POST, BUCKLEY, SCHUH & JERNIGAN, INC.

28082608/03/801

Keep report in file

PBS&J

~~HGR-RAM-CHT~~-GRS

BS&I TRANSMITTAL

RECEIVED
JAN 2. 1987
U. S. GEOLOGICAL SURVEY
ORLANDO, FL

1/22/87

TO Joel Kimrey
USGS
Orlando

DATE 1/21/87
JOB NO.
RE

GENTLEMEN:

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop Drawings ☐ Prints ☐ Plans ☐ Samples
☐ Copy of Letter ☐ Change Order ☐ Specifications ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Eastern Osceola County Exploratory Test Hole Number 1

THESE ARE TRANSMITTED As Checked Below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____ ☐ _____
☐ For bids due _____ 19___
☐ Prints returned after loan to us

REMARKS Joel
The attached document is for your use. It is essentially a data report with no interpretation of hydrologic conditions. The basic data should be of use in your Osceola County study. The test hole is closed with a locking cap and can be easily used for observation. We have a key if you need it. We expect to start another test hole within a few weeks.

SIGNED Willis Hyde

DISTRIBUTION

FORM NO. CIS/070-03R

If enclosures are not as noted, kindly notify us at once

EASTERN OSCEOLA

COUNTY EXPLORATORY

TEST HOLE NUMBER 1

EASTERN OSCEOLA COUNTY

EXPLORATORY TEST HOLE

NUMBER 1

Prepared for

South Brevard Water Authority

Post, Buckley, Schuh & Jernigan, Inc.
in cooperation with
Geraghty and Miller, Inc.

January 1987

Project Number 15-060.12

CONTENTS

FIGURES

APPENDICES

SUMMARY

1. The test hole was drilled at the western boundary of the St. John's River Water Management District on the south side of U.S. Highway 192 about 1.4 miles east of the junction of Highways 192 and 441 at Holopaw.

2. The total depth of the hole was 1100 feet. The upper 322 feet were cased with 10-inch black steel casing and grouted to the surface. The remaining depth was nominal 10-inch diameter open hole. The upper 20 feet of the test hole was completed with four-inch PVC pipe cemented inside the 10-inch casing. The casing is closed with a secure, locking cap.

3. The hydrogeologic section at the test hole site consists of 75 feet of surficial sands and shells which is underlain by about 245 feet of sands, clay and limestone of the Hawthorn Formation. Approximately the upper 130 feet comprise the surficial aquifer and the lower clays serve as a confining unit separating the nonartesian and artesian aquifers. The Hawthorn is underlain by more than 780 feet of Eocene limestones which compose the artesian Floridan aquifer.

4. Water quality tests were performed in the field and water samples were collected and analyzed in the laboratory. There was very little down-hole change in water quality.

5. Ten geophysical logs were performed: caliper; resistivity; spontaneous potential; gamma ray; temperature under pumping and static conditions; fluid conductivity under pumping and static conditions; and fluid velocity under pumping and static conditions. These logs confirmed geologic formations and water quality as determined from lithologic samples and field and laboratory analyses.

6. During drilling, seven specific capacity tests were performed by the air-lift method at approximately 100-foot intervals below the casing. Results from the tests are given in Appendix 3, Table 1. A five-hour yield test was conducted after completion of the test hole with a vertical turbine pump producing 970 gallons per minute. That test indicated the specific capacity to be 510 gallons per minute per foot of drawdown. Results of the test are given in Appendix 3, Table 2.

≈ 100,000 ft²/d

7. The aquifer transmissivity was estimated to be 780,000 gallons per day per foot based on the five-hour yield test. The aquifer is highly transmissive and capable of yielding large quantities of water.

