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PROJECTED 2020 AQUIFER DRAWDOWNS AT THE TILLMAN RIDGE WELLFIELD, ST. JOHNS COUNTY, FLORIDA

by

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Palatka, Florida

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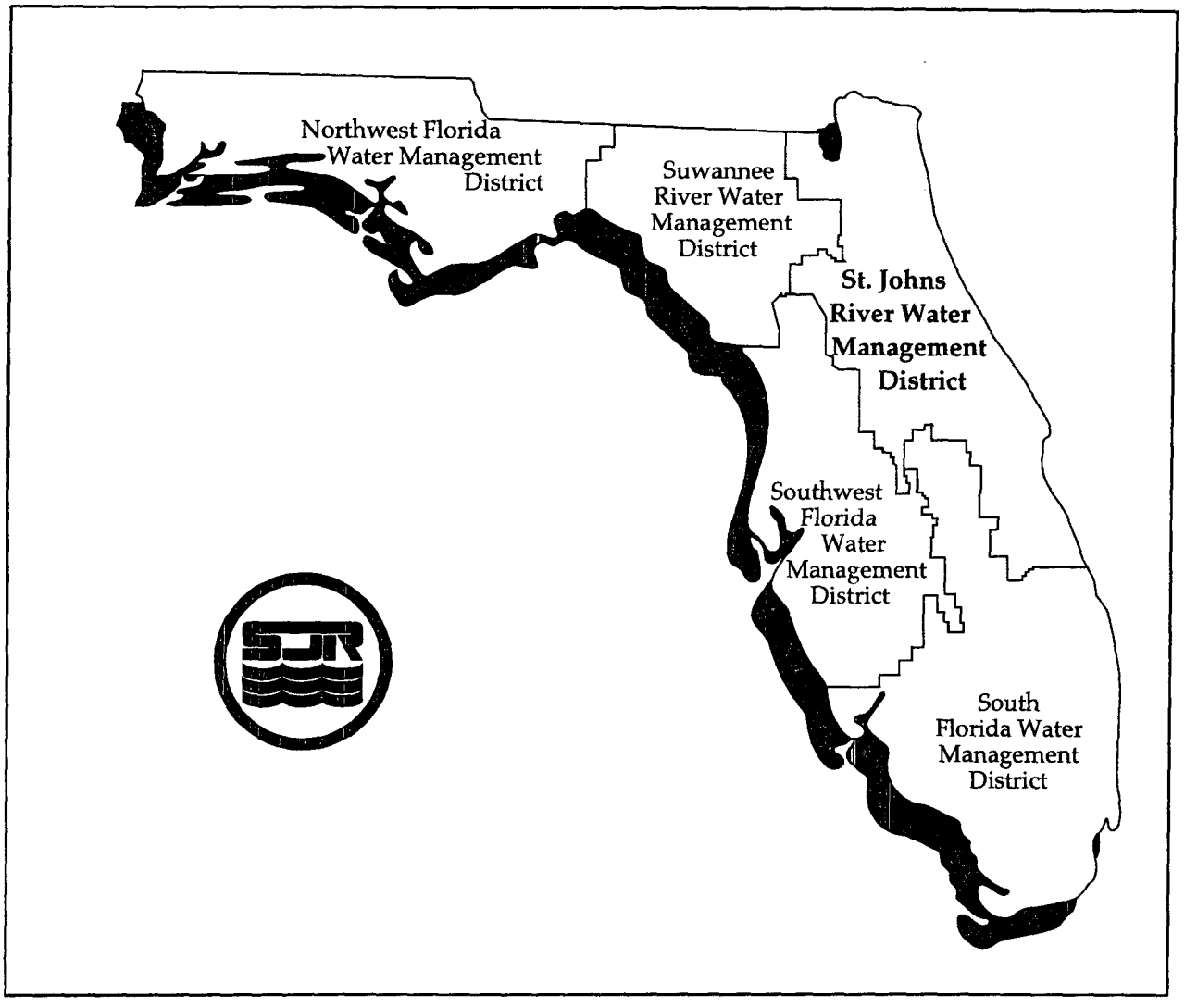

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ABSTRACT

This paper supports a water supply assessment performed by the St. Johns River Water Management District pursuant to the requirements of Subparagraph 373.036(2)(b)4, *Florida Statutes*. Two analytical models, MLTLAY and SURFDOWN, were used to simulate changes in the unconfined surficial aquifer (water table) and the potentiometric surfaces of the surficial aquifer system (SAS) and the Upper Floridan aquifer (UFA), based on 2020 projected pumpages at the Tillman Ridge wellfield operated by St. Johns County. The MLTLAY model calculates drawdowns in a multilayered, leaky-artesian aquifer system. The SURFDOWN model calculates drawdowns for a coupled two-aquifer system. Both models assume homogeneous, isotropic, and steady-state conditions. Simulated drawdowns for UFA at the wells ranged from 17.28 feet (ft) for 1995 pumpage to 28.30 ft for 2020 pumpage. Simulated drawdowns for SAS at the wells ranged from 7.74 to 17.19 ft for 1995 pumpage and from 14.81 to 23.63 ft for 2020 pumpage. A drawdown of 23.63 ft accounts for a 78.7% reduction in the thickness of SAS, which will likely result in a decline in production from the wellfield. Maximum drawdowns in the water table due to 1995 and 2020 withdrawals are projected to be greater than 2 and 3 ft, respectively. The simulated drawdowns for projected pumpages at this wellfield have a pronounced effect on the elevation of the water table and the potentiometric surfaces of SAS and UFA. Many isolated wetlands in the Tillman Ridge wellfield were observed to be impacted in 1996 as a result of earlier withdrawals, and this impact may continue as a result of the proposed 2020 withdrawals. Both models were used to determine acceptable yields from this wellfield. The existing wells at this wellfield could safely yield 1.13 mgd. Given the planning-level wetland constraint of 0.5 ft of drawdown in the water table, the Tillman Ridge wellfield could safely produce 2.37 million gallons per day (mgd) if additional surficial aquifer production wells were installed to the north of the existing wellfield. In contrast, the 2020 projected need of St. Johns County is 13.50 mgd.

INTRODUCTION

The St. Johns River Water Management District (SJRWMD) performs water supply assessments pursuant to the requirements of Subparagraph 373.036(2)(b)4, *Florida Statutes (FS)*. As part of this assessment process, SJRWMD identifies priority water resource caution areas, which are areas where existing and reasonably anticipated sources of water and water conservation efforts are not adequate to supply water for all existing legal uses and reasonably anticipated future needs and to sustain the water resources and related natural systems during a 20-year planning horizon. Regional numerical groundwater models and local analytical groundwater models are used as part of this overall assessment.

The objectives of the evaluation presented in this professional paper are (1) to use geohydrologic data collected since Toth 1994 to better refine the Tillman Ridge wellfield model; (2) to provide an analysis of the projected 2020 pumping impacts to the surficial aquifer system and the Upper Floridan aquifer; (3) to determine how much water could be realistically withdrawn from surficial aquifer production wells that existed in 1998 at the Tillman Ridge wellfield; and (4) to determine how much water could be realistically withdrawn from the surficial aquifer at the Tillman Ridge wellfield without causing unacceptable impacts.

A review of Toth 1994 indicates a need to acquire better information on the transmissivity of the unconfined and confined surficial aquifers and on the leakance of the semiconfining unit of the surficial aquifer system at the Tillman Ridge wellfield. This review also indicated an absence of water level monitoring data needed for calibrating model-simulated drawdowns in the aquifer systems. Because of this need to acquire better information and to verify projected drawdowns, SJRWMD entered into a cooperative agreement with St. Johns County in December 1996. Emphasis in the agreement was placed on acquiring hydrogeologic data that would improve the predictive capabilities of the existing analytical groundwater model.

In June 1997, St. Johns County constructed one confined surficial aquifer monitor well near each of five surficial aquifer production wells for the purpose of verifying confined surficial aquifer drawdowns. In June 1997, Huss Drilling, SJRWMD's well drilling contractor, drilled two surficial aquifer test wells (SJ-0282, SJ-0283) at the Tillman Ridge wellfield (Appendix A). The surficial aquifer at one site (SJ-0283) was non-productive. In September 1997, Huss Drilling constructed a surficial aquifer production well (SJ-0286) and four surficial aquifer observation wells, two confined (SJ-0284, SJ-0285) and two unconfined (SJ-0288, SJ-0289), at the second site (Appendix B). Huss Drilling also conducted a step-drawdown test on one of the unconfined surficial aquifer wells at the Tillman Ridge wellfield in September 1997 (Appendix C). In December 1997 and January 1998, H_2O Systems, with support from St. Johns County staff, conducted an aquifer performance test utilizing the test production well. In June 1998, Camp Dresser & McKee evaluated the results of the aquifer performance test (Appendixes D, E, F, and G).

WATER USE

St. Johns County blends water withdrawn from surficial aquifer and Floridan aquifer wells before distribution to its customers. In 1995, water was blended in a 63% to 37% (63:37) ratio (Table 1) to make up a total withdrawal of 3.26 million gallons per day (mgd). The ideal combination is a 60:40 ratio (Stewart 1998). This blending is necessary to increase the overall yield from the wellfield and to increase the quantity of water delivered to service.

The 2020 projected public supply utility need of St. Johns County at the time of performance of this evaluation was 13.50 mgd. At this time, St. Johns County has not made a final decision concerning how it will meet its projected 2020 water demand.

Tillman Ridge Wellfield

In 1995, St. Johns County withdrew water from seven surficial aquifer system wells and one Upper Floridan aquifer well at the Tillman Ridge wellfield. Pumpage for each well (Table 1) was based on a metered

Table 1. Well locations and pumpage values used in the MLTLAY and SURFDOWN models, Tillman Ridge wellfield

Well	Latitude	Longitude	1995 Pumpage (mgd)	Projected 2020 Pumpage (mgd)
Surficial Aquifer				
4	295308*	812541*	0.14	
5	295307*	812529*	0.10	
9	295248*	812508*	0.33	0.50
11	295236*	812528*	0.40	0.28
12	295301*	812508*	0.37	0.33
13	295222*	812527*	0.35	0.43
14	295223*	812513*	0.37	0.38
15†	295226*	812458*		0.53
16‡	295158	812452		0.53
P2	295326	812510		0.53
P3	295344	812518		0.53
P4	295402	812526		0.42
P5	295422	812528		0.40
P6	295442	812530		0.40
P7	295502	812530		0.40
Upper Floridan Aquifer				
TR42	295148*	812452*	1.20	1.44
TR41§	295158*	812452*		1.44

Note: mgd = million gallons per day

Blank cells indicate wells not pumped.

*Determined by GPS
†Drilled in 1997
‡Drilled in 1998
§Added into service in 1997

water use reported by county staff (Stewart 1997). The total metered water use for 1995 was 3.26 mgd.

In 1998, the Tillman Ridge wellfield (Figure 1) consisted of nine surficial aquifer system wells and two Upper Floridan aquifer wells. St. Johns County operated seven surficial aquifer system wells and two Upper Floridan aquifer wells at the Tillman Ridge wellfield in 1998. St. Johns County has considered expansion of the Tillman Ridge wellfield along a north bearing line from well 12 (Young 1997). Based on previous analysis, SJRWMD (1998) recommended that the county consider spacing future surficial aquifer production wells approximately 2,000 feet (ft) apart and at a location beginning about 2,000 ft north of well 12. There is enough undeveloped area north of well 12 to install six additional surficial aquifer production wells. Yields from surficial aquifer production wells 4 and 5 are poor, and the county does not plan to withdraw water from these wells in 2020. These wells are not included in the determination of how much water can be withdrawn from existing wells.

The 2020 individual well pumpages from the surficial aquifer were estimated to range between 190 and 370 gallons per minute (gpm) (Young 1997). The projected 2020 individual well pumpages for the existing surficial wells—9, 11, 12, 13, and 14—were assumed to be the same as on November 24, 1997 (Stewart 1997). The projected 2020 pumpages for surficial wells 15, 16, P2, P3, P4, P5, P6, and P7 were

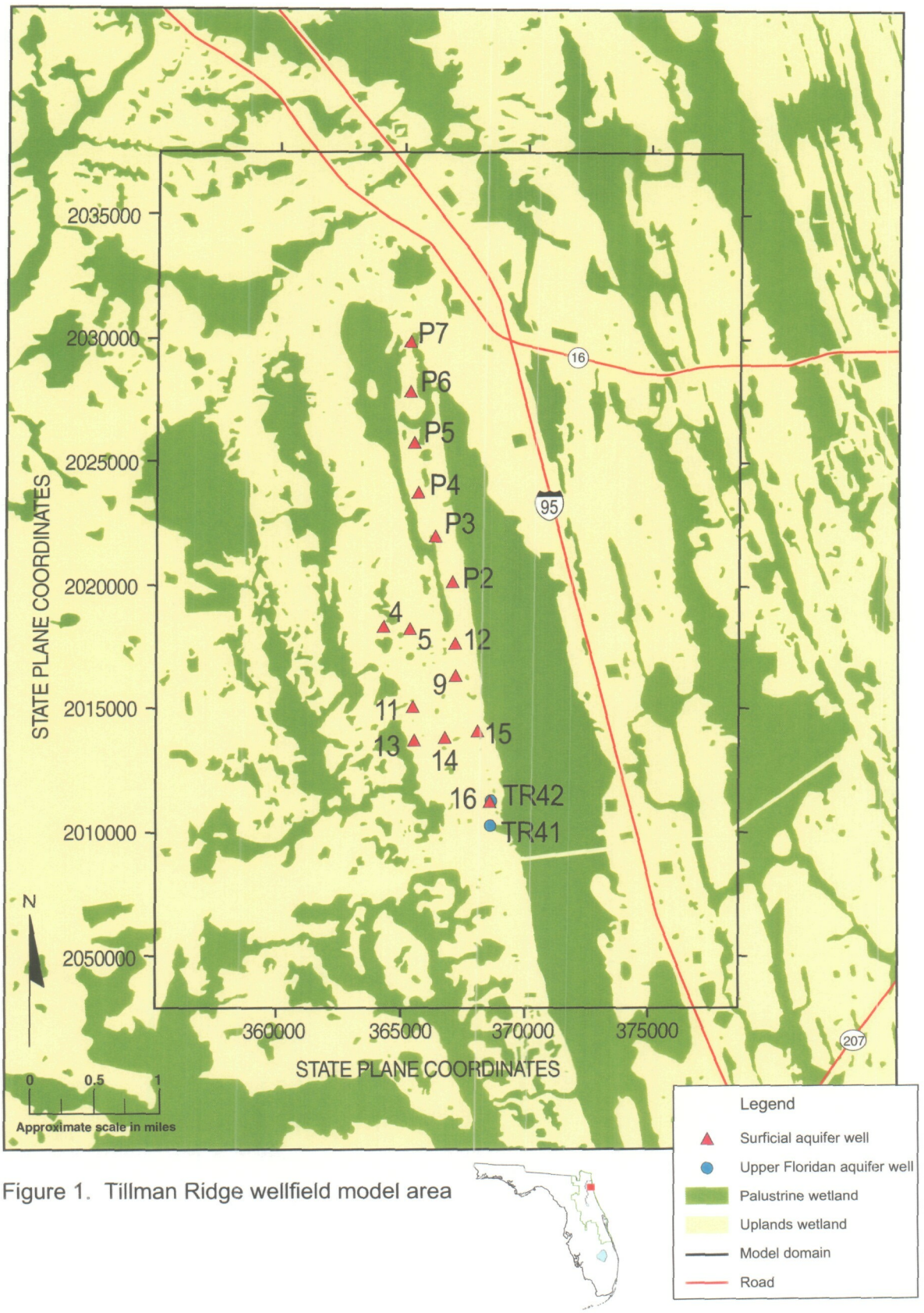

Figure 1. Tillman Ridge wellfield model area

assumed to range between 278 and 370 gpm (Young 1997). The 2020 projected pumpage from the two Upper Floridan wells is assumed to be 1,000 gpm. Projected 2020 individual well pumpages range from 0.27 to 1.44 mgd (Table 1).

METHODS

The methods used in this study were

1. Use of the MLTLAY (SJRWMD 1993) and SURFDOWN (Huang and Williams 1996) models to predict drawdowns in the surficial and Floridan aquifer systems. MLTLAY was used to calculate drawdowns in the confined surficial aquifer and the Floridan aquifer. SURFDOWN was used to calculate induced water table drawdowns resulting from drawdowns in the confined surficial aquifer. The surficial and Floridan aquifer systems are separated by a thick layer of low-permeability clay, and withdrawals from one aquifer do not appreciably affect the other. Drawdowns calculated by the models are based on the assumption that all wells pump 100% of the time, which is a worst-case scenario.

2. Use of aquifer characteristics determined from an aquifer performance and step-drawdown test to improve projected drawdowns for the surficial aquifer system.

3. Comparison of model-calculated drawdowns in the confined surficial aquifer with drawdowns measured in nearby monitor wells to adjust aquifer parameters for calibration.

4. Performance of sensitivity analysis on predicted water table drawdowns by varying the value of the evapotranspiration reduction coefficient.

5. Comparison of projected water table drawdowns with a generalized 0.5-ft planning-level threshold established for wetlands (CH2M HILL 1998) to determine how much water can realistically be withdrawn from the surficial aquifer at the Tillman Ridge wellfield.

6. Use of a 60:40 blend ratio to determine how much water can be realistically withdrawn from the Tillman Ridge wellfield.

HYDROGEOLOGY

The hydrogeology at the Tillman Ridge wellfield consists of the following units in descending order: the unconfined surficial aquifer or water table; the confining unit for the surficial aquifer system; the confined surficial aquifer; the upper confining unit or Hawthorn Group; and the Upper Floridan aquifer. A more thorough description of the hydrogeology can be found in Hayes (1981), Spechler and Hampson (1984), and Toth (1994).

Unconfined Surficial Aquifer

The transmissivity of the unconfined portion of the surficial aquifer system determined from a step-drawdown test near well 15 is 2,100 gallons per day per foot (gpd/ft). The step-drawdown test was conducted by Huss Drilling during construction of the unconfined surficial aquifer observation wells. Results of the test were based upon an average saturated thickness of 45 ft. The average hydraulic conductivity of the unconfined portion of the surficial aquifer system is 6.2 ft/day.

Unconfined aquifer characteristics based on the step-drawdown tests are almost a factor of three greater than the transmissivity value used in Toth (1994), which was derived from a saturated

thickness of 22 ft for the unconfined portion of the surficial aquifer and a hydraulic conductivity of 4.5 ft/day. Use of the larger transmissivity value will have a negligible simulated effect on the drawdown in the unconfined portion of the surficial aquifer system. The model is insensitive to the transmissivity of the water table because for this pumpage scenario, water table drawdowns are primarily governed by vertical leakage through the confining unit.

Confined Surficial Aquifer

Based on the results of the aquifer performance test which was conducted at well 15 (Figure 1), the transmissivity of the confined portion of the surficial aquifer system is 45,600 gpd/ft. The leakance of the semiconfining unit of the surficial aquifer system is 0.00249 gpd/ft^2/ft (Camp Dresser & McKee 1998).

A comparison of the aquifer and semiconfining unit characteristics from the aquifer performance test with those used in Toth (1994) shows that the transmissivity of the confined portion of the surficial aquifer system is slightly lower than that used in Toth (1994). The leakance of the semiconfining unit of the surficial aquifer system is also lower than previously used.

The lower transmissivity will produce a slightly greater drawdown in the confined portion of the surficial aquifer system for a given pumpage. However, the lower leakance will dampen the drawdown response in the overlying unconfined portion of the surficial aquifer system. Overall, there should be less water table drawdown for a given pumpage using the aquifer characteristics determined from the aquifer performance test (Camp Dresser & McKee 1998) as compared to Toth 1994.

Floridan Aquifer

Other aquifer characteristics used in the models include the transmissivity of the Upper Floridan aquifer (119,325 gpd/ft) and the leakance of the upper confining unit (0.0000748 gpd/ft^2/ft) (Toth 1994).

Evapotranspiration Reduction Coefficient

The evapotranspiration reduction coefficient describes the rate at which evapotranspiration is reduced per unit of water table drawdown. It too was used in the model. The initial value used for E (0.00065 feet per day per foot [ft/day/ft]) was obtained from a graph in Tibbals (1990, p. E10). This value was varied within a reasonable range to produce a best-fit measurement between observed and predicted drawdowns at well 15 (see Calibration). Predicted and observed water table drawdowns were 0.9 and 0.8 ft, respectively. The best-fit measurements were obtained for an E of 0.000975 ft/day/ft.

WELLFIELD MODEL

Impacts to the groundwater flow system resulting from withdrawals at the Tillman Ridge wellfield were evaluated using the MLTLAY (SJRWMD 1993) and SURFDOWN (Huang and Williams 1996) models. The MLTLAY model uses a linear analytical solution for a multilayered, leaky artesian aquifer system to calculate the amount of drawdown in the surficial aquifer system and the Upper Floridan aquifer. The method assumes that homogeneous and isotropic conditions prevail in the surficial and Floridan aquifer systems. The model simulates steady-state conditions and considers the flow of water through multiple aquifers separated by semipervious leaky layers. The model can also simulate the withdrawal of water from either the surficial aquifer system or the

Upper Floridan aquifer, or from both simultaneously.

The SURFDOWN model is based on an analytical solution for a coupled two-aquifer system (Motz 1978) in which pumping from an underlying aquifer is balanced by a reduction in evapotranspiration from an overlying aquifer. SURFDOWN is used to solve for drawdowns in the water table of the unconfined portion of the surficial aquifer system as a function of drawdowns in the potentiometric surface of the confined portion of the surficial aquifer system. SURFDOWN is an analytical, steady-state, two-layered flow model. The analysis is based on the assumption that homogeneous and isotropic conditions prevail in both the unconfined and confined portions of the surficial aquifer system.

The model domain was chosen to be large enough to include the most significant drawdown in the area around the wellfield. Drawdowns actually occur beyond the extent of the model domain. However, unlike numerical models where drawdowns are constrained by the boundary, the model boundary does not affect the drawdown calculation in an analytical model because the domain is considered to be infinite. The dimensions of the model domain were 23,500 ft wide and 34,500 ft long. A coordinate spacing of 50 ft was used between grid nodes. The origin for the model domain was at 355,122 ft for x and 2,002,928 ft for y (Figure 1).

Calibration

In an effort to provide for some qualitative level of calibration of the wellfield model, drawdowns calculated for the confined surficial aquifer were compared with measured drawdowns in the same aquifer in monitor wells located 12 to 26 ft away from pumping wells (Table 2).

Table 2. Calculated and measured drawdowns in confined surficial aquifer wells, Tillman Ridge wellfield

Well	Drawdown (feet)		Pumpage (gpm)
	Calculated	Measured	
9	11	11.8	340
11	9	6.1	210
12	8	1.4	220
13	10	7.6	290
14	10	12.6	270

Note: gpm = gallons per minute

The drawdown data used for this comparison were obtained from a specific-capacity test of five production wells in the wellfield. The wells were pumped at rates of 210 to 340 gpm for 12 hours. Visual comparisons between the measured and calculated drawdowns are generally good. For most wells, the differences are less than 3 ft. Well 12 is the exception, with a difference of 6.6 ft between calculated and measured drawdown. This comparison improves the confidence in the model and the resulting predicted drawdowns.

Data collected during the aquifer performance test on well 15 were used to calibrate the water table drawdowns calculated by the model. Calculated drawdowns for the unconfined surficial aquifer (water table) were compared with measured drawdowns near well 15, the only location where water table wells exist. For this comparison, the models were run with pumpage occurring only at well 15. Well 15 was pumped at 310 gpm in the field and simulated in the model at that rate. The drawdowns were compared by performing a sensitivity analysis on E, the evapotranspiration reduction coefficient. The value for E used in the model was adjusted within a reasonable range in order that the model-calculated drawdown would best fit the observed water levels collected in the field during the aquifer performance test. Three different values were used for E.

The initial value used for E (0.00065 ft/day/ft) was obtained from a graph in Tibbals (1990, p. E10) which relates estimated average evapotranspiration to water table depth. The average measured depth to water in the wellfield is 3 ft, which corresponds to this initial value of E. The value for E was then decreased and increased by 50%. An E value of 0.00065 ft/day/ft (Figure 2) and 0.000325 ft/day/ft (Figure 3) produced a predicted water table drawdown at the pumping well of 1.1 and 1.6 ft, respectively. The best fit between measured and predicted drawdowns in the water table at well 15 occurred for an E value of 0.000975 ft/day/ft (Figure 4). The predicted and measured water table drawdowns were 0.9 and 0.8 ft, respectively. The cone of depression in the water table increases and expands as E decreases.

RESULTS

The simulated drawdowns in the potentiometric surface of the confined portion of the surficial aquifer system at the wells ranged from 7.74 to 17.19 ft in 1995 and from 14.81 to 23.63 ft in 2020 (Table 3). A drawdown of 23.63 ft accounts for a 78.7% reduction in the thickness of the confined portion of the surficial aquifer system. Because the saturated thickness of the aquifer is predicted to be reduced, production from the wellfield is predicted to decline.

Simulated drawdowns in the potentiometric surface of the Upper Floridan aquifer at the Floridan aquifer production wells ranged from 17.28 ft in 1995 to 28.30 ft in 2020.

SURFDOWN does not calculate drawdowns at the wells for the unconfined portion of the surficial aquifer system; however, it does calculate drawdowns at the grid nodes. In response to these withdrawals, water levels in the unconfined surficial aquifer are anticipated to decline in the wellfield by more than 2 ft in response to the 1995 withdrawal and more than 3 ft in response to the 2020 withdrawals.

Simulated drawdowns in the Tillman Ridge wellfield were contoured for 1995 and 2020 for the unconfined and confined portions of the surficial aquifer system and the Upper Floridan aquifer (Figures 5–10). Figures 5–10 show the simulated localized effect that pumping of these wells has on the aquifer. In reality, the effect of the pumping extends beyond the model domain.

DISCUSSION

As part of SJRWMD's water supply planning process, a varying range of water table drawdowns was established as a planning-level constraint for characterizing potential wetland impacts (CH2M HILL 1998). The Tillman Ridge wellfield area is characterized by the presence of wetlands which include bay swamps, wet prairies, cypress swamps, and freshwater marshes (Epting 1999). The planning-level water table drawdown constraints for these wetland types are 0.35, 0.35, 0.55, and 0.55 ft, respectively. However, for purposes of this analysis of potential wetland impacts in the area of the Tillman Ridge wellfield, a generalized water table drawdown value of 0.5 ft in wetland areas was used to assess the sustainability of groundwater withdrawals.

Modeled maximum water level drawdowns in the unconfined surficial aquifer in the wellfield are in excess of 2 ft and 3 ft for the 1995 and 2020 withdrawal scenarios (Figures 5 and 8). In addition, the modeled drawdowns at several isolated wetlands exceed 0.5 ft in 1995 and 2020 (Figures 5 and 8). Based on this information, many isolated wetlands in the

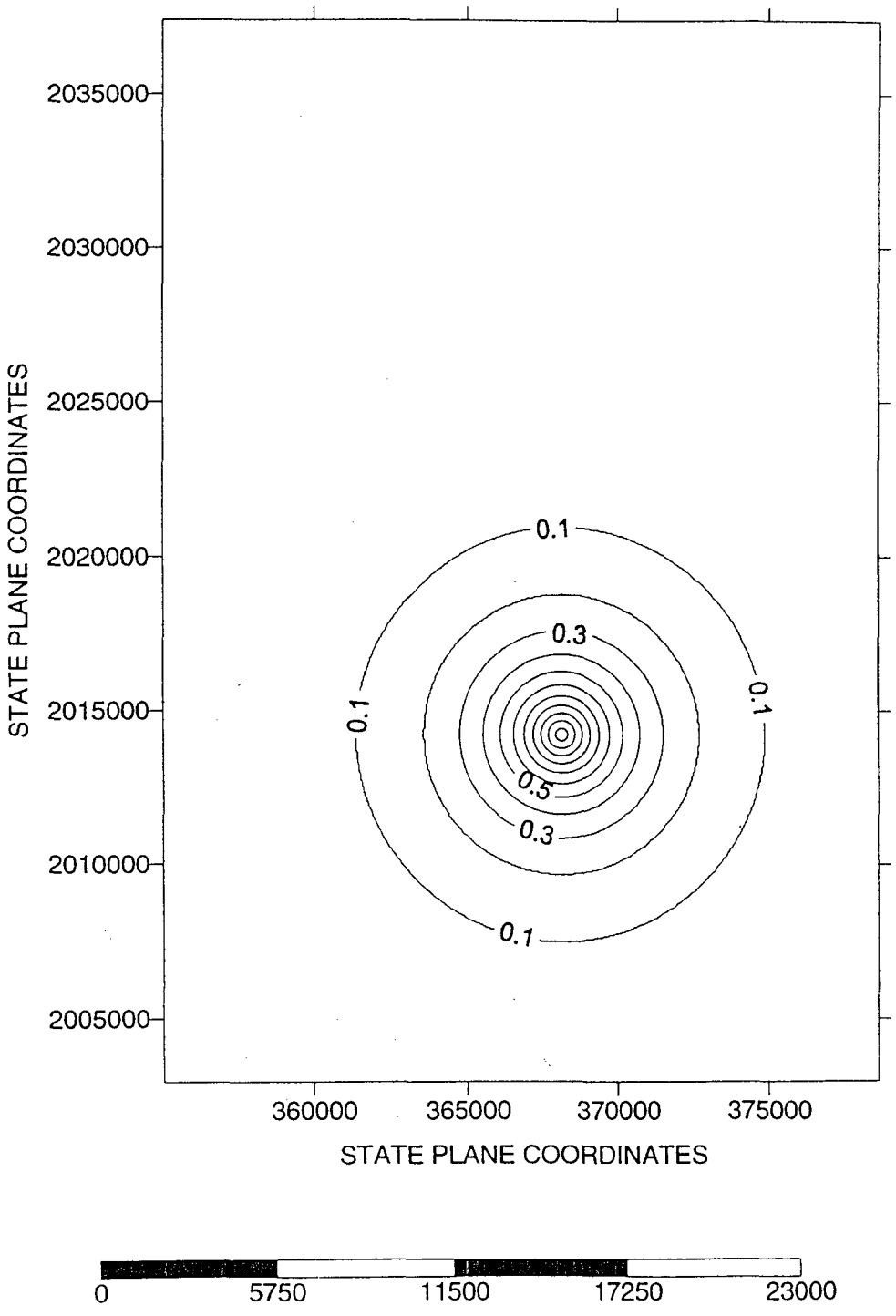

Figure 2. Water table drawdown at well 15 in the Tillman Ridge wellfield for E = 0.00065 feet/day/foot, pumpage = 310 gallons per minute

