TECHNICAL MEMORANDUM ON THE

Construction and Testing of Floridan Aquifer Test Production Well TP-2

Prepared for

Town of Highland Beach

Prepared by

CH2MHILL

June 2002

Construction and Testing of the Town of Highland Beach Floridan Aquifer Test Production Well TP-2

PREPARED FOR: Ben Saag/Highland Beach

PREPARED BY: David McNabb

COPIES: David Schuman/CH2M HILL

DATE: June 19, 2002

Introduction

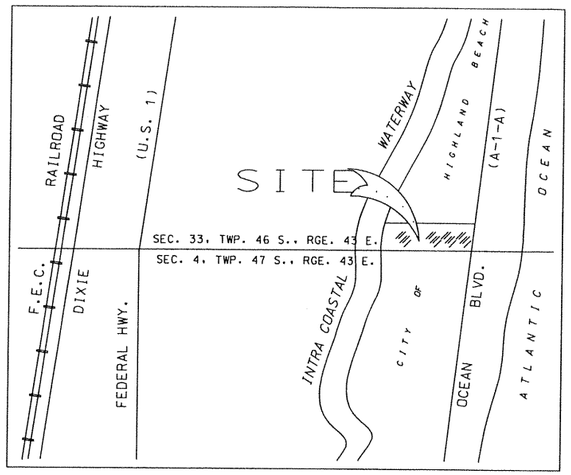
The Floridan aquifer is a sustainable, reliable source of drinking water with stable quality and a minimal risk of contamination. Though it is a brackish water supply that requires the Reverse Osmosis (RO) process to meet drinking water standards, it offers a more consistent supply than the Town's current source: water from the surficial aquifer. The Town of Highland Beach is planning to construct a RO water treatment plant (WTP) for production of drinking water taken from the Floridan aquifer. Two supply wells have been constructed into the upper Floridan aquifer to supply the raw water to the WTP. The WTP and the supply wells will eliminate or reduce the Town's demand on the surficial aquifer and ensure a more reliable water supply for the Town's future.

The WTP will have a design capacity of 2.25 million gallons per day (mgd) with capability for ultimate build-out to 2.75 mgd. The WTP and associated supply wells are being constructed behind the Town Hall building at 3614 South Ocean Boulevard, Highland Beach, Florida. Figure 1 shows the project location map and site plan showing the WTP, the locations of the two production wells TP-1 and TP-2.

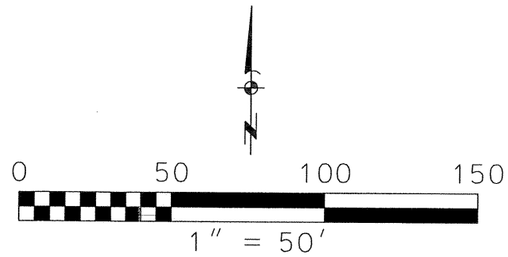
During the construction of well TP-1, the following information was obtained about the Floridan aquifer at the project site:

- Depth of the top of the artesian aquifer
- Thickness and character of the overlying confining beds
- Water quality of the Floridan aquifer at different depths
- Potential yield of the artesian aquifer at different depths
- Potentiometric head of the artesian aquifer
- Preliminary aquifer characteristics (transmissivity and storativity)

A report on the construction and testing of TP-1 has been prepared by CH2M HILL (October, 2001). This report details the construction and testing of test production well TP-2 including the results of testing during construction and a subsequent pumping test. Both test production wells will be converted Floridan aquifer supply wells (P-1 and P-2) upon completion of the WTP. TP-2 was constructed in accordance with the conditions set forth in South Florida Water Management District (SFWMD) Water Well Construction Permit #SE1025014.



LOCATION SKETCH
N.T.S.



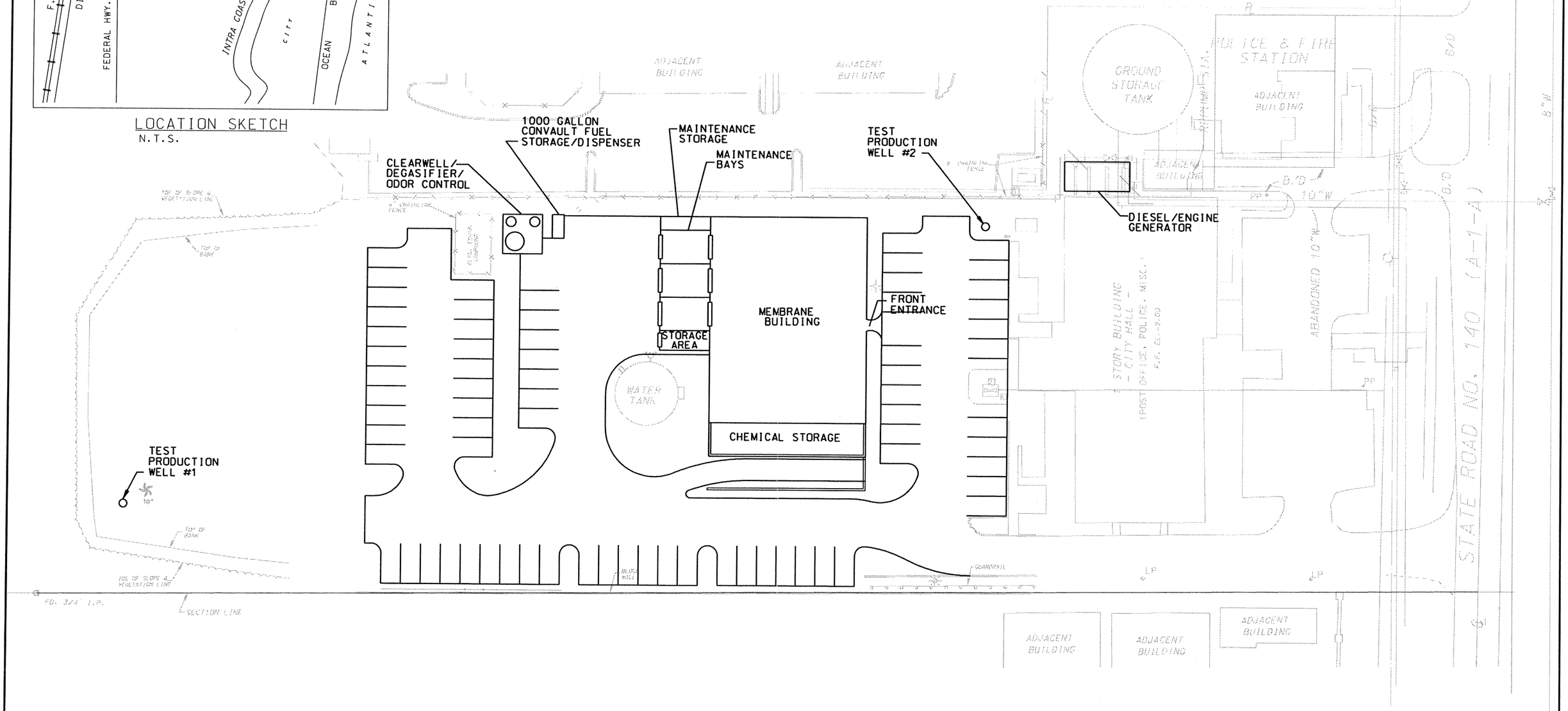


Figure 1
Project Location Map
and
Site Plan

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Floridan aquifer water produced from the well during testing was discharged to the Intracoastal Waterway as allowed by the Florida Department of Environmental Protection (FDEP) Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity. A copy of the SFWMD permit and the FDEP Generic Permit with associated correspondence is provided in Appendix A.

Construction of TP-2

The TP-2 drilling schedule and casing setting depths were designed to conform to the hydrogeological features observed at the site during the construction of well TP-1. Geologic formation samples were collected at 10-foot intervals during the drilling of the pilot hole. Data from the pilot hole interval (formation samples [cuttings] and geophysical logs) were evaluated to provide the basis for describing the geologic formations encountered, to assist in selecting the casing setting depth, and to interpret the site lithology and hydrogeology. Following collection of pilot hole data, the pilot hole was reamed to the specified diameter for the selected casing setting depth.

Construction of TP-1 began on November 9, 2001, with the installation of the 34-inch pit casing to a depth of 28 feet bls. A 32-inch diameter hole was then drilled to a depth of 254 feet below land surface (bls). The borehole was then caliper logged to determine hole diameter in preparation for casing installation. A 26-inch diameter steel surface casing was installed to a depth of 250 feet bls and cemented in place. The casing was cemented in two stages using 820 sacks of neat cement and 220 sacks of 4% bentonite cement.

A 12-inch diameter pilot hole was then drilled to a depth of 1,133 feet bls, and caliper, gamma ray, spontaneous potential and dual-induction geophysical logs were performed to provide data to assist in the selection of the appropriate setting depth for the 17-inch casing. An attempt was made to packer test the interval from 810 to 910 feet bls, however, while developing the drilling mud from the test interval, it was determined that the test interval was not productive and the test was aborted. The pilot hole was then reamed to a nominal 24-inch diameter to a depth of 1,014 feet bls and caliper logged. The 17-inch Certain-Teed PVC casing was then installed to a depth of 1,010 ft bls and cemented in place. The casing was cemented in three stages. The three cement stages are summarized in Table 1.

TABLE 1
17.4-inch PVC Casing Cementing Summary

Date	Cement Stage	Type of Cement	Quantity of Cement
1/30/2002	#1	4 percent bentonite with neat	280 sacks (4%) 140 sacks (neat)
1/31/2002	#2	4 percent bentonite	333 sacks
2/1/2002	#3	4 percent bentonite	370 sacks

Based on the information collected during the construction and testing of TP-1, TP-2 was completed to a total depth of 1,200 feet bls. The open hole interval from 1,010 to 1,200 feet bls was reamed to a 14.5-inch diameter.

Following completion of cementing the 17-inch diameter casing to land surface, the cement plug at the base of the casing was drilled out. The interval from 1,010 to 1,200 feet bls then underwent geophysical logging. Caliper, gamma ray, spontaneous potential, dual-induction, fluid resistivity, temperature, and flowmeter logs were performed on the completed well. Fluid resistivity, temperature, and flowmeter logs were performed under both static and flowing conditions. A video survey of the completed well was also performed to evaluate the open hole interval and the condition of the 17-inch casing.

The TP-2 wellhead was then installed and a concrete pad was constructed around the well. Figure 2 provides a completion diagram of TP-2. Figure 3 provides a wellhead diagram of TP-2.

Geologic and Hydrogeologic Framework

Groundwater in Palm Beach County's aquifer systems is developed within a thick carbonate platform with overlies the Early Jurassic (approximately 190 million years old). Sediments within the carbonate platform range in age from Early Jurassic to Holocene. The sediments consist primarily of carbonates and Miocene age siliciclastics. The aquifer systems in Palm Beach County exist in sediments ranging in age from late Paleocene (55 million years old) to Recent and include the Floridan aquifer system and the Surficial aquifer system. In general, groundwater within each of the aquifer systems becomes more saline with depth.

Due to its proximity to the Atlantic Ocean, groundwater in the Surficial aquifer at Highland Beach has a salinity level similar to that of seawater. Testing conducted during construction of TP-1 did not confirm the presence of an Underground Source of Drinking Water (USDW) within the Surficial aquifer at the site.

Figure 4 provides a stratigraphic profile of the site based on the correlation of formation samples with geophysical logs. Strata encountered during construction of TP-2 range in age from Recent to Eocene Age deposits. Each of the formations encountered are described below.

Undifferentiated Recent Sediments

The interval from land surface to 12 feet bls is made up of Recent unconsolidated quartz-rich sands and organic-rich soil. The base of the recent sediments consists of a 7-foot thick peat layer containing partially decomposed plant material. The undifferentiated Recent sediments form the upper-most portion of the Surficial aquifer; however, this portion of the aquifer is not productive at the site.

Pamlico Formation

The Pamlico Formation is of the Late Pleistocene Age and is present at the site from 12 feet bls to a depth of approximately 60 feet bls. It consists primarily of unconsolidated quartz sand and shell fragments. The contact between the base of the Pamlico Formation and the underlying Anastasia Formation is not clearly defined based on a review of the formation samples and geophysical logs; therefore, the depth of the contact of these formations is only approximate. The Pamlico Formation is part of the Surficial aquifer.

