96)*	$u = 1.6 \times 10^{-1}$ W(u) = 1.41 s = 4.28ft(6.02)*	u = 1.38 W(u) = 0.12 s = 0.36 ft	u = 5.5 W(u) = 0.0006 $s = 1.82 \times 10^{-3}$ ft	-
3	$u = 1.5 \times 10^{-3}$ W(u) = 5.93 s = 18.00ft(16.80)*	$u = 2.3 \times 10^{-2}$ W(u) = 3.22 s = 9.77ft(8.22)*	$u = 5.4 \times 10^{-2}$ W(u) = 2.40 s = 7.28ft(6.30)*	$u = 4.58 \times 10^{-1}$ W(u) = 0.61 s = 1.85ft	u = 1.83 W(u) = 0.06 s = 0.18 ft	-
30	$u = 2.0 \times 15^{-4}$ W(u) = 7.94 s = 24.09ft	$u = 3.1 \times 10^{-3}$ W(u) = 5.2 s = 15.77ft	$u = 7.3 \times 10^{-3}$ W(u) = 4.35 s = 13.19ft	$u = 4.58 \times 10^{-2}$ W(u) = 2.55 s = 7.74ft	$u = 1.83 \times 10^{-1}$ W(u) = 1.31 s = 3.97 ft	u = 1.36 W(u) = 0.12 s = 0.36ft

* Field drawdown data obtained from data sheets in Appendix B.





ACME IMPROVEMENT DISTRICT
LOCATION MAP

GEE & JENSON ENGINEERS-ARCHITECTS-PLANNERS, INC.
WEST PALM BEACH, FLORIDA

79-183

FIGURE 1