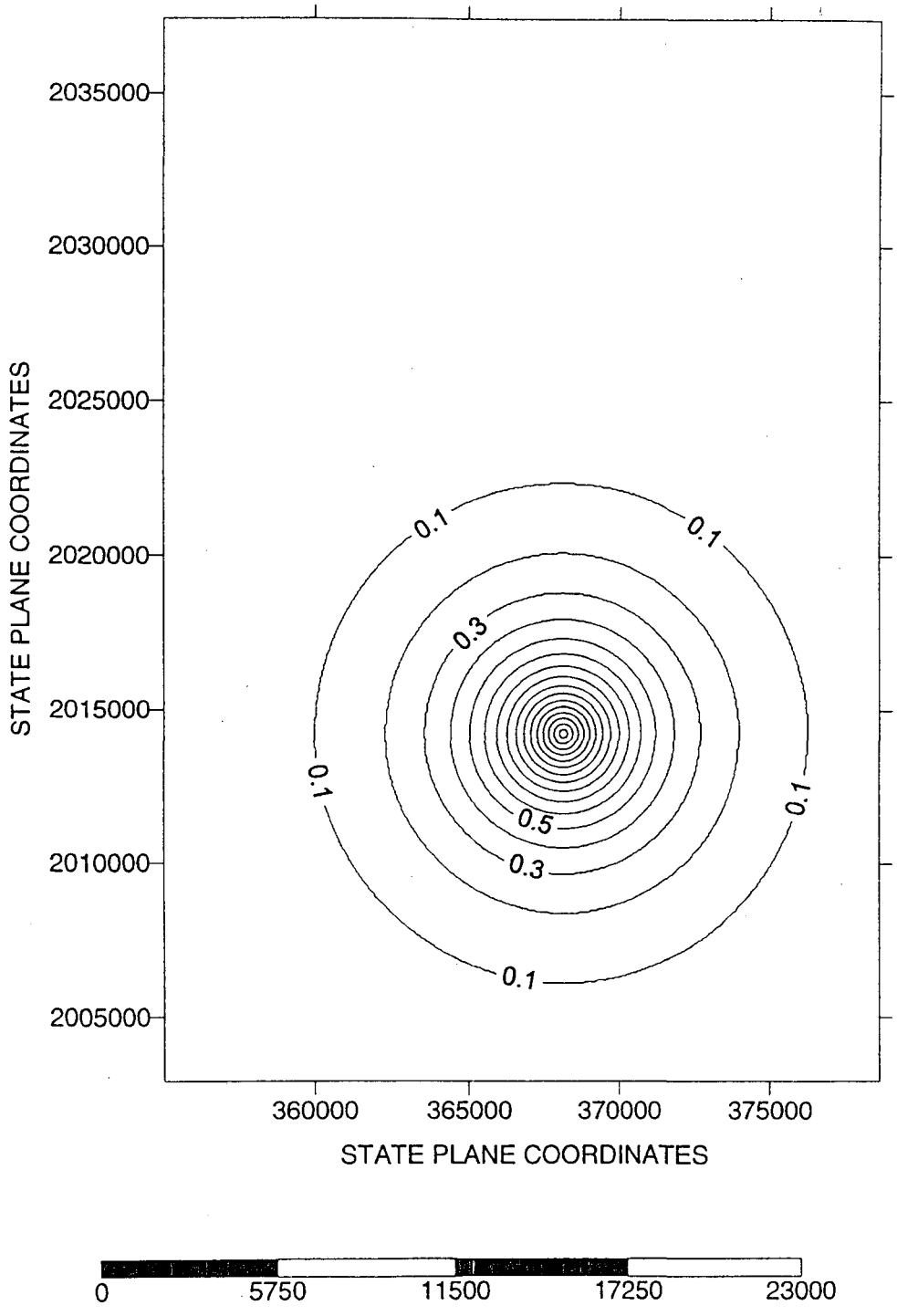

Figure 3. Water table drawdown at well 15 in the Tillman Ridge wellfield for E = 0.000325 feet/day/foot, pumpage = 310 gallons per minute

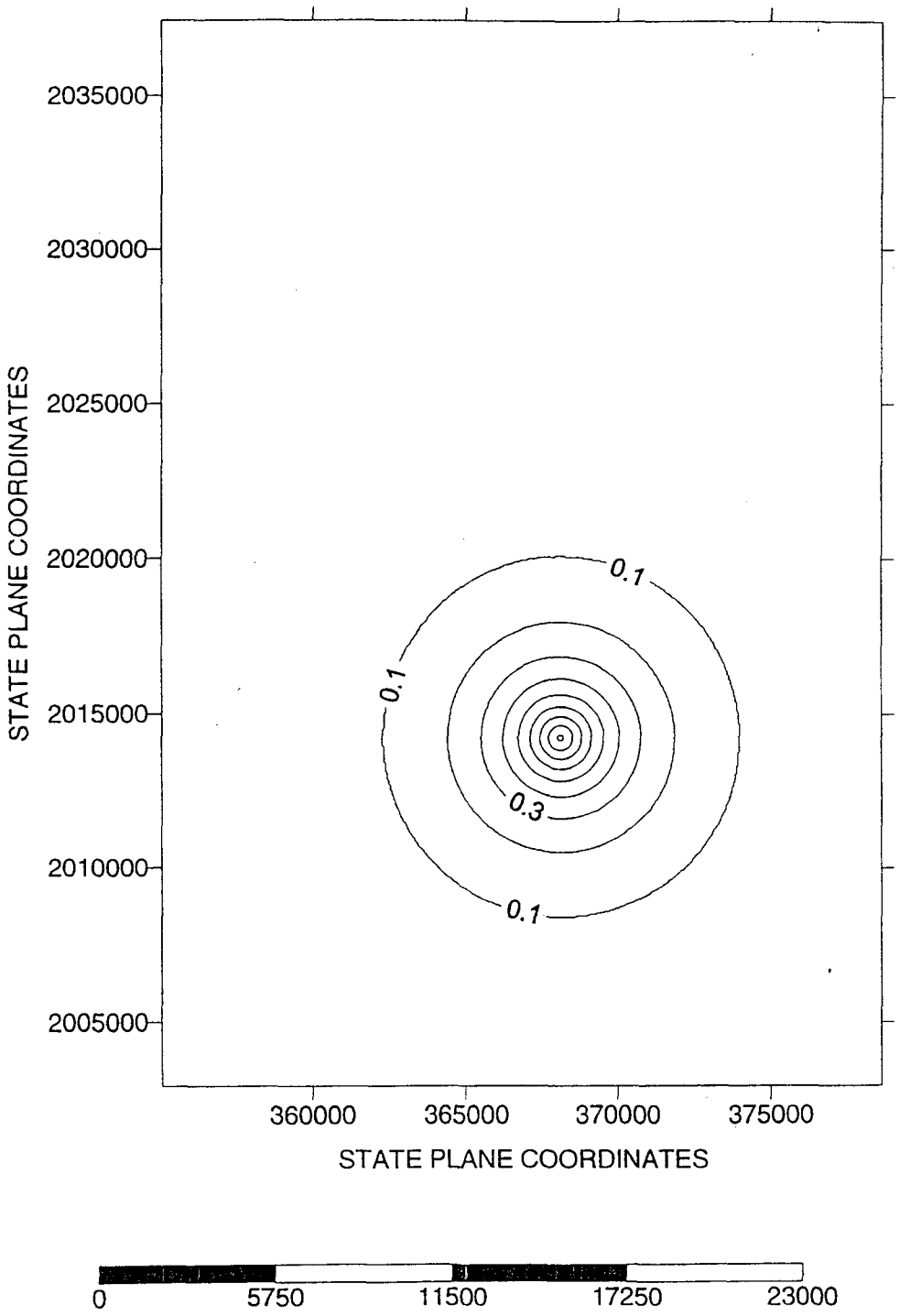

Figure 4. Water table drawdown at well 15 in the Tillman Ridge wellfield for E = 0.000975 feet/day/foot, pumpage = 310 gallons per minute

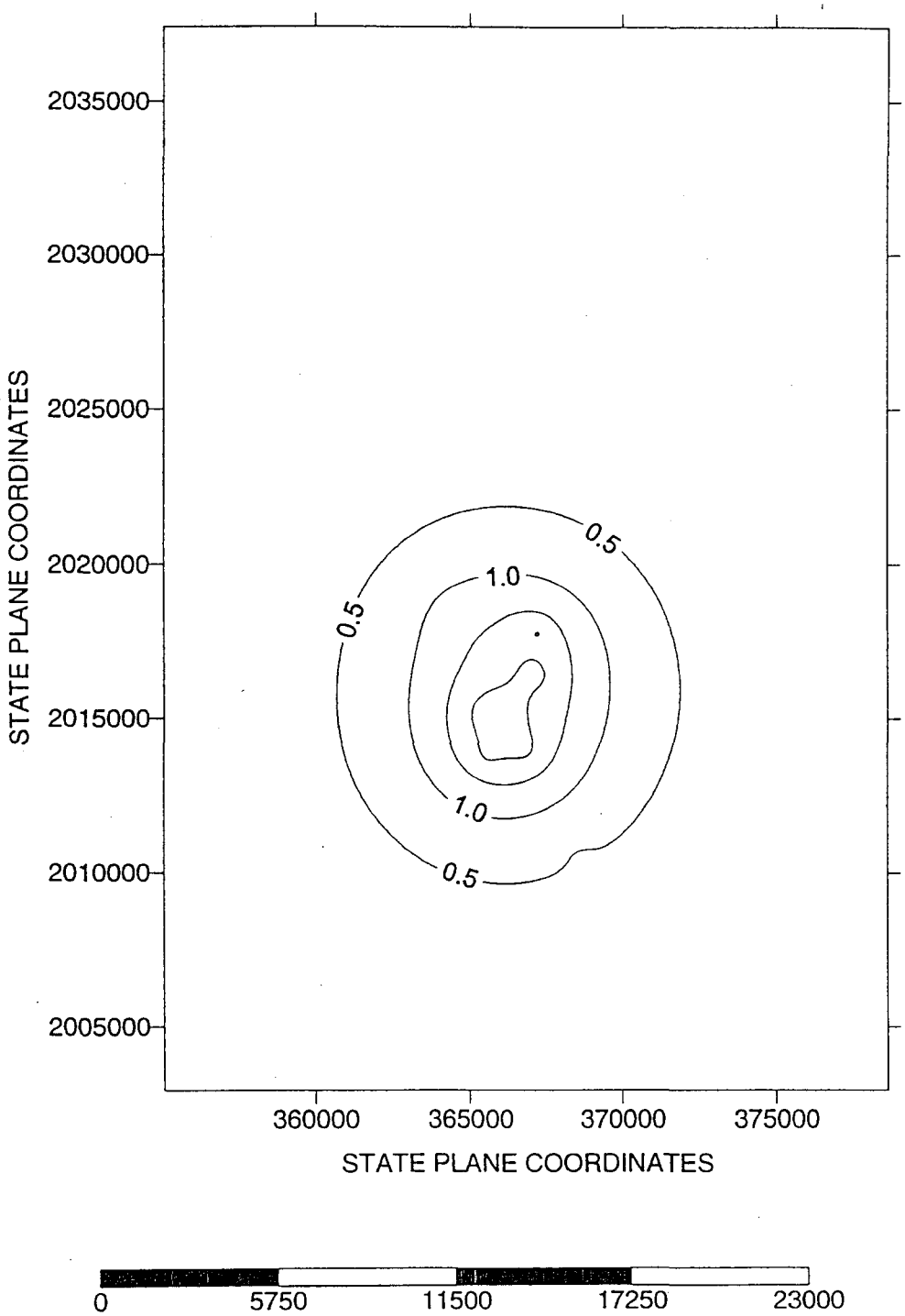

Figure 5. Simulated drawdowns in the unconfined portion of the surficial aquifer system for 1995 pumpage, Tillman Ridge wellfield (measured in feet)

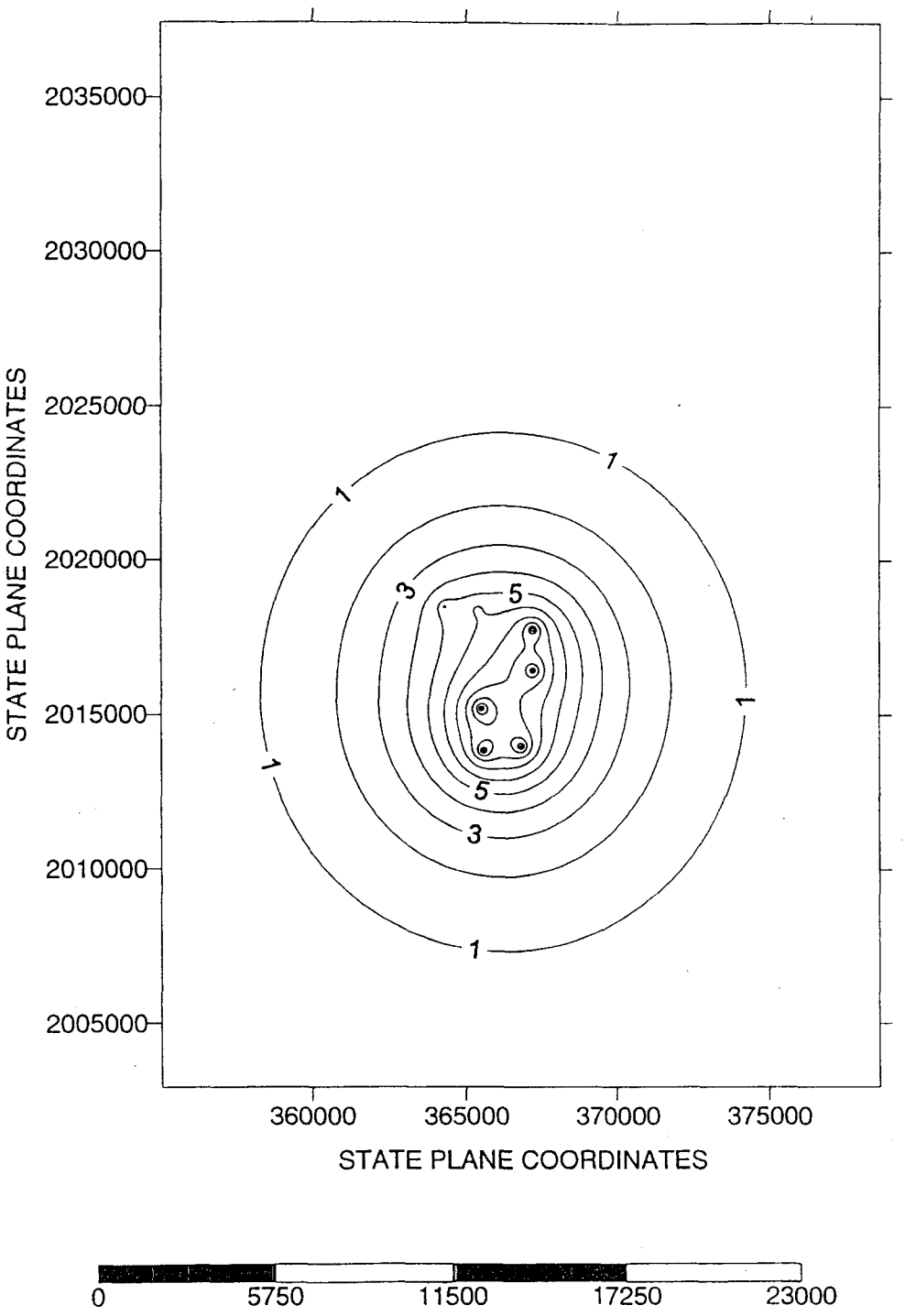

Figure 6. Simulated drawdowns in the confined portion of the surficial aquifer system for 1995 pumpage, Tillman Ridge wellfield (measured in feet)

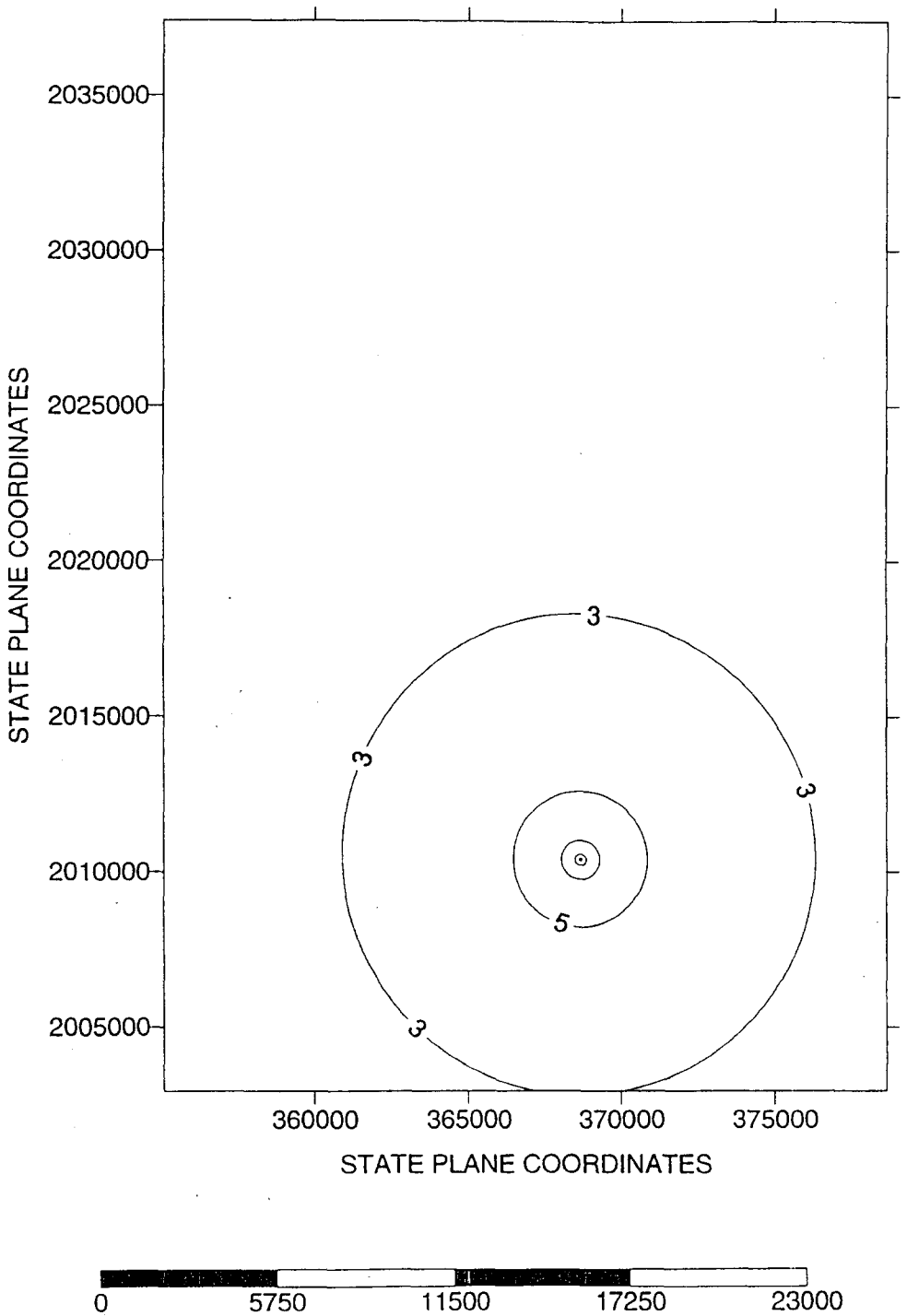

Figure 7. Simulated drawdowns in the Upper Floridan aquifer for 1995 pumpage, Tillman Ridge wellfield (measured in feet)

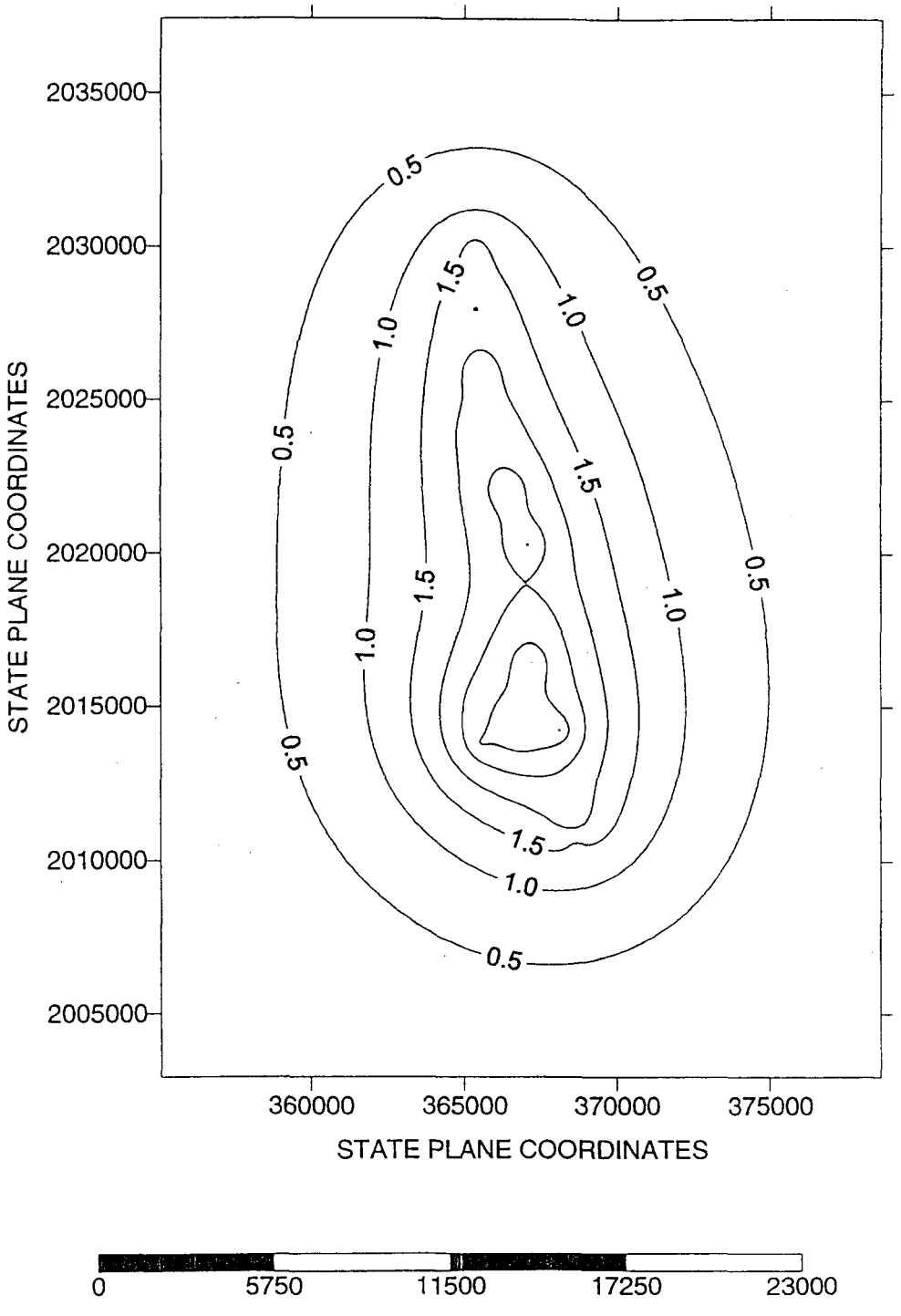

Figure 8. Simulated drawdowns in the unconfined portion of the surficial aquifer system for 2020 pumpage, Tillman Ridge wellfield (measured in feet)

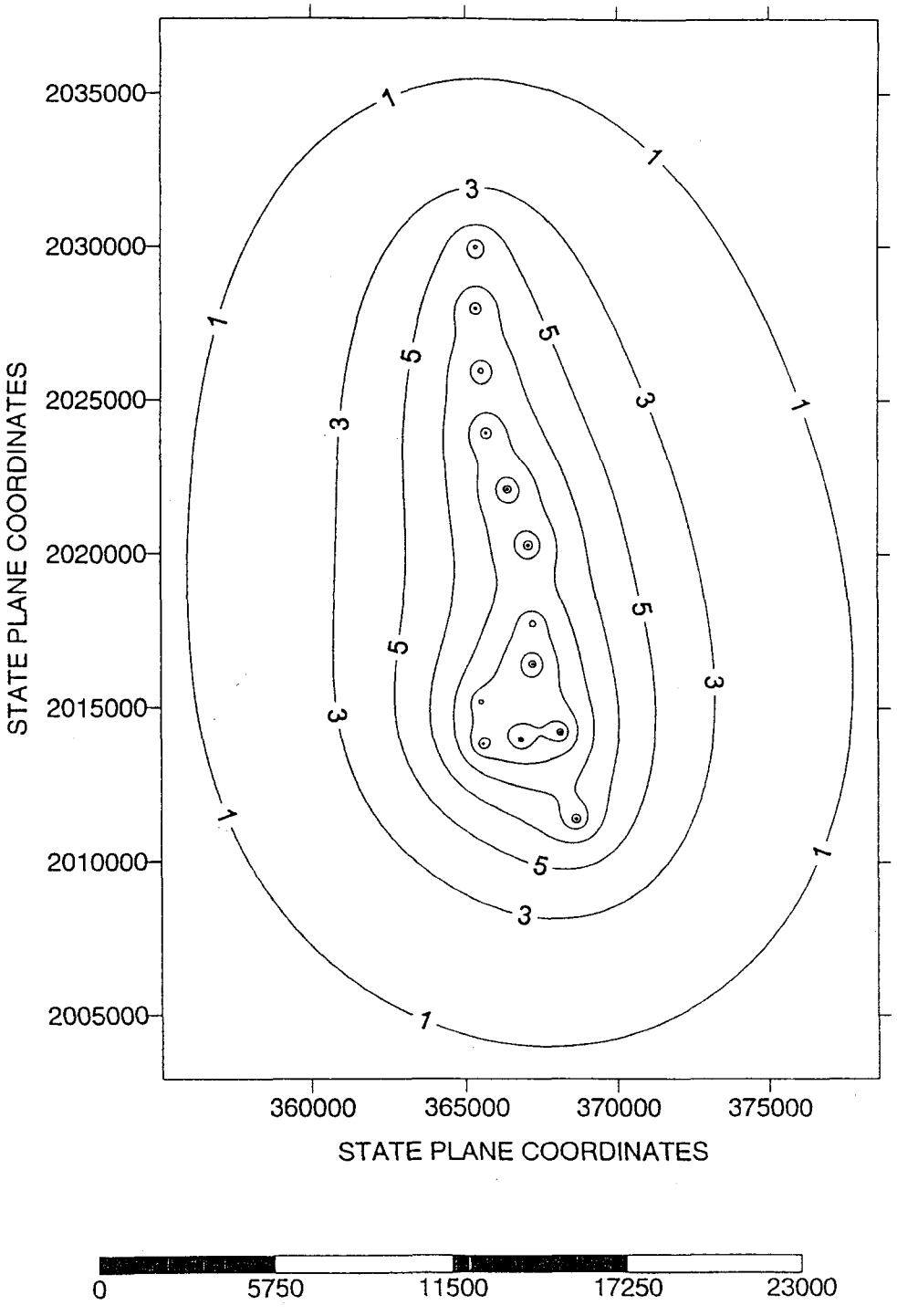

Figure 9. Simulated drawdowns in the confined portion of the surficial aquifer system for 2020 pumpage, Tillman Ridge wellfield (measured in feet)

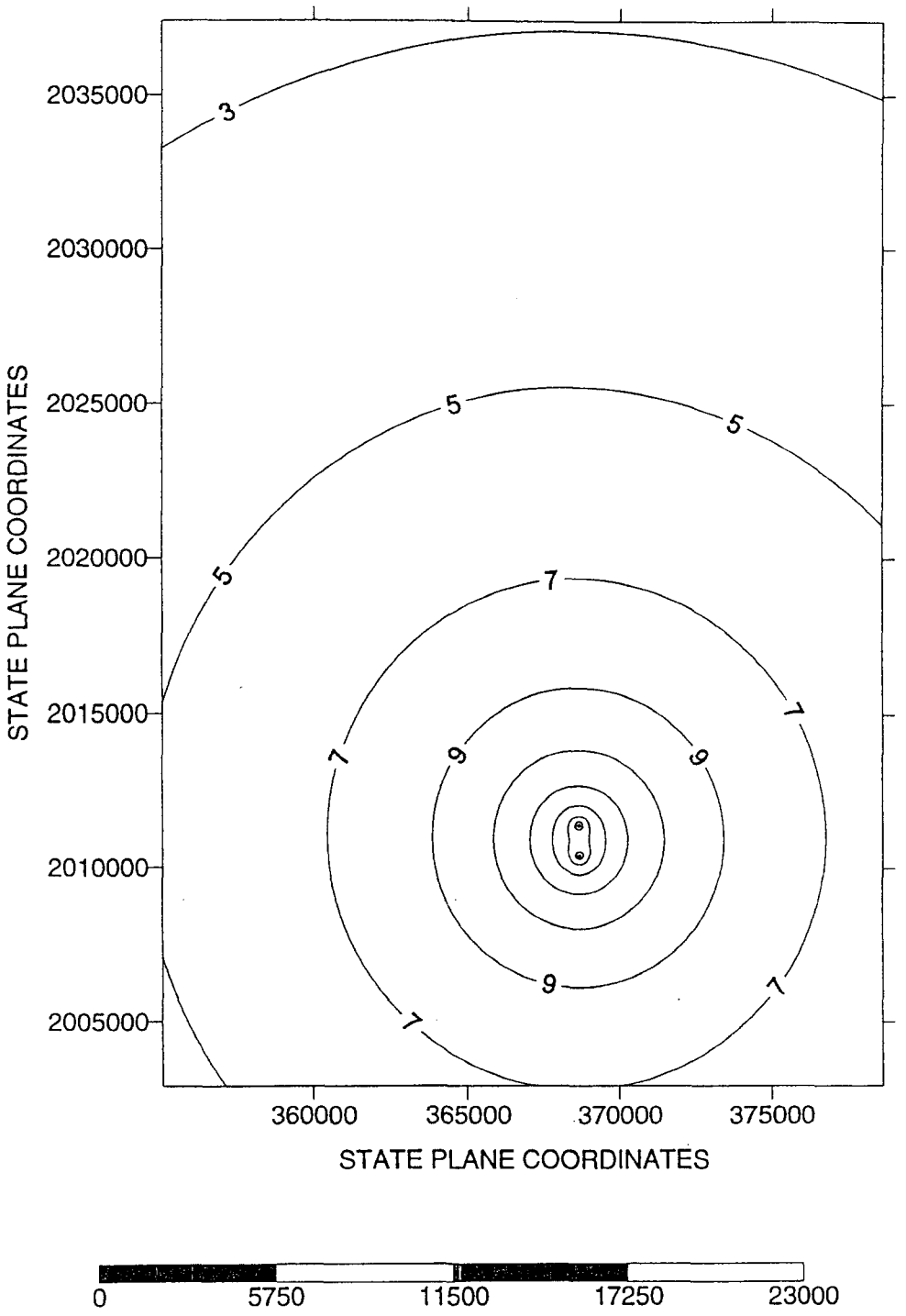

Figure 10. Simulated drawdowns in the Upper Floridan aquifer for 2020 pumpage, Tillman Ridge wellfield (measured in feet)

Table 3. Simulated drawdowns (in feet), Tillman Ridge wellfield

Well	Simulated 1995 Drawdown		Simulated 2020 Drawdown	
	Confined Portion of the Surficial Aquifer System	Upper Floridan Aquifer	Confined Portion of the Surficial Aquifer System	Upper Floridan Aquifer
4	7.89			
5	7.74			
9	15.24		23.37	
11	17.19		17.12	
12	15.24		18.29	
13	15.42		20.68	
14	15.99		20.76	
15*			23.63	
16†			20.17	
P2			22.21	
P3			22.05	
P4			18.53	
P5			17.19	
P6			16.29	
P7			14.81	
TR42		17.28		28.29
TR41‡				28.30

Blank cells indicate wells not pumped.

*Drilled in 1997
†Drilled in 1998
‡Added into service in 1997

county's wellfield may be impacted as a result of the 1995 withdrawals, and this potential impact may continue as a result of the proposed projected 2020 withdrawal. In fact, some impact was observed in 1996 (Schwartz 1996).