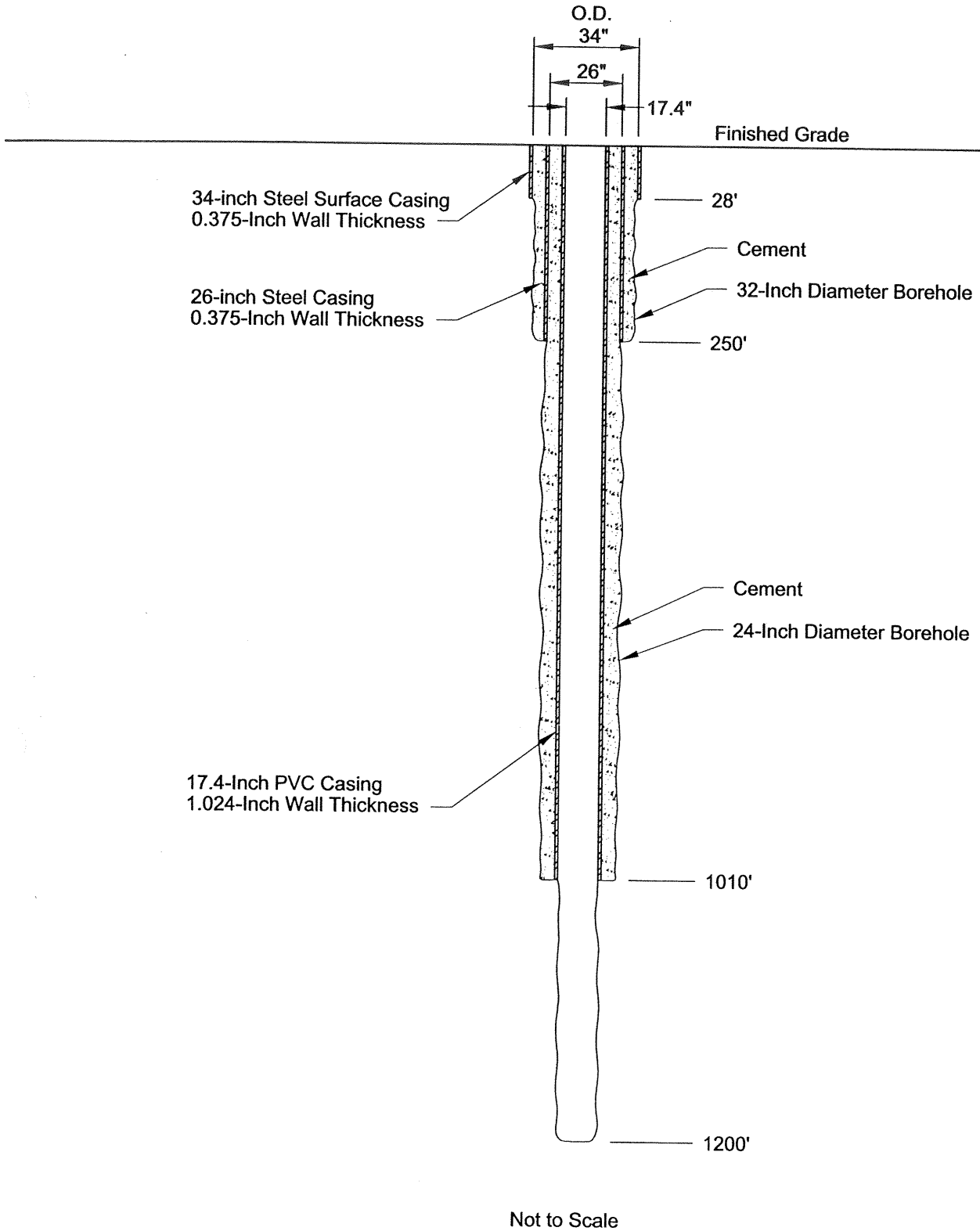

Figure 2
Highland Beach Test Production
Well TP-2 Completion Diagram

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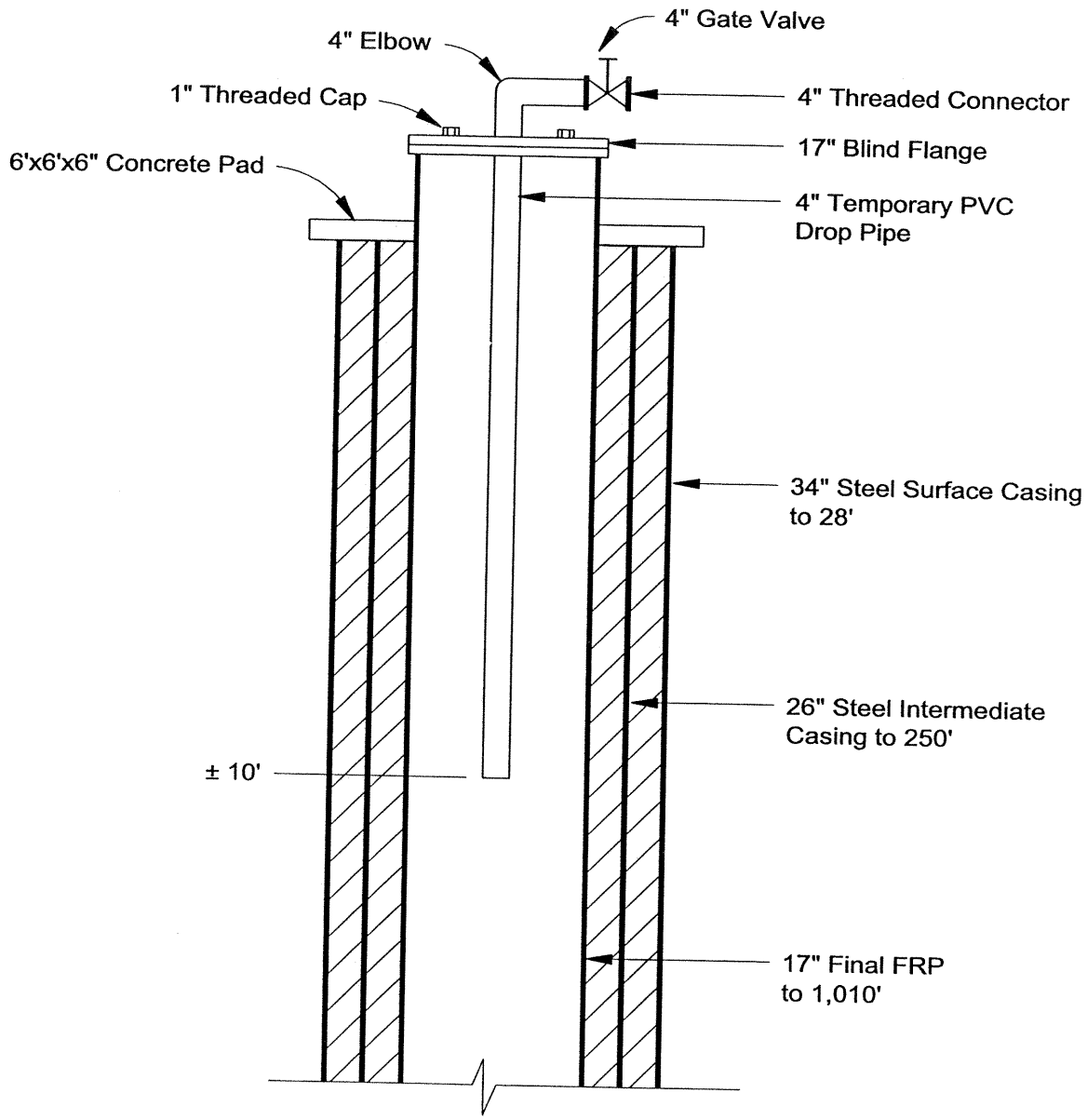

Figure 3
TP-2 Wellhead Diagram

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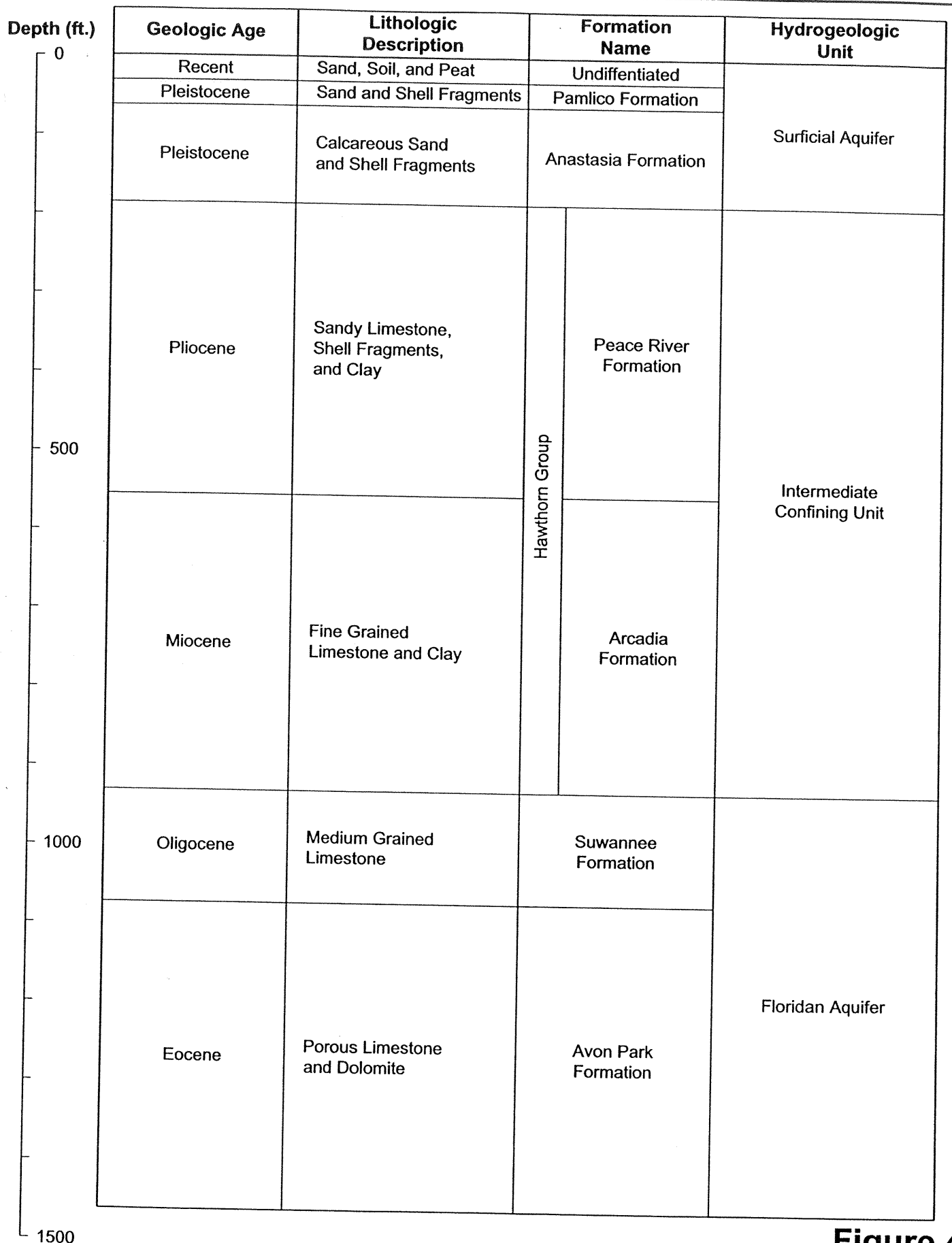

Figure 4
Geologic and Hydrogeologic Column of the TP-1 Site

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Anastasia Formation

The Anastasia Formation consists primarily of unconsolidated calcareous sand and shell fragments. Limestone and calcareous sandstone are present near the base of the Anastasia Formation. From approximately 60 to 190 feet bls. Deposited during the Pleistocene Age, the Anastasia Formation is part of the Surficial aquifer.

Hawthorn Group

Sediments making up the Hawthorn Group generally have a low permeability and are fine grained. These sediments act as a confining unit (often referred to as the Intermediate Confining Unit) separating the Surficial aquifer from the underlying Floridan aquifer. The Hawthorn Group is divided into the Peace River and Arcadia Formations, each of which are described below.

Peace River Formation

The Peace River Formation is of the lower-most Pliocene and upper Miocene Age and is present at the site from 190 to approximately 550 feet bls. It consist primarily of sandy limestone, shell fragments, and clay. The base of the Peace River Formation and top of the underlying Arcadia Formation is not clearly defined based on review of the formation samples and geophysical logs; therefore, the indicated base of the Peace River Formation is only approximate.

Arcadia Formation

The Arcadia Formation underlies the Peace River Formation and is present at the site between approximately 550 and 910 feet bls. The Arcadia Formation consists primarily of fine grained limestone and clay and is of the Miocene Age. Phosphate is common within the Arcadia Formation and responsible for the elevated gamma ray signature found in some intervals of the formation.

Suwannee Formation

The Suwannee Formation is present from 910 to 1,070 feet bls at the site. The formation is of the Oligocene Age and consists of medium grained limestone with occasional clay intervals.

Phosphate is common in the Suwannee Formation. The clay intervals within the Suwannee Formation greatly reduce the productivity of this Formation.

Avon Park Formation

Sediments making up the Avon Park Formation consists primarily of moderately consolidated, porous limestone with occasional dolomite intervals. The Avon Park Formation is present at the site from 1,070 to below 1,200 feet bls and is of the Eocene Age.

Testing During Construction

Testing during the construction of TP-2 included formation sampling, geophysical logging, and a 72-hour pumping test. Results of the hydrogeologic testing were used to determine the hydraulic characteristics of the strata intercepted by the borehole, which, in turn, were used to determine the optimal final subsurface design of the well.

The 72-hour pumping test was designed to determine aquifer productivity and water quality. These parameters are useful in determining the viability of a Floridan aquifer water supply for the proposed WTP.