II. INTRODUCTION

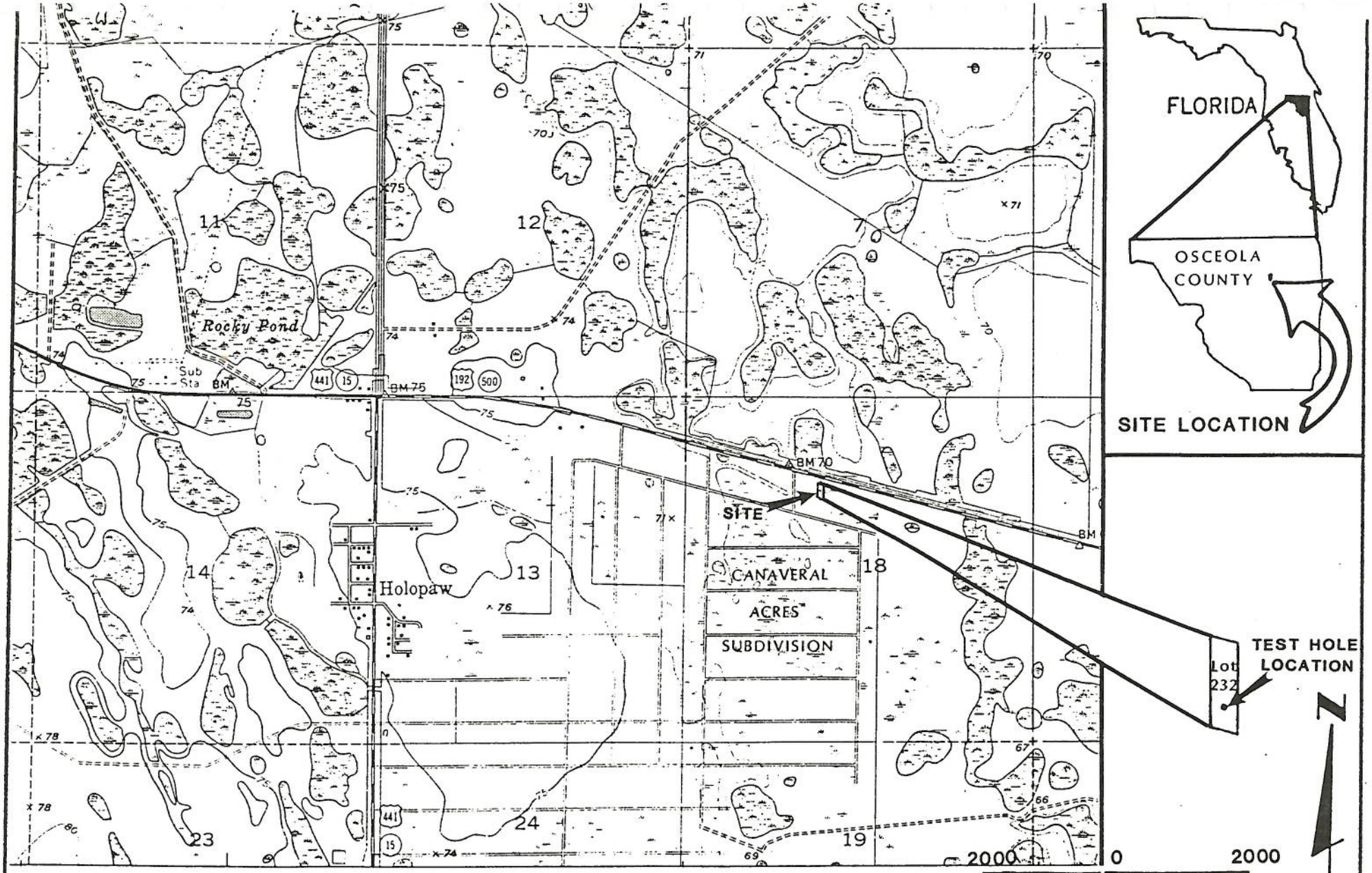
The South Brevard Water Authority (SBWA) is currently investigating the potential of developing a potable water supply from a well field in eastern Osceola County. Post, Buckley, Schuh & Jernigan, Inc. (PBS&J) is retained by SBWA as consultants for the project. Geraghty and Miller, Inc. (G&M) provided field support and technical review of the project.

This report discusses drilling and testing of a test hole in a pine-flatwoods area on Lot 232 in Canaveral Acres Subdivision, approximately 1.4 miles east of the Holopaw community and 300 feet south of U.S. Highway 192 (Figure 1). The test hole provided data on the hydrogeologic conditions in the area.

III. DESCRIPTION OF WORK

A. Test-Hole Construction

The test hole was drilled by Meridith Corporation according to specifications prepared by PBS&J/G&M. A Failing 3500 rotary rig was used to drill the hole. The upper 128 feet of 20-inch diameter hole was drilled by the mud-rotary method. At 128 feet, 16-inch diameter steel surface casing was seated and grouted from the bottom to land surface with neat cement. Below the surface casing, a nominal 10-inch diameter pilot hole was drilled by the mud-rotary method to a depth of 322 feet. The pilot hole was reamed with a nominal 16-inch diameter bit to 322 feet where 10-inch diameter steel casing was seated in a limestone bed and grouted from the bottom to the surface. A nominal 10-inch diameter hole was drilled by the reverse-air method from 322 feet to 1100 feet. Well construction details are shown in Figure 2.