In order to determine how much water can be withdrawn from the existing surficial aquifer production wells and still meet the environmental constraint for the isolated wetlands at the Tillman Ridge wellfield, the models were rerun with pumpages adjusted to one-half 1995 and one-quarter 1995 values (Table 4). Two additional wells which existed in 1998, wells 15 and 16, were included in the 1995 pumping scenario. Maximum water table drawdowns are in excess of 1.3 ft for the one-half 1995 pumping scenario (Figure 11) and 0.5 ft for the one-quarter 1995 pumping scenario (Figure 12).

Table 4. Adjusted 1995 pumpage values used in the MLTLAY and SURFDOWN models, surficial aquifer wells, Tillman Ridge wellfield

Well	One-quarter 1995 Pumpage (mgd)	One-half 1995 Pumpage (mgd)
9	0.09	0.16
11	0.10	0.20
12	0.09	0.19
13	0.09	0.17
14	0.09	0.19
15*	0.11	0.22
16†	0.11	0.22
Total	0.68	1.35

Note: mgd = million gallons per day

*Drilled in 1997
†Drilled in 1998

Total surficial aquifer pumpages for the one-quarter 1995 and one-half 1995 scenarios are 0.68 and 1.35 mgd,

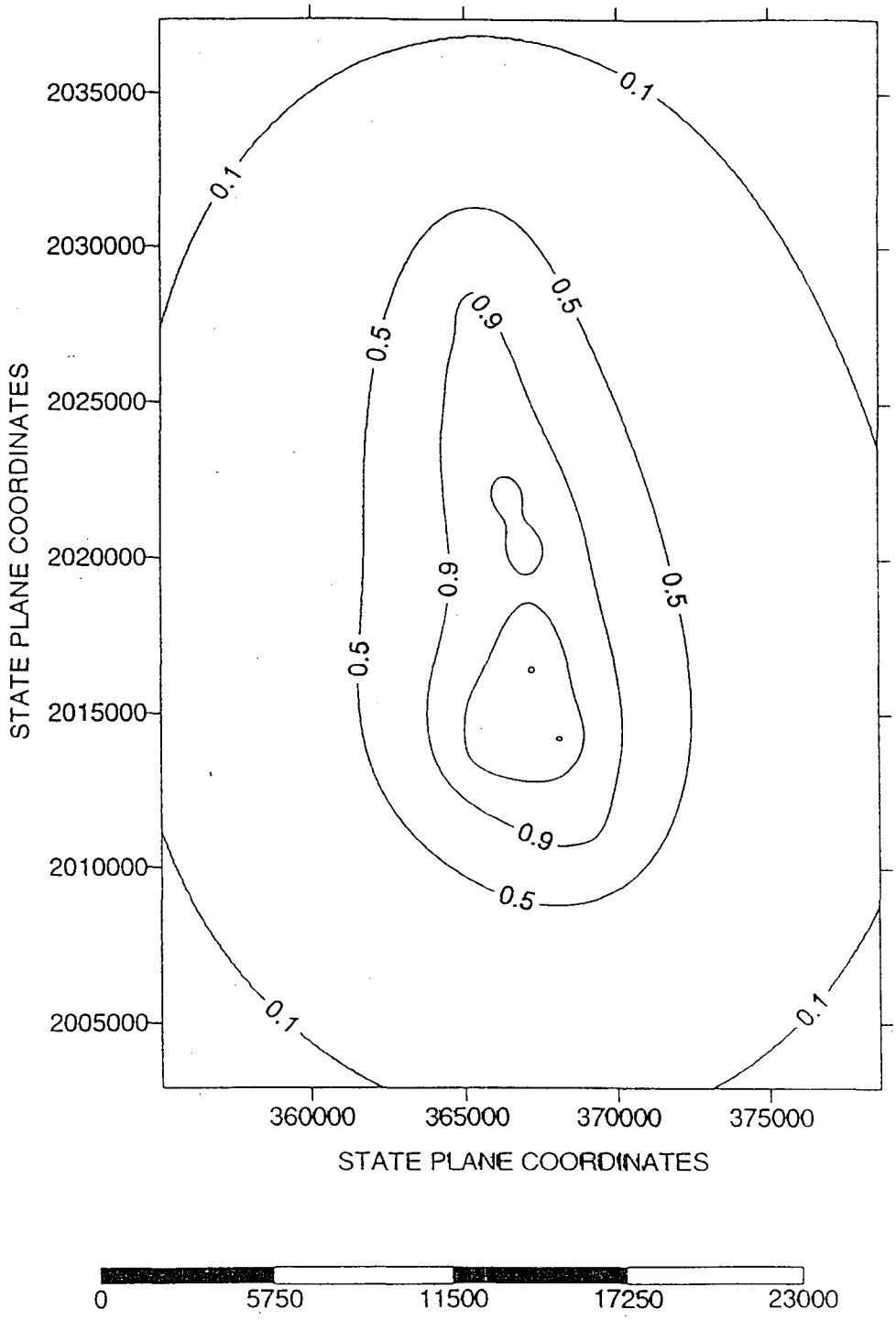

Figure 11. Simulated water table drawdowns at the Tillman Ridge wellfield for one-half 1995 pumpage values

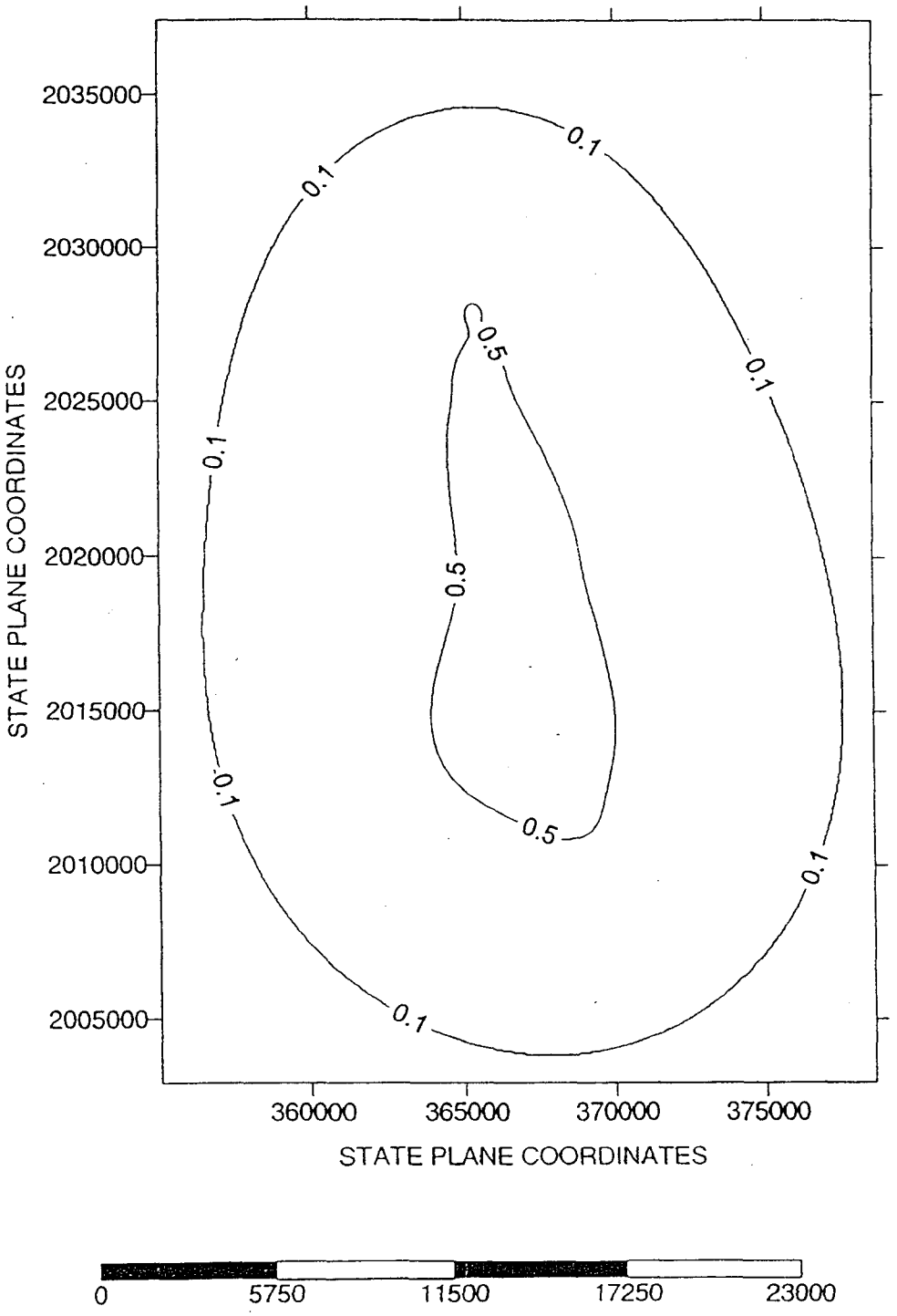

Figure 12. Simulated water table drawdowns at the Tillman Ridge wellfield for one-quarter 1995 pumpage values

respectively. However, only the one-quarter 1995 scenario satisfies the 0.5-ft water table constraint. With a 40% blend of water from the Upper Floridan aquifer, existing wells at the Tillman Ridge wellfield would yield 1.13 mgd.

Both MLTLAY and SURFDOWN models were rerun with seven existing and six proposed surficial aquifer production wells in order to determine acceptable drawdowns for the unconfined surficial aquifer in 2020. This was accomplished by reducing the withdrawal rate to one-half 2020 and one-quarter 2020 pumpage. A hybrid pumping scenario was run because constructing wells to pump only 69 gpm (wells P5–7) to 90 gpm (wells P2, P3) is considered to be financially impractical (Table 5). Pumpages ranged between 100 and 310 gpm in the hybrid scenario, with the smaller pumpages occurring in wells near isolated wetlands. For this purpose, only water table drawdowns were examined. Model results indicate that maximum water table drawdowns are in excess of 1.3, 0.5, and 2.1 ft, respectively, for the one-half 2020 (Figure 13), one-quarter 2020 (Figure 14), and hybrid (Figure 15) pumping scenarios.

Total surficial aquifer pumpages for the one-quarter 2020, one-half 2020, and hybrid scenarios are 1.42, 2.83, and 4.40 mgd, respectively (Table 5). With a 40% blend of water from the Upper Floridan aquifer, respective total pumpages from the wellfield are 2.37, 4.72, and 7.33 mgd. However, only the one-quarter 2020 scenario satisfies the 0.5-ft planning-level water table constraint. Therefore, the approximate yield of the Tillman Ridge wellfield would be 2.37 mgd from the combined surficial and Floridan aquifer wells.

CONCLUSIONS

Based on the generalized planning-level water table drawdown constraint of 0.5 ft in the unconfined surficial aquifer, the expanded Tillman Ridge wellfield could be expected to produce 2.37 mgd, which is 11.13 mgd less than the 2020 projected demand for St. Johns County. The existing wells at the Tillman Ridge wellfield could yield 1.13 mgd, without resulting in unacceptable wetland impacts.

Improved estimates of the projected yield of the Tillman Ridge wellfield could be developed if additional aquifer tests and evaluations were performed. The aquifer characteristics in the northern part of the wellfield may be different from those in the southern part. As additional wells are installed in the northern part of the wellfield, another aquifer performance test should be performed to define aquifer characteristics. Estimates of the extent of potential wetland impacts at the Tillman Ridge wellfield may be improved by improving calibrations of the groundwater models. Additional water level drawdown information is necessary to accomplish such improved calibrations.

It is recommended that St. Johns County conduct a stress test of its wellfield after its water table monitor wells are constructed. The resulting data can be used to improve the calibration of the model.

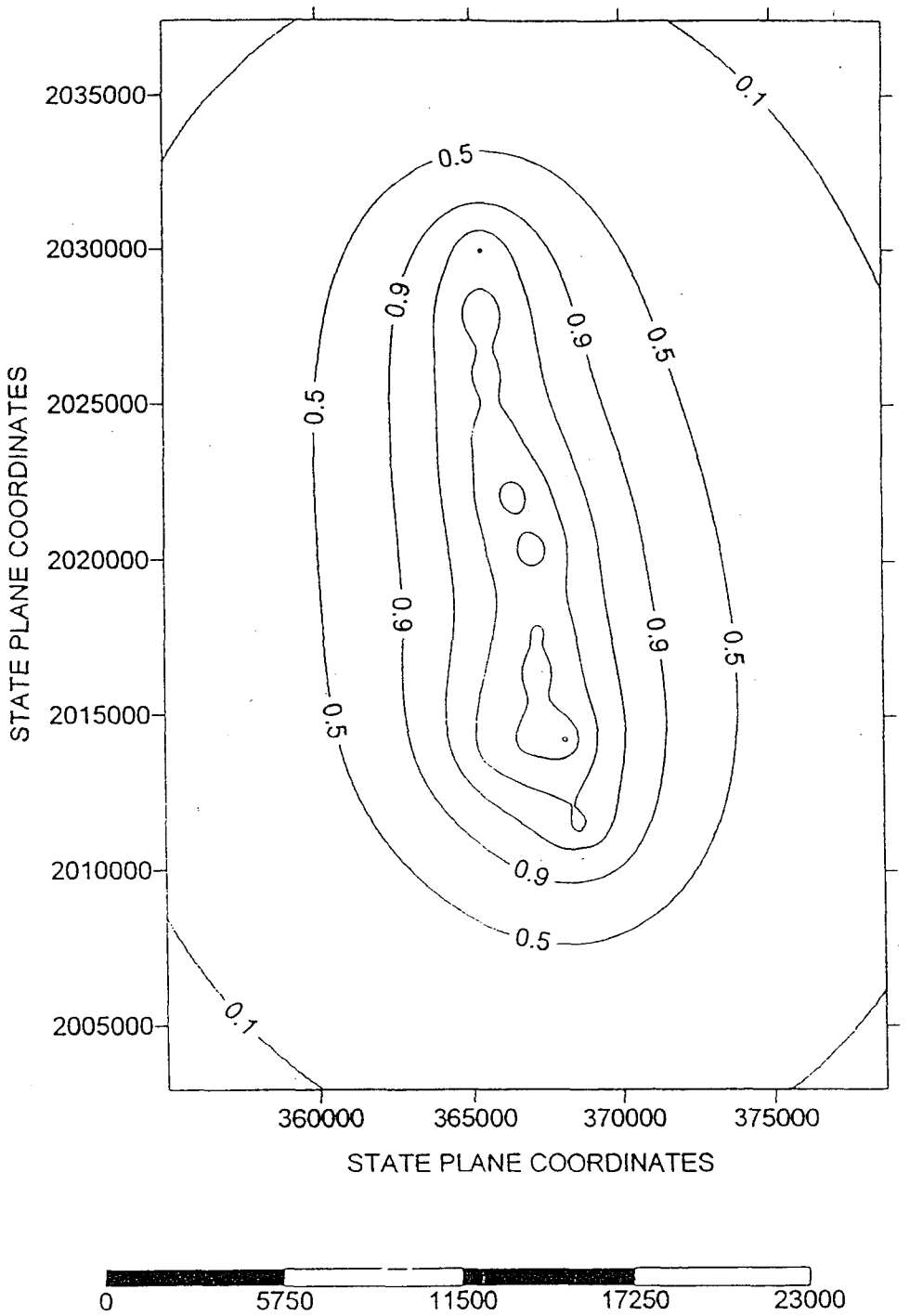

Figure 13. Simulated water table drawdowns at the Tillman Ridge wellfield for one-half 2020 pumpage values

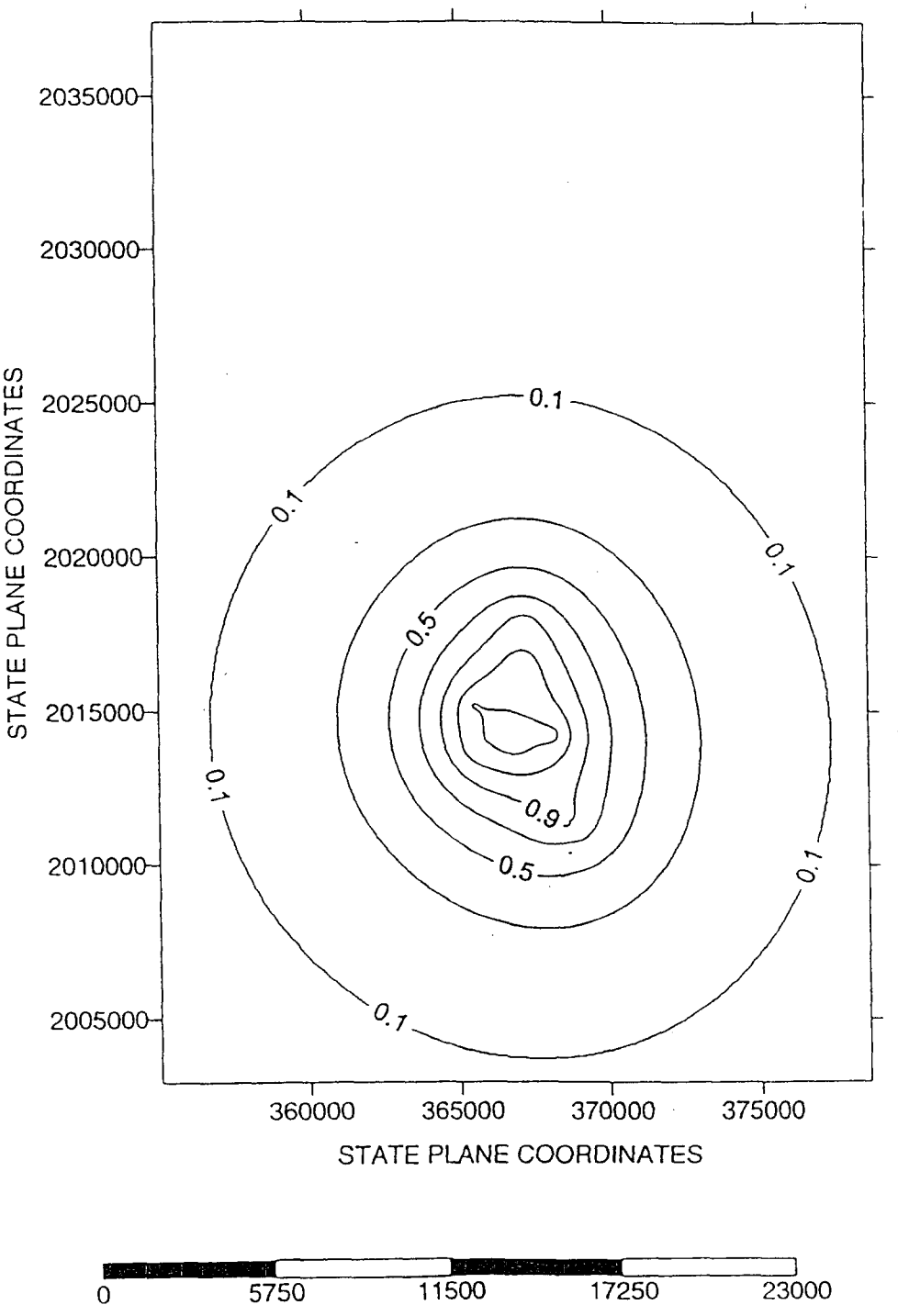

Figure 14. Simulated water table drawdowns at the Tillman Ridge wellfield for one-quarter 2020 pumpage values

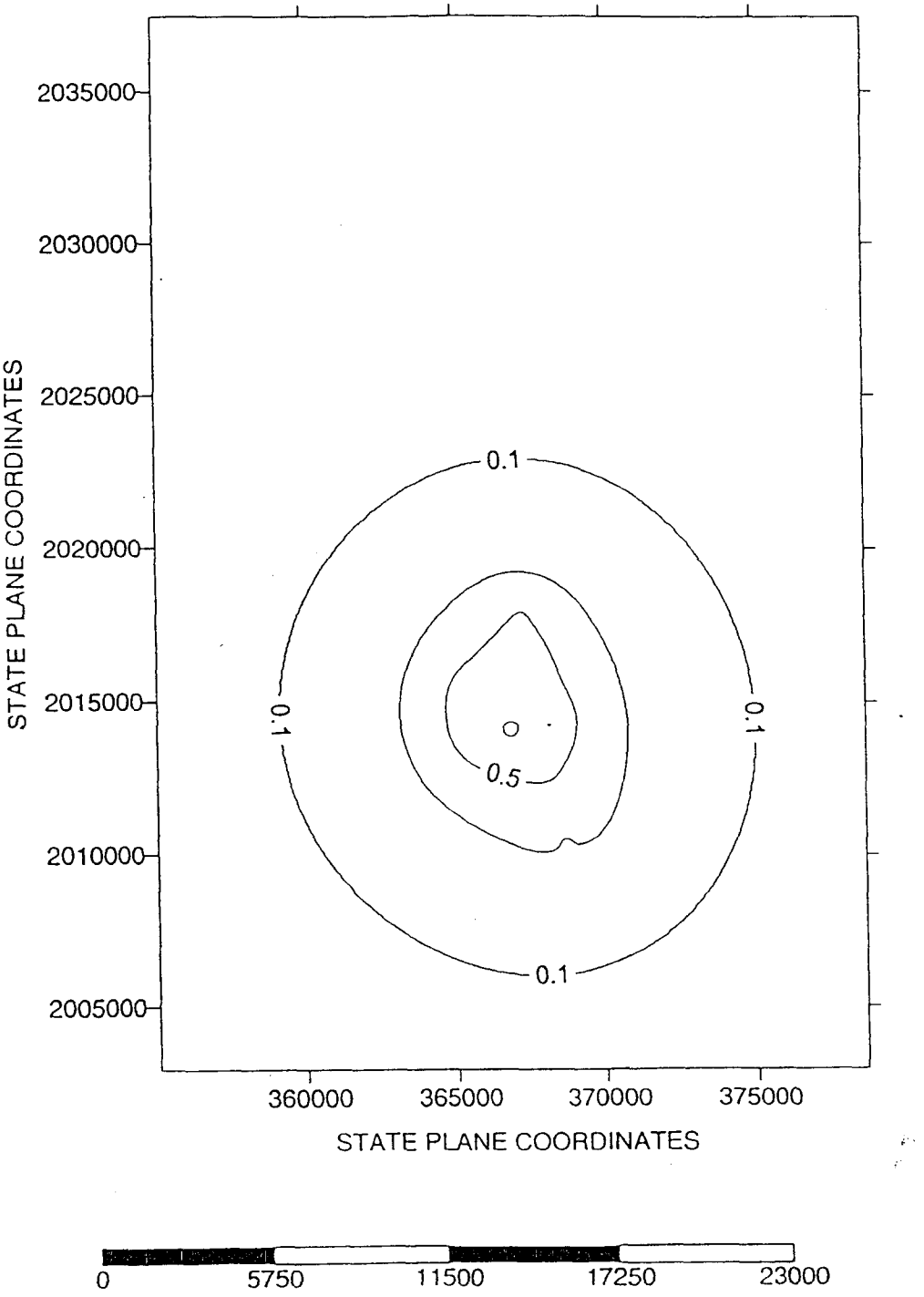

Figure 15. Simulated water table drawdowns at the Tillman Ridge wellfield for hybrid pumping values

Table 5. Adjusted 2020 pumpage values used in the MLTLAY and SURFDOWN models, surficial aquifer wells, Tillman Ridge wellfield

Well	One-quarter 2020 Pumpage (mgd)	One-half 2020 Pumpage (mgd)	Hybrid Pumpage (mgd)
9	0.13	0.25	0.29
11	0.07	0.14	0.14
12	0.08	0.16	0.29
13	0.11	0.21	0.21
14	0.09	0.19	0.21
15*	0.13	0.26	0.44
16†	0.14	0.27	0.45
P2	0.13	0.27	0.45
P3	0.13	0.27	0.45
P4	0.11	0.21	0.29
P5	0.10	0.20	0.29
P6	0.10	0.20	0.45
P7	0.10	0.20	0.44
Total	1.42	2.83	4.40

Note: mgd = million gallons per day

*Drilled in 1997
†Drilled in 1998

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APPENDIX A

Lithologic descriptions and GAMMA logs for surficial aquifer test wells SJ-0282 and SJ-0283

WELL NUMBER: SJ-0282
TOTAL DEPTH: 98 ft
SAMPLES COLLECTED
FROM: 0- 98 ft
COMPLETION DATE: 4 May, 1997
OWNER/DRILLER: SJRWMD, HUSS

COUNTY: St. Johns
LOCATION: T: 07S, R: 29E, S: 19
Lat: ~~29° 53' 18"~~ ~~29 52 26~~ 29 53 18
Long: ~~81° 25' 09"~~ ~~81 24 57~~ 81 25 09
ELEVATION: ~ 42' MSL

Samples Worked in Field By: J. Sego

Depth (ft)	Blow Count	Recovery (%)	Lithologic Description
0-2	4-3-5-6	75	Sand, fine, dk. gray-brown; with organic material and silt
2-4	8-16-22-23	80	SAA, brown; with wood fibers
4-6	13-15-20-24	70	Sand, fine, dk. gray-black, indurated intermittently throughout, with silt
6-8	22-50(6)-X-X	100	SAA, not as indurated
8-10	28-29-29-30	70	SAA to 9' bls; then sand, med-fine, brown; with silt
10-12	8-9-24-29	70	Sand, med-fine, brown-black; with organic material, and silt
12-14	13-50(6)-X-X	80	Sand, black, indurated to 12.5; then sand, med-fine, brown, with silt/clay
14-16	7-7-7-11	80	Sand, med-fine, brown; with silt/clay.(15.5-16')
16-18	3-8-15-22	70	SAA
18-20	11-11-14-16	60	Sand, fine, brown
20-22	8-13-18-22	100	Sand, fine, light brown to olive-brown
22-24	3-5-6-8	60	Sand, med-fine, light brown, trace silt
24-26	7-10-12-15	100	Sand, fine, gray; with blebs of indurated silt and fine sand, brown
26-28	4-2-3-1	60	SAA
28-30	3-16-22-24	80	Sand, fine, gray; with some blebs of organic material, sand, fine, dk. gray, and silt
30-32	11-7-14-28	50	Sand, fine, light gray
32-34	5-10-19-23	60	SAA
34-36	19-20-28-30	60	SAA
36-38	7-14-50(6)-X	100	SAA
38-40	19-30-35-50	75	SAA
40-42	4-27-50(5)-X	75	SAA
42-44	16-19-24-26	40	SAA

WELL NUMBER: SJ-0282
TOTAL DEPTH: 98 ft
SAMPLES COLLECTED
FROM: 0- 98 ft
COMPLETION DATE: 4 May, 1997
OWNER/DRILLER: SJRWMD, HUSS

COUNTY: St. Johns
LOCATION: T: 07S, R: 29E, S. 19
Lat: 29° 53'18"
Long: 81° 25'09"
ELEVATION: ~ 42' MSL

Samples Worked in Field By: J. Sego

Depth (ft)	Blow Count	Recovery (%)	Lithologic Description
44-46	25-25-40-45	70	SAA
46-48	7-10-9-8	60	Sand, fine, gray-green; with trace silt/clay
48-50	12-14-16-12	80	Sand, fine, gray-green; with clay and sand, gray interbedded
50-52	2-Hm Wt-1-1	60	Sand, fine-med, gray to 51.5; then clay, sandy; interbedded with shell material
52-54	10-16-11-12	100	Sand, gray; interbedded with shell and sand and clay
54-56	17-19-5-10	60	Sand, med-fine, gray; with clay and shell to 55.5'; then without little shell material
56-58	3-4-5-5	100	Clay, gray; with shell, sandy in bottom 4"
58-60	10-12-4-5	50	Clay, gray to 59'; then clay, gray; with shell
60-62	1-3-21-19	100	Sand, gray; with shell to 60.5'; then clay, gray, with some sand to 61.75'; then shell with clay
62-64	1-3-9-9	50	Shell; with sand, gray
64-66	2-19-17-34	70	SAA; with lenses of clay and shell
66-68	50(3)-X-X-X	10	Shell fragments (up to 0.5' dia.)
68-70	19-20-17-15	60	Shell and sand, med-fine, gray; trace phosphorite
70-72	4-6-7-9	40	Shell; with sand, med-fine, gray; trace phosphorite
72-74	2-3-8-8	30	SAA, shell fragments 2-5 mm; trace silt
74-76	15-36-24-25	70	Shell; with sand, very fine, gray; some clay in bottom 6"
76-78	12-50(6)-X-X	80	SAA to 76.5'; then sand, fine; with shell
78-80	32-20-14-17	70	Shell; with sand, gray and trace silt
80-82	16-50(5)-X-X	80	Shell and sand, gray; with silt/clay in bottom 6"
82-84	8-16-12-8	40	SAA
84-86	6-12-17-25	70	SAA
86-88	11-14-5-2	50	Sand, clay, and shell; with phosphorite, and indurated shell and sand @ 87', and seams of silt clay @ 87.5'

WELL NUMBER: SJ-0282
TOTAL DEPTH: 98 ft
SAMPLES COLLECTED
FROM: 0- 98 ft
COMPLETION DATE: 4 May, 1997
OWNER/DRILLER: SJRWMD, HUSS

COUNTY: St. Johns
LOCATION: T: 07S, R: 29E, S: 19
Lat: 29° 53'18"
Long: 81° 25'09"
ELEVATION: ~ 42' MSL

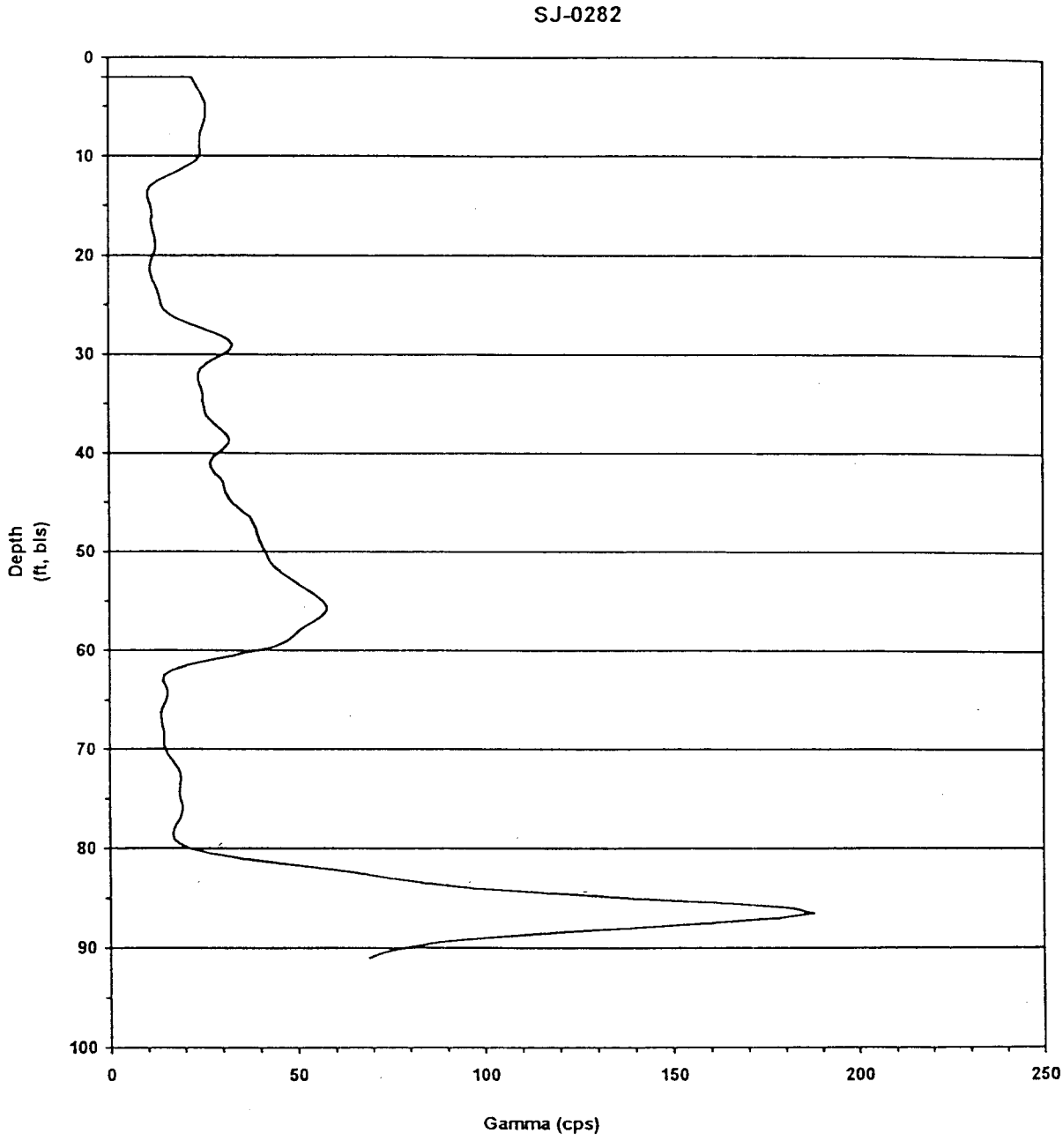
Samples Worked in Field By: J. Sego

Depth (ft)	Blow Count	Recovery (%)	Lithologic Description
88-90	6-4-6-22	80	Sand and clay, gray; with shell fragments and massive phosphorite intraclasts to 89', then clay, gray-green; with sand and phosphorite, and seams of sand, med, gray
90-92	10-8-8-18	80	Sand and clay, green-light green; with shell and seams of sand, med, gray, trace phosphorite
92-94	14-26-30-26	100	SAA; with trace shark teeth
94-96	NA	NA	Shelby tube sample collected over this interval. SAA
96-98	11-16-20-16	100	SAA