Formation samples (drill cuttings) from TP-2 were collected at 10-foot intervals during pilot hole drilling. The samples were characterized for rock type, color, grain size, consolidation, and fossils. The data were used to determine hydrogeologic characteristics of the strata encountered and determine which geologic formations the borehole penetrated. A generalized summary of the geologic formations encountered during construction of TP-2 is presented in Table 2 and in Figure 4. A detailed lithologic description of samples from TP-2 is provided in Appendix B.

TABLE 2
Geologic Formations Encountered

Depth Interval (feet bpl)	Description	Formation	Geologic Age
0 – 12	Unconsolidated Quartz Sand, Organic Soil and Peat	Undifferentiated	Recent
12 – 60	Unconsolidated Quartz Sand and Shell Fragments	Pamlico	Pleistocene
60 – 190	Unconsolidated Calcareous Sand and Shell Fragments	Anastasia	Pleistocene
190 – 550	Sandy Limestone, Shell Fragments and Clay	Peace River	Pilocene – Miocene
550 – 910	Fine Grained Limestone and Clay	Arcadia	Miocene
910 – 1,070	Medium Grained Limestone	Suwannee	Oligocene
1,070 – 1,200	Porous Limestone with some Dolomite	Avon Park	Eocene

Geophysical Logging

Geophysical logs were performed on the pilot hole interval from 250 ft bls to 1,130 ft bls to correlate formation samples taken during drilling, to identify formation boundaries, and to obtain specific geologic and hydrogeologic data pertaining to the underground formations. These data were then used to assist in the selection of the optimum casing setting depths for TP-2 and identify water-producing intervals. Reamed hole caliper logs were also performed prior to casing installation to confirm appropriate casing setting depths and borehole diameter. A video survey was performed on the completed well to evaluate the open hole interval of the well and the condition of the 17-inch casing. Table 3 provides a summary of geophysical logging conducted during the construction of TP-2. Copies of each of the logs performed on TP-1 are provided in Appendix C. A summary of the video survey performed on the completed well is provided in Appendix D.

Review of the geophysical logs from TP-1 and TP-2 indicates the presence of porous, water-producing strata from approximately 20 feet bls to 350 feet bls. Geophysical logs from TP-2 indicate additional productive strata at 1,030 to 1,160 feet bls. The remaining intervals are significantly less productive.

TABLE 3
Highland Beach TP-2 Geophysical Logs Summary

Date	Well Progress and Casing Depth	Type of Log Run[1]	Purpose
November 21, 2001	32-Inch Reamed Hole to 254 feet bls	Caliper	Confirm Hole Diameter and Depth
December 29, 2001	12-1/4 Inch Pilot Hole to 1,133 feet bls	Caliper, Gamma Ray, Spontaneous Potential, Dual-Induction	Evaluate the Hawthorn Group, Suwannee and Avon Park Formations. Determine 17-inch Casing Setting Depth.
January 29, 2002	24-Inch Reamed Hole to 1,014 feet bls	Caliper	Confirm Hole Diameter and Depth
February 25, 2002	Completed Well Cased to 1,010 feet bls, Total Depth of 1,203 feet bls	Caliper, Gamma Ray, Spontaneous Potential, Dual-Induction, Fluid Resistivity, Temperature, Flowmeter, Video Survey	Evaluate Open Hole Interval of the Completed Well

Note:
[1]Fluid Resistivity, Temperature, and Flowmeter Logs were performed under static and dynamic conditions.

Gamma ray peaks at depths of approximately 260, 280, 750, 820 to 910, and 980 to 1,010 feet bls. These intervals correlate to strata rich in phosphate. Flowmeter logging was performed on the interval from 1,010 to 1,200 feet bls (the base of the final casing string to the bottom of the borehole) to confirm the presence of productive intervals.

Pumping Test

A 72-hour pumping test was conducted to evaluate the hydrogeologic characteristics and water quality of the open hole interval of TP-2. Fluid produced during the pumping test was discharged to the Intracoastal Waterway. All conditions of the FDEP Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity were met while discharging to the Intracoast Waterway.

The pumping test included a 87-hour background data collection period, a 72-hour pumping period, and 24-hour recovery water level data collection. TP-2 was pumped at a rate of 3,000 gpm during the pumping portion of the test. Water levels were measured in wells TP-2 and TP-1 with a pressure transducer and were recorded by a Hermit 3000 data logger.

The pumping test and associated water level data collection occurred between March 14, 2002, when the pressure transducers were installed in the well, and March 22, 2002, when the pressure transducers were removed from the well. Water level data for the entire testing period are presented in Figure 5. Figures 6 through 8 present the background, pumping, and recovery portions of the pumping test, respectively.

Figure 6 provides a summary of the background water level data collection phase of the pumping test. The initial water level increase observed in both wells is due to recovery of