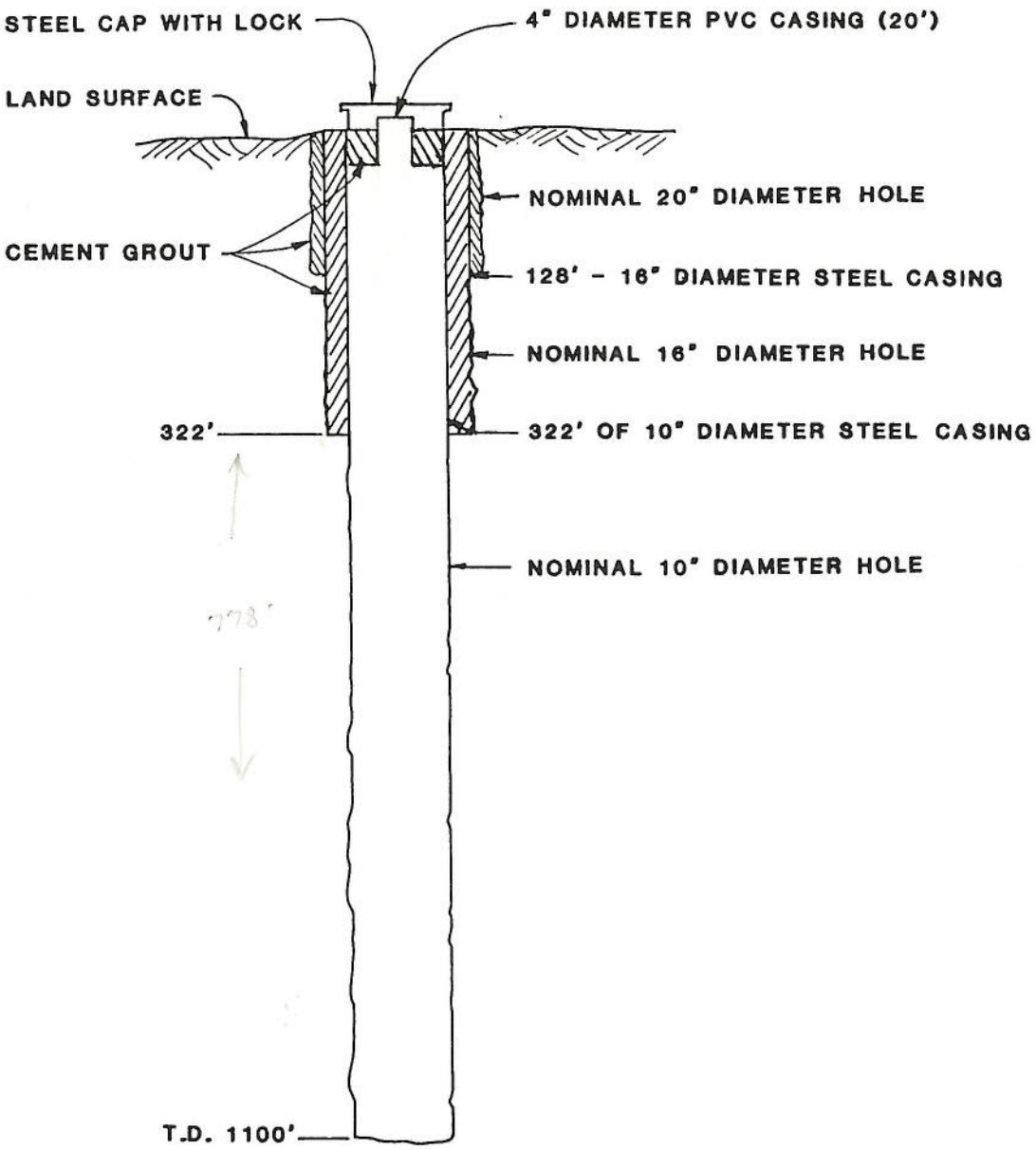


BASE MAP: U.S.G.S. TOPOGRAPHIC MAP (7.5 MINUTE SERIES) - HOLOPAW QUADRANGLE

EASTERN OSCEOLA COUNTY EXPLORATORY TEST HOLE SITE MAP

FIGURE 1

N69174



EASTERN OSCEOLA COUNTY EXPLORATORY TEST HOLE CONSTRUCTION DETAILS

FIGURE 2

N77416

B. Geologic and Water Quality Samples

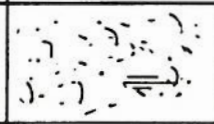
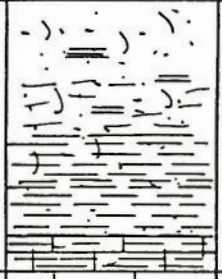
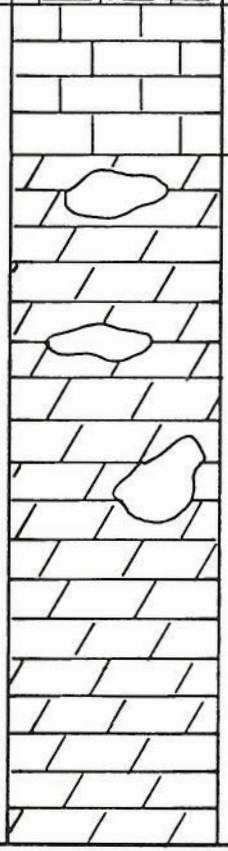
During the drilling, geologic samples were collected at 5-foot intervals by a geologist. The samples were examined in the field and logged to determine changes in lithology as a guide to selecting the proper casing depths. Figure 3 shows the general lithology of formations encountered.

After switching to reverse-air drilling, water samples were collected every 30 feet. The water samples were analyzed in the field for specific conductance, temperature, and chloride. A detailed description of the geologic formations penetrated is given in Appendix 1 and water quality analyses are given in Appendix 2.