Samples submitted for sieve and permeability analysis:

Sieve: 64-66', 74-76', 84-86'

Permeability (Shelby Tube): 94-96'



Project: Test Soil Borings SJ-0282 and SJ-0283
St. Johns County, Florida

Project No: 31-58200

SJRWMD

Figure C- 1. Gamma Log SJ-0282

WELL NUMBER: SJ-0283
TOTAL DEPTH: 100 ft
SAMPLES COLLECTED
FROM: 0-100 ft
COMPLETION DATE: 3 May, 1997
OWNER/DRILLER: SJRWMD, HUSS

COUNTY: St. Johns
LOCATION: T: 07S, R: 29E, S: 19
Lat: 29° 52'26"
Long: 81° 24'57"
ELEVATION: ~ 39' MSL

Samples Worked in Field By: J. Sego

Depth (ft)	Blow Count	Recovery (%)	Lithologic Description
0-2	3-5-5-6	75	Muck and sand, medium, brown, with organic material and gray sand
2-4	8-11-14-17	75	Sand, medium, brown; with organic material
4-6	8-10-10-17	60	Sand, medium, brown-black; with organic material and clay gray
6-8	18-20-28-31	75	SAA to 6.75'; then sand, medium, black; with organic material
8-10	20-29-27-22	80	SAA; with silt/clay to 9'; then same with no clay, sands fine
10-12	29-48-50(4)-X	100	SAA
12-14	29-2829-28-28	60	Sand, medium, light brown; with organic material (peaty)
14-16	16-21-18-19	50	SAA
16-18	9-12-15-15	50	SAA, light brown-tan
18-20	17-25-45(6)-X	60	SAA, med-fine grained
20-22	11-9-11-13	100	SAA to 23.5; then sand, med-fine, light gray interbedded with sand, med-fine, light brown
22-24	19-20-26-31	50	Clay, gray (1" @ top); then sand, med-fine, gray
24-26	11-9-11-10	50	SAA, no clay
26-28	10-11-14-19	50	SAA
28-30	4-3-5-5	25	SAA to 28.25'; then sand, coarse-medium, black-gray; with trace phosphorite
30-32	5-5-11-7	40	Sand, coarse-medium, gray; with trace phosphorite and shell (phosphatic and unaltered)
32-34	10-12-20-26	50	SAA
34-36	10-14-27-42	60	SAA
36-38	11-11-12-16	50	SAA

WELL NUMBER: SJ-0283
TOTAL DEPTH: 100 ft
SAMPLES COLLECTED
FROM: 0-100 ft
COMPLETION DATE: 3 May, 1997
OWNER/DRILLER: SJRWMD, HUSS

COUNTY: St. Johns
LOCATION: T: 07S, R: 29E, S: 19
Lat: 29° 52'26"
Long: 81° 24'57"
ELEVATION: ~ 39' MSL

Samples Worked in Field By: J. Sego

Depth (ft)	Blow Count	Recovery (%)	Lithologic Description
38-40	10-12-16-20	100	SAA
40-42	4-4-2-6	50	SAA
42-44	4-6-7-9	80	SAA, no shell 43.75-44'
44-46	9-14-21-50(0)	100	Sand, medium, gray; with trace phosphorite
46-48	15-29-50(6)-X	90	Sand, med-fine, gray
48-50	12-40-35-40	100	SAA
50-52	10-4-11-17	80	SAA, clay lenses 1-2" from 51-52'
52-54	9-12-18-22	100	Sand, med-fine, gray; with clay to 53'; then clay, gray
54-56	8-2-10-7	100	SAA to 55; then sand, gray and shell to 55.5'; then clay gray to 56'
56-58	8-11-38-4	100	Clay, gray; with sand and shell material to 56.5'; then sand, med-fine, gray to 57'
58-60	6-4-12	100	Clay, gray; with sand and shell material
60-62	8-22-22-6	100	Clay and sand, fine, gray; with some shell to 61'; then shell and sand, fine, gray with little/no clay
62-64	8-9-38-54	100	Shell and sand, fine, gray; with some clay
64-66	50(3)-X-X-X	80	Shell and sand, fine, gray
66-68	50(6)-X-X-X	30	SAA
68-70	7-6-9-10	NR	Shell; with some sand, med-fine, gray-white
70-72	9-4-11-16	50	SAA
72-74	5-5-6-13	100	SAA to 72.5'; then clay, gray; with sand and shell, shell bed @ 73.5-74'
74-76	5-8-8-12	80	Shell and sand, med-very fine, gray
76-78	8-8-9-10	50	SAA; with 1" bed of clay, gray @ 77'
78-80	9-10-10-13	80	SAA; with clay, gray from 79.8-80'
80-82	5-4-5-14	50	SAA, no discrete clay beds, trace phosphorite
82-84	16-15-18-22	80	Shell; with sand, gray; with greater percentage of phosphatic shell from 83'
84-86	10-10-12-14	40	SAA, greater % of phosphatic material

WELL NUMBER: SJ-0283
TOTAL DEPTH: 100 ft
SAMPLES COLLECTED
FROM: 0-100 ft
COMPLETION DATE: 3 May, 1997
OWNER/DRILLER: SJRWMD, HUSS

COUNTY: St. Johns
LOCATION: T: 07S, R: 29E, S: 19
Lat: 29^0 52'26"
Long: 81^0 24'57"
ELEVATION: ~ 39' MSL

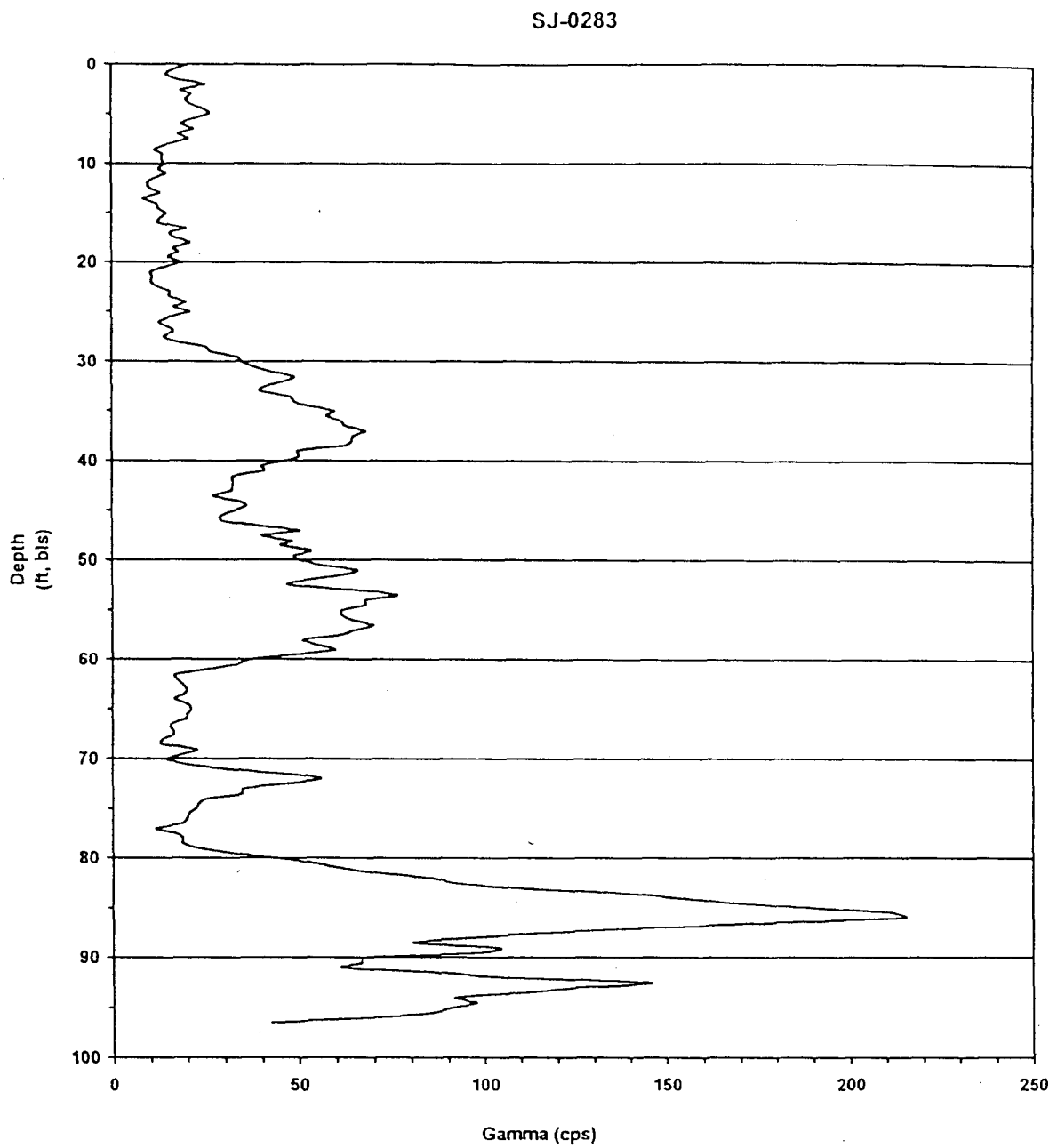
Samples Worked in Field By: J. Sego

Depth (ft)	Blow Count	Recovery (%)	Lithologic Description
86-88	12-14-17-2	40	SAA
88-90	21-50(6)-X-X	80	SAA, calcareous matrix
90-92	21-15-14-38	80	Sand and clay, calcareous; with shell to 91.5'; then sand, medium and clay, pale yellow-olive green; with phosphorite
92-94	30-50(3)-X-X	75	SAA
94-96	7-12-14-21	80	Sand, medium and clay, pale olive green; with blebs (0.5") of sand, med-coarse, gray, less % of phosphorite
96-98	NA	NA	Shelby tube sample collected over this interval: SAA
98-100	12-43-31-47	90	SAA with seam of sand, coarse, gray from 98.5-98.75'

Samples submitted for sieve and permeability analysis:

Sieve: 68-70', 78-80', 86-88'

Permeability (Shelby Tube): 96-98'



Project: Test Soil Borings SJ-0282 and SJ-0283
St. Johns County, Florida

Project No: 31-58200

SJRWMD

Figure C- 2. Gamma Log SJ-0283

APPENDIX B

Lithologic descriptions for confined surficial aquifer observation wells SJ-0284 and SJ-0285 and surficial aquifer production well SJ-0286; completion reports for surficial aquifer production well SJ-0286 and four surficial aquifer observation wells, two confined (SJ-0284, SJ-0285) and two unconfined (SJ-0288, SJ-0289)

SJ0284 9/10/97

SJ0284 = 25 ft from SJ0286 which is test well

SJ0284 is 90 ft observation well

1100 – 1:25 Site set-up

1:25 Start drilling with 7 7/8" bit cuttings below

0-5' Roots, dark organic matter some shell, Dark brn vf sand some clay.

5-10' Dk brn vf sand and silt some roots

10-15' v f g Brn sand

15-20' v f g Brn sand

20-25' v f g Brn sand, some shell

25-30' v f g Brn sand

30 - 35'	v f g Brn sand, some shell
35 - 40'	v f g Brn sand
40 - 45'	v f g gray sand and silt
45 - 50'	v f g gray sand and silt
50 - 55'	v f g gray sand and silt
55 - 60'	Interbedded clay, v f g gray sand and some shell. Clay from 55 - 58'
60 - 65'	v f g gray sand and shell
65 - 70'	v f g gray sand and shell
70 - 75'	f shell and f sand
75 - 80'	f sand and shell
80 - 85'	gray f. g sand and shell
85 - 90'	gray f. g sand and shell Sandy clay from 88 - 90

SIo285

Cuttings

0-5' vf. Brn sand, organics

5-10' vfg Brn sand

10-15' vfg Brn sand

15-20' vfg Brn sand

20-25' vfg Brn sand

25-30' vfg Brn sand

30-35' vfg Brn sand, silt

35-40' vfg ~~Brn~~ gray sand, silt

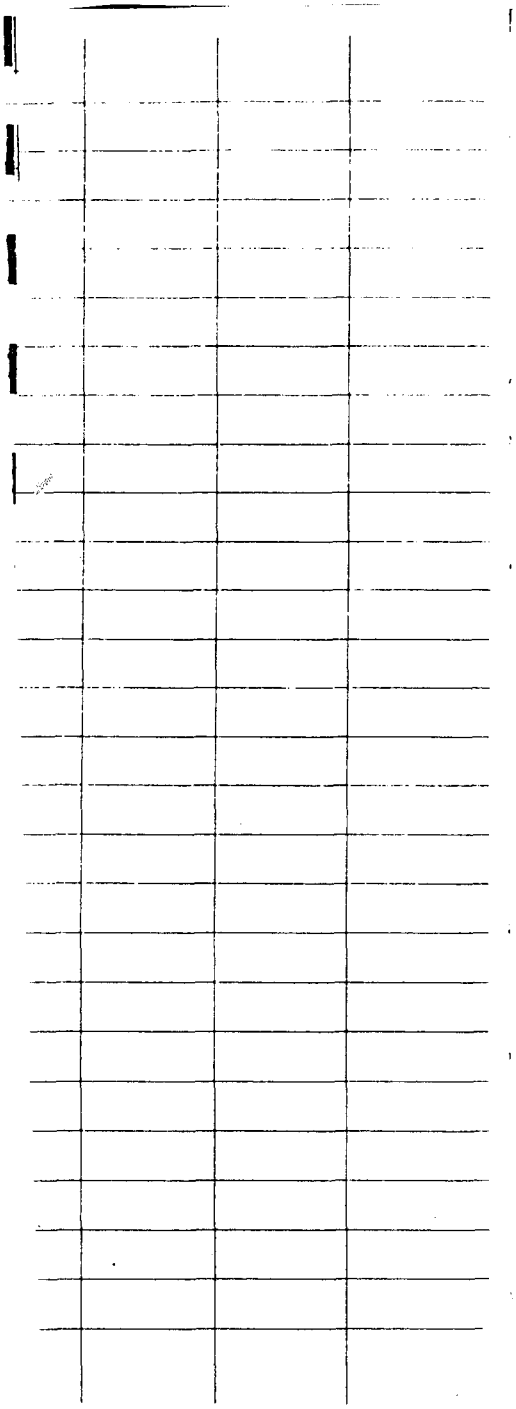
40-45' vfg gray sand, silt

45-50' vfg gray sand, silt

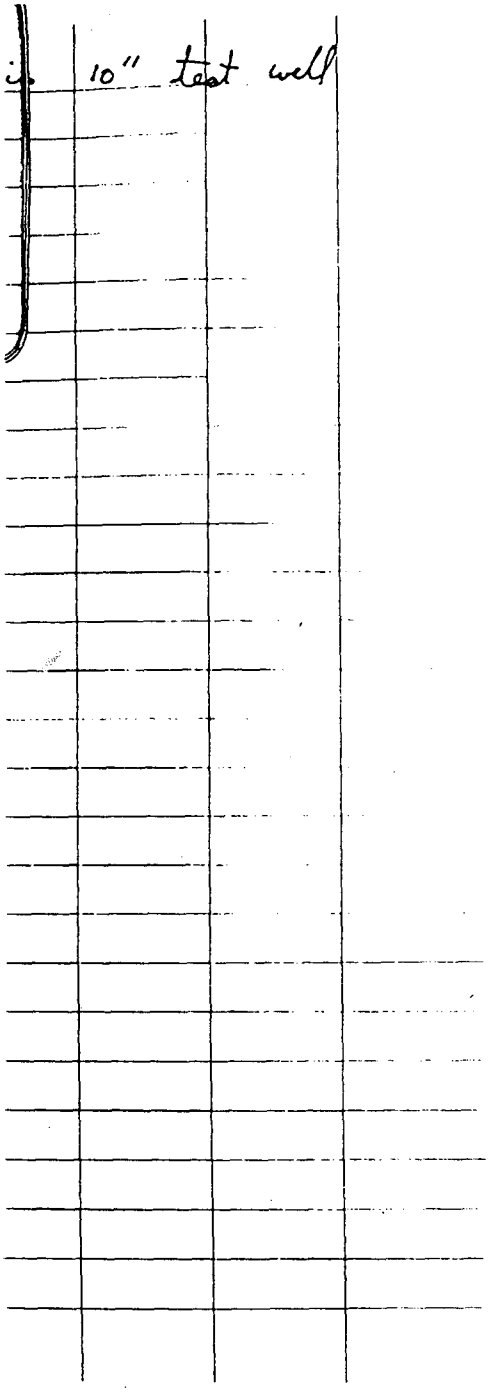
50-55' vfg gray sand, silt

55-60' vfg gray sand, silt, some shell, clay

lot of gray clay



60-65'	v fg gray sand and shell
65-70'	v fg gray sand and shell
70-75'	gray vf sand and f shell
75-80'	gray vf sand and f shell
80-85'	gray fg sand and shell
85-90'	gray fg sand and shell and tan sandy clay
11:25-11:30	Pump mud out of hole
	Used 5 1/2 bags of Quick Gel
11:48	Set 4" PVC screen - 30' Slot 0.010
11:50-11:52	Set 65' PVC SCH 40 Casing
11:53-11:58	Pump mud out of hole



SJ0286 9/8/97

Huss arrive on site at 10:30 AM to drill Test well

10:30 - 11:30 Set-up

11:30 Start drilling with 10" bit Cuttings below

0 - 2' Brn vfg sand and barks

0 - 10' Brn vfg sand and tree frag.

10 - 15' BRN vfg sand

15 - 20' BRN vfg sand and silt

20 - 25' BRN vfg sand

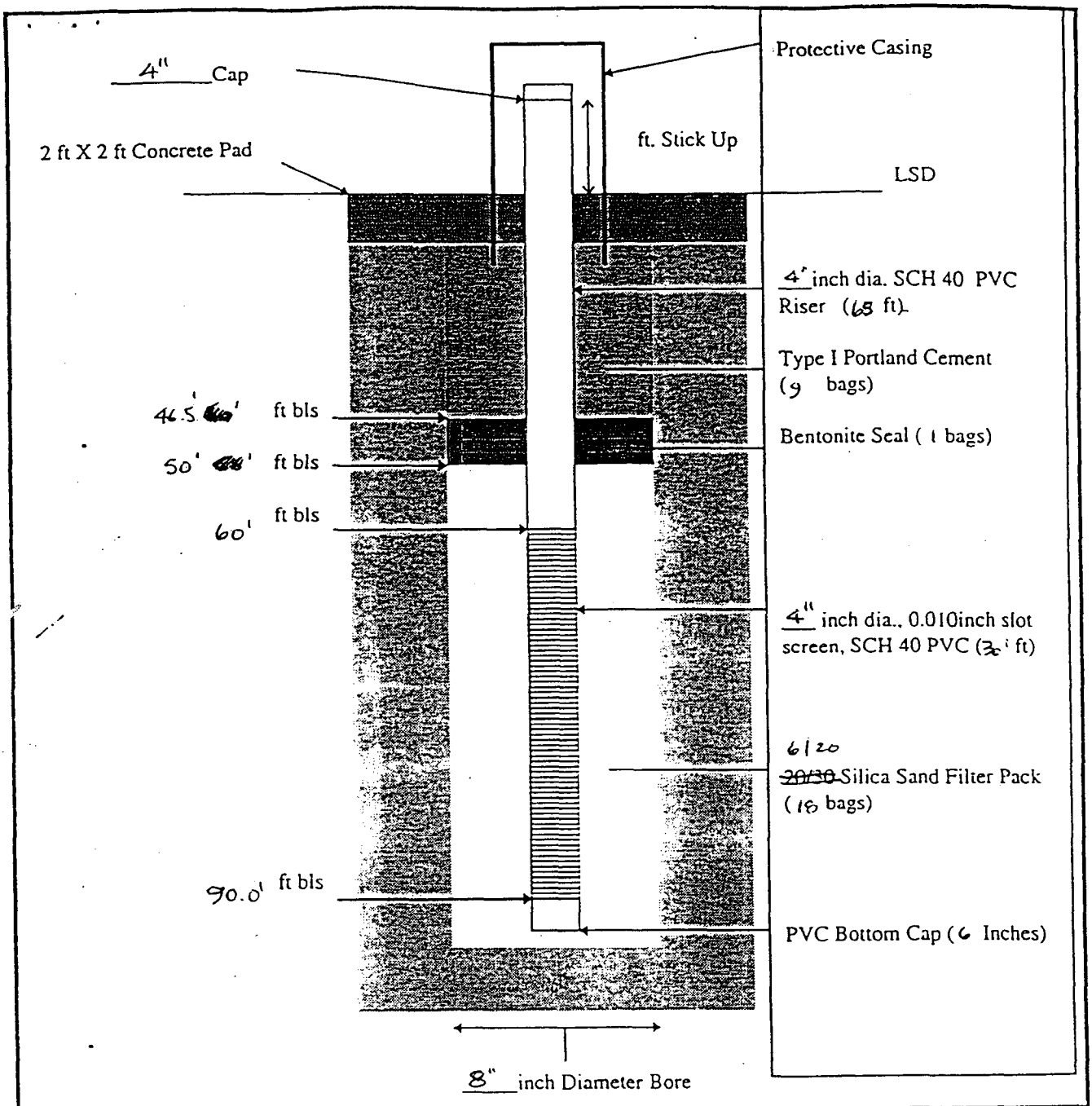
25 - 30' BRN vfg sand

30 - 35' gray vfg sand, shell, silt

35 - 40' gray vfg sand, shell, silt

40 - 45' shell and vfg Brn sand

45-50	shell and vf-g Brn sand
50-55	Interbedded sandy shell and clay
55-60	Interbedded sandy shell and clay
60-65	Gray f sandy shell
65-70	Gray f sandy shell
70-75	Gray f sandy shell
75-80	Gray f sandy shell
80-85	Gray f sandy shell
85-90	Interbedded gray f sandy shell and v.f. shelly sand, some clay
90-95	Gray sandy clay, some shell
95-100'	Sandy clay, abundant PO_4 green clay, some shell



Project: ST. JOHNS CO. TILLMAN SITE

Project No: 965128

Well Completed: 9-16-97

Not To Scale

SJRWMD

Well Number: SJ-0284

DSI Jacksonville, FL P-311 Q

...TION REPORT (Please complete in black ink or type.)

...-0284 CUP # _____ DID # _____

...wells drilled _____ /WUP # _____

...remaining wells to be cancelled _____

...wells drilled need an individual completion report)

WATER WELL CONTRACTOR'S SIGNATURE Edwin B. Broxton Jr. License # 2879

(I certify that the information provided in this report is accurate and true)

OWNER'S NAME ST. JOHNS RIVER WTR MGMT DISTRICT

COMPLETION DATE 9-16-97 Florida Unique I D _____

WELL USE: DEP/Public _____ Irrigation _____ Domestic _____ Monitor X

HRS Limited _____ 62-524 _____ Other _____

DRILL METHOD ☒ Rotary ☐ Cable Tool ☐ Combination

☐ Jet ☐ Auger Other

Grout	No. of Bags	From (ft.)	To (ft.)
Neat Cement:	9	0.0	46.5
Bentonite:	1	46.5	50.0'

Measured Static Water Level _____ Measured Pumping Water Level _____

After _____ Hours at _____ G.P.M. Measuring Pt. (Describe) _____

Which is _____ Ft. ☐ Above ☐ Below Land Surface

Casing: ☐ Black Steel ☐ Galv ☒ PVC Other _____

WELL LOCATION: Site Address ST JOHNS CO. WTP County ST. JOHNS

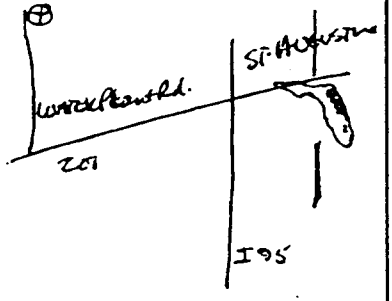
Qtr: _____ Qtr: _____ Sec: 19 Twp: 7S Rge: 29E

Latitude 295226 Longitude 812457

DATE STAMP

Official Use Only

Sketch of well location on property N



Give distances from septic tank and house or other reference points

☐ Open Hole / ☒ Screen	Depth (Ft.) From	To	DRILL CUTTINGS LOG: Examine cuttings every 20 ft. or at formation changes. Give color, grain size, and type of material. Note cavities, depth to producing zones
Casing Diameter & Depth (Ft.)			
Diameter 4"	0.0		DK. BR. SI. F.S
From 0.0		22.0	
To 60.0'	22.0		TAN F.S,
SCREEN		40.0	
Diameter 4"	40.0		LT. BR. FS w/ MO. SHELL
From 60.0'		55.0	
To 90.0'	55.0		LT BR. F/m w/ MO. SHELL
		88.0	
Liner ☐ or Casing ☐	88.0		GR. TAN, SC/CS
Diameter ___ ___		90.0	
From _____			
To _____			

CHEMICAL ANALYSIS

Iron: ____ ppm Sulfate: _____ ppm

Chlorides: _____ppm

[ ] Lab Test [ ] Field Test Kit

Pump Type

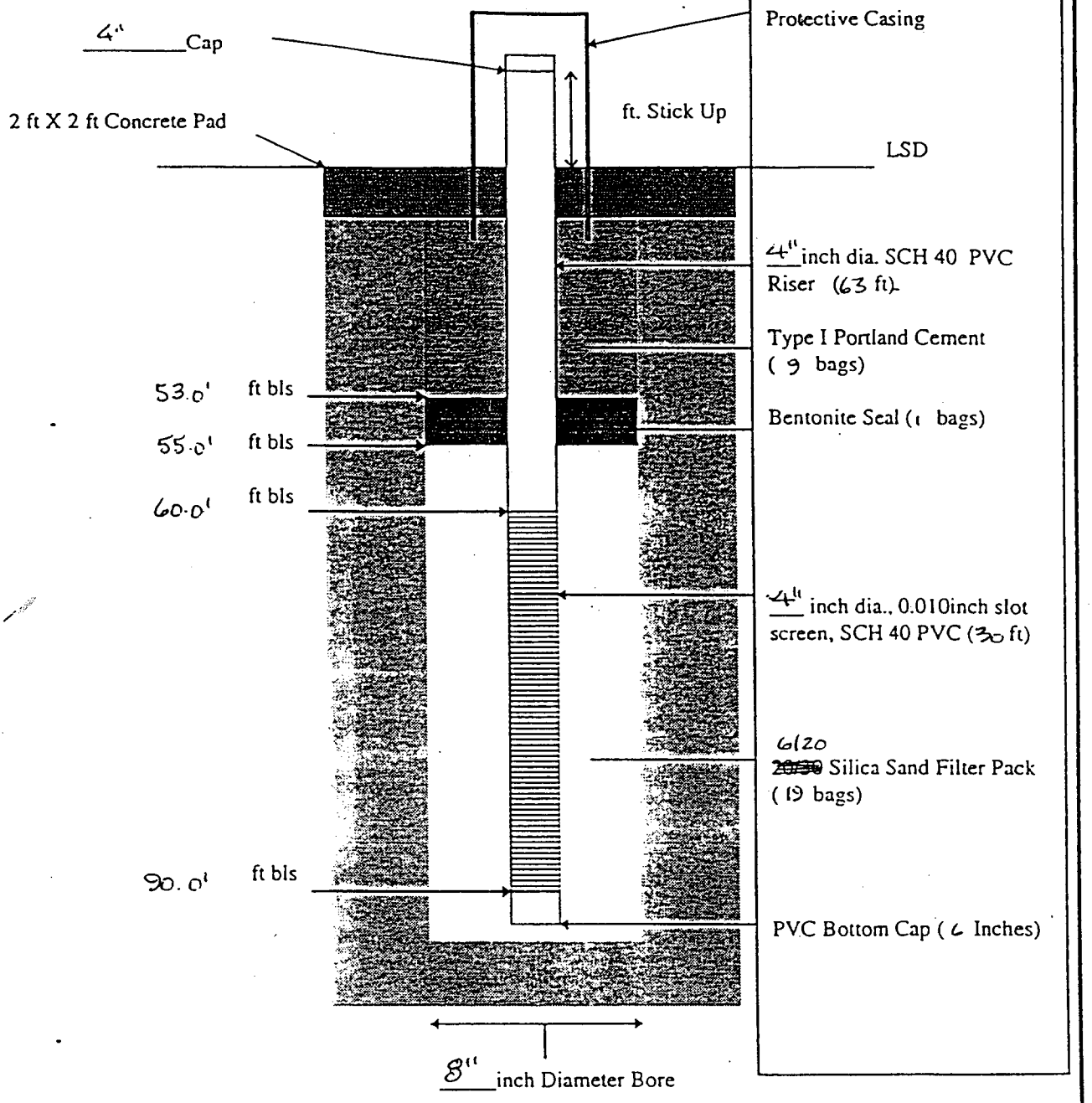
[ ] Centrifugal [ ] Jet [ ] Submersible

[ ] Turbine

Horsepower _____ Capacity _____ G.P.M. _____

Pump Depth _____ Ft. Intake Depth _____ Ft.

Driller's Name: (print or type) EDWIN BROXTON



Project: ST. JOHNS CO. TILLMAN SITE

Project No: 96J128

Well Completed: 9-16-97

Not To Scale

SJRWMD

Well Number: SJ-0285

LL COMPLETION REPORT (Please complete in black ink or type.)

ERMIT # SJ-0285 CUP # _____ DID # _____

lumber of wells drilled _____ /WUP # _____

idicate remaining wells to be cancelled _____

ll wells drilled need an individual completion report)

ATER WELL CONTRACTOR'S GNATURE _____ License # 2879

I certify that the information provided on this report is accurate and true.