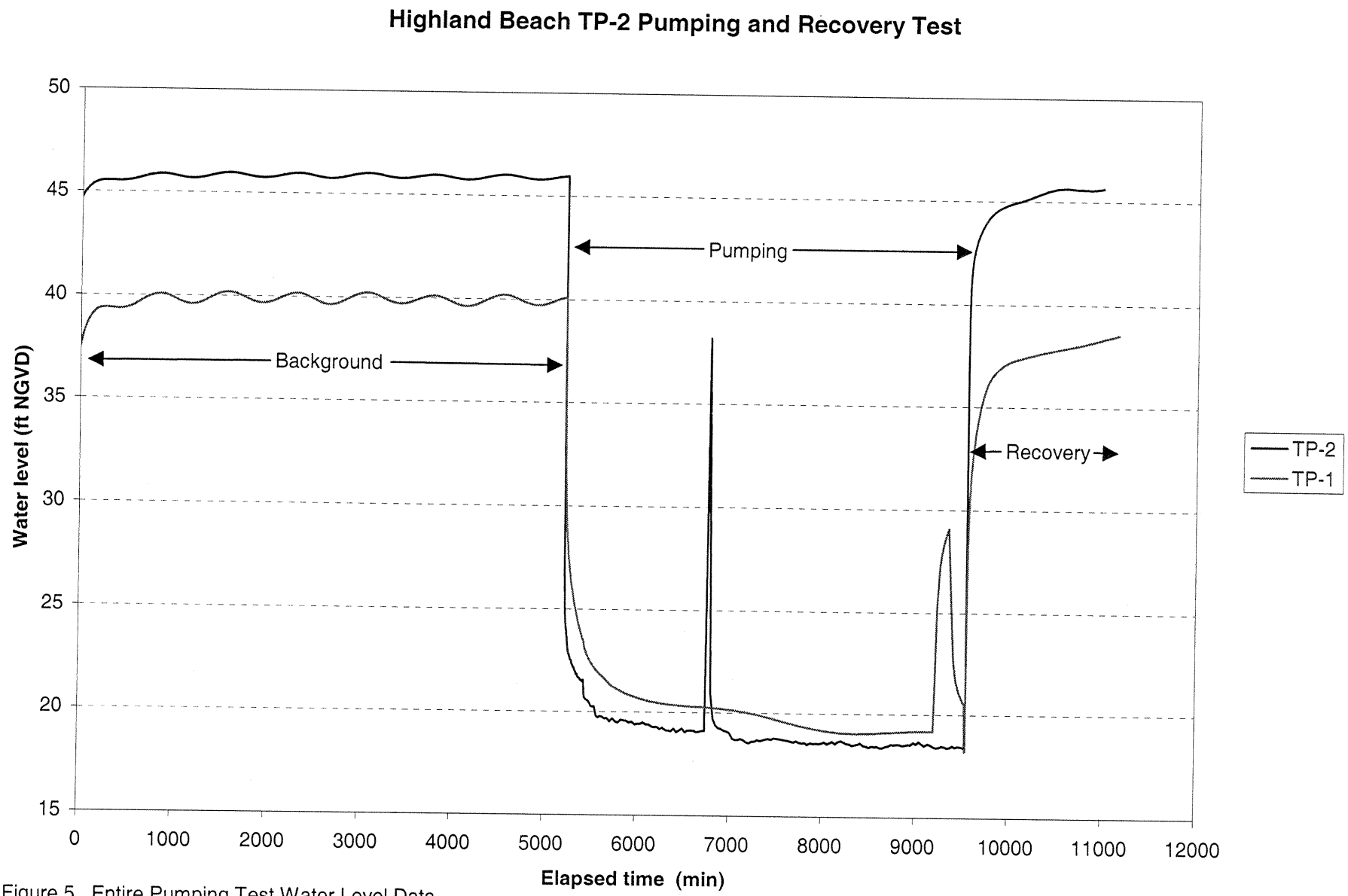


Figure 5. Entire Pumping Test Water Level Data

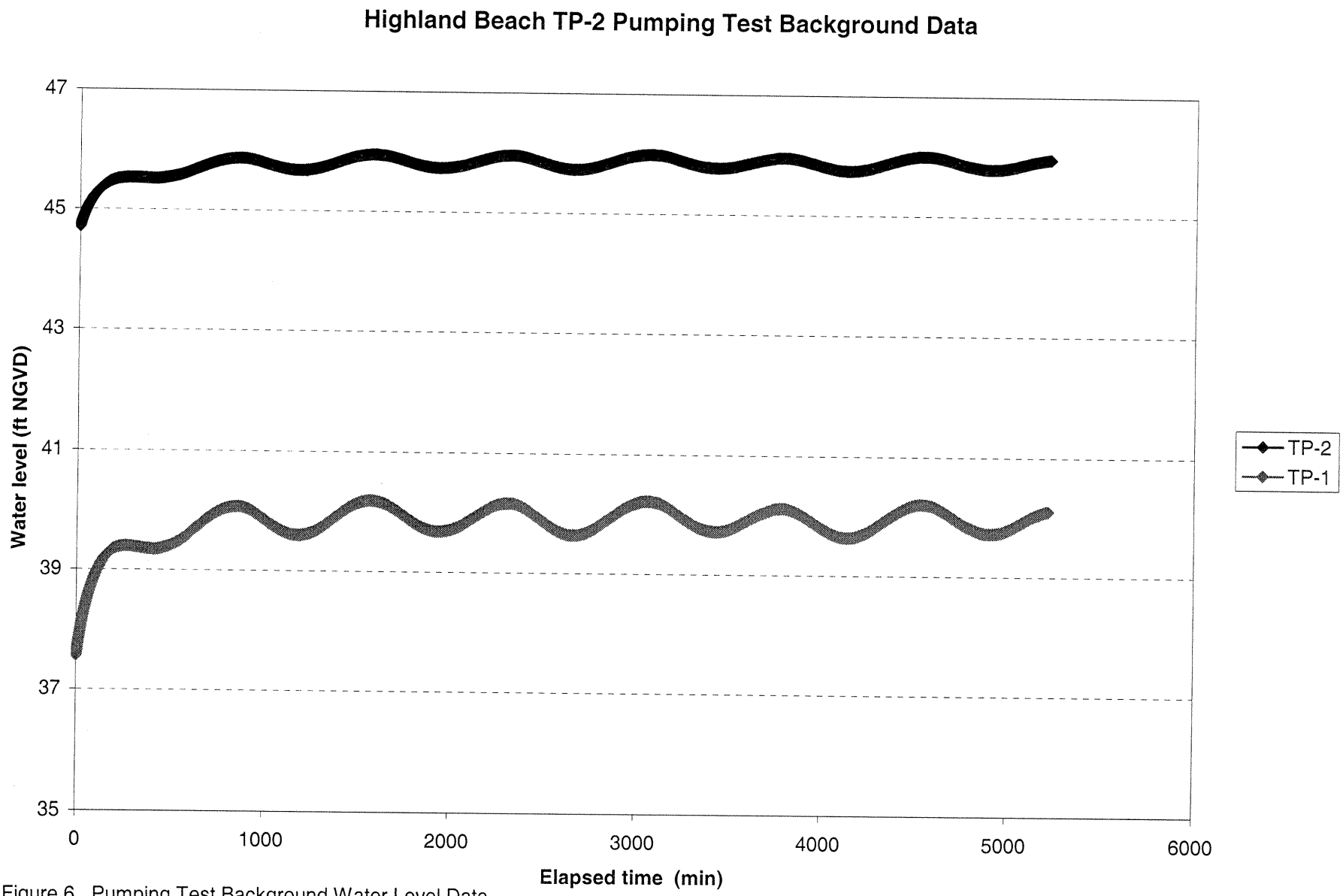


Figure 6. Pumping Test Background Water Level Data

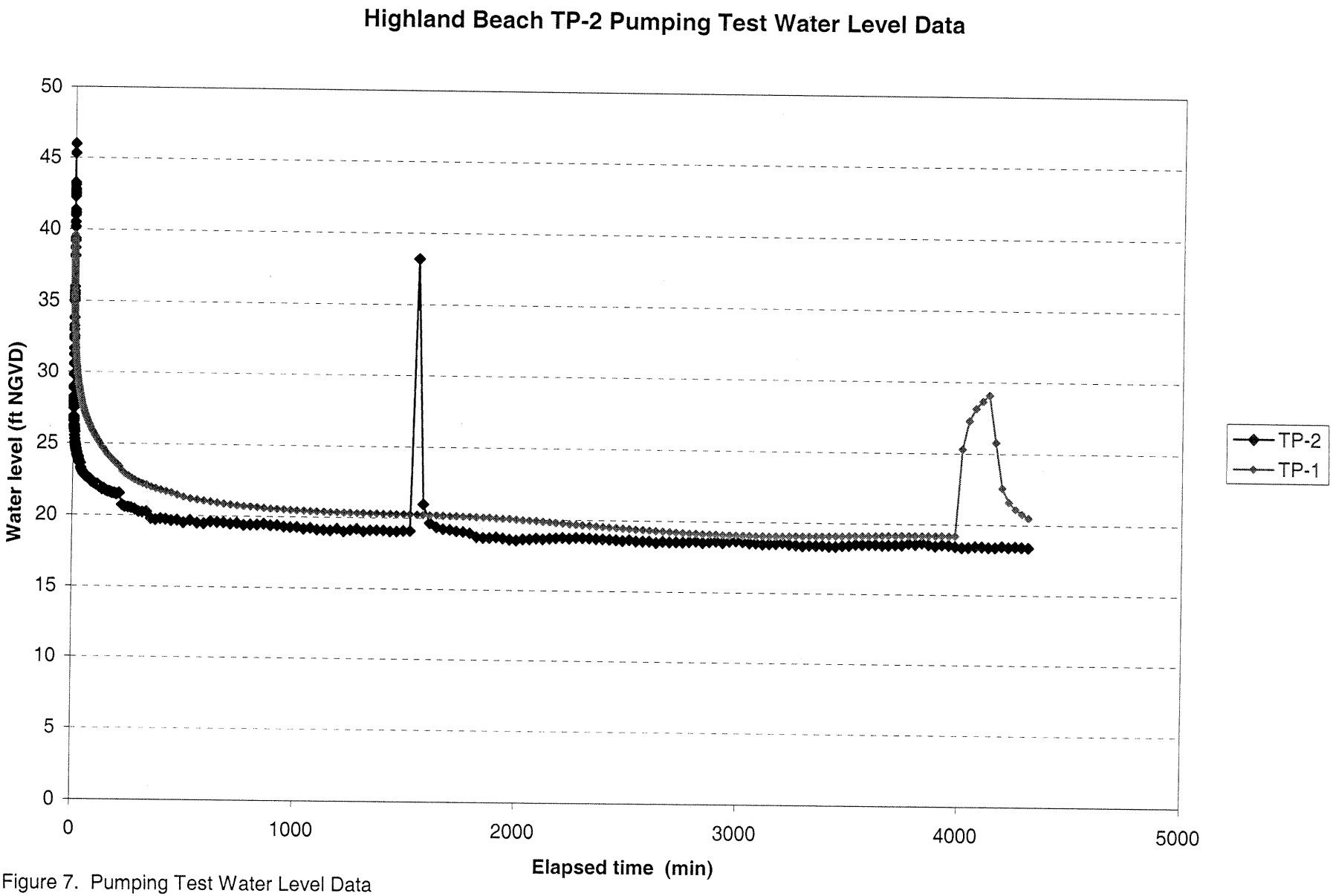


Figure 7. Pumping Test Water Level Data

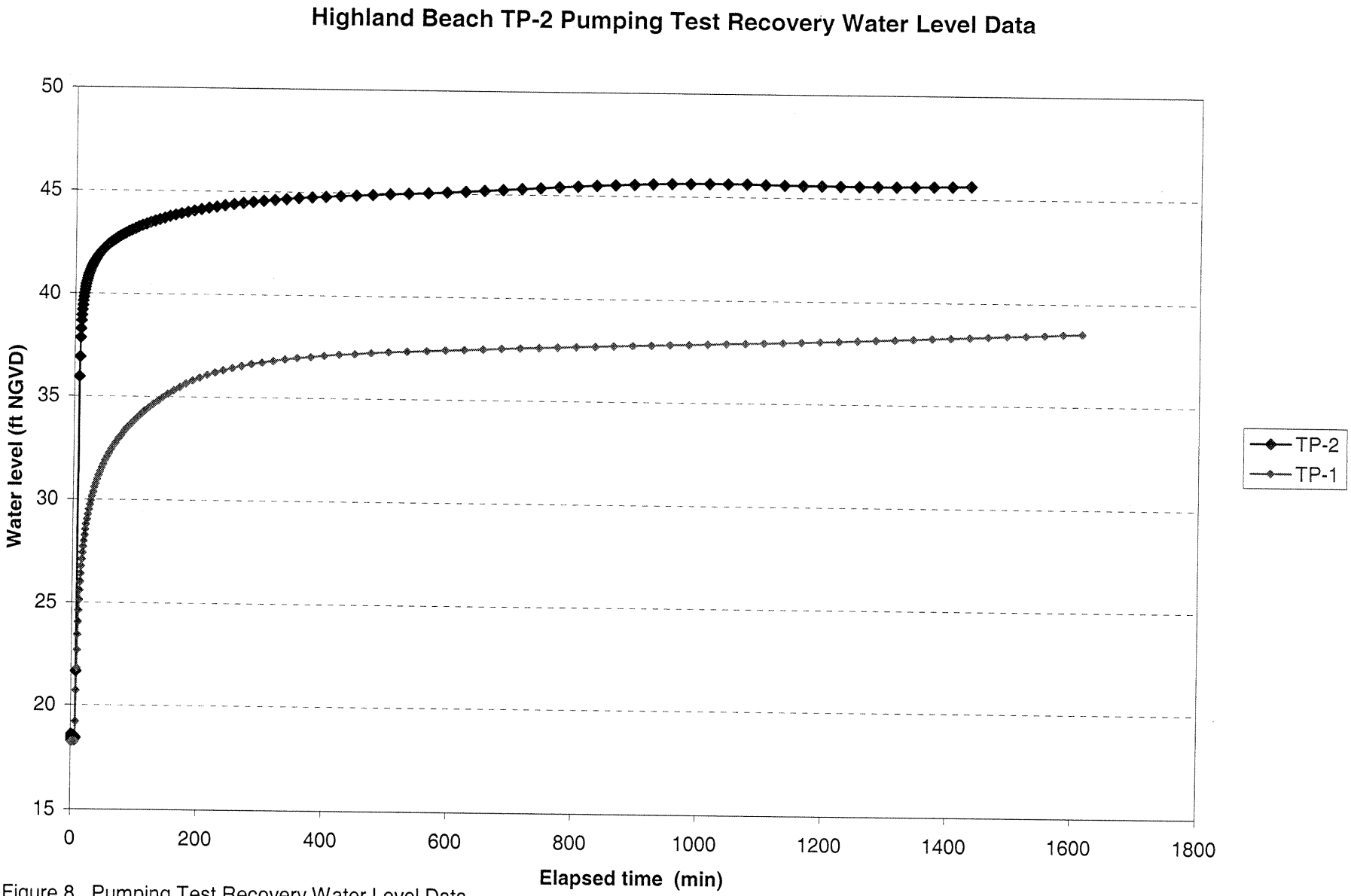


Figure 8. Pumping Test Recovery Water Level Data

the well following installation of the pump utilized for the pumping test. The well was allowed to flow during pump installation, resulting in a lowered water level that recovered during the background data collection period. The subsequent cyclic water level fluctuations are due to tidal influences that affect the Floridan aquifer.

Water level data during the pumping portion of the pumping test are presented in Figure 7. The water levels in wells TP-2 and TP-1 were approximately 46 and 40 ft NGVD prior to beginning the pumping portion of the test. After approximately 20 hours of pumping, the water levels in both wells had stabilized at approximately 20 feet NGVD. The specific capacity of TP-2 was 112 gpm/ft at a discharge rate of 3,000 gpm. The pumping test continued for another 52 hours, with water levels in both wells continuing to decline approximately one foot over this time. Towards the latter portion of the test, the water levels appear to oscillate slightly, which may be due to the superimposition of tidal influences upon the pumping water levels.

Figure 8 presents the water level data for the recovery portion of the pumping test. The data demonstrate that water level in TP-2 recovered to within 3.5 ft of the background water level approximately one hour after shutting off the pump and had fully recovered after approximately 10 hours. The water level in TP-1 was slower to recover, and was still approximately one foot below the static level after approximately 2 days of recovery, though increasing.

Both pumping and recovery water level data were analyzed to calculate the aquifer transmissivity and hydraulic conductivity of the open hole interval of TP-2. The presence of well TP-1 also made it possible to calculate the storativity of the aquifer.

Table 4 summarizes the aquifer test methods and results for the analysis of the pumping portion of the aquifer test.

TABLE 4
Aquifer Pump Test Data

Method	Transmissivity, ft^2/d	Hydraulic conductivity, ft/d	Storativity	Figure
Theis (1935)	20,367	107	$5.55x10^{-2}$	Figure 9
Hantush (1960)	18,252	96	$7.41x10^{-2}$	Figure 10
Hantush and Jacob (1955)	17,897	94	$7.16x10^{-2}$	Figure 11
Cooper and Jacob (1955)	21,540	113	$3.81x10^{-2}$	Figure 12
Average	**19,456**	**102**	**$5.98x10^{-2}$**	

The geometric mean transmissivity was 19,456 ft^2/d, yielding an average hydraulic conductivity of 102 ft/d. The average storativity was $5.98x10^{-2}$.

Plots of the recovery data are presented in Figures 13 and 14. The data were analyzed by the methods of Cooper and Jacob (1946) and Theis (1935), and yielded transmissivity values of 15,100 and 14,547 ft^2/d, respectively. These values are slightly less than those calculated from the pumping test, but are the same order of magnitude.

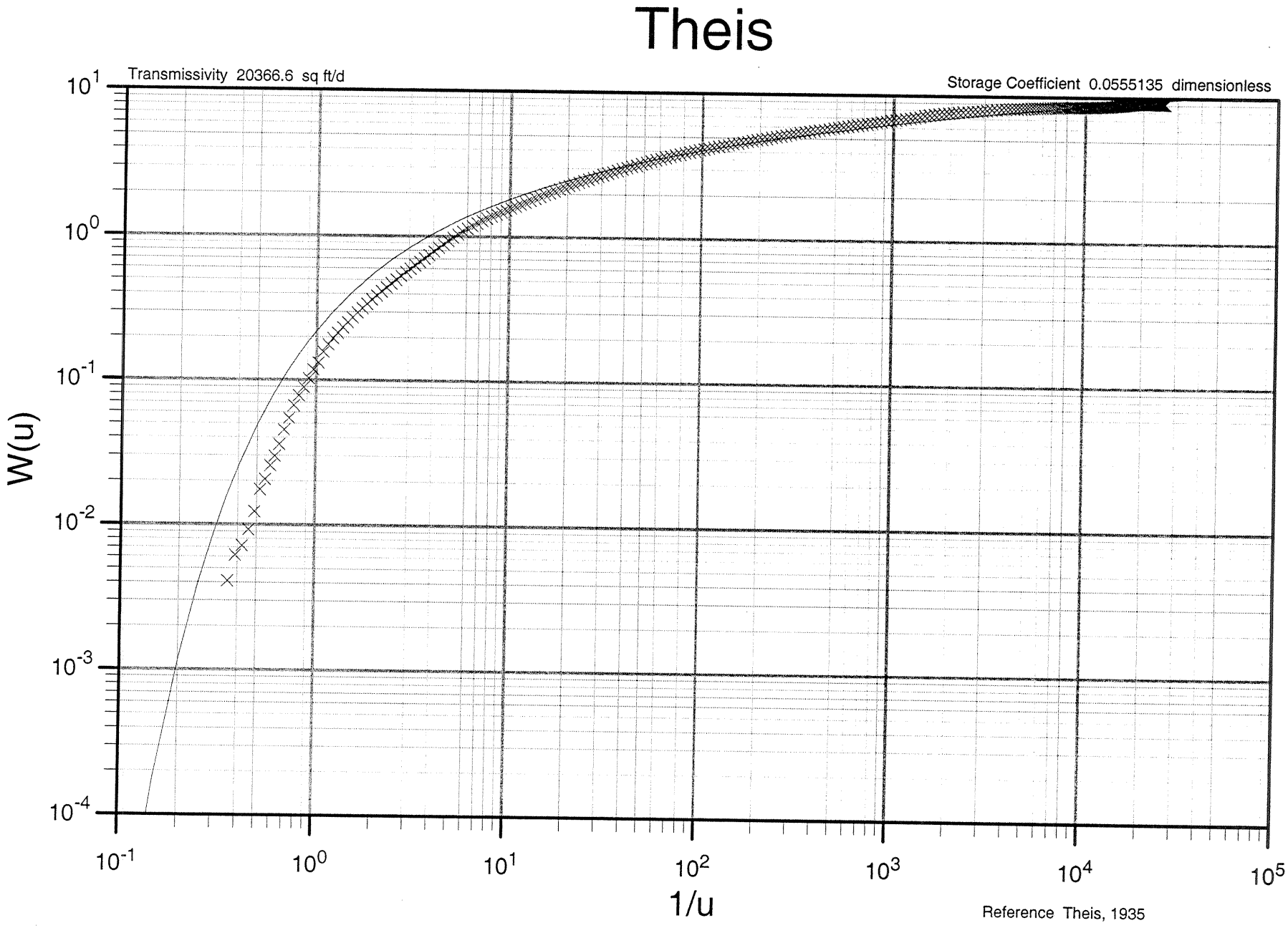


Figure 9. Pumping Test Data Analysis (Theis)