C. Specific Capacity Tests

During the drilling of the open-hole section of the test hole, specific capacity tests were conducted at approximately 100-foot intervals. Prior to initiating each test, the hole was cleaned of cuttings by circulation. The hole was pumped by the air-lift method at an average rate of 175 gallons per minute (gpm) to produce water-level drawdown. Drawdown was measured with an electric water-level indicator, and discharge was measured by filling a 55 gallon drum in a timed interval. These tests were conducted to determine, in an economical manner, the relative yield of different zones in the test hole as it was deepened. Although the tests only provide estimates of actual yield, they are useful, in conjunction with other data, in assessing major flow zones in the test hole. Results of seven short-term specific capacity tests are given in Appendix 3, Table 1.

Water samples were collected during each test and analyzed in the field for temperature, conductivity and chloride. Selected samples were analyzed for major ions by the PBS&J laboratory in Orlando. Results of laboratory analyses are given in Appendix 2.

DEPTH (FT)	THICKNESS (FT)	GEOLOGIC AGE	UNIT	LITHOLOGY	LITHOLOGIC DESCRIPTION	WATER-BEARING PROPERTIES
0–75	75	Holocene, Pleistocene, & Pliocene	Unconsolidated Sediments		SAND & SHELLS, gray to white with trace of sticky white CLAY	SURFICIAL AQUIFER
75–320	245	Miocene	Hawthorn Formation		SANDSTONE, CLAY, & LIMESTONE, greyish green to olive green, shelly, sandy, & phosphatic	AQUICLUDE – confining unit
320–1100	780+	Eocene	Ocala Group, Avon Park & Lake City Limestones		LIMESTONE, white to tan, soft, granular, chalky, fossiliferous DOLOMITE & LIMESTONE, light grey to dark brown to buff, vuggy to dense, granular to microcrystalline, poorly cemented to well cemented, cavernous	FLORIDAN AQUIFER – major water-bearing zone. Yields large quantities of water

PBS&J

EASTERN OSCEOLA COUNTY EXPLORATORY TEST HOLE GENERALIZED GEOLOGIC SECTION

FIGURE 3

N69174

D. Geophysical Logging

Caliper, resistivity, spontaneous potential, gamma ray, temperature, fluid conductivity and fluid velocity logs were run to verify subsurface geologic conditions, to detect down-hole changes in water quality and to determine the major zones of water entry into the test hole. Fluid conductivity and velocity logs were run under static and pumping conditions. The geophysical logs are included in Appendix 4.

The caliper log shows a 16 to 35-inch diameter cavity just below the casing from 322 to 336 feet in soft limestone mixed with clay and sand. Numerous solutional features were encountered from about 424 to 644 feet with voids ranging from 10 to more than 36 inches in diameter in soft limestone and porous, dolomitic limestone. Below about 680 feet the log indicated little solutional development.

The resistivity and spontaneous potential logs show high resistance and spontaneous potential from about 644 to 720 feet in a hard, microcrystalline dolomite. This indicates a less-permeable unit within the Floridan aquifer, possibly separating the aquifer into upper and lower units.

The gamma log shows an increase in gamma emission from about 120 to 320 feet which corresponds to the sands, shells, clay and phosphorite of the Hawthorn Formation. In the interval from about 220 to 320 feet, the gamma log shows a marked increase in emissions corresponding to a greater amount of clay and phosphorite in that section. It appears that the lower section of the Hawthorn is the principal confining unit above the Floridan aquifer.

The temperature logs show an increase from about 78.5° to 80°F. Such an increase is normal within the depth drilled.

The fluid conductivity logs show a slight increase in conductivity with depth under static and pumping conditions. Conductivity, as recorded by the logs, varied from 1490 to 1640 micromhos/cm under static conditions and from 1450 to 1500 micromhos/cm under pumping conditions. These conductivity values are slightly higher than those determined in the laboratory due to calibration of the logging equipment.

The fluid velocity logs, under pumping conditions, show three possible flow zones; from the bottom of the casing (322 feet) to about 430 feet, from about 520 to 575 feet and from 650 to 680 feet. The increased velocity between 650 and 680 may be related to the reduced hole diameter in a dense dolomite unit rather than an increase in flow. Under static conditions, the velocity log did not change significantly from casing depth to the bottom of the hole.

E. Five-Hour Yield Test

After the geophysical logging, a yield test was performed on the test hole using a vertical turbine pump powered by a diesel engine which pumped at 970 gpm for five hours. Drawdown measurements were made with an electric water-level indicator and the discharge was measured with an in-line flow meter. Maximum drawdown in the well was 1.9 feet after 5 hours of pumping. Following the pumping, the water recovered to static level in four minutes. The specific capacity of the well is approximately 510 gallons per minute, per foot of drawdown (gpm/ft). Test data are given in Appendix 3, Table 2.

IV. TEST HOLE RESULTS

A. Hydrogeology

The site is underlain by sediments ranging in age from Eocene to Holocene. From bottom to top these formations include the Eocene age Avon Park, Lake City and Ocala Group limestones, the Miocene age Hawthorn Formation, and unconsolidated sediments of Miocene, Pleistocene and Holocene age. Lithologic data obtained during the drilling is presented in Figure 3 and Appendix 1.