Grout	No. of Bags	From (ft.)	To (ft.)
at Cement:	9	0.0	53.0'
ntonite:	1	53.0'	55.0'

LL LOCATION: Site Address ST. JOHNS WTP County ST JOHNS

_____ Qtr: _____ Sec: 17 Twp: 7S Rge: 29E

itude 295226 Longitude 812457

DATE STAMP

Official Use Only

MICAL ANALYSIS

____ ppm Sulfate: ____ ppm

rides: _____ppm

ab Test [ ] Field Test Kit

Type

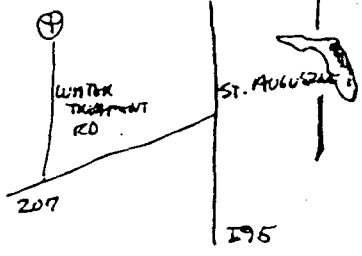
entrifugal [ ] Jet [ ] Submersible

urbine

power _____ Capacity _____ G.P.M. _____

Depth _____ Ft. Intake Depth _____ Ft.

Sketch of well location on property N



Give distances from septic tank and house or other reference points

OWNER'S NAME ST. JOHNS RIVER WATER MGMT DISTRICT

COMPLETION DATE 9-16-77 Florida Unique I.D. _____

WELL USE: DEP/Public ____ Irrigation ____ Domestic ____ Monitor X

HRS Limited ____ 62-524 ____ Other _____

DRILL METHOD ☒ Rotary ☐ Cable Tool ☐ Combination

☐ Jet ☐ Auger Other _____

Measured Static Water Level _____ Measured Pumping Water Level _____

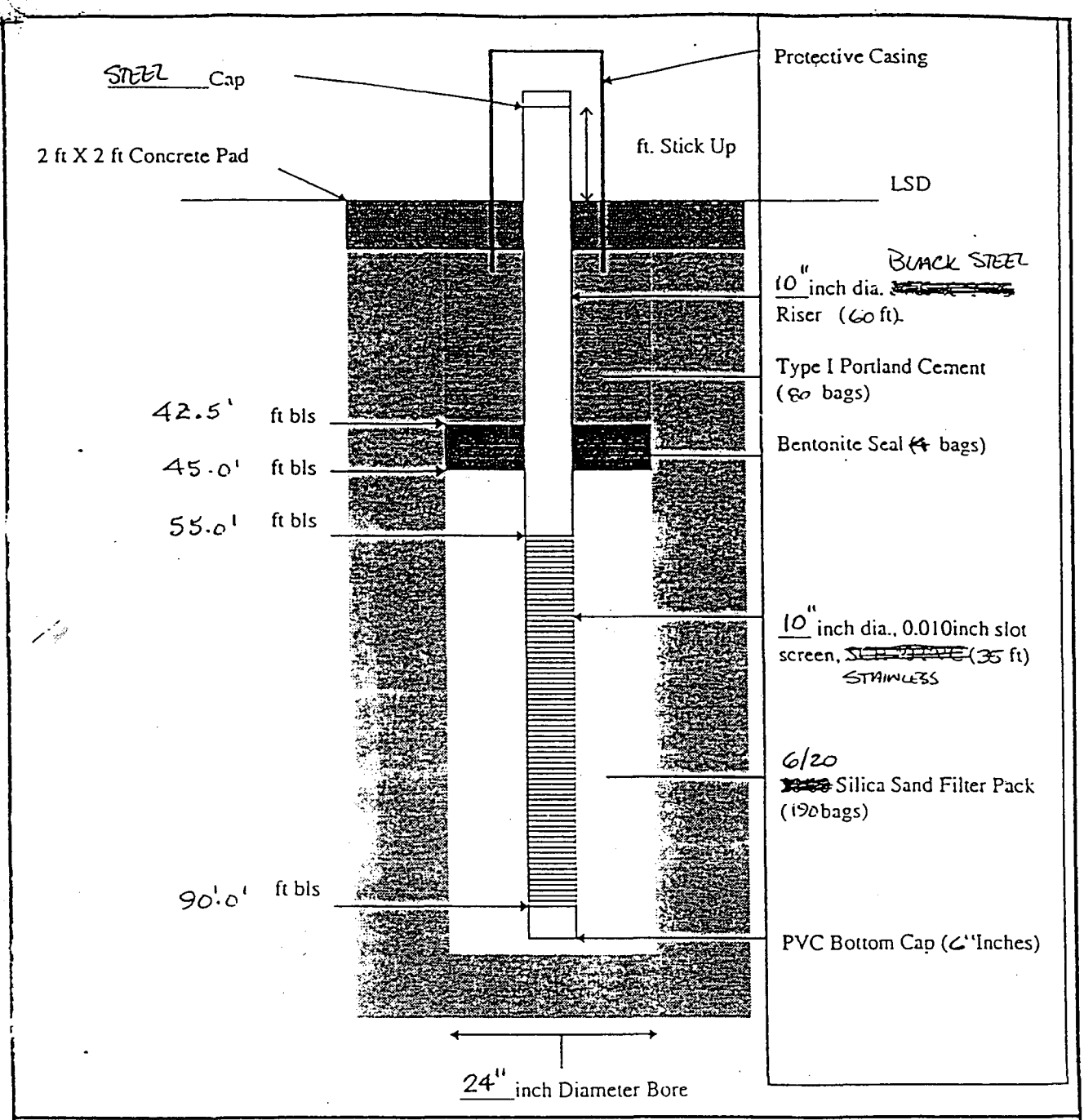
After _____ Hours at _____ G.P.M. Measuring Pt. (Describe): _____

Which is ____ Ft. ☐ Above ☐ Below Land Surface

Casing: ☐ Black Steel ☐ Galv. ☐ PVC Other _____

☐ Open Hole ☒ Screen	Depth (Ft.)		DRILL CUTTINGS LOG Examine cuttings every 20 ft. or at formation changes. Give color, grain size, and type of material. Note cavities, depth to producing zones.
Casing Diameter & Depth (Ft.)	From	To	
Diameter 4"	0.0		DK. BR, S. F.S.
From 0.0		22.0'	
To [redacted] 60'	22.0'		TAN F. SAND
SCREEN		90.0'	
Diameter 4"	60.0'		LT. BR, F.S., W/SHELL
From [redacted] 60'			
To 90.0'		88.0'	
	88.0'		
Liner ☐ or Casing ☐		90.0'	GR. TAN SHELL
Diameter ___ ___			
From _____			
To _____			

Driller's Name: (print or type) EDWIN BRANTLY



Project: ST. JOHNS CO. TIMMN

Project No: 96J128

Well Completed: 9-10-97

Not To Scale

SJRWMD

Well Number: SJ-0286

COMPLETION REPORT (Please complete in black ink or type.)

EU # SJ-0286 CUP # _____ DID # _____

PERMIT # _____ /WUP # _____

Number of wells drilled _____

Indicate remaining wells to be cancelled _____

(All wells drilled need an individual completion report)

WATER WELL CONTRACTOR'S SIGNATURE Robert B. Nunn License # 2879

I certify that the information provided in this report is accurate and true.

OWNER'S NAME ST. Johns Rivr Wtr Mgmt

COMPLETION DATE 9-10-97 Florida Unique I.D. _____

WELL USE: DEP/Public _____ Irrigation _____ Domestic _____ Monitor X

HRS Limited _____ 62-524 _____ Other _____

DRILL METHOD ☒ Rotary ☐ Cable Tool ☐ Combination

☐ Jet ☐ Auger Other _____

Grout	No. of Bags	From (ft.)	To (ft.)
Neat Cement:	80.0	0.0	42.5'
Bentonite:	4	42.5	45.0'

Measured Static Water Level _____ Measured Pumping Water Level _____

After _____ Hours at _____ G.P.M. Measuring Pt. (Describe): _____

Which is _____ Ft. ☐ Above ☐ Below Land Surface

Casing: ☒ Black Steel ☐ Galv. ☐ PVC Other _____

WELL LOCATION: Site Address St Johns Co. WTP County ST. JOHNS

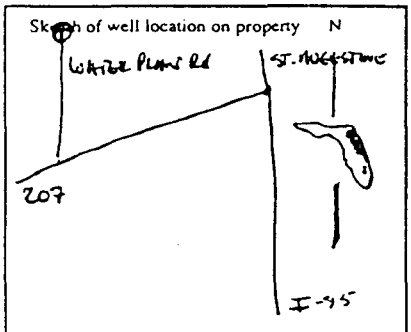
Qtr: _____ Qtr: _____ Sec: 19 Twp: 7S Rge: 29E

Latitude 29 5 22 Longitude 81 24 57

DATE STAMP

Official Use Only

Sketch of well location on property N



Give distances from septic tank and house or other reference points

CHEMICAL ANALYSIS

Iron: ____ ppm Sulfate: _____ ppm

Chlorides: _____ppm

[ ] Lab Test [ ] Field Test Kit

Pump Type

[ ] Centrifugal [ ] Jet [ ] Submersible

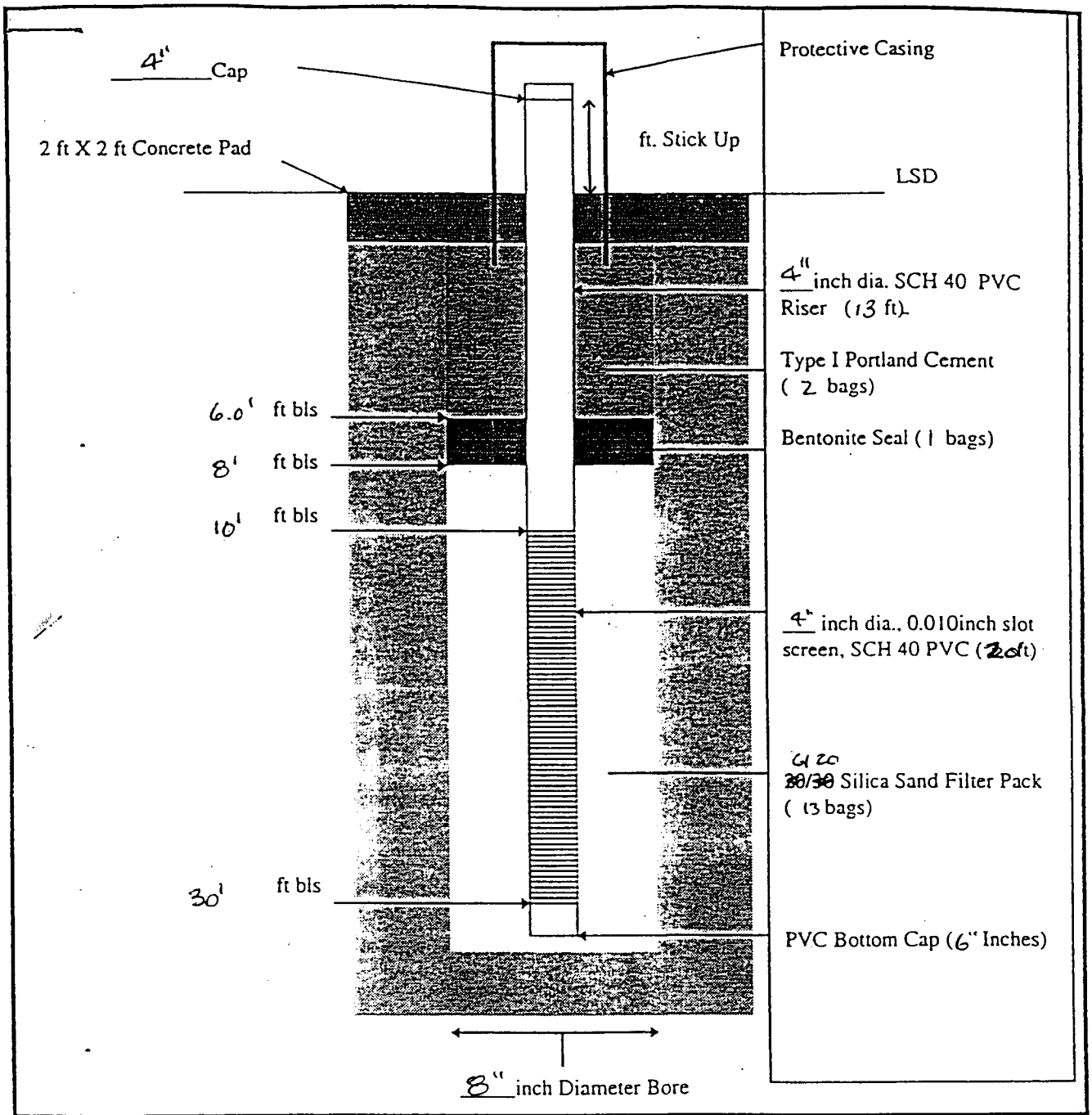
[ ] Turbine

Horsepower _____ Capacity _____ G.P.M. _____

Pump Depth _____ Ft. Intake Depth _____ Ft.

☐ Open Hole / ☒ Screen	Depth (Ft.) From	To	DRILL CUTTINGS LOG Examine cuttings every 20 ft or at formation changes. Give color, grain size, and type of material. Note cavities, depth to producing zones.
Casing Diameter & Depth (Ft.)			
Diameter 16"	0.0		DK. BR. SI. F. SAND W/ ROOTS
From 0.0			
To 55.0'		22.0'	
SCREEN	22.0'		TAN F/M. SAND
Diameter 10"		40.0	
From 55.0'	40.0		LT. BR. F.S. W/ ABOND. SHELL
To 90.0'			
		88.0'	
Liner ☐ or Casing ☐	88.0'		LT. GRAY BROWN SC/CS
Diameter ___ ___		90.0	
From _____			
To _____			

Driller's Name: (print or type) EDWIN BROXTON



Project: ST. JOHNS CO. TILLMAN SITE

Project No: 96J128

Well Completed: 9-11-97

Not To Scale

SJRWMD

Well Number: SJ-0288

LETION REPORT (Please complete in black ink or type.)

SJ-0288 CUP # _____ DID # _____

wells drilled _____ /WUP # _____

maining wells to be cancelled _____

is drilled need an individual completion report)

ER WELL CONTRACTOR'S

JATURE Edwin B. Broxton License # 2879

I certify that the information provided in this report is accurate and true)

OWNER'S NAME ST. JOHNS RIVER WTR MGMT DISTRICT

COMPLETION DATE 9-11-97 Florida Unique I.D. _____

WELL USE: DEP/Public _____ Irrigation _____ Domestic _____ Monitor X

HRS Limited _____ 62-524 _____ Other _____

DRILL METHOD ☒ Rotary ☐ Cable Tool ☐ Combination

☐ Jet ☐ Auger Other _____

Grout	No. of Bags	From (ft.)	To (ft.)
Neat Cement:	2	0.0	6.0
Bentonite:	1	6.0	8.0'

Measured Static Water Level _____ Measured Pumping Water Level _____

After _____ Hours at _____ G.P.M. Measuring Pt. (Describe): _____

Which is _____ Ft. ☐ Above ☐ Below Land Surface

Casing: ☐ Black Steel ☐ Galv. ☒ PVC Other _____

WELL LOCATION: Site Address ST. JOHNS CO. WTP County ST. JOHNS

Qtr: _____ Qtr: _____ Sec: 19 Twp: 7S Rge: 29E

Latitude 295226 Longitude 812457

DATE STAMP

Official Use Only

CHEMICAL ANALYSIS

Iron: ____ ppm Sulfate: _____ ppm

Chlorides: _____ppm

[ ] Lab Test [ ] Field Test Kit

Pump Type

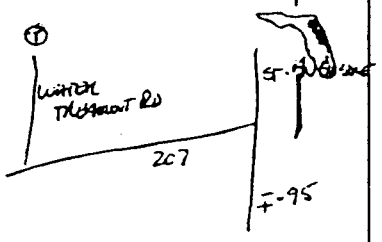
[ ] Centrifugal [ ] Jet [ ] Submersible

[ ] Turbine

Horsepower _____ Capacity _____ G.P.M. _____

Pump Depth _____ Ft. Intake Depth _____ Ft.

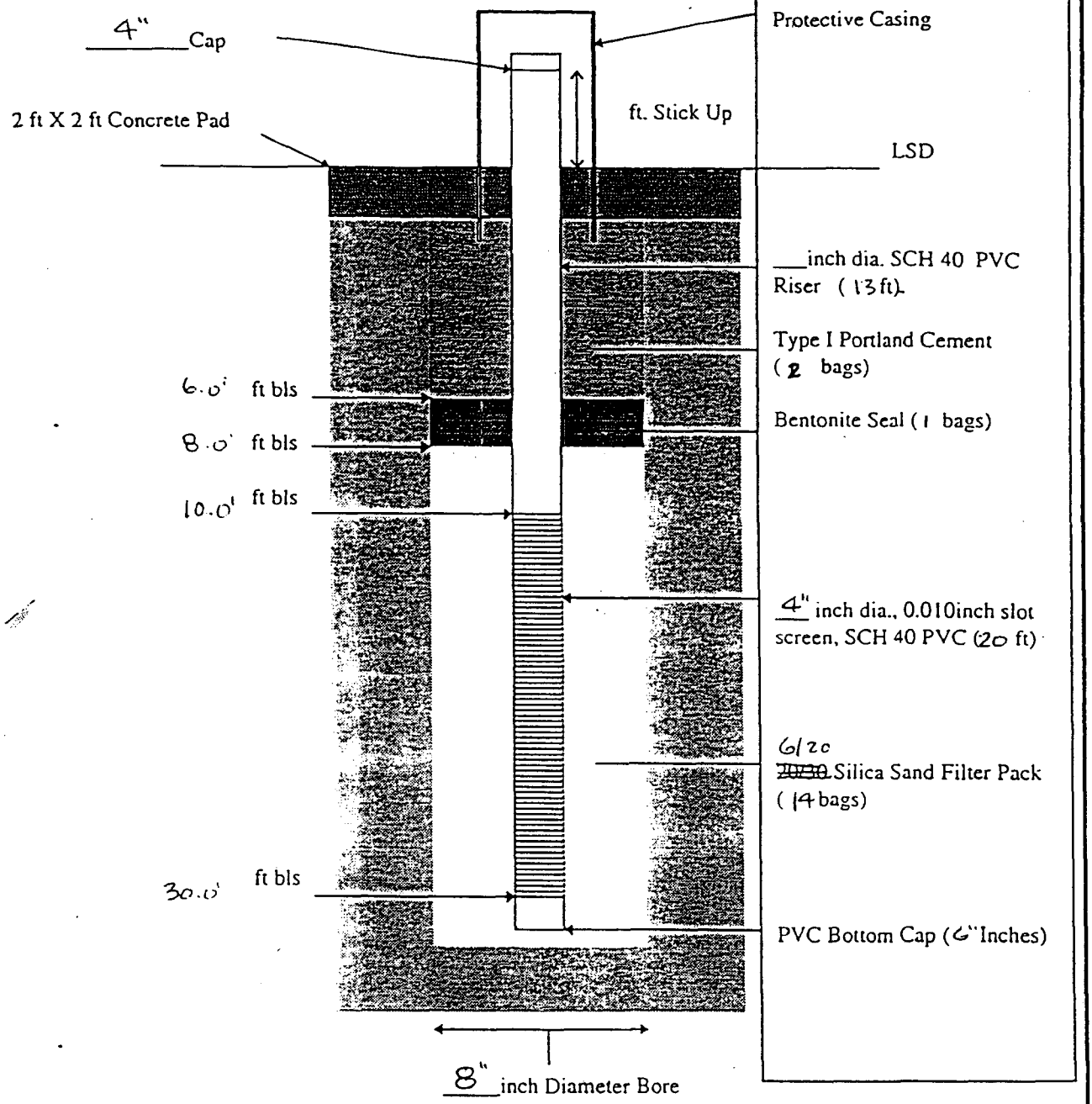
Sketch of well location on property N



Give distances from septic tank and house or other reference points

☐ Open Hole ☒ Screen Casing Diameter & Depth (Ft.)	Depth (Ft.) From	To	DRILL CUTTINGS LOG Examine cutting every 20 ft. or at formation changes. Giv color, grain size, and type of material. Not cavities, depth to producing zones.
Diameter 4"	0.0		DC Bx. Gi. F.S.
From 0.0		22.0'	
To 40.0	22.0		Thin F/m Sands
SCREEN		30.0'	
Diameter 4"			
From 10.0			
To 30.0'			
Liner ☐ or Casing ☐			
Diameter ___ ___			
From _____			
To _____			

Driller's Name: (print or type) EDWIN BROXTON



Project: ST. JOHNS CO. TILLMAN SITE

Project No: 96J 128

Well Completed: 9-16-97

Not To Scale

SJRWMD

Well Number: SJ-0289

WELL COMPLETION REPORT (Please complete in black ink or type)

PERMIT # # SJ-0289 CUP # _____ DID # _____

Number of wells drilled _____ /WUP # _____

Indicate remaining wells to be cancelled _____

(All wells drilled need an individual completion report)

WATER WELL CONTRACTOR'S

SIGNATURE Robert B. Hunt Jr. License # 2879

I certify that the information provided in this report is accurate and true.

Grout	No. of Bags	From (ft.)	To (ft.)
Neat Cement:	2	0.0	6.0
Bentonite:	1	6.0	8.0

WELL LOCATION: Site Address St John WTP County St Johns

Qtr: _____ Qtr: _____ Sec: 17 Twp: 7 S Rge: 27 E

Latitude 295226 Longitude 812457

DATE STAMP

Official Use Only

CHEMICAL ANALYSIS

Iron: ____ ppm Sulfate: ____ ppm

Chlorides: _____ppm

[ ] Lab Test [ ] Field Test Kit

Pump Type

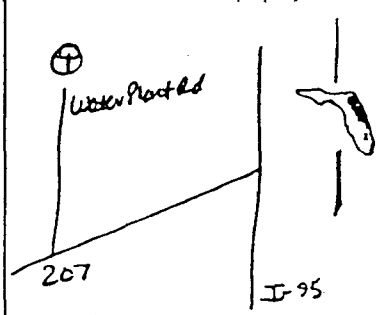
[ ] Centrifugal [ ] Jet [ ] Submersible

[ ] Turbine

Horsepower _____ Capacity _____ G.P.M. _____

Pump Depth _____ Ft. Intake Depth _____ Ft.

Sketch of well location on property N



Give distances from septic tank and house or other reference points

OWNER'S NAME St Johns River WTP Maint District

COMPLETION DATE 9-16-97 Florida Unique I.D. _____

WELL USE: DEP/Public _____ Irrigation _____ Domestic _____ Monitor X

HRS Limited _____ 62-524 _____ Other _____

DRILL METHOD [X] Rotary [ ] Cable Tool [ ] Combination

[ ] Jet [ ] Auger Other _____

Measured Static Water Level _____ Measured Pumping Water Level _____

After _____ Hours at _____ G.P.M. Measuring Pt. (Describe): _____

Which is ____ Ft. [ ] Above [ ] Below Land Surface

Casing: [ ] Black Steel [ ] Galv. [X] PVC Other _____

[ ] Open Hole [X] Screen	Depth (Ft.)		DRILL CUTTINGS LOG Examine cuttings every 20 ft. or at formation changes. Give color, grain size, and type of material. Note cavities, depth to producing zones.
Casing Diameter & Depth (Ft.)	From	To	
Diameter 4"	0.0		DK. BL. SI. FS.
From 0.0			
To 10.0'		22.0	
SCH 80			
Diameter 4"	22.0		TAN F.S.
From 10.0'			
To 20.0'		30.0'	
Liner [ ] or Casing [ ]			
Diameter ___ ___			
From _____			
To _____			

Driller's Name: (print or type) EDWIN BROOKER

APPENDIX C

Step-drawdown results at unconfined surficial aquifer well SJ-0288

Q	Time	Total Drawdown
15 gpm	15 min	4.07
~~15.8~~ 16	10 min	6.35
~~16.7~~ 17	10 min	7.65
~~27.3~~ 27	15 min	4.73

$T_{AV} = 2,098 \approx 2100$ gpd/ft

for $S = 0.22$

SJO 288

Depth to water = 6.45
@ 7:37

5 gal / 20 sec

7:40	Start	
7:43	3 min	11.13
7:45	5 min	10.72
7:47	7 min	10.69
7:48	8 min	10.66
7:50	10 min	10.62
7:55	15 min	10.52
	Chg Q	5 gal / 19 sec
7:58	3 min	12.89
8:00	5 min	12.78
8:02	7 min	12.74
8:05	10 min	12.80
	Chg Q	5 gal / 18 sec
8:07	2 min	13.70
8:10	5 min	14.02
8:12	7 min	14.10
8:15	10 min	14.10
	Chg Q	5 gal / 11 sec

SJo288

8:20	5 min	17.76
8:22	7 min.	18.16
8:25	10 min	18.11
8:30	15 min	18.18

8:50 Set Protective casing and
-9:15 cement pad (2x2')

Used 2 bags of concrete mix

2:05- Set Protective casing ~~and cement pad~~ for SJo284

4:30 Set cement pad (2x2') for SJo284

APPENDIX D

Pumping and recovery water levels for the aquifer performance test

St. Johns County Well Field Aquifer Test 01

Site Name: **St. Johns County Well Field**
Location: **Section 19 Township 7S Range 29E**
Test Date: **1-1-98**
Client: **St. Johns County Utility Department**
Project Number: **A021966**

Well Discharge Rate: 59690 ft^3/day 310 gpm
Storativity: 2.00E-04

Well Label:	PW-0286	OW-0284	OW-0285	OW-0288	OW-0289
Static Water Level (feet)	15.54	16.27	16.52	4.54	4.98
Distance to Obs Well:	0. meters	25 feet	71 feet	25 feet	71 feet
Aquifer Top to Screen Top:	0. meters	5 feet	5 feet	0. meters	0. meters
Aquifer Top to Screen Bottom:	35 feet	30 feet	30 feet	0. meters	0. meters
Aquifer Thickness:	35 feet				

There are 179 time and drawdown measurements
There are 93 pumping trials

Trial	Time (minutes)	Drawdown (feet) Obs Well 1	Obs Well 2	Obs Well 3	Obs Well 4	Obs Well 5
1	1	14.76	2.58	1.78		
2	2	14.90	3.14	2.28		
3	3	15.18	3.52	2.53		
4	4	15.51	3.72	2.83		
5	5	15.73	3.94	3.08		
6	6	15.90	4.10	3.38	0.02	
7	7	15.99	4.23	3.53	0.04	
8	8	16.13	4.35	3.68	0.05	
9	9	16.21	4.45	3.78	0.06	
10	10	16.27	4.52	3.90	0.06	
11	11	16.33	4.60	3.98	0.08	0.01
12	12	16.41	4.67	4.05	0.09	0.01
13	13	16.45	4.74	4.10	0.09	0.01
14	14	16.51	4.80	4.13	0.10	0.01
15	15	16.57	4.86	4.20	0.11	0.01
16	16		4.89	4.24	0.11	0.02
17	18		5.00	4.28	0.12	0.02
18	20	16.78	5.07	4.39	0.14	0.04
19	22		5.16	4.46	0.14	0.05
20	24		5.19	4.55	0.15	0.06
21	26		5.28	4.60	0.16	0.08
22	28		5.34	4.67	0.17	0.08
23	30	17.09	5.40	4.70	0.18	0.09
24	32		5.44	4.72	0.19	0.09
25	34		5.48	4.81	0.19	0.10
26	36		5.54	4.83	0.20	0.11
27	38		5.56	4.87	0.21	0.11
28	40	17.31	5.60	4.90	0.22	0.12

Trial	Time (minutes)	Drawdown (feet)				
		Obs Well 1	Obs Well 2	Obs Well 3	Obs Well 4	Obs Well 5
29	42		5.64	4.93	0.22	0.13
30	44		5.68	4.99	0.23	0.13
31	46		5.71	5.01	0.23	0.13
32	48		5.74	5.03	0.24	0.15
33	50	17.45	5.76	5.05	0.24	0.15
34	52		5.80	5.09	0.25	0.16
35	54		5.82	5.12	0.25	0.16
36	56		5.85	5.13	0.26	0.17
37	58		5.87	5.16	0.26	0.17
38	60	17.57	5.89	5.18	0.27	0.18
39	65		5.95	5.23	0.28	0.19
40	70		6.01	5.31	0.29	0.19
41	75		6.05	5.35	0.30	0.20
42	80		6.10	5.39	0.31	0.21
43	85		6.16	5.44	0.32	0.22
44	90	17.82	6.19	5.48	0.32	0.23
45	95		6.22	5.50	0.33	0.24
46	100		6.26	5.54	0.34	0.25
47	105		6.29	5.60	0.35	0.26
48	110		6.32	5.64	0.36	0.26
49	115		6.34	5.67	0.36	0.26
50	120	18.00	6.38	5.73	0.37	0.27
51	130		6.44	5.73	0.38	0.28
52	140		6.49	5.78	0.38	0.29
53	150	18.11	6.54	5.85	0.39	0.30
54	160		6.58	5.89	0.40	0.32
55	170		6.63	5.93	0.41	0.32
56	180	18.21	6.66	5.98	0.42	0.32
57	190		6.70	6.02	0.42	0.33
58	200		6.74	6.06	0.43	0.34
59	210	18.29	6.77	6.08	0.43	0.34
60	220		6.80	6.12	0.43	0.34
61	230		6.84	6.15	0.43	0.35
62	240	18.38	6.86	6.18	0.44	0.35
63	270	18.48	6.95	6.27	0.45	0.36
64	300	18.53	7.02	6.34	0.46	0.37
65	330		7.09	6.41	0.47	0.38
66	360	18.65	7.16	6.47	0.48	0.39
67	420	18.72	7.25	6.58	0.49	0.40
68	480	18.79	7.34	6.65	0.51	0.42
69	540	18.85	7.42	6.73	0.52	0.43
70	600	18.91	7.49	6.79	0.54	0.45
71	660	18.95	7.54	6.86	0.56	0.45
72	720	19.03	7.61	6.92	0.57	0.47
73	780	19.09	7.71	6.97	0.58	0.49
74	840	19.11	7.71	7.02	0.59	0.49

Trial	Time (minutes)	Drawdown (feet)				
		Obs Well 1	Obs Well 2	Obs Well 3	Obs Well 4	Obs Well 5
75	900	19.13	7.75	7.06	0.59	0.50
76	960	19.16	7.78	7.09	0.59	0.50
77	1020	19.18	7.82	7.13	0.60	0.50
78	1080	19.20	7.84	7.17	0.61	0.51
79	1140	19.21	7.87	7.19	0.61	0.52
80	1200	19.23	7.90	7.22	0.62	0.52
81	1260	19.23	7.92	7.24	0.62	0.52
82	1320	19.27	7.94	7.27	0.63	0.54
83	1380	19.27	7.97	7.28	0.64	0.55
84	1440	19.28	7.99	7.30	0.64	0.56
85	1800	19.16	8.07	7.38	0.65	0.57
86	2160	19.27	8.14	7.46	0.68	0.58
87	2520	19.34	8.18	7.50	0.69	0.59
88	2880	19.38	8.23	7.55	0.72	0.62
89	3360	19.42	8.28	7.60	0.73	0.64
90	3840	19.45	8.33	7.65	0.76	0.66
91	4320	19.46	8.35	7.67	0.78	0.69
92	4800	19.47	8.38	7.69	0.78	0.69
93	5280	19.47	8.43	7.73	0.83	0.79
94	5281	5.46	5.76	5.78	0.69	0.52
95	5282	4.83	5.02	4.73	0.76	0.57
96	5283	4.49	4.79	4.68	0.71	0.57
97	5284	4.25	4.60	4.58	0.70	0.57
98	5285	4.06	4.41	4.42	0.70	0.57
99	5286	3.89	4.26	4.28	0.68	0.56
100	5287	3.77	4.14	4.21	0.67	0.55
101	5288	3.66	4.04	4.13	0.65	0.54
102	5289	3.56	3.95	4.00	0.65	0.53
103	5290	3.48	3.84	3.91	0.64	0.52
104	5291	3.40	3.76	3.82	0.63	0.52
105	5292	3.33	3.69	3.74	0.62	0.51
106	5293	3.26	3.64	3.67	0.62	0.50
107	5294	3.20	3.58	3.60	0.61	0.49
108	5295	3.14	3.51	3.54	0.60	0.49
109	5296		3.46	3.50	0.60	0.47
110	5298		3.37	3.38	0.58	0.46
111	5300	2.91	3.30	3.30	0.57	0.46
112	5302		3.20	3.23	0.56	0.46
113	5304		3.14	3.15	0.55	0.45
114	5306		3.08	3.09	0.54	0.44
115	5308		3.03	2.99	0.54	0.44
116	5310	2.59	2.98	2.95	0.53	0.42
117	5312		2.92	2.91	0.52	0.41
118	5314		2.87	2.86	0.52	0.40
119	5316		2.83	2.82	0.51	0.40
120	5318		2.79	2.76	0.51	0.39