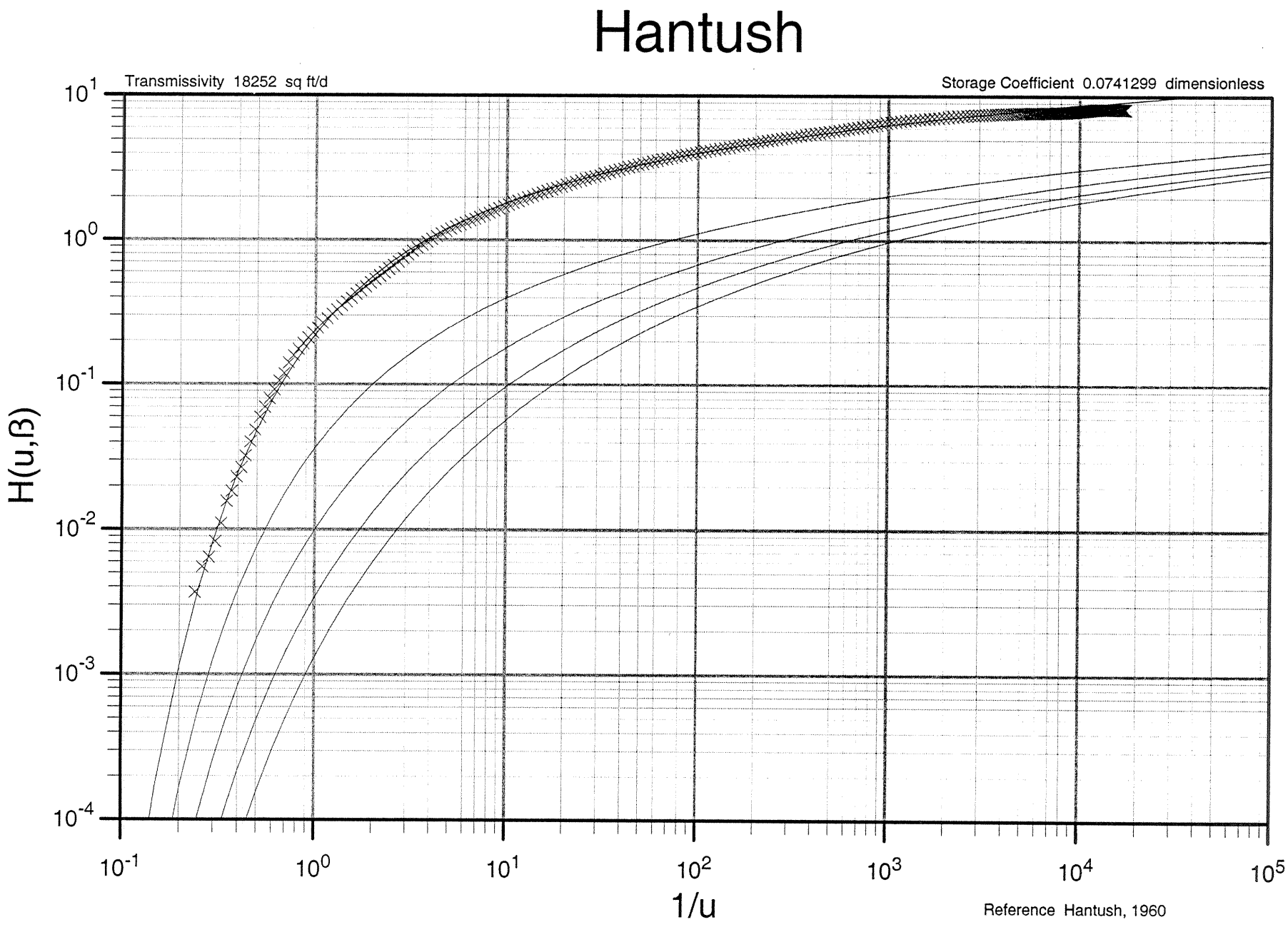


Figure 10. Pumping Test Data Analysis (Hantush)

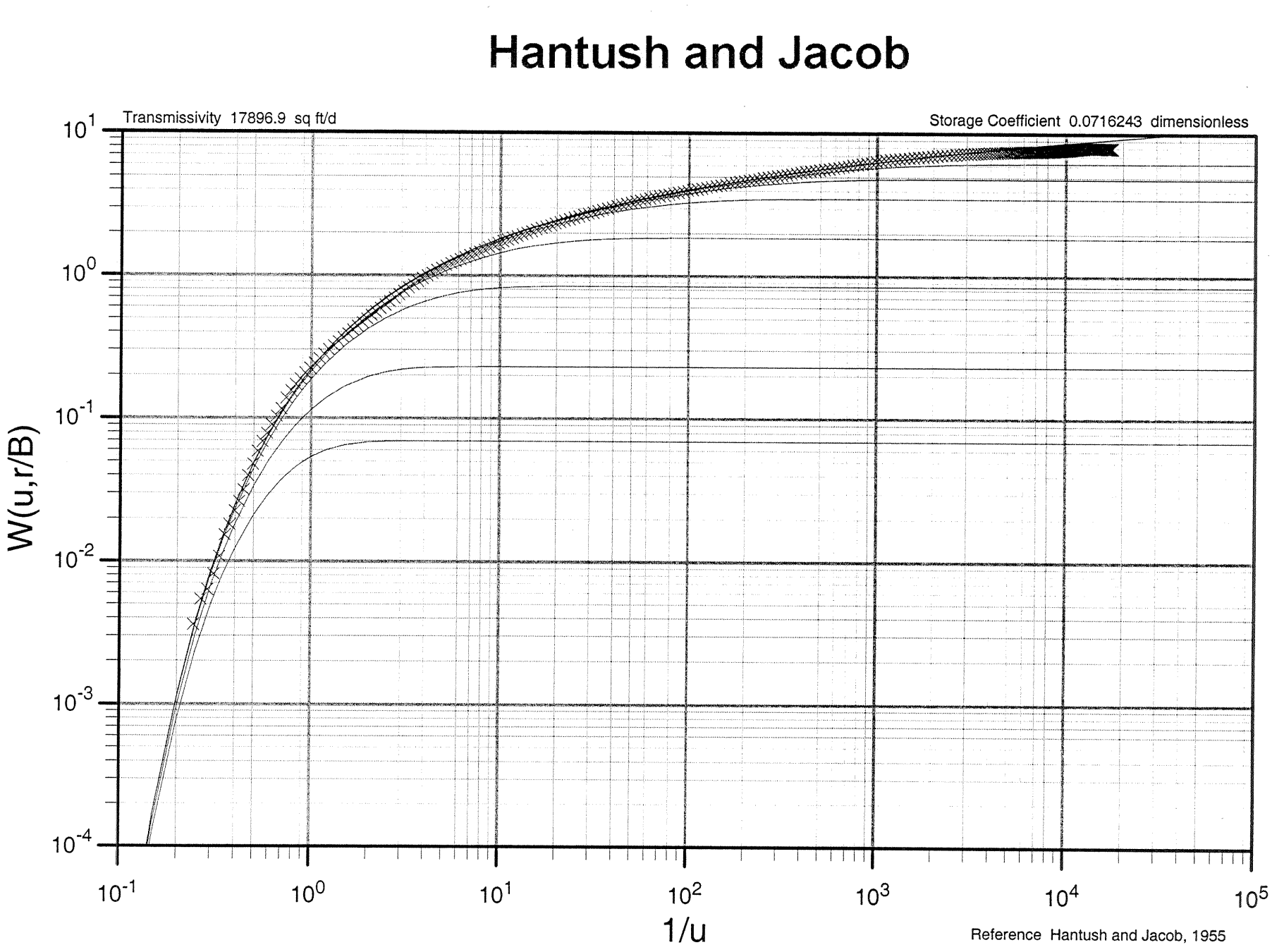


Figure 11. Pumping Test Data Analysis (Hantush and Jacob)

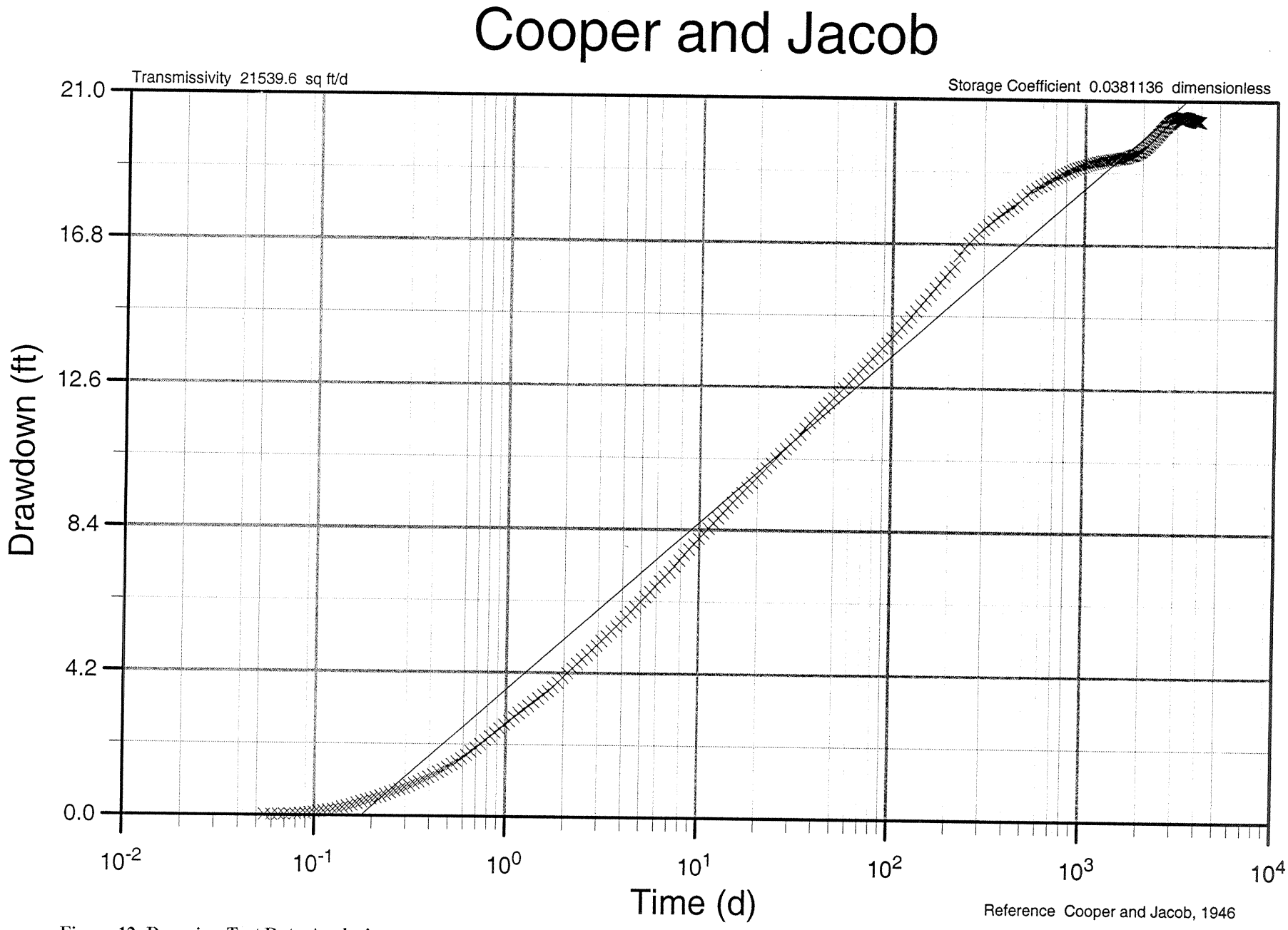


Figure 12. Pumping Test Data Analysis (Cooper and Jacob)