The Avon Park, Lake City and Ocala Group limestones were encountered from 320 to 1100 feet. The limestone section consists of white to buff, soft, chalky, granular limestone and dark-brown to grayish-red to buff, vuggy, sucrosic, microcrystalline dolomite with white to tan, soft, granular, fossiliferous limestone in the upper section.

Above the limestones are approximately 245 feet of the Hawthorn Formation which contains phosphatic greenish-gray clay, shells, sandstone and limestone beds. The surficial sediments consist of 75 feet of sand and shell with trace amounts of clay.

These geologic units comprise a complex hydrogeologic system consisting of a surficial, non-artesian aquifer which extends to a depth of about 130 feet; a thick, semi-permeable confining unit from about 130 to 320 feet; and the artesian Floridan aquifer below that depth (Figure 3).

The Floridan aquifer contain cavities and solutionally enlarged openings which yield large quantities of water. In the test hole, the limestone section contains dense, dark brown dolomite from about 644 to 720 feet. This section appears to be a confining unit separating the Floridan aquifer into upper and lower zones. However, the potentiometric pressure and the water quality do not indicate any difference between the two zones.

The transmissivity of the aquifer at the test hole site was estimated to be about 780,000 gallons per day per foot (gpd/ft) based on the five-hour yield test. This value was obtained by using Walton's (1970) relationship in which transmissivity typically ranges from 1500 to 2000 times specific capacity, depending upon pumping duration and storage coefficient. Transmissivity values in Osceola and Brevard Counties range from less than 100,000 to more than 1,000,000 gpd/ft and vary greatly depending upon the presence of cavities and solutionally enlarged openings encountered at a specific site.

B. Water Quality

Water quality samples were taken throughout the drilling process, during the specific capacity and yield tests, and from thief samples at selected depths during the geophysical logging. The results are included in Appendix 2. No signifcant changes in quality occurred during the drilling operation. Chloride content ranged from 278 to 330 mg/l, conductivity ranged from 1120 to 1340 micromhos/cm, and total dissolved solids ranged from 642 to 706 mg/l.

APPENDIX 1

GEOLOGIC LOG

PBS&J

APPENDIX 1

WELL LOG

PROJECT E. Osceola County Test Hole DATE 12/2/86 to 12/12/86 SHEET 1 OF 6

LOCATION East of Holopaw DRILLING CONTRACTOR Meridith Corporation

WELL NUMBER Test Hole DRILLING METHOD Mud rotary/reverse air

SAMPLE DESCRIBED BY G.B. Jones/J.R. Baker SAMPLING METHOD Catch and wash

SAMPLE NUMBER	SAMPLE DESCRIPTION	DRILLING COMMENTS	DEPTH INTERVAL (feet)	THICKNESS (feet)
	Sand and Shell Sand, 50%, Dk gray to tan, coarse-to v. fine-grained, angular (large grains) to subangular (small grains); shell fragments, 50%, white to gray, coarse grained	17 klbs String Weight 1 collar + kelly = 20 klbs	0 to 55	55'
	Sand and Shell (as above, trace of sticky white clay)		55 to 65	10'
	Sand and Shell (as in 0-55')		65 to 75	10'
	Sandstone and Shell Shell, 50%, white to gray, coarse grained, fragmented; sand, 50% clear, quartz, fine-to medium-grained subangular, moderately well cemented, calcareous matrix; trace, silt sized phosphorite		75 to 105	30'
	Sandstone, Shell and Clay Sand, 50% , clear, quartz, fine- to medium-grained, subangular; shell, 40%, white to gray, coarse, fragmented; clay, 10%, green to gray, sticky; phosphorite, trace, black fine-to coarse-grained, subangular	WOB = 3 klbs	105 to 130	25'
	Sand, Shells and Clay Sand, 75%, clear, quartz, fine-to coarse-grained, subangular to angular; shells, 20%, white to gray, fragmented, angular; clay, 5%, greenish gray, sticky; phor-phorite trace, black, fine-to medium-grained, subangular to angular	P.R. = 0.3 min/ft.	130 to 160	30'