Trial	Time (minutes)	Drawdown (feet)				
		Obs Well 1	Obs Well 2	Obs Well 3	Obs Well 4	Obs Well 5
121	5320	2.38	2.75	2.73	0.50	0.39
122	5322		2.72	2.70	0.50	0.39
123	5324		2.69	2.66	0.49	0.38
124	5326		2.65	2.62	0.49	0.37
125	5328		2.62	2.60	0.48	0.37
126	5330	2.21	2.59	2.58	0.48	0.37
127	5332		2.56	2.54	0.47	0.36
128	5334		2.53	2.50	0.47	0.36
129	5336		2.51	2.48	0.46	0.35
130	5338		2.48	2.45	0.46	0.35
131	5340	2.07	2.46	2.43	0.45	0.34
132	5345	2.14	2.40	2.38	0.45	0.33
133	5350		2.34	2.32	0.44	0.32
134	5355		2.30	2.28	0.43	0.32
135	5360		2.24	2.23	0.42	0.31
136	5365		2.19	2.19	0.41	0.30
137	5370	1.78	2.17	2.14	0.41	0.30
138	5375		2.13	2.11	0.40	0.29
139	5380		2.09	2.08	0.40	0.29
140	5385		2.05	2.04	0.40	0.28
141	5390		2.03	2.00	0.40	0.28
142	5395		1.99	1.97	0.39	0.27
143	5400	1.58	1.97	1.93	0.38	0.27
144	5410		1.89	1.89	0.38	0.26
145	5420		1.84	1.83	0.37	0.26
146	5430	1.42	1.80	1.78	0.35	0.25
147	5440		1.76	1.75	0.35	0.24
148	5450		1.72	1.70	0.34	0.23
149	5460	1.30	1.68	1.64	0.33	0.22
150	5470		1.64	1.61	0.33	0.21
151	5480		1.60	1.59	0.32	0.21
152	5490	1.19	1.56	1.55	0.32	0.20
153	5500		1.53	1.52	0.31	0.20
154	5510		1.51	1.49	0.31	0.20
155	5520	1.10	1.48	1.46	0.30	0.19
156	5550	1.01	1.38	1.38	0.28	0.17
157	5580	0.96	1.32	1.33	0.27	0.15
158	5610		1.25	1.24	0.25	0.14
159	5640	0.81	1.20	1.19	0.24	0.14
160	5700	0.71	1.09	1.08	0.23	0.12
161	5760	0.61	0.99	0.99	0.21	0.10
162	5820	0.56	0.91	0.91	0.21	0.08
163	5880	0.46	0.84	0.81	0.19	0.07
164	5940	0.41	0.78	0.76	0.17	0.06
165	6000	0.33	0.72	0.70	0.16	0.05
166	6060	0.27	0.66	0.64	0.15	0.04

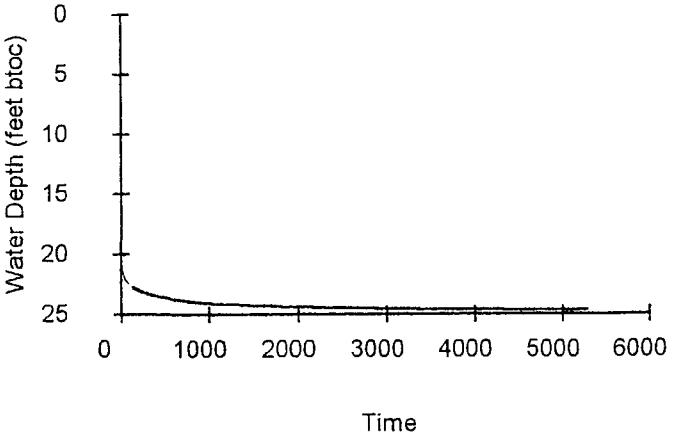
Trial	Time (minutes)	Drawdown (feet)				
		Obs Well 1	Obs Well 2	Obs Well 3	Obs Well 4	Obs Well 5
167	6120	0.24	0.62	0.59	0.14	0.04
168	6180	0.19	0.58	0.55	0.13	0.02
169	6240	0.16	0.53	0.51	0.12	0.02
170	6300	0.12	0.50	0.47	0.12	0.02
171	6360	0.80	0.46	0.43	0.12	0.01
172	6420	0.05	0.43	0.40	0.12	0.01
173	6480	0.02	0.39	0.37	0.11	0.01
174	6540		0.36	0.34	0.11	0.01
175	6600		0.34	0.32	0.11	0.02
176	6660		0.31	0.28	0.11	0.02
177	6720		0.29	0.27	0.11	0.02
178	7080		0.28	0.19	0.04	
179	7440		0.09	0.11	0.05	

APPENDIX E

Aquifer performance test analyses for well OW-0284 [SJ-0284]

Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C
Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Done By: H2O Systems
Date Started: 12/19/97 | Notes:

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (feet):	16.27
Riser Pipe Diameter (feet):	0.333
Initial Test Depth Value (ft.):	16.27
TOC Elevation (feet):	100
Aquifer to Well Intake Top(ft):	0.00
Aquifer to Piez. Intake Top(ft):	0.00
Aq. to Piez. Intake Bottom(ft):	0.00
Thickness of Aquifer (feet):	30
Intake/Pack Diameter (feet):	0.333
Intake/Pack Length (feet):	30
Saturat. Col. Thickness (ft.):	30
Distance to Pumping Well(ft.):	25
Pumping Rate (ft^3/min):	41.4



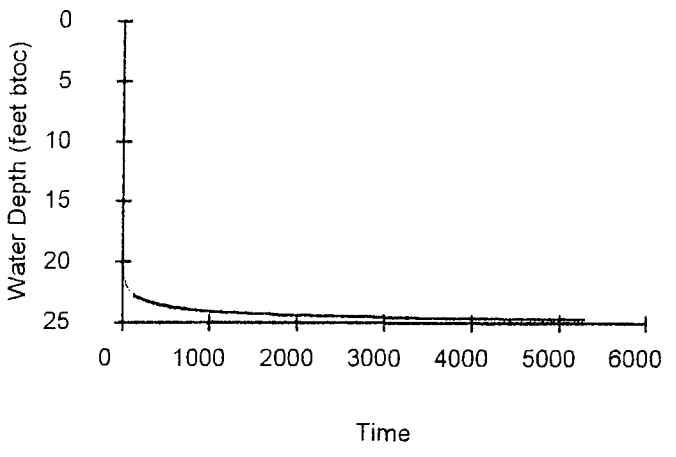
AQUIFER TIME/DRAWDOWN DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
42	21.910039	1140	24.141119				
44	21.949411	1200	24.170648				
46	21.97894	1260	24.190334				
48	22.01175	1320	24.21002				
50	22.031436	1380	24.239549				
52	22.070808	1440	24.259235				
54	22.090494	1800	24.34126				
56	22.120023	2160	24.410161				
58	22.139709	2520	24.449533				
60	22.159395	2880	24.502029				
65	22.221734	3360	24.551244				
70	22.280792	3840	24.600459				
75	22.320164	4320	24.620145				
80	22.369379	4800	24.649674				
85	22.431718	5280	24.698889				
90	22.461247						
95	22.490776						
100	22.530148						
105	22.559677						
110	22.589206						
115	22.608892						
120	22.651545						

PUMP TEST DATA ENTRY FORM

Client Name:	St. Johns County	Well Number:	OW-0284	Test Type:	Pump Test
Project No.:	6334-13658-042	Topo. Elev.:	42 feet	Weather:	See Appendix C
Project Name:	Tillman Ridge APT	Analysis By:	L. Wiseman	Done By:	H2O Systems
Date Started:	12/19/97	Notes:			

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (feet):	16.27
Riser Pipe Diameter (feet):	0.333
Initial Test Depth Value (ft.):	16.27
TOC Elevation (feet):	100
Aquifer to Well Intake Top(ft):	0.00
Aquifer to Piez. Intake Top(ft):	0.00
Aq. to Piez. Intake Bottom(ft):	0.00
Thickness of Aquifer (feet):	30
Intake/Pack Diameter (feet):	0.333
Intake/Pack Length (feet):	30
Saturat. Col. Thickness (ft.):	30
Distance to Pumping Well(ft.):	25
Pumping Rate (ft^3/min):	41.4



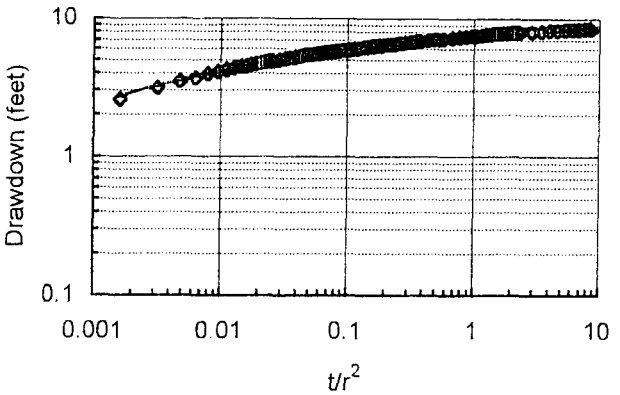
AQUIFER TIME/DRAWDOWN DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
1	18.8501784	130	22.710603				
2	19.4102451	140	22.759818				
3	19.790513	150	22.809033				
4	19.990654	160	22.851686				
5	20.210481	170	22.900901				
6	20.37125	180	22.93043				
7	20.499209	190	22.969802				
8	20.620606	200	23.009174				
9	20.719036	210	23.041984				
10	20.791218	220	23.071513				
11	20.869962	230	23.110885				
12	20.938863	240	23.130571				
13	21.011045	270	23.219158				
14	21.070103	300	23.29134				
15	21.129161	330	23.360241				
16	21.15869	360	23.429142				
18	21.270244	420	23.52101				
20	21.339145	480	23.609597				
22	21.431013	540	23.691622				
24	21.460542	600	23.760523				
26	21.549129	660	23.809738				
28	21.611468	720	23.88192				
30	21.670526	780	23.98035				
32	21.709898	840	23.98035				
34	21.74927	900	24.019722				
36	21.811609	960	24.049251				
38	21.831295	1020	24.091904				
40	21.870667	1080	24.11159				

Theis' Method for Calculating Storage and Transmissivity

Project Name:	Tillman Ridge APT	Project No.:	6334-13658-042
Client Name:	St. Johns County	Run Date:	5/15/98
Analysis By:	L. Wiseman		
Identification:	OW-0284		

Distance (r):	25	feet
Quantity (Q):	41.4	ft^3/min
Starting Level:	16.27	feet
Unconf. Correct.:	N	Y or N
Output Units:	3	1 to 9
Line Fit Start No.:	3	Min 1 to
Line Fit End No.:	34	Max 93
Transmissivity:	5.95E+03	ft^2/day
Storage:	5.18E-04	
Error of Fit:	0.0201	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	t/r^2	Predicted Drawdown feet	Weight Factor
1)	1.00	18.85	2.58	1.60E-03	2.69	0
2)	2.00	19.41	3.14	3.20E-03	3.23	1
3)	3.00	19.79	3.52	4.80E-03	3.55	1
4)	4.00	19.99	3.72	6.40E-03	3.78	1
5)	5.00	20.21	3.94	8.00E-03	3.96	1
6)	6.00	20.37	4.10	9.60E-03	4.10	1
7)	7.00	20.50	4.23	1.12E-02	4.23	1
8)	8.00	20.62	4.35	1.28E-02	4.33	1
9)	9.00	20.72	4.45	1.44E-02	4.43	1
10)	10.00	20.79	4.52	1.60E-02	4.51	1
11)	11.00	20.87	4.60	1.76E-02	4.59	1
12)	12.00	20.94	4.67	1.92E-02	4.66	1
13)	13.00	21.01	4.74	2.08E-02	4.72	1
14)	14.00	21.07	4.80	2.24E-02	4.78	1
15)	15.00	21.13	4.86	2.40E-02	4.83	1
16)	16.00	21.16	4.89	2.56E-02	4.88	1
17)	18.00	21.27	5.00	2.88E-02	4.98	1
18)	20.00	21.34	5.07	3.20E-02	5.06	1
19)	22.00	21.43	5.16	3.52E-02	5.14	1
20)	24.00	21.46	5.19	3.84E-02	5.21	1
21)	26.00	21.55	5.28	4.16E-02	5.27	1
22)	28.00	21.61	5.34	4.48E-02	5.33	1
23)	30.00	21.67	5.40	4.80E-02	5.38	1
24)	32.00	21.71	5.44	5.12E-02	5.44	1
25)	34.00	21.75	5.48	5.44E-02	5.48	1
26)	36.00	21.81	5.54	5.76E-02	5.53	1
27)	38.00	21.83	5.56	6.08E-02	5.57	1
28)	40.00	21.87	5.60	6.40E-02	5.61	1
29)	42.00	21.91	5.64	6.72E-02	5.65	1
30)	44.00	21.95	5.68	7.04E-02	5.69	1

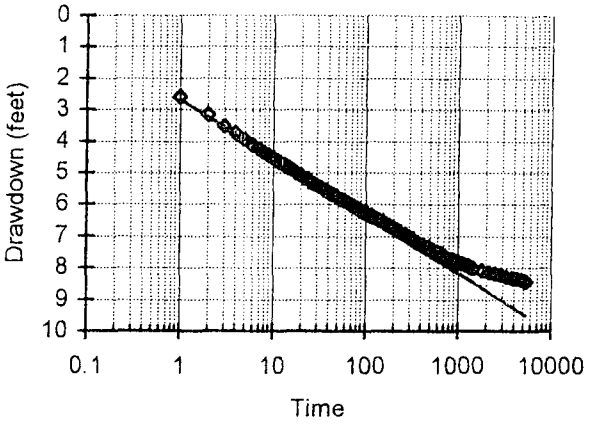
31)	46.00	21.98	5.71	7.36E-02	5.72	1
32)	48.00	22.01	5.74	7.68E-02	5.76	1
33)	50.00	22.03	5.76	8.00E-02	5.79	1
34)	52.00	22.07	5.80	8.32E-02	5.82	1
35)	54.00	22.09	5.82	8.64E-02	5.85	1
36)	56.00	22.12	5.85	8.96E-02	5.88	1
37)	58.00	22.14	5.87	9.28E-02	5.91	1
38)	60.00	22.16	5.89	9.60E-02	5.94	1
39)	65.00	22.22	5.95	1.04E-01	6.00	1
40)	70.00	22.28	6.01	1.12E-01	6.06	1
41)	75.00	22.32	6.05	1.20E-01	6.11	1
42)	80.00	22.37	6.10	1.28E-01	6.17	1
43)	85.00	22.43	6.16	1.36E-01	6.21	1
44)	90.00	22.46	6.19	1.44E-01	6.26	1
45)	95.00	22.49	6.22	1.52E-01	6.30	1
46)	100.00	22.53	6.26	1.60E-01	6.34	1
47)	105.00	22.56	6.29	1.68E-01	6.38	1
48)	110.00	22.59	6.32	1.76E-01	6.42	1
49)	115.00	22.61	6.34	1.84E-01	6.45	1
50)	120.00	22.65	6.38	1.92E-01	6.49	1
51)	130.00	22.71	6.44	2.08E-01	6.55	1
52)	140.00	22.76	6.49	2.24E-01	6.61	1
53)	150.00	22.81	6.54	2.40E-01	6.67	1
54)	160.00	22.85	6.58	2.56E-01	6.72	1
55)	170.00	22.90	6.63	2.72E-01	6.77	1
56)	180.00	22.93	6.66	2.88E-01	6.81	1
57)	190.00	22.97	6.70	3.04E-01	6.85	1
58)	200.00	23.01	6.74	3.20E-01	6.90	1
59)	210.00	23.04	6.77	3.36E-01	6.93	1
60)	220.00	23.07	6.80	3.52E-01	6.97	1
61)	230.00	23.11	6.84	3.68E-01	7.01	1
62)	240.00	23.13	6.86	3.84E-01	7.04	1
63)	270.00	23.22	6.95	4.32E-01	7.13	1
64)	300.00	23.29	7.02	4.80E-01	7.22	1
65)	330.00	23.36	7.09	5.28E-01	7.29	1
66)	360.00	23.43	7.16	5.76E-01	7.36	1
67)	420.00	23.52	7.25	6.72E-01	7.49	1
68)	480.00	23.61	7.34	7.68E-01	7.59	1
69)	540.00	23.69	7.42	8.64E-01	7.69	1
70)	600.00	23.76	7.49	9.60E-01	7.77	1
71)	660.00	23.81	7.54	1.06E+00	7.85	1
72)	720.00	23.88	7.61	1.15E+00	7.92	1
73)	780.00	23.98	7.71	1.25E+00	7.98	1
74)	840.00	23.98	7.71	1.34E+00	8.04	1
75)	900.00	24.02	7.75	1.44E+00	8.09	1
76)	960.00	24.05	7.78	1.54E+00	8.15	1
77)	1020.00	24.09	7.82	1.63E+00	8.19	1
78)	1080.00	24.11	7.84	1.73E+00	8.24	1
79)	1140.00	24.14	7.87	1.82E+00	8.28	1

80)	1200.00	24.17	7.90	1.92E+00	8.32	1
81)	1260.00	24.19	7.92	2.02E+00	8.36	1
82)	1320.00	24.21	7.94	2.11E+00	8.40	1
83)	1380.00	24.24	7.97	2.21E+00	8.43	1
84)	1440.00	24.26	7.99	2.30E+00	8.47	1
85)	1800.00	24.34	8.07	2.88E+00	8.65	1
86)	2160.00	24.41	8.14	3.46E+00	8.79	1
87)	2520.00	24.45	8.18	4.03E+00	8.91	1
88)	2880.00	24.50	8.23	4.61E+00	9.02	1
89)	3360.00	24.55	8.28	5.38E+00	9.14	1
90)	3840.00	24.60	8.33	6.14E+00	9.25	1
91)	4320.00	24.62	8.35	6.91E+00	9.34	1
92)	4800.00	24.65	8.38	7.68E+00	9.43	1
93)	5280.00	24.70	8.43	8.45E+00	9.50	1

Jacob's Method for Calculating Storage and Transmissivity

Project Name: Tillman Ridge APT
Project No.: 6334-13658-042
Client Name: St. Johns County
Run Date: 5/15/98
Analysis By: L. Wiseman
Identification: OW-0284

Radius (r):	25	feet
Starting Level:	16.27	feet
Pump Rate:	41.4	ft^3/min
Partial Penetration:	N	Y or N
Specify Output Units:	3	1 to 9
Unconfined Correct.:	N	Y or N
Line Fit Start No.:	8	Min 1 to
Line Fit End No.:	19	Max 93
Transmissivity:	5.96E+03	ft^2/day
Storage:	5.03E-04	
Error of Fit:	0.0005	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	Calculated Drawdown feet	Specify U Value for min. time
1)	1.00	18.85	2.58	2.70	0.05
2)	2.00	19.41	3.14	3.25	Min. T for U<0.05:
3)	3.00	19.79	3.52	3.57	0.38
4)	4.00	19.99	3.72	3.80	minutes
5)	5.00	20.21	3.94	3.98	
6)	6.00	20.37	4.10	4.12	
7)	7.00	20.50	4.23	4.24	
8)	8.00	20.62	4.35	4.35	
9)	9.00	20.72	4.45	4.44	
10)	10.00	20.79	4.52	4.53	
11)	11.00	20.87	4.60	4.60	
12)	12.00	20.94	4.67	4.67	
13)	13.00	21.01	4.74	4.74	
14)	14.00	21.07	4.80	4.80	
15)	15.00	21.13	4.86	4.85	
16)	16.00	21.16	4.89	4.90	
17)	18.00	21.27	5.00	5.00	
18)	20.00	21.34	5.07	5.08	
19)	22.00	21.43	5.16	5.15	
20)	24.00	21.46	5.19	5.22	
21)	26.00	21.55	5.28	5.29	
22)	28.00	21.61	5.34	5.35	
23)	30.00	21.67	5.40	5.40	
24)	32.00	21.71	5.44	5.45	
25)	34.00	21.75	5.48	5.50	
26)	36.00	21.81	5.54	5.55	
27)	38.00	21.83	5.56	5.59	
28)	40.00	21.87	5.60	5.63	
29)	42.00	21.91	5.64	5.67	
30)	44.00	21.95	5.68	5.71	
31)	46.00	21.98	5.71	5.74	
32)	48.00	22.01	5.74	5.78	
33)	50.00	22.03	5.76	5.81	

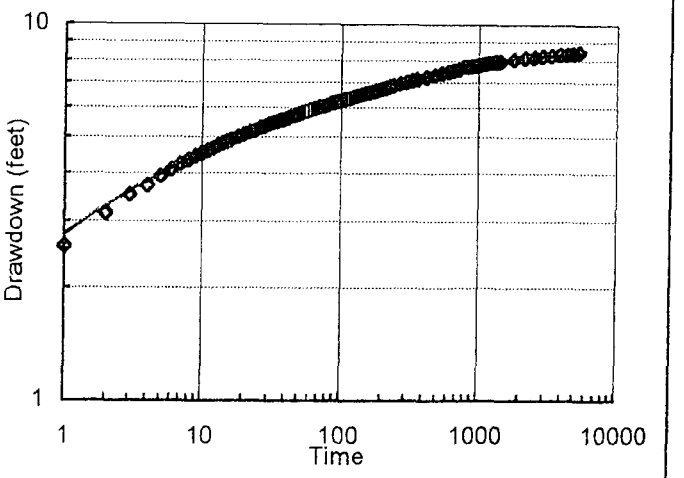
34)	52.00	22.07	5.80	5.84	
35)	54.00	22.09	5.82	5.87	
36)	56.00	22.12	5.85	5.90	
37)	58.00	22.14	5.87	5.93	
38)	60.00	22.16	5.89	5.95	
39)	65.00	22.22	5.95	6.02	
40)	70.00	22.28	6.01	6.08	
41)	75.00	22.32	6.05	6.13	
42)	80.00	22.37	6.10	6.18	
43)	85.00	22.43	6.16	6.23	
44)	90.00	22.46	6.19	6.28	
45)	95.00	22.49	6.22	6.32	
46)	100.00	22.53	6.26	6.36	
47)	105.00	22.56	6.29	6.40	
48)	110.00	22.59	6.32	6.44	
49)	115.00	22.61	6.34	6.47	
50)	120.00	22.65	6.38	6.50	
51)	130.00	22.71	6.44	6.57	
52)	140.00	22.76	6.49	6.63	
53)	150.00	22.81	6.54	6.68	
54)	160.00	22.85	6.58	6.73	
55)	170.00	22.90	6.63	6.78	
56)	180.00	22.93	6.66	6.83	
57)	190.00	22.97	6.70	6.87	
58)	200.00	23.01	6.74	6.91	
59)	210.00	23.04	6.77	6.95	
60)	220.00	23.07	6.80	6.99	
61)	230.00	23.11	6.84	7.02	
62)	240.00	23.13	6.86	7.06	
63)	270.00	23.22	6.95	7.15	
64)	300.00	23.29	7.02	7.23	
65)	330.00	23.36	7.09	7.31	
66)	360.00	23.43	7.16	7.38	
67)	420.00	23.52	7.25	7.50	
68)	480.00	23.61	7.34	7.61	
69)	540.00	23.69	7.42	7.70	
70)	600.00	23.76	7.49	7.78	
71)	660.00	23.81	7.54	7.86	
72)	720.00	23.88	7.61	7.93	
73)	780.00	23.98	7.71	7.99	
74)	840.00	23.98	7.71	8.05	
75)	900.00	24.02	7.75	8.11	
76)	960.00	24.05	7.78	8.16	
77)	1020.00	24.09	7.82	8.21	
78)	1080.00	24.11	7.84	8.25	
79)	1140.00	24.14	7.87	8.30	
80)	1200.00	24.17	7.90	8.34	
81)	1260.00	24.19	7.92	8.37	
82)	1320.00	24.21	7.94	8.41	
83)	1380.00	24.24	7.97	8.45	
84)	1440.00	24.26	7.99	8.48	
85)	1800.00	24.34	8.07	8.66	
86)	2160.00	24.41	8.14	8.80	
87)	2520.00	24.45	8.18	8.93	

88)	2880.00	24.50	8.23	9.03	
89)	3360.00	24.55	8.28	9.16	
90)	3840.00	24.60	8.33	9.26	
91)	4320.00	24.62	8.35	9.36	
92)	4800.00	24.65	8.38	9.44	
93)	5280.00	24.70	8.43	9.51	

Walton's Method for Calculating Storage and Transmissivity

Project Name: Tillman Ridge APT
Project No.: 6334-13658-042
Client Name: St. Johns County
Run Date: 5/19/98
Analysis By: L. Wiseman
Identification: OW-0284

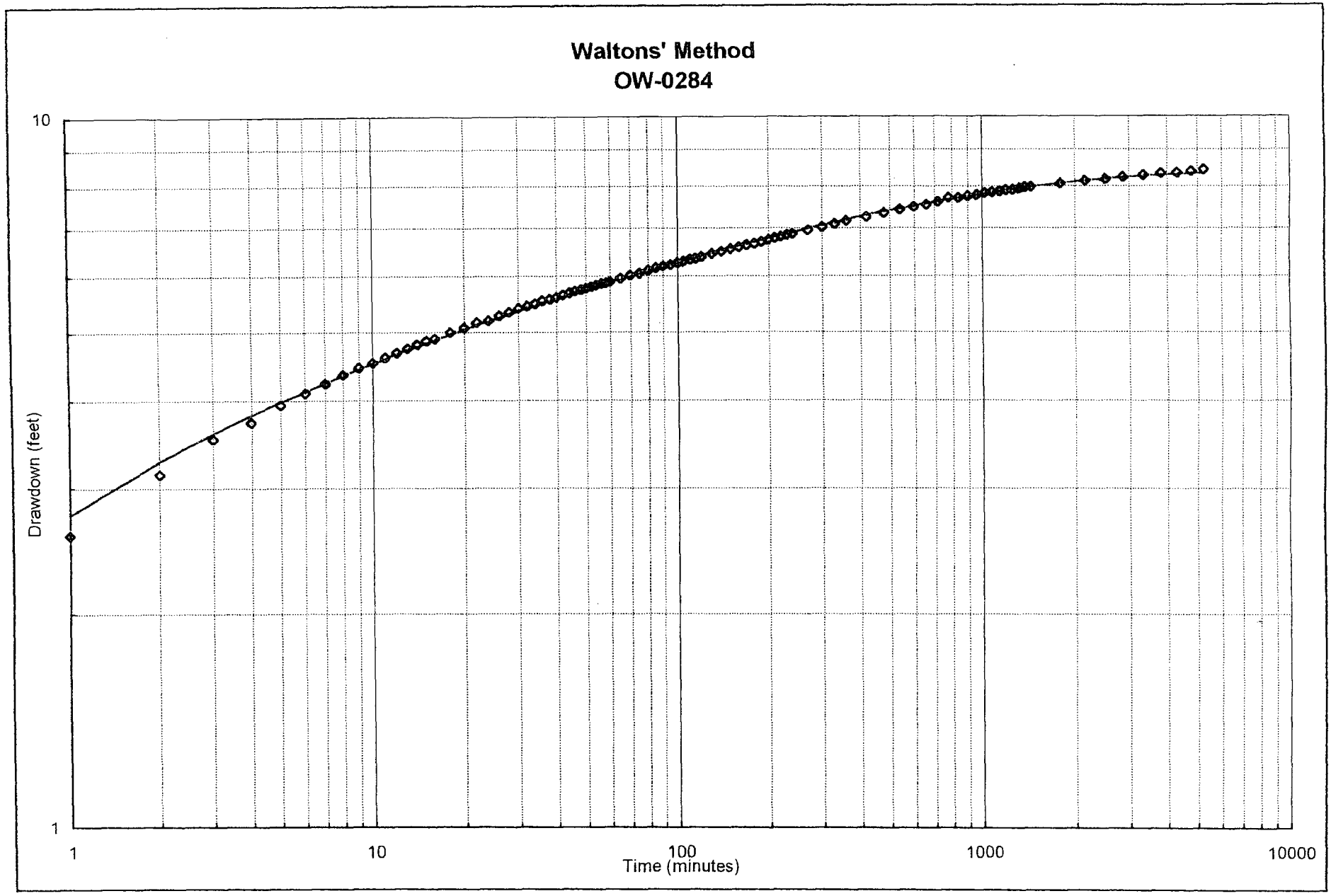
Distance (r):	25	feet
Quantity (Q):	41.4	ft^3/min
Starting Level:	16.27	feet
r/B ratio:	0.005	
Output Units:	3	1 to 9
Aquitard L(sat.):	5	feet
Aquitard K(v):	1.23E-03	ft/day
Storage	Transmissivity	
4.43E-04	6.14E+03	ft^2/day
Start & End Of Fit:	3	93
Error of Fit:	0.0295	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	Calc. Drawdown feet	Weight Factor
1)	1.00	18.85	2.58	2.75	1
2)	2.00	19.41	3.14	3.28	1
3)	3.00	19.79	3.52	3.59	1
4)	4.00	19.99	3.72	3.81	1
5)	5.00	20.21	3.94	3.98	1
6)	6.00	20.37	4.10	4.12	1
7)	7.00	20.50	4.23	4.24	1
8)	8.00	20.62	4.35	4.34	1
9)	9.00	20.72	4.45	4.44	1
10)	10.00	20.79	4.52	4.52	1
11)	11.00	20.87	4.60	4.59	1
12)	12.00	20.94	4.67	4.66	1
13)	13.00	21.01	4.74	4.72	1
14)	14.00	21.07	4.80	4.77	1
15)	15.00	21.13	4.86	4.83	1
16)	16.00	21.16	4.89	4.88	1
17)	18.00	21.27	5.00	4.97	1
18)	20.00	21.34	5.07	5.05	1
19)	22.00	21.43	5.16	5.12	1
20)	24.00	21.46	5.19	5.19	1
21)	26.00	21.55	5.28	5.25	1
22)	28.00	21.61	5.34	5.31	1
23)	30.00	21.67	5.40	5.36	1
24)	32.00	21.71	5.44	5.41	1
25)	34.00	21.75	5.48	5.45	1
26)	36.00	21.81	5.54	5.50	1
27)	38.00	21.83	5.56	5.54	1
28)	40.00	21.87	5.60	5.58	1
29)	42.00	21.91	5.64	5.61	1
30)	44.00	21.95	5.68	5.65	1
31)	46.00	21.98	5.71	5.68	1