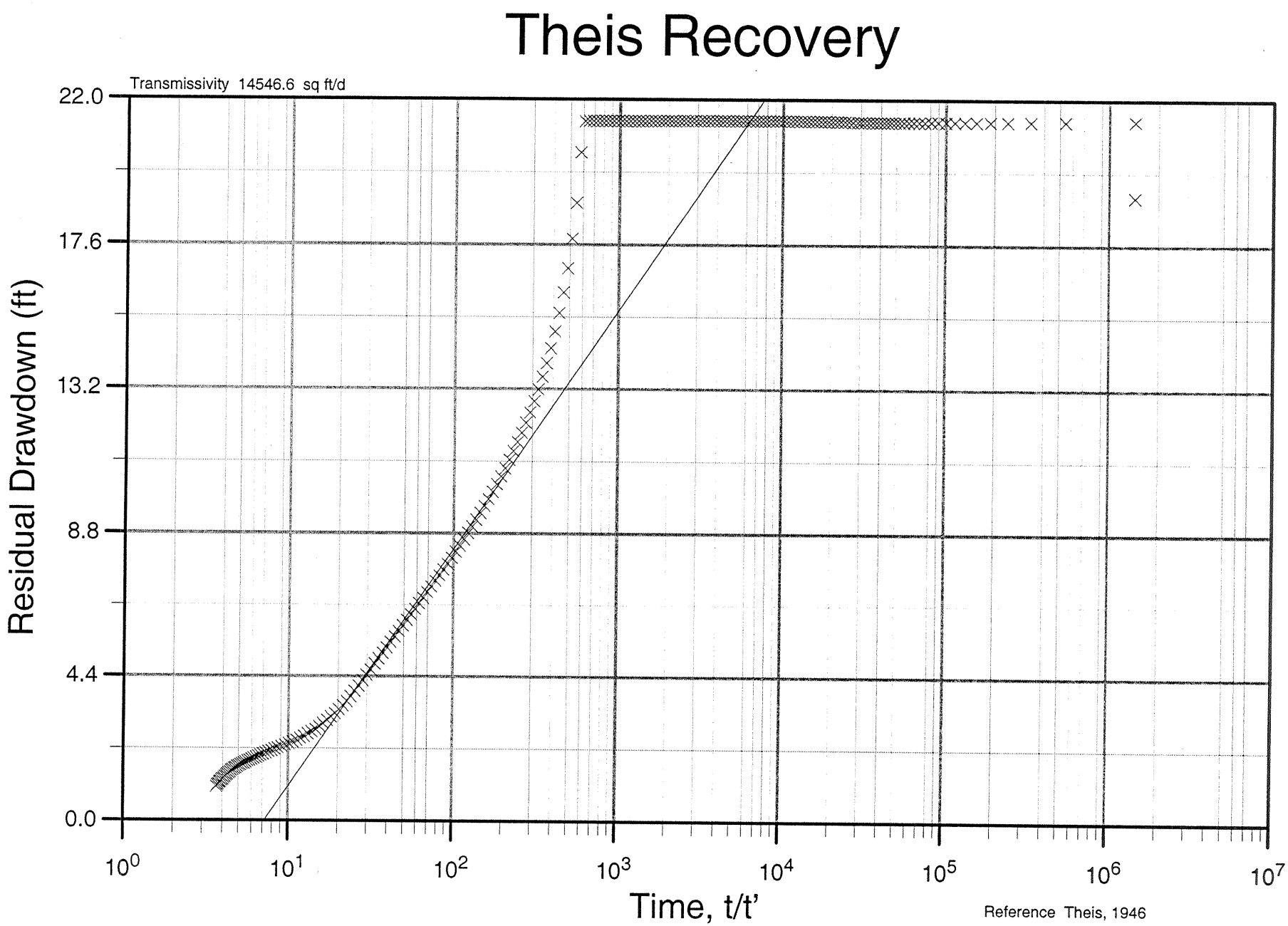


Figure 13. Recovery Test Data Analysis (Theis)

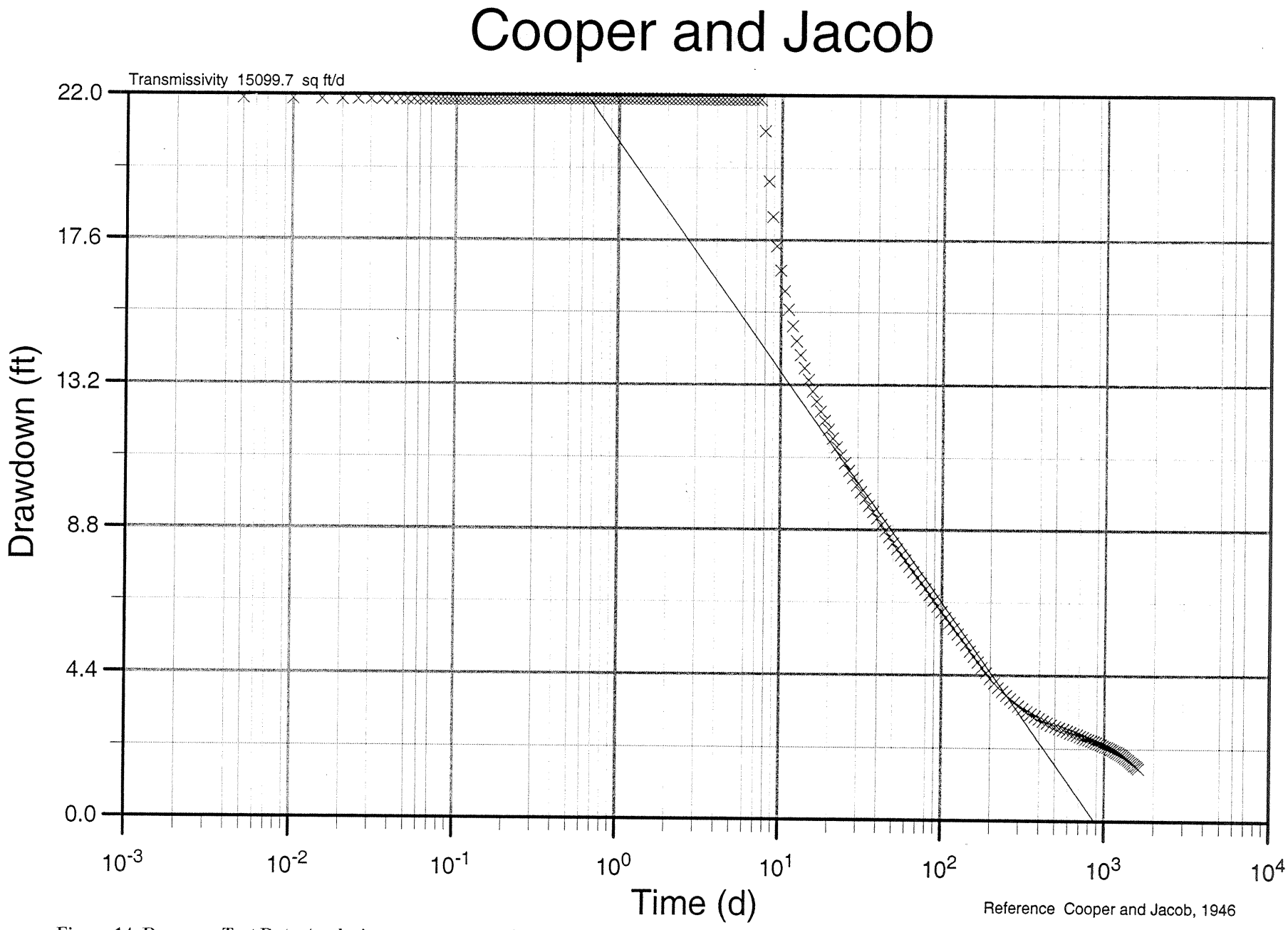


Figure 14. Recovery Test Data Analysis
(Cooper and Jacob)

Based on the transmissivity data from both the pumping and recovery portions of the test, the open interval of TP-2 has a mean transmissivity of 17,769 ft^2/d, a hydraulic conductivity of 94 ft/d, and a storativity of $5.98x10^{-2}$. These data are consistent with the data from the pump and recovery tests performed on TP-1 and with published values for the Floridan aquifer.

A water sample was collected at the end of the pumping portion or the pumping test and analyzed for primary and secondary drinking water standards. The water quality analyses indicate a total dissolved solids (TDS) concentration of 7,280 mg/L. Table 5 provides a summary of some of the key water quality parameters from the pumping test water sample. The analytical results for the entire list of drinking water standards are provided in Appendix E.

TABLE 5
Pumping Test Water Quality Summary

Parameter	Results
Total Dissolved Solids (mg/L)	7,280
Chloride (mg/L)	3,900
Sodium (mg/L)	1,800
Hydrogen Sulfide (mg/L)	6.4
Sulfate (mg/L)	610
Iron (mg/L)	0.08
Color (color units)	<5
Odor (T.O.N.)	3.0

Summary

Test Production well TP-2 was constructed with a final 17-inch diameter FRP casing set to a depth of 1,010 feet bls and an open hole interval to 1,200 feet bls. Analysis of data collected during a 72-hour pumping test conducted on the completed well indicated the open hole interval of TP-1 has a transmissivity of 17,769 ft^2/d, a hydraulic conductivity of 94 ft/d, and a storativity of $5.98x10^{-2}$. A specific capacity of 112 gpm/foot was calculated for TP-2.

Water quality sampling indicates water produced from the well during the pumping test has a TDS concentration of 7,280 mg/L. These data indicate that TP-2 will successfully serve as a supply well for the planned RO plant.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
3301 Gun Club Road, West Palm Beach, Florida 33406 • (561) 686-8800 • FL WATS 1-800-432-2045 • TDD (561) 697-2574
Mailing Address: P.O. Box 24680, West Palm Beach, FL 33416-4680 • www.sfwmd.gov

CON 24-06

November 05, 2001

PERMITTEE
TOWN OF HIGHLAND BEACH
3614 SOUTH OCEAN BLVD.
HIGHLAND BEACH, FL 33487

CONTRACTOR
RINGDAHL, DANIEL C.
17174 JEAN STREET
FORT MYERS, FL 33912
LICENSE NO:11148

WATER WELL CONSTRUCTION PERMIT # SF102501A
EXPIRATION DATE: May 05, 2002

PROJECT: TOWN OF HIGHLAND BEACH TEST/PRODUCTION WELL #2
TYPE OF USE: PUBLIC WATER SUPPLY/TEST
COUNTY: PALM BEACH SEC: 33 TWP: 46 RGE: 43

WELL CONSTRUCTION SPECIFICATIONS:	INNER	OUTER
CASING DIAMETER:	17"	26"
CASING DEPTH:	1060.00'	260.00'
SCREENED INTERVAL:	-	
OPEN HOLE INTERVAL:	1060' - 1200'	
TOTAL DEPTH OF WELL:	1200.00'	

GROUT REQUIREMENT:
Inner casing shall be grouted bottom to top.
Outer casing shall be grouted bottom to top.

See additional conditions of permit on attached sheet.

We appreciate your assistance and cooperation in better managing the water resources of the District. If you have any questions on this matter, please call Ann-Marie Superchi at extension 6929.

Sincerely,

Kurt Leckler, Supervising Hydrogeologist
Water Use Regulation Department, Water Supply Division

Attachment: Additional Conditions of Permit
c: MR. TOM LEFEVRE-DOH
DEP-POTABLE WATER SUPPLY
CH2M HILL

Department of Environmental Protection

Jeb Bush
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

David B. Struhs
Secretary

FEB 26 2001

February 26, 2001

Mr. Ben Saag
Town Manager
Town of Highland Beach
Highland Beach, Florida 33487

Dear Mr. Saag:

RE: Well Construction Discharge

In response to your letter dated November 15, 2000, the Department has determined that the discharge of Floridan Aquifer water during the construction and testing of the new Test Production well can be authorized under the *Generic Permit for Discharge of Produced Ground Water from any Non-Contaminated Site Activity*, as given in Florida Administrative Code (FAC) Rule 62-621.302.

As indicated in your letter, additional monitoring is necessary over what the generic permit requires, for turbidity and dissolved oxygen (DO) at the point of discharge. Such monitoring shall be accomplished by taking a grab sample every two hours, and may be discontinued for any day in which four consecutive samples do not exceed standards. The standard for DO is 5 mg/L; the standard for turbidity is 29 NTU. The discharge shall be discontinued immediately should either standard be exceeded.

Please call me at (561)681-6684 should you have any questions.

Sincerely,

Tim Powell

Tim Powell, P.E., Supervisor
Wastewater Permitting Section

cc: David McNabb, CH2M Hill

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL PROTECTION

GENERIC PERMIT

FOR THE

DISCHARGE OF PRODUCED GROUND WATER

FROM ANY NON-CONTAMINATED SITE ACTIVITY

June 19, 1995

Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity

(1) The facility is authorized to discharge produced ground water from any non-contaminated site activity which discharges by a point source to surface waters of the State, as defined in Chapter 62-620, F.A.C., only if the reported values for the parameters listed in Table 1 do not exceed any of the listed screening values. Before discharge of produced ground water can occur from such sites, analytical tests on samples of the proposed untreated discharge water shall be performed to determine if contamination exists.

(2) Minimum reporting requirements for all produced ground water dischargers. The effluent shall be sampled before the commencement of discharge, again within thirty (30) days after commencement of discharge, and then once every six (6) months for the life of the project to maintain continued coverage under this generic permit. Samples taken in compliance with the provisions of this permit shall be taken prior to actual discharge or mixing with the receiving waters. The effluent shall be sampled for the parameters listed in Table 1.

Table 1

	Screening Values for Discharges into:	
Parameter	Fresh Waters	Coastal Waters
Total Organic Carbon (TOC)	10.0 mg/l	10.0 mg/l
pH, standard units	6.0-8.5	6.5-8.5
Total Recoverable Mercury	0.012 µg/l	0.025 µg/l
Total Recoverable Cadmium	9.3 µg/l	9.3 µg/l
Total Recoverable Copper	2.9 µg/l	2.9 µg/l
Total Recoverable Lead	0.03 µg/l	5.6 µg/l
Total Recoverable Zinc	86.0 µg/l	86.0 µg/l
Total Recoverable Chromium (Hex.)	11.0 µg/l	50.0 µg/l
Benzene	1.0 µg/l	1.0 µg/l
Naphthalene	100.0 µg/l	100.0 µg/l

(3) If any of the analytical test results exceed the screening values listed in Table 1, except TOC, the discharge is not authorized by this permit.