PBS&J

APPENDIX 1

WELL LOG

PROJECT E. Osceola County Test Hole DATE 12/2/86 to 12/12/86 SHEET 2 OF 6

LOCATION East of Holopaw DRILLING CONTRACTOR Meridith Corporation

WELL NUMBER Test Hole DRILLING METHOD Mud rotary/reverse air

SAMPLE DESCRIBED BY G.B. Jones/J.R. Baker SAMPLING METHOD Catch and Wash

SAMPLE NUMBER	SAMPLE DESCRIPTION	DRILLING COMMENTS	DEPTH INTERVAL (feet)	THICKNESS (feet)
	Sand, Clay and Phosphorite Sand, 60%, clear, quartz, fine-to medium-grained, subangular to angular; clay, 30%, olive gray, silty, sticky; phosphorite, 10%, black to brown, fine- to medium-grained, subangular to angular; trace, shells	P.R. = 1 to 1.5 min./ft.	160 to 190	30'
	Clay, Sand and Shells Clay 80%, olive gray, sticky, silty; sand, 10%, clear, quartz, fine-to medium-grained, subangular; shell, 8%, white to gray, fragmented; phosphorite, 2%, black to brown fine-to medium-grained, rounded	P.R. = 2-3 min./ft.	190 to 240	50'
	Clay, Phosphorite and Shells Clay, 85%, olive gray, few brown lenses of silt; phosphorite, 10%, black to brown, fine-to medium-grained, rounded; shells, 5%, white to gray, fragmented; limesilt, trace.		240 to 275	35'
	Limestone, Phosphorite and Clay Limestone, 85%, white to lt. gray, granular, fine-to coarse-grained, angular; phosphorite, 10%, fine-to medium-grained, rounded; clay, 5%, lt. gray green, sticky, silty		275 to 280	5'
	Clay, Limestone and Phosphorite Clay, 75%, olive gray, sticky, silty; limestone (shell fragments, limesilt), 20%, lt. gray; phosphorite, 5%, fine- to coarse-grained subangular to rounded, black to brown	No weight on bit. streaks of limestone and shell hit at 300' and 307' - 6" thick each time	280 to 310	30'

PBS&J

APPENDIX 1 WELL LOG

PROJECT E. Osceola County Test Hole DATE 12/2/86 to 12/12/86 SHEET 3 OF 6

LOCATION East of Holopaw DRILLING CONTRACTOR Meridith Corporation

WELL NUMBER Test Hole DRILLING METHOD Mud rotary/reverse air

SAMPLE DESCRIBED BY G.B. Jones/J.R. Baker SAMPLING METHOD Catch and wash

SAMPLE NUMBER	SAMPLE DESCRIPTION	DRILLING COMMENTS	DEPTH INTERVAL (feet)	THICKNESS (feet)
	Limestone, Sand and Clay Limestone, 85%, light gray to dark gray, fragmented; clay, 15%, olive gray, sticky, silty; phosphorite, trace; coarse-fine grained, sub-rounded to subangular, black to brown Calcareous Cement, cementing quartz silt and phosphorite	Lost circulation at 319.10' Casing set at 322 ft.	310 to 320	10'
	Limestone 100%, Light green to dark gray, pelmicrite (quartz and phosphorite grains in a micrite matrix), fine-to medium-grained, quartz-clear, phosphorite-black to brown, rounded to subangular, fossiliferous, w/trace white shell fragments, formation very loose		320 to 337	17'
	Limestone 95%, white to cream, friable, granular, fossiliferous, in a soft chalky marine limesilt and sand; dolomite, 5%, yellowish brown to gray, micro-crystalline, sucrosic, vuggy 380' 1st appearance of Dictyoconus		337 to 375	38'
	Dolomite and Dolomitic Limestone Dolomite, 60%, moderate yellowish brown to black to gray, micro-crystalline to granular, sucrosic, vuggy dolomitic limestone, 40%, lt. gray to cream, granular, limestone grains cemented w/dolomite		375 to 428	53'

PBS&J

APPENDIX 1 WELL LOG

PROJECT E. Osceola County Test Hole DATE 12/2/86 to 12/12/86 SHEET 4 OF 6

LOCATION East of Holopaw DRILLING CONTRACTOR Meridith Corporation

WELL NUMBER Test Hole DRILLING METHOD Mud rotary/reverse air

SAMPLE DESCRIBED BY G.B. Jones/J.R. Baker SAMPLING METHOD Catch and wash

SAMPLE NUMBER	SAMPLE DESCRIPTION	DRILLING COMMENTS	DEPTH INTERVAL (feet)	THICKNESS (feet)
	No Return Cavity		428 to 455	27'
	Mixed Cuttings:	Mixed cuttings from dredging in hole.	455 to 480	25'
	Limestone and Dolomite Limestone, 70%, white to cream, fine grained to medium grained, very soft, granular; Dolomite, 30%, lt. gray to yellowish brown, to black, microcrystalline to sucrosic, moderately-to well-cemented, vuggy			
	No Return Cavity		480 to 484	4'
	Limestone and Dolomite Limestone, 90%, cream to lt. tan, granular, fine-medium-grained, poorly cemented, fossiliferous, vuggy; Dolomite, 10%, moderate yellow brown to black, microcrystalline, sucrosic, vuggy, druzy crystalization; dog-tooth calcite in vuggs		484 to 495	11'
	Dolomite and Limestone Dolomite, 90%, moderate yellowish brown, fine to microcrystalline, vuggy, sucrosic; Limestone, 10%, white to cream, granular, fine grained, vuggy	Easy drilling but bit keeps plugging off No W.O.B.	495 to 515	20'
	Dolomite Dolomite, 95%, yellow brown to black to gray, microcrystalline, sucrosic, vuggy, very well cemented; Limestone, 5%, white, granular, probably from uphole		515 to 560	45'