32)	48.00	22.01	5.74	5.72	1
33)	50.00	22.03	5.76	5.75	1
34)	52.00	22.07	5.80	5.78	1
35)	54.00	22.09	5.82	5.81	1
36)	56.00	22.12	5.85	5.83	1
37)	58.00	22.14	5.87	5.86	1
38)	60.00	22.16	5.89	5.88	1
39)	65.00	22.22	5.95	5.95	1
40)	70.00	22.28	6.01	6.00	1
41)	75.00	22.32	6.05	6.05	1
42)	80.00	22.37	6.10	6.10	1
43)	85.00	22.43	6.16	6.15	1
44)	90.00	22.46	6.19	6.19	1
45)	95.00	22.49	6.22	6.23	1
46)	100.00	22.53	6.26	6.27	1
47)	105.00	22.56	6.29	6.30	1
48)	110.00	22.59	6.32	6.34	1
49)	115.00	22.61	6.34	6.37	1
50)	120.00	22.65	6.38	6.40	1
51)	130.00	22.71	6.44	6.46	1
52)	140.00	22.76	6.49	6.52	1
53)	150.00	22.81	6.54	6.57	1
54)	160.00	22.85	6.58	6.61	1
55)	170.00	22.90	6.63	6.66	1
56)	180.00	22.93	6.66	6.70	1
57)	190.00	22.97	6.70	6.74	1
58)	200.00	23.01	6.74	6.77	1
59)	210.00	23.04	6.77	6.81	1
60)	220.00	23.07	6.80	6.84	1
61)	230.00	23.11	6.84	6.87	1
62)	240.00	23.13	6.86	6.90	1
63)	270.00	23.22	6.95	6.99	1
64)	300.00	23.29	7.02	7.06	1
65)	330.00	23.36	7.09	7.12	1
66)	360.00	23.43	7.16	7.18	1
67)	420.00	23.52	7.25	7.29	1
68)	480.00	23.61	7.34	7.37	1
69)	540.00	23.69	7.42	7.45	1
70)	600.00	23.76	7.49	7.51	1
71)	660.00	23.81	7.54	7.57	1
72)	720.00	23.88	7.61	7.62	1
73)	780.00	23.98	7.71	7.67	1
74)	840.00	23.98	7.71	7.71	1
75)	900.00	24.02	7.75	7.75	1
76)	960.00	24.05	7.78	7.78	1
77)	1020.00	24.09	7.82	7.82	1
78)	1080.00	24.11	7.84	7.84	1
79)	1140.00	24.14	7.87	7.87	1
80)	1200.00	24.17	7.90	7.90	1
81)	1260.00	24.19	7.92	7.92	1
82)	1320.00	24.21	7.94	7.94	1
83)	1380.00	24.24	7.97	7.96	1
84)	1440.00	24.26	7.99	7.98	1

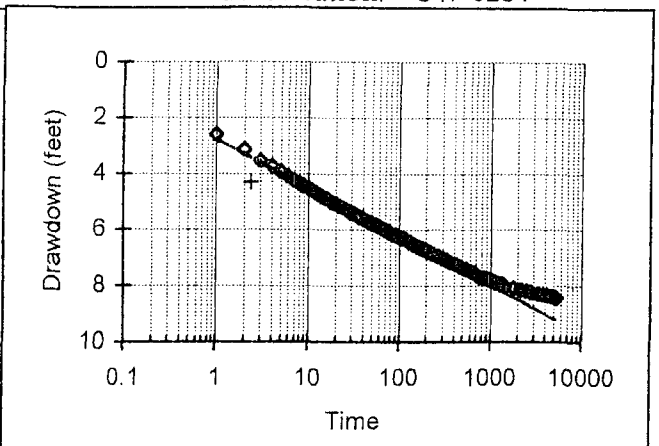
85)	1800.00	24.34	8.07	8.07	1
86)	2160.00	24.41	8.14	8.14	1
87)	2520.00	24.45	8.18	8.19	1
88)	2880.00	24.50	8.23	8.23	1
89)	3360.00	24.55	8.28	8.26	1
90)	3840.00	24.60	8.33	8.29	1
91)	4320.00	24.62	8.35	8.31	1
92)	4800.00	24.65	8.38	8.32	1
93)	5280.00	24.70	8.43	8.33	1


Waltons' Method
OW-0284
10
1
Drawdown (feet)
1
10
100
1000
10000
Time (minutes)

Hantush Inflection Point Method for Storage and Transmissivity

Project Name:	Tillman Ridge APT	Project No.:	6334-13658-042
Client Name:	St. Johns County	Run Date:	5/19/98
Analysis By:	L. Wiseman	Identification:	OW-0284

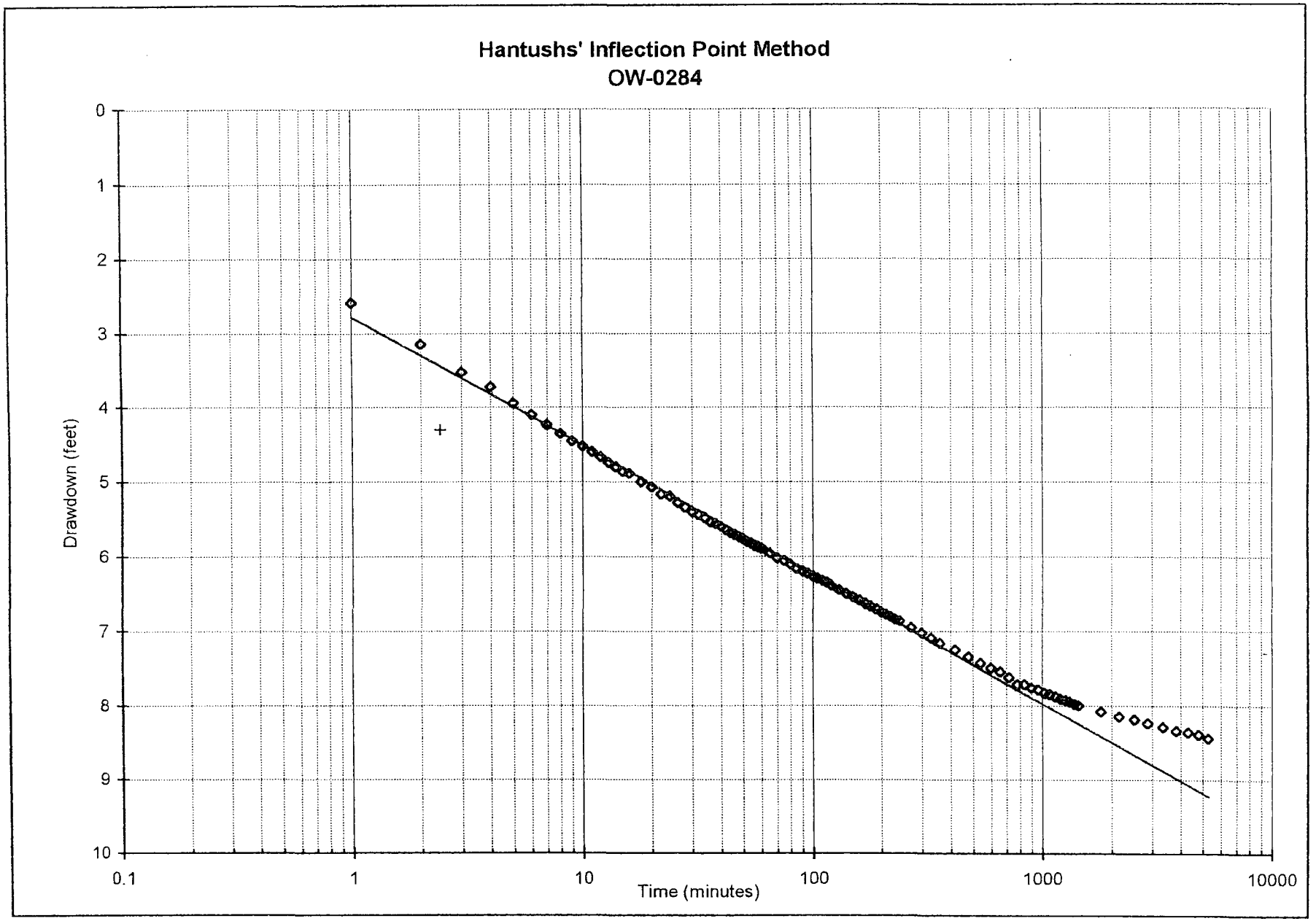
Radius (r):	25	feet
Starting Level:	16.27	feet
Pump Rate:	41.4	ft^3/min
Unconfined Correct.:	N	Y or N
Line Fit Start No.:	1	Min 1 to
Line Fit End No.:	70	Max 93
Output Units:	3	1 to 9
Max. Drawdown:	8.6	feet
Wedged Aquifer:	N	Y or N
Piez.->Well Angle:	0.00	degrees
Transmissivity:	6.28E+03	ft^2/day
Storage:	1.47E-04	



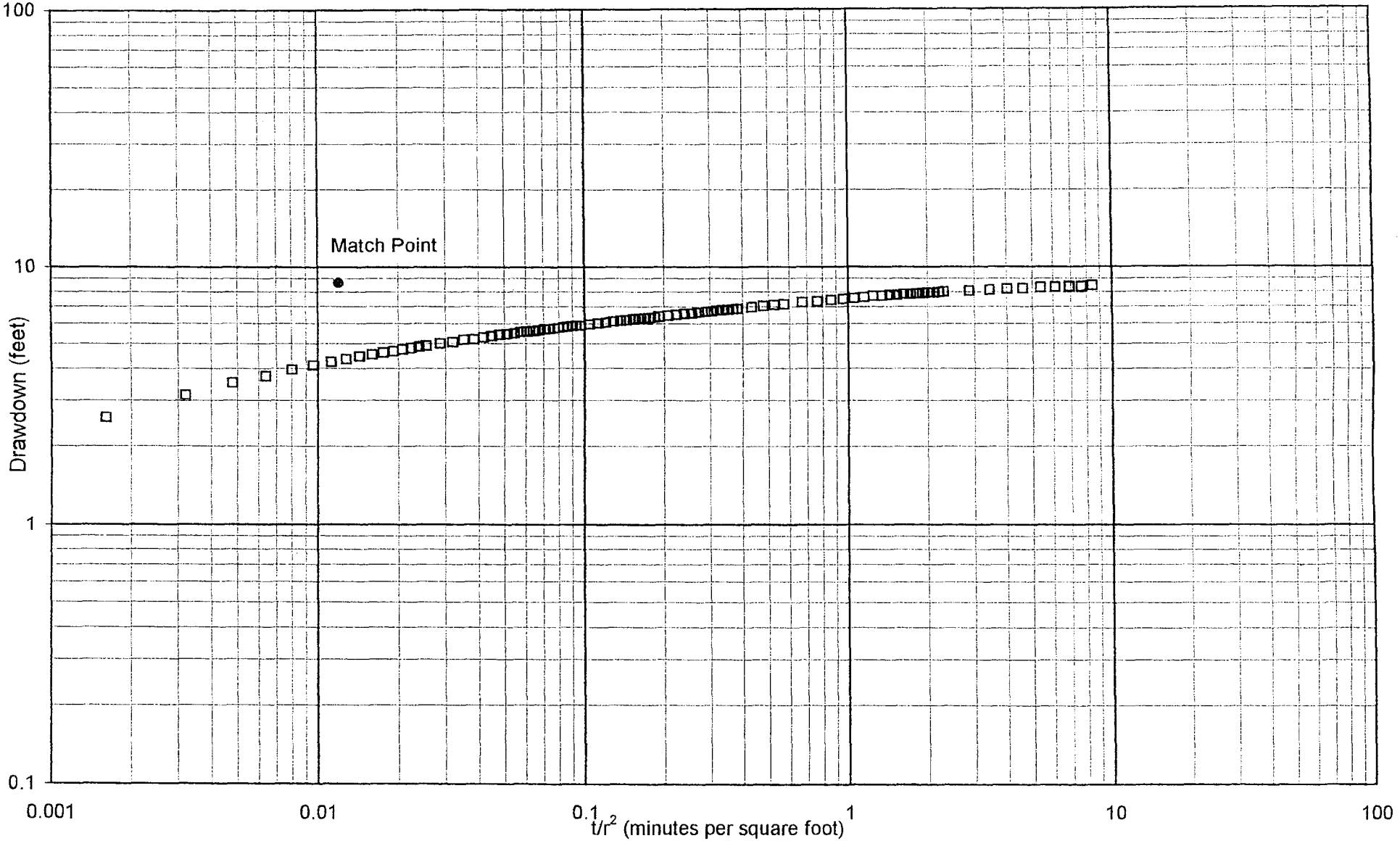
Meas. #	Time minutes	Field Meas. feet	Drawdown feet	Inflection Point:	4.3
				Calc. r/B ratio:	0.004
1)	1.00	18.85	2.58		
2)	2.00	19.41	3.14		
3)	3.00	19.79	3.52		
4)	4.00	19.99	3.72		
5)	5.00	20.21	3.94		
6)	6.00	20.37	4.10		
7)	7.00	20.50	4.23		
8)	8.00	20.62	4.35		
9)	9.00	20.72	4.45		
10)	10.00	20.79	4.52		
11)	11.00	20.87	4.60		
12)	12.00	20.94	4.67		
13)	13.00	21.01	4.74		
14)	14.00	21.07	4.80		
15)	15.00	21.13	4.86		
16)	16.00	21.16	4.89		
17)	18.00	21.27	5.00		
18)	20.00	21.34	5.07		
19)	22.00	21.43	5.16		
20)	24.00	21.46	5.19		
21)	26.00	21.55	5.28		
22)	28.00	21.61	5.34		
23)	30.00	21.67	5.40		
24)	32.00	21.71	5.44		
25)	34.00	21.75	5.48		
26)	36.00	21.81	5.54		
27)	38.00	21.83	5.56		
28)	40.00	21.87	5.60		
29)	42.00	21.91	5.64		
30)	44.00	21.95	5.68		
31)	46.00	21.98	5.71		
32)	48.00	22.01	5.74		

33)	50.00	22.03	5.76		
34)	52.00	22.07	5.80		
35)	54.00	22.09	5.82		
36)	56.00	22.12	5.85		
37)	58.00	22.14	5.87		
38)	60.00	22.16	5.89		
39)	65.00	22.22	5.95		
40)	70.00	22.28	6.01		
41)	75.00	22.32	6.05		
42)	80.00	22.37	6.10		
43)	85.00	22.43	6.16		
44)	90.00	22.46	6.19		
45)	95.00	22.49	6.22		
46)	100.00	22.53	6.26		
47)	105.00	22.56	6.29		
48)	110.00	22.59	6.32		
49)	115.00	22.61	6.34		
50)	120.00	22.65	6.38		
51)	130.00	22.71	6.44		
52)	140.00	22.76	6.49		
53)	150.00	22.81	6.54		
54)	160.00	22.85	6.58		
55)	170.00	22.90	6.63		
56)	180.00	22.93	6.66		
57)	190.00	22.97	6.70		
58)	200.00	23.01	6.74		
59)	210.00	23.04	6.77		
60)	220.00	23.07	6.80		
61)	230.00	23.11	6.84		
62)	240.00	23.13	6.86		
63)	270.00	23.22	6.95		
64)	300.00	23.29	7.02		
65)	330.00	23.36	7.09		
66)	360.00	23.43	7.16		
67)	420.00	23.52	7.25		
68)	480.00	23.61	7.34		
69)	540.00	23.69	7.42		
70)	600.00	23.76	7.49		
71)	660.00	23.81	7.54		
72)	720.00	23.88	7.61		
73)	780.00	23.98	7.71		
74)	840.00	23.98	7.71		
75)	900.00	24.02	7.75		
76)	960.00	24.05	7.78		
77)	1020.00	24.09	7.82		
78)	1080.00	24.11	7.84		
79)	1140.00	24.14	7.87		
80)	1200.00	24.17	7.90		
81)	1260.00	24.19	7.92		
82)	1320.00	24.21	7.94		
83)	1380.00	24.24	7.97		
84)	1440.00	24.26	7.99		
85)	1800.00	24.34	8.07		

86)	2160.00	24.41	8.14		
87)	2520.00	24.45	8.18		
88)	2880.00	24.50	8.23		
89)	3360.00	24.55	8.28		
90)	3840.00	24.60	8.33		
91)	4320.00	24.62	8.35		
92)	4800.00	24.65	8.38		
93)	5280.00	24.70	8.43		


Hantushs' Inflection Point Method
OW-0284
Drawdown (feet)
0
1
2
3
4
5
6
7
8
9
10
0.1
1
10
100
1000
10000
Time (minutes)

Coopers' Method for Calculating Transmissivity, Storage and Leakance
OW-0284



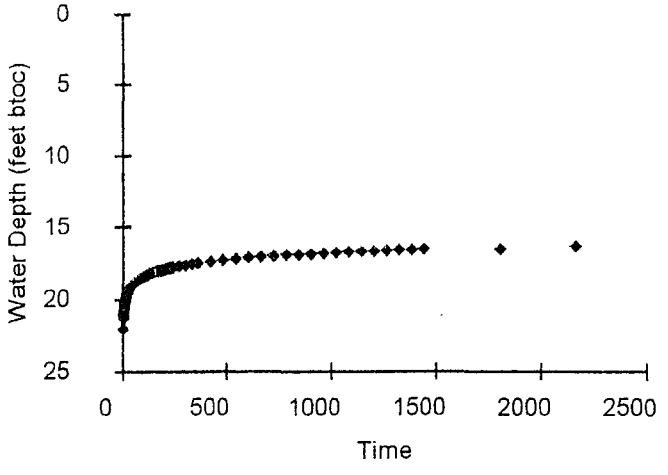
AQUIFER RECOVERY TEST DATA ENTRY FORM

Client Name: St. Johns County | Well Number: OW-0284 | Test Type: Recovery Test

Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C

Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Date Started: 1/1/98

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (ft.):	16.27
Riser Pipe Diameter (feet):	0.3333
Initial Depth Value (feet):	16.27
TOC Elevation (feet):	100
Intake/Pack Diameter (feet):	0.3333
Depth to Top of Pack (feet):	0
Pack/Intake Length (feet):	30
Saturated Aqu. Thickness (ft.):	30
Distance to Pumping Well (ft.):	25
Pumping Rate (ft^3/min):	41.4
Pumping Duration (min.):	5280



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
1	22.031436	130	18.160184				
2	21.28993	140	18.109985				
3	21.06026	150	18.069957				
4	20.869962	160	18.030257				
5	20.679664	170	17.990228				
6	20.528738	180	17.9502				
7	20.410622	190	17.910172				
8	20.308911	200	17.870144				
9	20.220324	210	17.830116				
10	20.10877	220	17.79993				
11	20.030026	230	17.780244				
12	19.961125	240	17.750059				
13	19.908629	270	17.649989				
14	19.849571	300	17.589946				
15	19.78067	330	17.520061				
16	19.731455	360	17.47019				
18	19.639587	420	17.359948				
20	19.570686	480	17.260206				
22	19.4702874	540	17.180149				
24	19.4102451	600	17.109936				
26	19.3502028	660	17.049894				
28	19.3003316	720	16.99018				
30	19.2501323	780	16.930137				
32	19.19009	840	16.890109				
34	19.1402188	900	16.850081				
36	19.1001906	960	16.799882				
38	19.0601624	1020	16.770024				

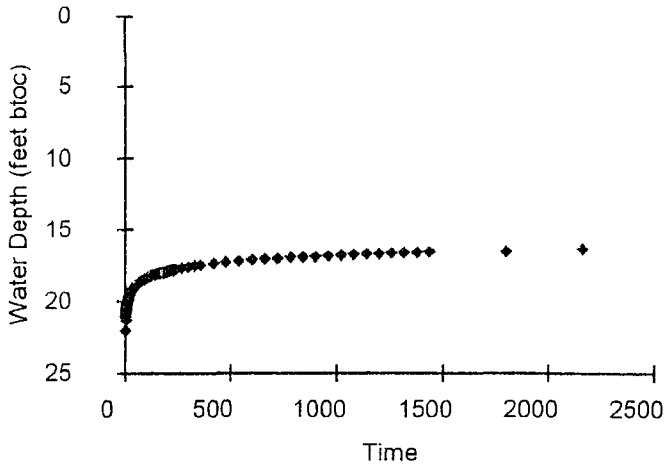
AQUIFER RECOVERY TEST DATA ENTRY FORM

Client Name: St. Johns County | Well Number: OW-0284 | Test Type: Recovery Test

Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C

Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Date Started: 1/1/98

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (ft.):	16.27
Riser Pipe Diameter (feet):	0.3333
Initial Depth Value (feet):	16.27
TOC Elevation (feet):	100
Intake/Pack Diameter (feet):	0.3333
Depth to Top of Pack (feet):	0
Pack/Intake Length (feet):	30
Saturated Aqu. Thickness (ft.):	30
Distance to Pumping Well (ft.):	25
Pumping Rate (ft^3/min):	41.4
Pumping Duration (min.):	5280



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
40	19.0201342	1080	16.729996				
42	18.9902771	1140	16.700139				
44	18.9600919	1200	16.660111				
46	18.9200637	1260	16.629926				
48	18.8902066	1320	16.609912				
50	18.8600214	1380	16.580022				
52	18.8301643	1440	16.560008				
54	18.8003072	1800	16.550033				
56	18.7802931	2160	16.359998				
58	18.7501079						
60	18.7300938						
65	18.6700515						
70	18.6100092						
75	18.569981						
80	18.5102668						
85	18.4600675						
90	18.4400534						
95	18.4000252						
100	18.359997						
105	18.3199688						
110	18.3002828						
115	18.2602546						
120	18.2402405						

Theis' Recovery Method for Calculating Transmissivity

Project Name: Tillman Ridge APT Project No.: 6334-13658-042

Client Name: St. Johns County

Analysis By: L. Wiseman

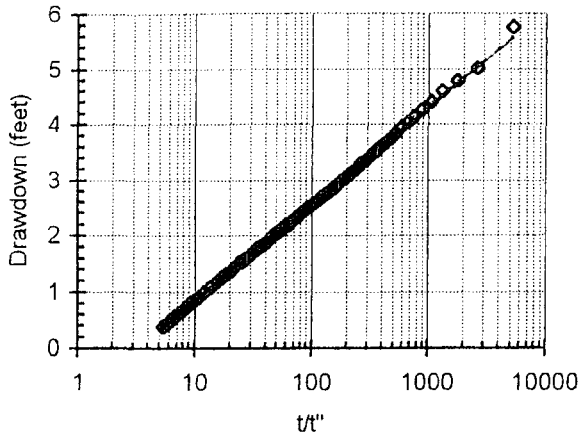
Run Date: 5/15/98

Identification: OW-0284

Pump Rate:	4.14E+01	ft^3/min
Pumping Duration:	5280	minutes
Static Water Level:	16.27	feet
Unconfined Correction:	N	Y or N
Starting No.:	4	Min 1 to
Ending No.:	80	Max 86
Output Units:	3	1 to 9

Calculated Transmissivity

Transmissivity:	6.31E+03	ft^2/day
Error of Fit:	0.0510	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	t/t"	Calc. Drawdown feet
1)	1.00	22.03	5.76	5281.0	5.55
2)	2.00	21.29	5.02	2641.0	5.03
3)	3.00	21.06	4.79	1761.0	4.72
4)	4.00	20.87	4.60	1321.0	4.51
5)	5.00	20.68	4.41	1057.0	4.34
6)	6.00	20.53	4.26	881.0	4.20
7)	7.00	20.41	4.14	755.3	4.09
8)	8.00	20.31	4.04	661.0	3.99
9)	9.00	20.22	3.95	587.7	3.90
10)	10.00	20.11	3.84	529.0	3.82
11)	11.00	20.03	3.76	481.0	3.75
12)	12.00	19.96	3.69	441.0	3.68
13)	13.00	19.91	3.64	407.2	3.62
14)	14.00	19.85	3.58	378.1	3.57
15)	15.00	19.78	3.51	353.0	3.52
16)	16.00	19.73	3.46	331.0	3.47
17)	18.00	19.64	3.37	294.3	3.38
18)	20.00	19.57	3.30	265.0	3.30
19)	22.00	19.47	3.20	241.0	3.23
20)	24.00	19.41	3.14	221.0	3.17
21)	26.00	19.35	3.08	204.1	3.11
22)	28.00	19.30	3.03	189.6	3.05
23)	30.00	19.25	2.98	177.0	3.00
24)	32.00	19.19	2.92	166.0	2.95
25)	34.00	19.14	2.87	156.3	2.90
26)	36.00	19.10	2.83	147.7	2.86
27)	38.00	19.06	2.79	139.9	2.82
28)	40.00	19.02	2.75	133.0	2.78
29)	42.00	18.99	2.72	126.7	2.75
30)	44.00	18.96	2.69	121.0	2.71
31)	46.00	18.92	2.65	115.8	2.68
32)	48.00	18.89	2.62	111.0	2.65
33)	50.00	18.86	2.59	106.6	2.62

34)	52.00	18.83	2.56	102.5	2.59
35)	54.00	18.80	2.53	98.8	2.56
36)	56.00	18.78	2.51	95.3	2.53
37)	58.00	18.75	2.48	92.0	2.51
38)	60.00	18.73	2.46	89.0	2.48
39)	65.00	18.67	2.40	82.2	2.42
40)	70.00	18.61	2.34	76.4	2.37
41)	75.00	18.57	2.30	71.4	2.32
42)	80.00	18.51	2.24	67.0	2.27
43)	85.00	18.46	2.19	63.1	2.22
44)	90.00	18.44	2.17	59.7	2.18
45)	95.00	18.40	2.13	56.6	2.14
46)	100.00	18.36	2.09	53.8	2.10
47)	105.00	18.32	2.05	51.3	2.07
48)	110.00	18.30	2.03	49.0	2.03
49)	115.00	18.26	1.99	46.9	2.00
50)	120.00	18.24	1.97	45.0	1.97
51)	130.00	18.16	1.89	41.6	1.91
52)	140.00	18.11	1.84	38.7	1.86
53)	150.00	18.07	1.80	36.2	1.81
54)	160.00	18.03	1.76	34.0	1.76
55)	170.00	17.99	1.72	32.1	1.71
56)	180.00	17.95	1.68	30.3	1.67
57)	190.00	17.91	1.64	28.8	1.63
58)	200.00	17.87	1.60	27.4	1.60
59)	210.00	17.83	1.56	26.1	1.56
60)	220.00	17.80	1.53	25.0	1.53
61)	230.00	17.78	1.51	24.0	1.50
62)	240.00	17.75	1.48	23.0	1.46
63)	270.00	17.65	1.38	20.6	1.38
64)	300.00	17.59	1.32	18.6	1.31
65)	330.00	17.52	1.25	17.0	1.24
66)	360.00	17.47	1.20	15.7	1.18
67)	420.00	17.36	1.09	13.6	1.07
68)	480.00	17.26	0.99	12.0	0.98
69)	540.00	17.18	0.91	10.8	0.89
70)	600.00	17.11	0.84	9.8	0.82
71)	660.00	17.05	0.78	9.0	0.76
72)	720.00	16.99	0.72	8.3	0.70
73)	780.00	16.93	0.66	7.8	0.65
74)	840.00	16.89	0.62	7.3	0.60
75)	900.00	16.85	0.58	6.9	0.56
76)	960.00	16.80	0.53	6.5	0.51
77)	1020.00	16.77	0.50	6.2	0.48
78)	1080.00	16.73	0.46	5.9	0.44
79)	1140.00	16.70	0.43	5.6	0.41
80)	1200.00	16.66	0.39	5.4	0.38
81)	1260.00	16.63	0.36	5.2	0.35
82)	1320.00	16.61	0.34	5.0	0.32
83)	1380.00	16.58	0.31	4.8	0.29
84)	1440.00	16.56	0.29	4.7	0.27
85)	1800.00	16.55	0.28	3.9	0.14
86)	2160.00	16.36	0.09	3.4	0.04

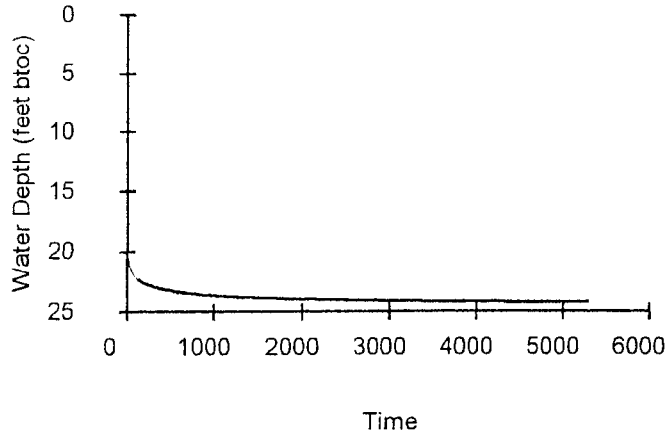
APPENDIX F

Aquifer performance test analyses for well OW-0285 [SJ-0285]

PUMP TEST DATA ENTRY FORM

Client Name:	St. Johns County	Well Number:	OW-0285	Test Type:	Pump Test
Project No.:	6334-13658-042	Topo. Elev.:	42 feet	Weather:	See Appendix C
Project Name:	Tillman Ridge APT	Analysis By:	L. Wiseman	Done By:	H_2O Systems
Date Started:	12/19/97	Notes:			

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (feet):	16.52
Riser Pipe Diameter (feet):	0.333
Initial Test Depth Value (ft.):	16.52
TOC Elevation (feet):	100
Aquifer to Well Intake Top(ft):	0.00
Aquifer to Piez. Intake Top(ft):	0.00
Aq. to Piez. Intake Bottom(ft):	0.00
Thickness of Aquifer (feet):	30
Intake/Pack Diameter (feet):	0.333
Intake/Pack Length (feet):	30
Saturat. Col. Thickness (ft.):	30
Distance to Pumping Well(ft.):	71
Pumping Rate (ft^3/min):	41.4



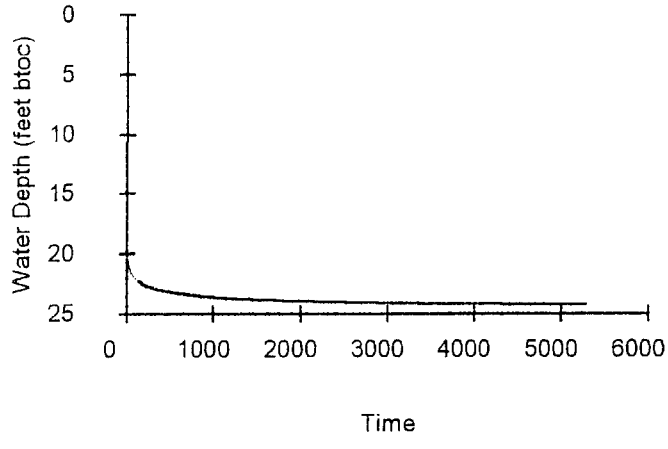
AQUIFER TIME/DRAWDOWN DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
1	18.3002706	130	22.251907				
2	18.800295	140	22.301122				
3	19.0503072	150	22.370023				
4	19.3501906	160	22.409395				
5	19.6002028	170	22.448767				
6	19.89943	180	22.501263				
7	20.050356	190	22.540635				
8	20.201282	200	22.580007				
9	20.299712	210	22.599693				
10	20.421109	220	22.639065				
11	20.499853	230	22.671875				
12	20.568754	240	22.701404				
13	20.62125	270	22.789991				
14	20.650779	300	22.858892				
15	20.71968	330	22.931074				
16	20.759052	360	22.990132				
18	20.801705	420	23.101686				
20	20.909978	480	23.170587				
22	20.978879	540	23.249331				
24	21.070747	600	23.31167				
26	21.119962	660	23.380571				
28	21.188863	720	23.439629				
30	21.221673	780	23.488844				
32	21.241359	840	23.54134				
34	21.329946	900	23.580712				
36	21.349632	960	23.610241				
38	21.389004	1020	23.649613				
40	21.421814	1080	23.688985				