(a) For initial TOC values that exceed the screening values listed in Table 1, which may be caused by naturally-occurring, high molecular weight organic compounds, the

permittee may request to be exempted from the TOC requirement. To request this exemption, the permittee shall submit additional information with a Notice of Intent (NOI) which describes the method used to determine that these compounds are naturally occurring.

(b) The NOI shall be submitted to the appropriate Department district office thirty (30) days prior to discharge, and contain the following information:

1. the name and address of the person that the permit coverage will be issued to;

2. the name and address of the facility, including county location;

3. any applicable individual wastewater permit number(s);

4. a map showing the facility and discharge location (including latitude and longitude);

5. the name of the receiving water; and

6. the additional information required by paragraph (3)(a) of this permit.

(c) Discharge shall not commence until notification of coverage is received from the Department.

(4) For fresh waters and coastal waters, the pH of the effluent shall not be lowered to less than 6.0 units for fresh waters, or less than 6.5 units for coastal waters, or raised above 8.5 units, unless the permittee submits natural background data confirming a natural background pH outside of this range. If natural background of the receiving water is determined to be less than 6.0 units for fresh waters, or less than 6.5 units in coastal waters, the pH shall not vary below natural background or vary more than one (1) unit above natural background for fresh and coastal waters. If natural background of the receiving water is determined to be higher than 8.5 units, the pH shall not vary above natural background or vary more than one (1) unit below natural background of fresh and coastal waters. The permittee shall include the natural background pH of the receiving waters with the results of the analyses required under paragraph (2) of this permit. For purposes of this section only, fresh waters are those having a chloride concentration of less than 1500 mg/l, and coastal waters are those having a chloride concentration equal to or greater than 1500 mg/l.

(5) In accordance with Rule 62-302.500(1)(a-c), F.A.C., the discharge shall at all times be free from floating solids, visible foam, turbidity, or visible oil in such amounts as to form nuisances on surface waters.

(6) If contamination exists, as indicated by the results of the analytical tests required by paragraph (2), the discharge cannot be covered by this generic permit. The facility shall apply for an individual wastewater permit at least ninety (90) days prior to the date discharge to surface waters of the State is expected, or, if applicable, the facility may seek coverage under any other applicable Department generic permit. No discharge is permissible without an effective permit.

(7) If the analytical tests required by paragraph (2) reveal that no contamination exists from any source, the facility can begin discharge immediately and is covered by this permit without having to submit an NOI request for coverage to the Department. A short summary of the proposed activity and copy of the analytical tests shall be sent to the applicable Department district office within one (1) week after discharge begins. These analytical tests shall be kept on site during discharge and made available to the Department if requested. Additionally, no Discharge Monitoring Report forms are required to be submitted to the Department.

(8) All of the general conditions listed in Rule 62-621.250, F.A.C., are applicable to this generic permit.

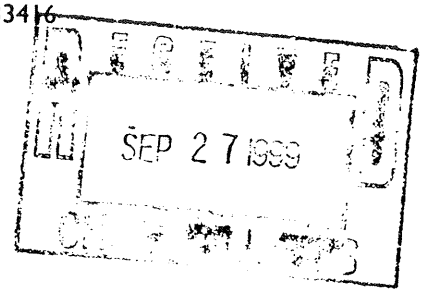
(9) There are no annual fees associated with the use of this generic permit.

Department of Environmental Protection

Jeb Bush
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

David B. Struhs
Secretary



September 23, 1999

Mr. David McNabb
CH2M Hill
800 Fairway Drive
Suite 350
Deerfield Beach, Florida 33441

Dear David:

RE: Highland Beach Well Construction/Testing

In reference to our telephone conversation the other day, enclosed is the document *Generic Permit for Discharge of Produced Ground Water from any Non-Contaminated Site Activity*, as given in Florida Administrative Code (FAC) Rule 62-621.302. The Department will require additional monitoring, over what the generic permit requires, for turbidity and dissolved oxygen at the point of discharge.

Monitoring/effluent limits for Dissolved Oxygen and Turbidity shall be as follows:

Parameter	Discharge Limit	Frequency
Dissolved Oxygen	5.0 mg/L	Every two hours*
Turbidity	29 NTU	Every two hours*

*Sampling may be discontinued for that day, provided that 4 consecutive samples did not exceed either discharge limit.

Sampling for Turbidity and Dissolved Oxygen must be done daily for each day there is a discharge using field equipment. The sampling point(s) shall be at the end-of-pipe prior to discharge into the receiving ditch. Should either limit be exceeded the discharge shall be immediately discontinued until the problem is resolved.

Please call me at (561)681-6698 should you have any questions.

Sincerely,

Tim Powell, Supervisor
Industrial Waste Section

Enclosure:

Highland Beach
Well TP-2
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
	0	10	Sand, dark yellowish brown (10YR6/2), fine grained, 10% shell fragments
	10	20	Limestone, yellowish gray (5Y8/1) to light gray (N7), coarse sand grained, poorly consolidated
	20	30	Same as above
	30	40	Same as above
	40	50	Same as above
	50	60	Same as above
	60	70	Limestone, yellowish gray (5Y8/1) to light gray (N7), medium sand grained, poorly consolidated
	70	80	Limestone, yellowish gray (5Y8/1) to light gray (N7), sparse shell fragments, coarse sand grained, poorly consolidated
	80	90	Same as above
	90	100	Same as above
	100	110	Same as above
	110	120	Limestone, yellowish gray (5Y8/1) to light gray (N7), sparse shell fragments, medium sand grained, poorly consolidated
	120	130	Limestone, yellowish gray (5Y8/1) to light gray (N7), sparse shell fragments, coarse sand grained, poorly consolidated
	130	140	Same as above
	140	150	Same as above
	150	160	Shell fragments, yellowish gray (5Y8/1) to light gray (N7), sparry cement, coarse sand grained, poorly consolidated
	160	170	Same as above
	170	180	Same as above
	180	190	Same as above
	190	200	Limestone, yellowish gray (5Y8/1) to light gray (N7), sparse shell fragments, coarse sand grained, poorly consolidated
	200	210	Same as above
	210	220	Same as above
	220	230	Same as above
	230	240	Limestone, light gray (N7), sparse shell fragments, coarse sand grained, poorly consolidated, slightly phosphatic
	240	250	Same as above
	250	260	Fossiliferous Limestone, light gray (N7), fine sand grained, primarily coral and shell fragments, low porosity, well consolidated
	260	270	Same as above
	270	280	Same as above
	280	290	Same as above
	290	300	Limestone, light gray (N7), medium to fine sand grained, moderate porosity, moderately consolidated
	300	310	Same as above
	310	320	Same as above
	320	330	Same as above
	330	340	Limestone, light gray (N7), medium sand grained, moderate porosity, moderately consolidated, slightly phosphatic
	340	350	Same as above
	350	360	Same as above
	360	370	Limestone, light gray (N7), fine sand grained, moderate porosity, well consolidated, slightly phosphatic

Highland Beach
Well TP-2
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
	370	380	Same as above
	380	390	Limestone, light gray (N7), fine sand grained, moderate porosity, moderately consolidated, slightly phosphatic
	390	400	Same as above
	400	410	Limestone, yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	410	420	Same as above
	420	430	Same as above
	430	440	Limestone (60%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated, Silty Clay (40%), light olive gray (5Y6/1), phosphatic
	440	450	Silty Clay (80%), light olive gray (5Y6/1), phosphatic, Limestone (20%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	450	460	Same as above, increase limestone to 30%
	460	470	Clay, light olive gray (5Y6/1), phosphatic
	470	480	Same as above
	480	490	Same as above
	490	500	Clay (80%), light olive gray (5Y6/1), phosphatic, Limestone (20%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	500	510	Same as above
	510	520	Same as above, slightly phosphatic
	520	530	Same as above
	530	540	Same as above
	540	550	Clay (50%), light olive gray (5Y6/1), phosphatic, Limestone (50%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	550	560	Clay, light olive gray (5Y6/1), phosphatic
	560	570	Same as above
	570	580	Clay (80%), light olive gray (5Y6/1), phosphatic, Limestone (20%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	580	590	Same as above
	590	600	Same as above
	600	610	Same as above
	610	620	Clay (50%), light olive gray (5Y6/1), phosphatic, Limestone (50%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	620	630	Clay, light olive gray (5Y6/1), phosphatic
	630	640	Same as above
	640	650	Same as above
	650	660	Same as above
	660	670	Clay (60%), light olive gray (5Y6/1), phosphatic, Limestone (40%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	670	680	Limestone, yellowish gray (5Y8/1), medium sand grained, poorly consolidated, phosphatic

Highland Beach
Well TP-2
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
	680	690	Same as above
	690	700	Same as above
	700	710	Missing
	710	720	Missing
	720	730	Missing
	730	740	Missing
	740	750	Clay, yellowish gray (5Y8/1), phosphatic
	750	760	Missing
	760	770	Clay (80%), yellowish gray (5Y8/1), phosphatic, Limestone (20%), yellowish gray (5Y8/1) to light olive gray (5Y6/1), fine sand grained, moderately consolidated
	770	780	Clay, yellowish gray (5Y8/1), phosphatic
	780	790	Same as above
	790	800	Same as above
	800	810	Clay, light olive gray (5Y6/1), phosphatic
	810	820	Clay (60%), light olive gray (5Y6/1), slightly phosphatic, Limestone (40%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	820	830	Clay (50%), light olive gray (5Y6/1), slightly phosphatic, Limestone (50%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	830	840	Limestone (80%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated, Clay (20%), light olive gray (5Y6/1), slightly phosphatic,
	840	850	Clay (80%), light olive gray (5Y6/1), phosphatic, Limestone (20%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	850	860	Same as above, increase limestone to 30%
	860	870	Clay (90%), yellowish gray (5Y8/1), phosphatic, Limestone (10%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	870	880	Same as above
	880	890	Clay (90%), light olive gray (5Y6/1), phosphatic, Limestone (10%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	890	900	Same as above, increase limestone to 30%
	900	910	Clay (90%), light olive gray (5Y6/1), phosphatic, Limestone (60%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated
	910	920	Clay (60%), yellowish gray (5Y8/1), phosphatic, Limestone (40%), yellowish gray (5Y8/1), fine sand grained, moderately consolidated
	920	930	Limestone (90%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated, Clay (10%), yellowish gray (5Y8/1), phosphatic,
	930	940	Clay (60%), yellowish gray (5Y8/1), phosphatic, Limestone (40%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated
	940	950	Limestone (70%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated, Clay (30%), yellowish gray (5Y8/1), phosphatic
	950	960	Clay (70%), yellowish gray (5Y8/1), phosphatic, Limestone (30%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated
	960	970	Limestone (70%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated, Clay (30%), yellowish gray (5Y8/1), phosphatic

Highland Beach
Well TP-2
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
	970	980	Limestone (70%), yellowish gray (5Y8/1), fine sand grained, poorly consolidated, sparse shell fragments, Clay (30%), yellowish gray (5Y8/1), phosphatic
	980	990	Same as above, increase limestone to 90%
	990	1000	Same as above
	1000	1010	Same as above
	1010	1020	Limestone, medium light gray (N6) to yellowish gray (5Y8/1), fine sand grained, poor to moderate consolidation
	1020	1030	Limestone, light gray (N7) to yellowish gray (5Y8/1), fine sand grained, poor to moderate consolidation, *lepidocyclina sp.* present
	1030	1040	Limestone, medium light gray (N6) to yellowish gray (5Y8/1), fine sand grained, poor to moderate consolidation
	1040	1050	Same as above
	1050	1060	Same as above, poorly consolidated
	1060	1070	Same as above
	1070	1080	Limestone, yellowish gray (5Y8/1), fine sand grained, moderate consolidation
	1080	1090	Same as above, poorly consolidated
	1090	1100	Same as above, bivalve fragments present
	1100	1110	Limestone, yellowish gray (5Y8/1), fine to medium sand grained, moderate consolidation
	1110	1120	Same as above
	1120	1130	Same as above
	1130	1140	Same as above
	1140	1150	Limestone, white (N9), fine sand grained, moderate consolidation
	1150	1160	Limestone, yellowish gray (5Y8/1), fine sand grained, moderate consolidation
	1160	1170	Limestone, white (N9), fine sand grained, moderate consolidation
	1170	1180	Limestone, yellowish gray (5Y8/1), fine sand grained, poorly consolidation
	1180	1190	Same as above
	1190	1200	Same as above

ft. bpl = feet below pad level

Town of Highland Beach
Test Production Well TP-2
Video Survey Summary

Date: 25-Feb-2002
Observer: M. Schilling

Depth in feet below land surface		Joints Observed	Observations
From	To		
0	100	20, 40, 60, 80, 100	Casing in good condition.
100	200	120, 140, 160, 180, 200	Same as above
200	300	220, 240, 260, 280, 300	Same as above
300	400	320, 340, 360, 380, 400	Same as above
400	500	420, 440, 460, 480, 500	Same as above
500	600	520, 540, 560, 580, 600	Same as above
600	700	620, 640, 660, 680, 700	Same as above
700	800	720, 740, 760, 780, 800	Same as above
800	900	820, 840, 860, 880, 900	Same as above
900	1000	920, 940, 960, 980, 1000	Same as above
1000	1100		Base of casing at 1,010 feet bls. Flow zones at 1,029 and 1,093 feet bls.
1100	1203		Flow zone from 1,127 to 1,147 feet bls.

bls = below land surface

Environmental Services of South Florida, Inc.