PBS&J

APPENDIX 1 WELL LOG

PROJECT E. Osceola County Test Hole DATE 12/2/86 to 12/12/86 SHEET 5 OF 6

LOCATION East of Holopaw DRILLING CONTRACTOR Meridith Corporation

WELL NUMBER Test Hole DRILLING METHOD Mud rotary/reverse air

SAMPLE DESCRIBED BY G.B. Jones/J.R. Baker SAMPLING METHOD Catch and wash

SAMPLE NUMBER	SAMPLE DESCRIPTION	DRILLING COMMENTS	DEPTH INTERVAL (feet)	THICKNESS (feet)
	Limestone 100%, lt. green to dk. green to gray, soft, friable, granular, silt to cobble sized, trace white limestone shell material and dolomite		560 to 565	5'
	Dolomite - Dark Gray	No sample	565 to 575	10'
	Limestone 90%, white to gray, fine grained, soft, granular to chalky; Dolomite, 10%, yellowish brown, microcrystalline, mod. well cemented; clay, trace, white, calcareous, sticky	Bit plugging badly	575 to 637	62'
	Cavity - No Return just dredging	Big plugging	637 to 644	
	Dolomite and Limestone Dolomite, 60%, dark brown to yellow brown to dark gray to tan, microcrystalline, v. hard, v. well cemented; Limestone; 40%, as in description above	P.R. = 3-15 min./ft.	644 to 654	10'
	Dolomite and Limestone Dolomite, 85%, yellow brown to dark brown to gray, microcrystalline, v. hard, v. well cemented; Limestone, 15%, as before, probably from uphole	Possibly confining dolomite	654 to 664	10'
	Dolomite Tan to dark brown to dk gray/purplish, very hard, very well cemented; trace Limestone (probably from uphole)	P.R.= 6 min./ft.	664 to 725	61'

PBSJ APPENDIX 1 WELL LOG

PROJECT E. Osceola County Test Hole DATE 12/2/86 to 12/12/86 SHEET 6 OF 6

LOCATION East of Holopaw DRILLING CONTRACTOR Meridith Corporation

WELL NUMBER Test Hole DRILLING METHOD Mud rotary/reverse air

SAMPLE DESCRIBED BY G.B. Jones/J.R. Baker SAMPLING METHOD Catch and wash

SAMPLE NUMBER	SAMPLE DESCRIPTION	DRILLING COMMENTS	DEPTH INTERVAL (feet)	THICKNESS (feet)
	Dolomite 100%, cream to lt. gray, moderately hard, microcrystalline, well cemented; trace limestone	P.R. = 1.5 min./ft.	725 to 745	20'
	Dolomite - same as 664-725		745 to 755	10'
	Dolomite 100%, buff to tan-gray to medium brown, mod. well cemented, fine grained, slightly vuggy; trace, white clay; trace, white soft limestone		755 to 775	20'
	as above only denser and harder, no vuggs		775 to 795	20'
	as in 755 to 775		795 to 900	105'
	Dolomite 100%, buff to grayish red to pale red to very pale orange, fine grained to microcrystalline, slightly vuggy to dense, layered in some cuttings	Appearance of grayish red dolomite	900 to 910	10'
	Dolomite 100%, pale yellowish orange to buff and yellowish brown, fine-grained to micro-crystalline, slightly vuggy to dense, mod. hard to v. hard, mod. well-to-well-cemented, trace, ls	P.R. = 1-3 min./ft.	910 to 1106	196

APPENDIX 2

WATER QUALITY

APPENDIX 2

Table 1

FIELD WATER QUALITY ANALYSES

Date	Time	Depth (ft.)	Temperature (°C)	Specific Conductance (umhos/cm)	Chloride (mg/l)
12-7-86	1700	330	26	1,217	300
12-7-86	2200	337	26	1,225	300
12-7-86	2310	368	25	1,250	300
12-8-86	0230	398	25	1,260	300
12-8-86	0345	428	25	1,200	300
12-8-86	0415	457	25	1,200	300
12-8-86	1000	487	25	1,120	315
12-8-86	1430	517	25	1,125	330
12-8-86	1740	547	25	1,160	300
12-9-86	0300	577	25	1,200	315
12-9-86	0730	607	25	1,220	300
12-9-86	1130	636	25	1,133	330
12-9-86	1810	666	25	1,230	270
12-10-86	0000	695	25	1,180	300
12-10-86	0400	723	25	1,240	300
12-10-86	0545	753	25	1,220	293
12-10-86	0730	782	25	1,260	330
12-10-86	0930	812	25	1,123	330
12-10-86	1130	842	25	1,142	330
12-10-86	1235	871	25	1,125	300
12-10-86	1400	900	26	1,125	285
12-10-86	1635	930	26	1,164	300
12-10-86	1800	959	26	1,204	300
12-10-86	1900	988	25	1,150	300
12-10-86	2030	1,017	25	1,180	300
12-10-86	2145	1,047	25	1,190	278
12-10-86	2245	1,076	25	1,185	285
12-11-86	0100	1,100	25	1,172	300

APPENDIX 2

Table 2

LABORATORY ANALYSES OF WATER QUALITY

Date	Depth (ft.)	Chloride (mg/l)	Sulfate (mg/l)	Bicarbonate (mg/l)	Calcium (mg/l)	Potassium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	pH	Total Dissolved Solids (mg/l)	Total Hardness (mg/l)	Conductivity umhos/cm
12-8-86	398	324	78.40						8.38	706		1,340
12-8-86	487	278	65.50						8.13	642		1,230
12-8-86	517	285	60.00						8.10	672		1,300
12-8-86	547	289	59.30	94.45	60.15	7.46	24.72	116.30	7.98	665	288	1,300
12-15-86	430	331	85.00	38.50	58.80	8.79	21.10	152.00		702		1,200
12-15-86	1100	295	80.00	94.60	97.10	8.48	27.60	150.50		714		1,200
12-17-86	*1	376	67.70							762		1,300
12-17-86	*2	370	61.40							708		1,300

*1 Beginning of five hour yield test.