P. O. Box 10003 • Riviera Beach, Florida 33419 • (561) 848-7805

LAB # E86740

LABORATORY ANALYSIS
WATER / WASTEWATER / SOIL / FOOD

CONSULTING
INDUSTRIAL / AGRICULTURAL / DOMESTIC

April 24, 2002

Mr. Dan Ringdahl
Diversified Well Drilling

Results of chemical and bacteriological analysis of **Well TPW-2** collected at Town of Highland Beach Utilities by E. Olavarria on March 21, 2002 at 1000 are as follow:

Parameter	Result
Chloride, Cl	3,900
Conductivity (μmhos)	11,800
Iron, Fe	0.08
Field pH (units)	7.4
Sodium, Na	1,800
Sulfate, SO_4	610
Total Dissolved Solids	7,280
Total Hardness, as $CaCO_3$	1,700
Calcium Hardness, as $CaCO_3$	740
Alkalinity, as $CaCO_3$	150
Silica, Si	5.7
Hydrogen Sulfide, H_2S	6.4
Antimony, Sb	<0.005
Arsenic, As	<0.001
Barium, Ba	0.02
Beryllium, Be	<0.002
Cadmium, Cd	<0.002
Chromium, Cr	<0.02
Cyanide, CN	<0.02
Fluoride, F	0.52
Lead, Pb	0.0073
Mercury, Hg	<0.0002
Nickel, Ni	<0.02
Nitrate, N	<0.10
Nitrite, N	<0.002
Selenium, Se	<0.01
Thallium, Tl	<0.001

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LAB # E86740

LABORATORY ANALYSIS
WATER / WASTEWATER / SOIL / FOOD

CONSULTING
INDUSTRIAL / AGRICULTURAL / DOMESTIC

cont. from Page 1
April 24, 2002

Parameter	Result
Volatile Organic Compounds	See Attached Sheet
Total Trihalomethanes	See Attached Sheet
Pesticides/PCBs	See Attached Sheet
Gross Alpha	See Attached Sheet
Radium 226 and 228	See Attached Sheet
Turbidity, NTU	0.85
Aluminum, Al	0.26
Copper, Cu	0.05
Color, APHA	<5
Foaming Agents	0.02
Manganese, Mn	<0.01
Threshold Odor	3
Silver, Ag	<0.01
Zinc, Zn	<0.01
Strontium, Sr	13
Potassium, K	50
Dissolved Oxygen	0.3
Orthophosphate, P	<0.01
Napthalene	<0.001
Anthracene	<0.001
Phenanthrene	<0.001
Ammonia, N	0.49
Organic Nitrogen, N	0.44
Total Kjeldahl Nitrogen, N	0.93
Unregulated Group III Compounds	See Attached Sheet
Total Coliform	See Attached Sheet
Fecal Coliform	See Attached Sheet
Fecal Streptococci	See Attached Sheet

NOTE: - Results, unless otherwise specified, expressed in mg/l.

Michael A. Fiedor

Michael A. Fiedor
Director, E.S.S.F.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Environmental Services of South Florida Inc.
Town of Highland Beach Utilities

April 18, 2002
Project No: 28127

Sample ID: Well TPW-2

Volatile Organic Analysis
62-550.310(2)(b)
(PWS028)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2378	1,2,4 Trichlorobenzene	70	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2380	cis-1,2-Dichloroethene	70	28127.01	0.2 U	ug/l	EPA 502.2	04/02/02	0.2	E84129
2955	Xylenes (Total)	10000	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2964	Methylene Chloride	5	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2968	o-Dichlorobenzene	600	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2969	p-Dichlorobenzene	75	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2976	Vinyl chloride	1	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2977	1,1-Dichloroethene	7	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2979	trans-1,2-Dichloroethene	100	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2980	1,2-Dichloroethane	3	28127.01	0.2 U	ug/l	EPA 502.2	04/02/02	0.2	E84129
2981	1,1,1-Trichloroethane	200	28127.01	0.3 U	ug/l	EPA 502.2	04/02/02	0.3	E84129
2982	Carbon tetrachloride	3	28127.01	0.3 U	ug/l	EPA 502.2	04/02/02	0.3	E84129
2983	1,2-Dichloropropane	5	28127.01	0.3 U	ug/l	EPA 502.2	04/02/02	0.3	E84129
2984	Trichloroethene	3	28127.01	0.2 U	ug/l	EPA 502.2	04/02/02	0.2	E84129
2985	1,1,2-Trichloroethane	5	28127.01	0.3 U	ug/l	EPA 502.2	04/02/02	0.3	E84129
2987	Tetrachloroethene	3	28127.01	0.2 U	ug/l	EPA 502.2	04/02/02	0.2	E84129
2989	Chlorobenzene	100	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2990	Benzene	1	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2991	Toluene	1000	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2992	Ethylbenzene	700	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129
2996	Styrene	100	28127.01	0.5 U	ug/l	EPA 502.2	04/02/02	0.5	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Environmental Services of South Florida Inc.
Town of Highland Beach Utilities

April 18, 2002
Project No: 28127

Sample ID: Well TPW-2

Trihalomethane Analysis
62-550.310(2)(a)
(PWS027)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2950	Total Trihalomethanes	0.10	28127.01	0.0015 U	mg/l	EPA 502.2	04/02/02	0.0015	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Environmental Services of South Florida Inc.
Town of Highland Beach Utilities

April 18, 2002
Project No: 28127

Sample ID: Well TPW-2

Pesticide/PCB Analysis
62-5550.310(2)(c)
(PWS029)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2005	Endrin	2	28127.01	0.01 U	ug/l	EPA 508	04/05/02	0.01	E84129
2010	Lindane	0.2	28127.01	0.01 U	ug/l	EPA 508	04/05/02	0.01	E84129
2015	Methoxychlor	40	28127.01	0.02 U	ug/l	EPA 508	04/05/02	0.02	E84129
2020	Toxaphene	3	28127.01	0.2 U	ug/l	EPA 508	04/05/02	0.2	E84129
2031	Dalapon	200	28127.01	1 U	ug/l	EPA 515.1	04/08/02	1	E84129
2032	Diquat	20	28127.01	1 U	ug/l	EPA 549.2	03/29/02	1	E84129
2033	Endothall	100	28127.01	20 U	ug/l	EPA 548.1	04/09/02	20	E84129
2034	Glyphosate	700	28127.01	10 U	ug/l	EPA 547	03/28/02	10	E84129
2035	Di(2-ethylhexyl)adipate	400	28127.01	1 U	ug/l	EPA 506	04/05/02	1	E84129
2036	Oxamyl (Vydate)	200	28127.01	0.5 U	ug/l	EPA 531.1	04/05/02	0.5	E84129
2037	Simazine	4	28127.01	0.1 U	ug/l	EPA 507	04/05/02	0.1	E84129
2039	Di(2-ethylhexyl)phthalate	6	28127.01	1 U	ug/l	EPA 506	04/05/02	1	E84129
2040	Picloram	500	28127.01	0.2 U	ug/l	EPA 515.1	04/08/02	0.2	E84129
2041	Dinoseb	7	28127.01	0.2 U	ug/l	EPA 515.1	04/08/02	0.2	E84129
2042	Hexachlorocyclopentadiene	50	28127.01	0.1 U	ug/l	EPA 508	04/05/02	0.1	E84129
2046	Carbofuran	40	28127.01	0.5 U	ug/l	EPA 531.1	04/05/02	0.5	E84129
2050	Atrazine	3	28127.01	0.1 U	ug/l	EPA 507	04/05/02	0.1	E84129
2051	Alachlor	2	28127.01	0.3 U	ug/l	EPA 507	04/05/02	0.3	E84129
2065	Heptachlor	0.4	28127.01	0.01 U	ug/l	EPA 508	04/05/02	0.01	E84129
2067	Heptachlor epoxide	0.2	28127.01	0.01 U	ug/l	EPA 508	04/05/02	0.01	E84129
2105	2,4-D	70	28127.01	0.5 U	ug/l	EPA 515.1	04/08/02	0.5	E84129
2110	2,4,5-TP (Silvex)	50	28127.01	0.05 U	ug/l	EPA 515.1	04/08/02	0.05	E84129
2274	Hexachlorobenzene	1	28127.01	0.01 U	ug/l	EPA 508	04/05/02	0.01	E84129
2306	Benzo(a)pyrene	0.2	28127.01	0.01 U	ug/l	EPA 550	04/10/02	0.01	E84129
2326	Pentachlorophenol	1	28127.01	0.05 U	ug/l	EPA 515.1	04/08/02	0.05	E84129
2383	PCBs	0.5	28127.01	0.05 U	ug/l	EPA 508	04/05/02	0.05	E84129
2931	Dibromochloropropane	0.2	28127.01	0.005 U	ug/l	EPA 504.1	03/30/02	0.005	E84129
2946	Ethylene dibromide	0.02	28127.01	0.005 U	ug/l	EPA 504.1	03/30/02	0.005	E84129
2959	Chlordane	2	28127.01	0.05 U	ug/l	EPA 508	04/05/02	0.05	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

KNL
LABORATORY SERVICES
2742 N. Florida Ave.
P.O. Box 1833
Tampa, Florida 33601
(813) 229-2879
Fax (813) 229-0002

DEP COMPQAP #870251
Lab ID: E84025

18959A

CERTIFICATE OF ANALYSIS

RADIOCHEMICAL ANALYSIS

62-550.310(4)

(PWS033)

Parameter ID	Name	Sample Number	Analysis Result (pCi/l)	Analytical Method	Analysis Error	Analysis Date
4000	Gross Alpha	66678	21	EPA 00-02	± 1.0	4-16-02
4020	Radium-226	66678	11.6	EPA 903.1	± 0.7	4-15-02
4030	Radium-228	66678	1.4	EPA Ra-05	± 0.9	4-12-02

Alpha Standard: Th-230

Test results meet all requirements of the NELAC standards.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Environmental Services of South Florida Inc.
Town of Highland Beach Utilities

April 18, 2002
Project No: 28127

Sample ID: Well TPW-2

Unreg Group III Analysis
62-550.415
(PWS036 & 037)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2262	Isophorone		28127.01	1 U	ug/l	EPA 609	04/05/02	1	E84129
2270	2,4-Dinitrotoluene		28127.01	1 U	ug/l	EPA 609	04/05/02	1	E84129
2282	Dimethylphthalate		28127.01	1 U	ug/l	EPA 606	04/05/02	1	E84129
2284	Diethylphthalate		28127.01	1 U	ug/l	EPA 606	04/05/02	1	E84129
2290	Di-n-butylphthalate		28127.01	1 U	ug/l	EPA 606	04/05/02	1	E84129
2294	Butyl benzyl phthalate		28127.01	1 U	ug/l	EPA 606	04/05/02	1	E84129
9089	Dioctylphthalate		28127.01	1 U	ug/l	EPA 606	04/05/02	1	E84129
9108	2-Chlorophenol		28127.01	5 U	ug/l	EPA 604	04/02/02	5	E84129
9112	2-Methyl-4,6-dinitrophenol		28127.01	20 U	ug/l	EPA 604	04/02/02	20	E84129
9115	Phenol		28127.01	5 U	ug/l	EPA 604	04/02/02	5	E84129
9116	2,4,6-Trichlorophenol		28127.01	10 U	ug/l	EPA 604	04/02/02	10	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

Environmental Services of South Florida, Inc.

P. O. Box 10003 • Riviera Beach, Florida 33419 • (561) 848-7805

LAB # E86740

LABORATORY ANALYSIS
WATER / WASTEWATER / SOIL / FOOD

CONSULTING
INDUSTRIAL / AGRICULTURAL / DOMESTIC

BACTERIOLOGICAL ANALYSIS

System Name: Town of Highland Beach Utilities

Address: Palm Beach County, Florida

Sample Site: Well TPW-2

Date and Time of Collection: 3/21/02, 1000

E.S.S.F. Collector: E. Olavarria

Type of Supply: Community Water System

Type of Sample: Check

Date and Time of Sample Arrival in Lab: 3/21/02, 1230

Date and Time of Sample Analysis: 3/21/02, 1445

Analysis Method:

(MF) MTF MMO-MUG PA

Remarks:

Sample No.	Sample Point	Res.Cl (mg/l)	pH	Coliform, MF/100 ml Total*	Coliform, MF/100 ml Fecal	Non Coliform	Fecal Streptococci
1.				A	0/100ml	None Detected	0/100ml

Michael A. Fiedor

* P - Coliforms are present
A - Coliforms are absent

C - Confluent growth
TNTC - Too numerous to count

Michael A. Fiedor
Director