*2 End of five hour yield test.

APPENDIX 3

SPECIFIC CAPACITY TESTS

APPENDIX 3

Table 1

SPECIFIC CAPACITY TESTS

Date	Depth (ft.)	Pumping* Rate (gpm)	* Drawdown (ft.)	Specific* Capacity (gpm/ft.)
12/8/86	400	95	0.65	145
12/8/86	517	185	0.25	740
12/9/86	607	175	0.25	700
12/10/86	695	205	0.10	2050
12/10/86	812	145	0.05	2900
12/10/86	900	150	0.10	1500
12/10/86	1,006	205	0.10	2050
12/11/86	1,100	185	0.05	3700

*Number rounded

Appendix 3, Table 2

FIVE-HOUR YIELD TEST

Owner Brevard County Address Exploratory Test Hole County Osceola State FL

Date 12/16/86 Company performing test Post, Buckley, Schuh & Jernigan, Inc. Measured by Glenda Jones

Well No. Test Distance from pumping well X Type of test Specific Capacity Test No. _____

Measuring equipment Water level indicator ; In-line flow meter; Pump-vertical turbine

Time Data
Pump on Date 12/16 Time 7:59 (t.)
Pump off. Date 12/16 Time 12:59 (t')
Duration of aquifer test:
Pumping 5 hr. Recovery 4 min.

Water Level Data
Static water level 28.48'
Measuring point t.o.c.
Elevation of measuring point _____

Discharge Data
How Q measured flow meter
Depth of pump/air line _____
Previous pumping? Yes ____ No X
Duration _____ End _____

Comments on factors affecting test data

Date	Clock time	Time since pump started t min	Time since pump stopped t'	t/t'		(feet) Water level measurement	Correction or Conversion	Water level	(feet) Water level change s or s'		Discharge measurement	(gpm) Rate		
2/16/6	7:57	0				28.48			0					
	7:58					28.48			0					
	7:59	0				28.48			0					
		.4				30.15			1.67					
		.7				30.21			1.73					
		1.2				30.28			1.80					
		1.3				30.30			1.82					
		2.0				30.30			1.82					
		2.3				30.31			1.83					
		2.7				30.31			1.83					
		2.8				30.32			1.84					
		3.3				30.31			1.83			970		
		4.0				30.31			1.83					
		5.0				30.32			1.84					
		6.0				30.31			1.83					
		8.0				30.31			1.83					
		9.0				30.31			1.83					
		10.0				30.31			1.83					
		15.0				30.31			1.83					
		20.0				30.31			1.83			970		
		25.0				30.32			1.84					
		30.0				30.32			1.84			980		
		60.0				30.35			1.87					
		90.0				30.35			1.87					
		120.0				30.37			1.89			970		Specific capacity = 520 gpm/ft
		180.0				30.32			1.84					~~(pump shut off 10 min.)~~
		210.0				30.33			1.85			960		

Appendix 3, Table 2 Cont. **FIVE-HOUR YIELD TEST**

Owner Brevard County Address Exploratory Test Hole County Osceola State FL

Date 12/16/86 Company performing test Post, Buckley, Schuh & Jernigan, Inc. Measured by Glenda Jones

Well No Test Distance from pumping well X Type of test Specific Capacity Test No. _____

Measuring equipment Water level indicator; In-line flow meter; Pump-vertical turbine

Time Data
Pump on Date 12/16 Time 7:59 (t.)
Pump off. Date 12/16 Time 12:59 (t')
Duration of aquifer test:
Pumping 5 hr. Recovery 4 min

Water Level Data
Static water level 28.48'
Measuring point t.o.c.
Elevation of measuring point _____

Discharge Data
How Q measured flow meter
Depth of pump/air line _____
Previous pumping? Yes ___ No X
Duration _____ End _____

Date	Clock time	Time since pump started t (min)	Time since pump stopped t'	t/t'		(feet) Water level measurement	Correction or Conversion	Water level	(feet) Water level change s or s'		(gpm) Discharge measurement	Rate		Comments on factors affecting test data
		240				30.33			1.85					
		270				30.33			1.84					
		300				30.34			1.85			960		
		.25				30.20			1.72					Recovery
		.60				29.08			0.60					
		1.33				28.55			0.07					
		2.17				28.55			0.07					
		2.50				28.55			0.07					
		3.00				28.52			0.04					
		3.40				28.48			0.00					
		4.00				28.48			0.00					Recovery complete

APPENDIX 4

GEOPHYSICAL LOGS