PUMP TEST DATA ENTRY FORM

Client Name:	St. Johns County	Well Number:	OW-0285	Test Type:	Pump Test
Project No.:	6334-13658-042	Topo. Elev.:	42 feet	Weather:	See Appendix C
Project Name:	Tillman Ridge APT	Analysis By:	L. Wiseman	Done By:	H_2O Systems
Date Started:	12/19/97	Notes:			

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (feet):	16.52
Riser Pipe Diameter (feet):	0.333
Initial Test Depth Value (ft.):	16.52
TOC Elevation (feet):	100
Aquifer to Well Intake Top(ft):	0.00
Aquifer to Piez. Intake Top(ft):	0.00
Aq. to Piez. Intake Bottom(ft):	0.00
Thickness of Aquifer (feet):	30
Intake/Pack Diameter (feet):	0.333
Intake/Pack Length (feet):	30
Saturat. Col. Thickness (ft.):	30
Distance to Pumping Well(ft.):	71
Pumping Rate (ft^3/min):	41.4



AQUIFER TIME/DRAWDOWN DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
42	21.451343	1140	23.711952				
44	21.510401	1200	23.741481				
46	21.530087	1260	23.761167				
48	21.549773	1320	23.790696				
50	21.569459	1380	23.800539				
52	21.608831	1440	23.820225				
54	21.641641	1800	23.898969				
56	21.651484	2160	23.980994				
58	21.681013	2520	24.020366				
60	21.700699	2880	24.069581				
65	21.749914	3360	24.122077				
70	21.831939	3840	24.171292				
75	21.871311	4320	24.190978				
80	21.910683	4800	24.210664				
85	21.959898	5280	24.250036				
90	21.99927						
95	22.018956						
100	22.061609						
105	22.120667						
110	22.160039						
115	22.189568						
120	22.251907						

Theis' Method for Calculating Storage and Transmissivity

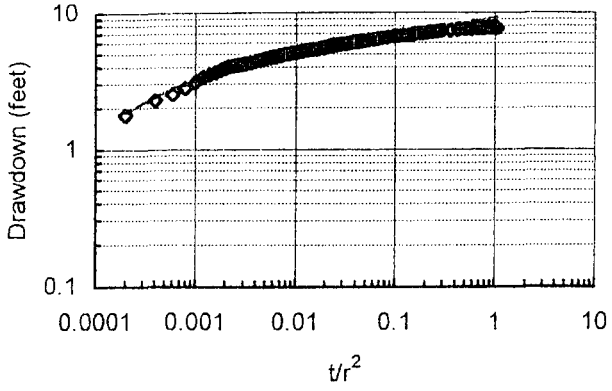
Project Name: Tillman Ridge APT Project No.: 6334-13658-042

Client Name: St. Johns County Run Date: 5/19/98

Analysis By: L. Wiseman

Identification: OW-0285

Distance (r):	71	feet
Quantity (Q):	41.4	ft^3/min
Starting Level:	16.52	feet
Unconf. Correct.:	N	Y or N
Output Units:	3	1 to 9
Line Fit Start No.:	2	Min 1 to
Line Fit End No.:	34	Max 93
Transmissivity:	5.54E+03	ft^2/day
Storage:	2.11E-04	
Error of Fit:	0.0873	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	t/r^2	Predicted Drawdown feet	Weight Factor
1)	1.00	18.30	1.78	1.98E-04	1.85	0
2)	2.00	18.80	2.28	3.97E-04	2.41	1
3)	3.00	19.05	2.53	5.95E-04	2.75	1
4)	4.00	19.35	2.83	7.93E-04	2.99	1
5)	5.00	19.60	3.08	9.92E-04	3.18	1
6)	6.00	19.90	3.38	1.19E-03	3.34	1
7)	7.00	20.05	3.53	1.39E-03	3.47	1
8)	8.00	20.20	3.68	1.59E-03	3.58	1
9)	9.00	20.30	3.78	1.79E-03	3.68	1
10)	10.00	20.42	3.90	1.98E-03	3.77	1
11)	11.00	20.50	3.98	2.18E-03	3.85	1
12)	12.00	20.57	4.05	2.38E-03	3.92	1
13)	13.00	20.62	4.10	2.58E-03	3.99	1
14)	14.00	20.65	4.13	2.78E-03	4.05	1
15)	15.00	20.72	4.20	2.98E-03	4.11	1
16)	16.00	20.76	4.24	3.17E-03	4.17	1
17)	18.00	20.80	4.28	3.57E-03	4.27	1
18)	20.00	20.91	4.39	3.97E-03	4.36	1
19)	22.00	20.98	4.46	4.36E-03	4.44	1
20)	24.00	21.07	4.55	4.76E-03	4.51	1
21)	26.00	21.12	4.60	5.16E-03	4.58	1
22)	28.00	21.19	4.67	5.55E-03	4.65	1
23)	30.00	21.22	4.70	5.95E-03	4.70	1
24)	32.00	21.24	4.72	6.35E-03	4.76	1
25)	34.00	21.33	4.81	6.74E-03	4.81	1
26)	36.00	21.35	4.83	7.14E-03	4.86	1
27)	38.00	21.39	4.87	7.54E-03	4.91	1
28)	40.00	21.42	4.90	7.93E-03	4.95	1
29)	42.00	21.45	4.93	8.33E-03	4.99	1
30)	44.00	21.51	4.99	8.73E-03	5.03	1

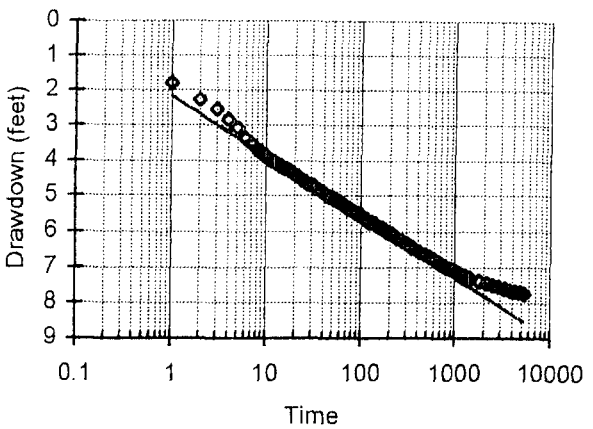
31)	46.00	21.53	5.01	9.13E-03	5.07	1
32)	48.00	21.55	5.03	9.52E-03	5.11	1
33)	50.00	21.57	5.05	9.92E-03	5.14	1
34)	52.00	21.61	5.09	1.03E-02	5.17	1
35)	54.00	21.64	5.12	1.07E-02	5.21	1
36)	56.00	21.65	5.13	1.11E-02	5.24	1
37)	58.00	21.68	5.16	1.15E-02	5.27	1
38)	60.00	21.70	5.18	1.19E-02	5.30	1
39)	65.00	21.75	5.23	1.29E-02	5.37	1
40)	70.00	21.83	5.31	1.39E-02	5.43	1
41)	75.00	21.87	5.35	1.49E-02	5.49	1
42)	80.00	21.91	5.39	1.59E-02	5.54	1
43)	85.00	21.96	5.44	1.69E-02	5.59	1
44)	90.00	22.00	5.48	1.79E-02	5.64	1
45)	95.00	22.02	5.50	1.88E-02	5.69	1
46)	100.00	22.06	5.54	1.98E-02	5.73	1
47)	105.00	22.12	5.60	2.08E-02	5.78	1
48)	110.00	22.16	5.64	2.18E-02	5.81	1
49)	115.00	22.19	5.67	2.28E-02	5.85	1
50)	120.00	22.25	5.73	2.38E-02	5.89	1
51)	130.00	22.25	5.73	2.58E-02	5.96	1
52)	140.00	22.30	5.78	2.78E-02	6.02	1
53)	150.00	22.37	5.85	2.98E-02	6.08	1
54)	160.00	22.41	5.89	3.17E-02	6.14	1
55)	170.00	22.45	5.93	3.37E-02	6.19	1
56)	180.00	22.50	5.98	3.57E-02	6.24	1
57)	190.00	22.54	6.02	3.77E-02	6.28	1
58)	200.00	22.58	6.06	3.97E-02	6.33	1
59)	210.00	22.60	6.08	4.17E-02	6.37	1
60)	220.00	22.64	6.12	4.36E-02	6.41	1
61)	230.00	22.67	6.15	4.56E-02	6.45	1
62)	240.00	22.70	6.18	4.76E-02	6.48	1
63)	270.00	22.79	6.27	5.36E-02	6.58	1
64)	300.00	22.86	6.34	5.95E-02	6.67	1
65)	330.00	22.93	6.41	6.55E-02	6.75	1
66)	360.00	22.99	6.47	7.14E-02	6.83	1
67)	420.00	23.10	6.58	8.33E-02	6.96	1
68)	480.00	23.17	6.65	9.52E-02	7.08	1
69)	540.00	23.25	6.73	1.07E-01	7.18	1
70)	600.00	23.31	6.79	1.19E-01	7.27	1
71)	660.00	23.38	6.86	1.31E-01	7.35	1
72)	720.00	23.44	6.92	1.43E-01	7.42	1
73)	780.00	23.49	6.97	1.55E-01	7.49	1
74)	840.00	23.54	7.02	1.67E-01	7.55	1
75)	900.00	23.58	7.06	1.79E-01	7.61	1
76)	960.00	23.61	7.09	1.90E-01	7.67	1
77)	1020.00	23.65	7.13	2.02E-01	7.72	1
78)	1080.00	23.69	7.17	2.14E-01	7.77	1
79)	1140.00	23.71	7.19	2.26E-01	7.82	1

80)	1200.00	23.74	7.22	2.38E-01	7.86	1
81)	1260.00	23.76	7.24	2.50E-01	7.90	1
82)	1320.00	23.79	7.27	2.62E-01	7.94	1
83)	1380.00	23.80	7.28	2.74E-01	7.98	1
84)	1440.00	23.82	7.30	2.86E-01	8.02	1
85)	1800.00	23.90	7.38	3.57E-01	8.21	1
86)	2160.00	23.98	7.46	4.28E-01	8.36	1
87)	2520.00	24.02	7.50	5.00E-01	8.49	1
88)	2880.00	24.07	7.55	5.71E-01	8.61	1
89)	3360.00	24.12	7.60	6.67E-01	8.74	1
90)	3840.00	24.17	7.65	7.62E-01	8.85	1
91)	4320.00	24.19	7.67	8.57E-01	8.96	1
92)	4800.00	24.21	7.69	9.52E-01	9.05	1
93)	5280.00	24.25	7.73	1.05E+00	9.13	1

Jacob's Method for Calculating Storage and Transmissivity

Project Name: Tillman Ridge APT
Project No.: 6334-13658-042
Client Name: St. Johns County
Run Date: 5/19/98
Analysis By: L. Wiseman
Identification: OW-0285

Radius (r):	71	feet
Starting Level:	16.52	feet
Pump Rate:	41.4	ft^3/min
Partial Penetration:	N	Y or N
Specify Output Units:	3	1 to 9
Unconfined Correct.:	N	Y or N
Line Fit Start No.:	8	Min 1 to
Line Fit End No.:	19	Max 93
Transmissivity:	6.40E+03	ft^2/day
Storage:	1.05E-04	
Error of Fit:	0.0063	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	Calculated Drawdown feet	Specify U Value for min. time
1)	1.00	18.30	1.78	2.18	0.05
2)	2.00	18.80	2.28	2.69	Min. T for U<0.05:
3)	3.00	19.05	2.53	2.99	0.59
4)	4.00	19.35	2.83	3.21	minutes
5)	5.00	19.60	3.08	3.37	
6)	6.00	19.90	3.38	3.51	
7)	7.00	20.05	3.53	3.62	
8)	8.00	20.20	3.68	3.72	
9)	9.00	20.30	3.78	3.81	
10)	10.00	20.42	3.90	3.88	
11)	11.00	20.50	3.98	3.95	
12)	12.00	20.57	4.05	4.02	
13)	13.00	20.62	4.10	4.08	
14)	14.00	20.65	4.13	4.13	
15)	15.00	20.72	4.20	4.18	
16)	16.00	20.76	4.24	4.23	
17)	18.00	20.80	4.28	4.32	
18)	20.00	20.91	4.39	4.40	
19)	22.00	20.98	4.46	4.47	
20)	24.00	21.07	4.55	4.53	
21)	26.00	21.12	4.60	4.59	
22)	28.00	21.19	4.67	4.65	
23)	30.00	21.22	4.70	4.70	
24)	32.00	21.24	4.72	4.75	
25)	34.00	21.33	4.81	4.79	
26)	36.00	21.35	4.83	4.83	
27)	38.00	21.39	4.87	4.87	
28)	40.00	21.42	4.90	4.91	
29)	42.00	21.45	4.93	4.95	
30)	44.00	21.51	4.99	4.98	
31)	46.00	21.53	5.01	5.01	
32)	48.00	21.55	5.03	5.05	
33)	50.00	21.57	5.05	5.08	

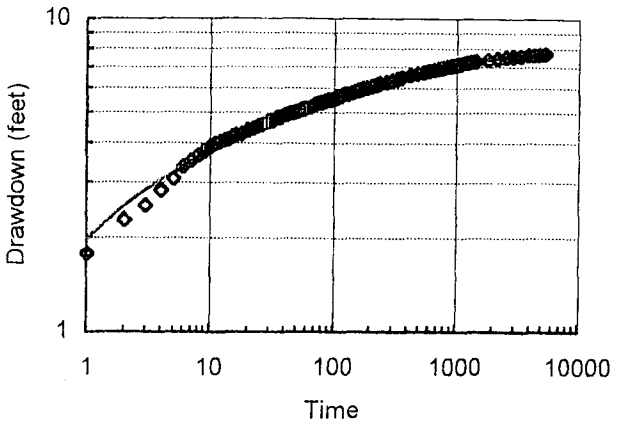
34)	52.00	21.61	5.09	5.10	
35)	54.00	21.64	5.12	5.13	
36)	56.00	21.65	5.13	5.16	
37)	58.00	21.68	5.16	5.19	
38)	60.00	21.70	5.18	5.21	
39)	65.00	21.75	5.23	5.27	
40)	70.00	21.83	5.31	5.33	
41)	75.00	21.87	5.35	5.38	
42)	80.00	21.91	5.39	5.42	
43)	85.00	21.96	5.44	5.47	
44)	90.00	22.00	5.48	5.51	
45)	95.00	22.02	5.50	5.55	
46)	100.00	22.06	5.54	5.59	
47)	105.00	22.12	5.60	5.63	
48)	110.00	22.16	5.64	5.66	
49)	115.00	22.19	5.67	5.69	
50)	120.00	22.25	5.73	5.72	
51)	130.00	22.25	5.73	5.78	
52)	140.00	22.30	5.78	5.84	
53)	150.00	22.37	5.85	5.89	
54)	160.00	22.41	5.89	5.94	
55)	170.00	22.45	5.93	5.98	
56)	180.00	22.50	5.98	6.02	
57)	190.00	22.54	6.02	6.06	
58)	200.00	22.58	6.06	6.10	
59)	210.00	22.60	6.08	6.14	
60)	220.00	22.64	6.12	6.17	
61)	230.00	22.67	6.15	6.21	
62)	240.00	22.70	6.18	6.24	
63)	270.00	22.79	6.27	6.33	
64)	300.00	22.86	6.34	6.40	
65)	330.00	22.93	6.41	6.47	
66)	360.00	22.99	6.47	6.54	
67)	420.00	23.10	6.58	6.65	
68)	480.00	23.17	6.65	6.75	
69)	540.00	23.25	6.73	6.84	
70)	600.00	23.31	6.79	6.92	
71)	660.00	23.38	6.86	6.99	
72)	720.00	23.44	6.92	7.05	
73)	780.00	23.49	6.97	7.11	
74)	840.00	23.54	7.02	7.17	
75)	900.00	23.58	7.06	7.22	
76)	960.00	23.61	7.09	7.26	
77)	1020.00	23.65	7.13	7.31	
78)	1080.00	23.69	7.17	7.35	
79)	1140.00	23.71	7.19	7.39	
80)	1200.00	23.74	7.22	7.43	
81)	1260.00	23.76	7.24	7.47	
82)	1320.00	23.79	7.27	7.50	
83)	1380.00	23.80	7.28	7.53	
84)	1440.00	23.82	7.30	7.56	
85)	1800.00	23.90	7.38	7.73	
86)	2160.00	23.98	7.46	7.87	
87)	2520.00	24.02	7.50	7.98	

88)	2880.00	24.07	7.55	8.08	
89)	3360.00	24.12	7.60	8.19	
90)	3840.00	24.17	7.65	8.29	
91)	4320.00	24.19	7.67	8.38	
92)	4800.00	24.21	7.69	8.46	
93)	5280.00	24.25	7.73	8.53	

Walton's Method for Calculating Storage and Transmissivity

Project Name: Tillman Ridge APT
Project No.: 6334-13658-042
Client Name: St. Johns County
Run Date: 5/19/98
Analysis By: L. Wiseman
Identification: OW-0285

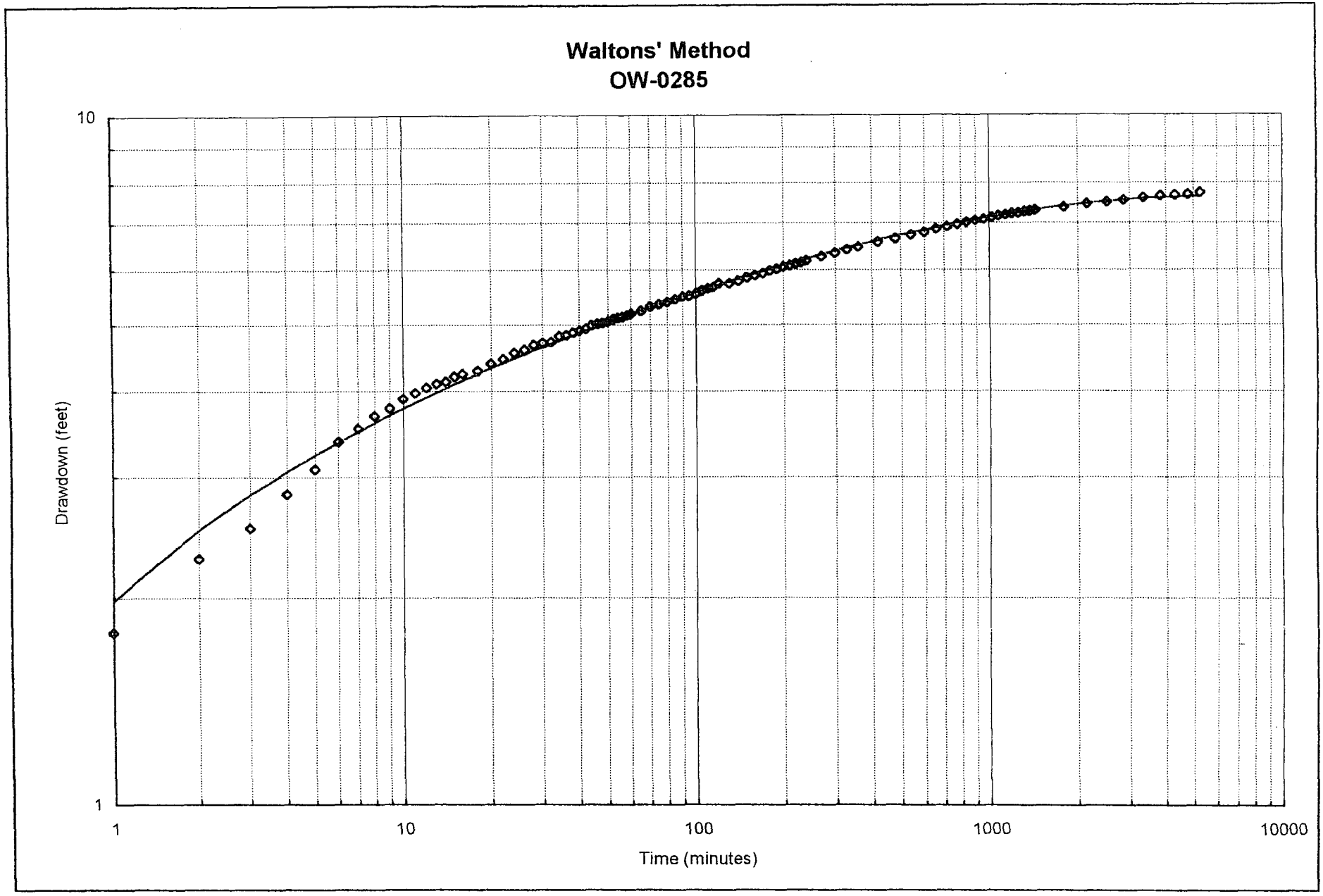
Distance (r):	71	feet
Quantity (Q):	41.4	ft^3/min
Starting Level:	16.52	feet
r/B ratio:	0.009	
Output Units:	3	1 to 9
Aquitard L(sat.):	5	feet
Aquitard K(v):	4.79E-04	ft/day
Storage	Transmissivity	
1.60E-04	5.97E+03	ft^2/day
Start & End Of Fit:	1	93
Error of Fit:	0.0715	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	Calc. Drawdown feet	Weight Factor
1)	1.00	18.30	1.78	1.98	1
2)	2.00	18.80	2.28	2.51	1
3)	3.00	19.05	2.53	2.83	1
4)	4.00	19.35	2.83	3.05	1
5)	5.00	19.60	3.08	3.23	1
6)	6.00	19.90	3.38	3.37	1
7)	7.00	20.05	3.53	3.49	1
8)	8.00	20.20	3.68	3.60	1
9)	9.00	20.30	3.78	3.69	1
10)	10.00	20.42	3.90	3.77	1
11)	11.00	20.50	3.98	3.85	1
12)	12.00	20.57	4.05	3.92	1
13)	13.00	20.62	4.10	3.98	1
14)	14.00	20.65	4.13	4.04	1
15)	15.00	20.72	4.20	4.09	1
16)	16.00	20.76	4.24	4.14	1
17)	18.00	20.80	4.28	4.24	1
18)	20.00	20.91	4.39	4.32	1
19)	22.00	20.98	4.46	4.39	1
20)	24.00	21.07	4.55	4.46	1
21)	26.00	21.12	4.60	4.53	1
22)	28.00	21.19	4.67	4.58	1
23)	30.00	21.22	4.70	4.64	1
24)	32.00	21.24	4.72	4.69	1
25)	34.00	21.33	4.81	4.74	1
26)	36.00	21.35	4.83	4.78	1
27)	38.00	21.39	4.87	4.82	1
28)	40.00	21.42	4.90	4.86	1
29)	42.00	21.45	4.93	4.90	1
30)	44.00	21.51	4.99	4.94	1
31)	46.00	21.53	5.01	4.97	1

32)	48.00	21.55	5.03	5.01	1
33)	50.00	21.57	5.05	5.04	1
34)	52.00	21.61	5.09	5.07	1
35)	54.00	21.64	5.12	5.10	1
36)	56.00	21.65	5.13	5.13	1
37)	58.00	21.68	5.16	5.15	1
38)	60.00	21.70	5.18	5.18	1
39)	65.00	21.75	5.23	5.24	1
40)	70.00	21.83	5.31	5.30	1
41)	75.00	21.87	5.35	5.35	1
42)	80.00	21.91	5.39	5.40	1
43)	85.00	21.96	5.44	5.45	1
44)	90.00	22.00	5.48	5.49	1
45)	95.00	22.02	5.50	5.53	1
46)	100.00	22.06	5.54	5.57	1
47)	105.00	22.12	5.60	5.61	1
48)	110.00	22.16	5.64	5.64	1
49)	115.00	22.19	5.67	5.68	1
50)	120.00	22.25	5.73	5.71	1
51)	130.00	22.25	5.73	5.77	1
52)	140.00	22.30	5.78	5.83	1
53)	150.00	22.37	5.85	5.88	1
54)	160.00	22.41	5.89	5.93	1
55)	170.00	22.45	5.93	5.97	1
56)	180.00	22.50	5.98	6.01	1
57)	190.00	22.54	6.02	6.05	1
58)	200.00	22.58	6.06	6.09	1
59)	210.00	22.60	6.08	6.13	1
60)	220.00	22.64	6.12	6.16	1
61)	230.00	22.67	6.15	6.19	1
62)	240.00	22.70	6.18	6.22	1
63)	270.00	22.79	6.27	6.31	1
64)	300.00	22.86	6.34	6.38	1
65)	330.00	22.93	6.41	6.45	1
66)	360.00	22.99	6.47	6.51	1
67)	420.00	23.10	6.58	6.61	1
68)	480.00	23.17	6.65	6.70	1
69)	540.00	23.25	6.73	6.78	1
70)	600.00	23.31	6.79	6.84	1
71)	660.00	23.38	6.86	6.90	1
72)	720.00	23.44	6.92	6.95	1
73)	780.00	23.49	6.97	7.00	1
74)	840.00	23.54	7.02	7.04	1
75)	900.00	23.58	7.06	7.08	1
76)	960.00	23.61	7.09	7.11	1
77)	1020.00	23.65	7.13	7.15	1
78)	1080.00	23.69	7.17	7.18	1
79)	1140.00	23.71	7.19	7.20	1
80)	1200.00	23.74	7.22	7.23	1
81)	1260.00	23.76	7.24	7.25	1
82)	1320.00	23.79	7.27	7.27	1
83)	1380.00	23.80	7.28	7.29	1
84)	1440.00	23.82	7.30	7.31	1

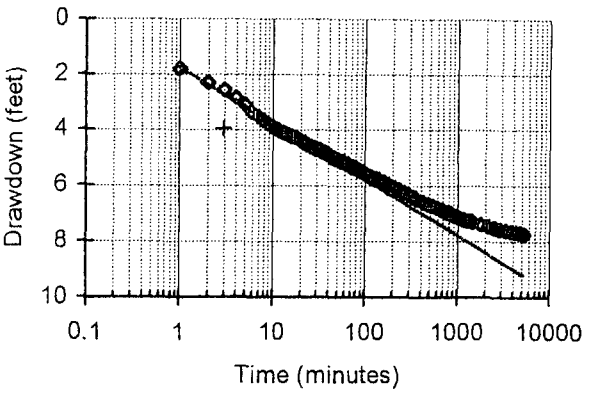
85)	1800.00	23.90	7.38	7.40	1
86)	2160.00	23.98	7.46	7.47	1
87)	2520.00	24.02	7.50	7.51	1
88)	2880.00	24.07	7.55	7.55	1
89)	3360.00	24.12	7.60	7.58	1
90)	3840.00	24.17	7.65	7.61	1
91)	4320.00	24.19	7.67	7.62	1
92)	4800.00	24.21	7.69	7.64	1
93)	5280.00	24.25	7.73	7.64	1


Waltons' Method
OW-0285
10
1
Drawdown (feet)
1
10
100
1000
10000
Time (minutes)

Hantush Inflection Point Method for Storage and Transmissivity

Project Name:	Tillman Ridge APT	Project No.:	6334-13658-042
Client Name:	St. Johns County	Run Date:	5/19/98
Analysis By:	L. Wiseman	Identification:	OW-0285

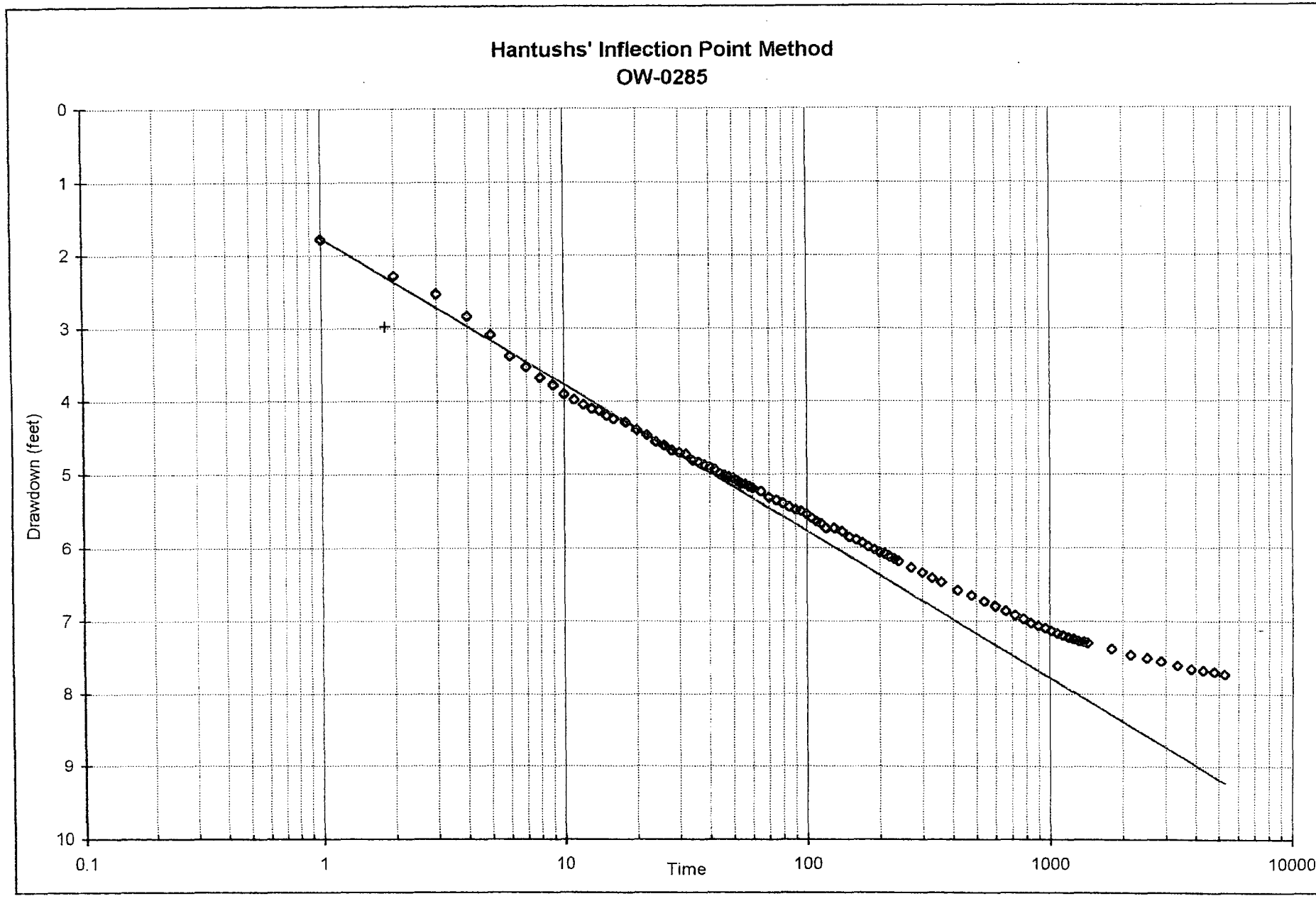
Radius (r):	71	feet
Starting Level:	16.52	feet
Pump Rate:	41.4	ft^3/min
Unconfined Correct.:	N	Y or N
Line Fit Start No.:	2	Min 1 to
Line Fit End No.:	30	Max 93
Output Units:	3	1 to 9
Max. Drawdown:	7.9	feet
Wedged Aquifer:	N	Y or N
Piez.->Well Angle:	0.00	degrees
Transmissivity:	5.38E+03	ft^2/day
Storage:	3.35E-05	



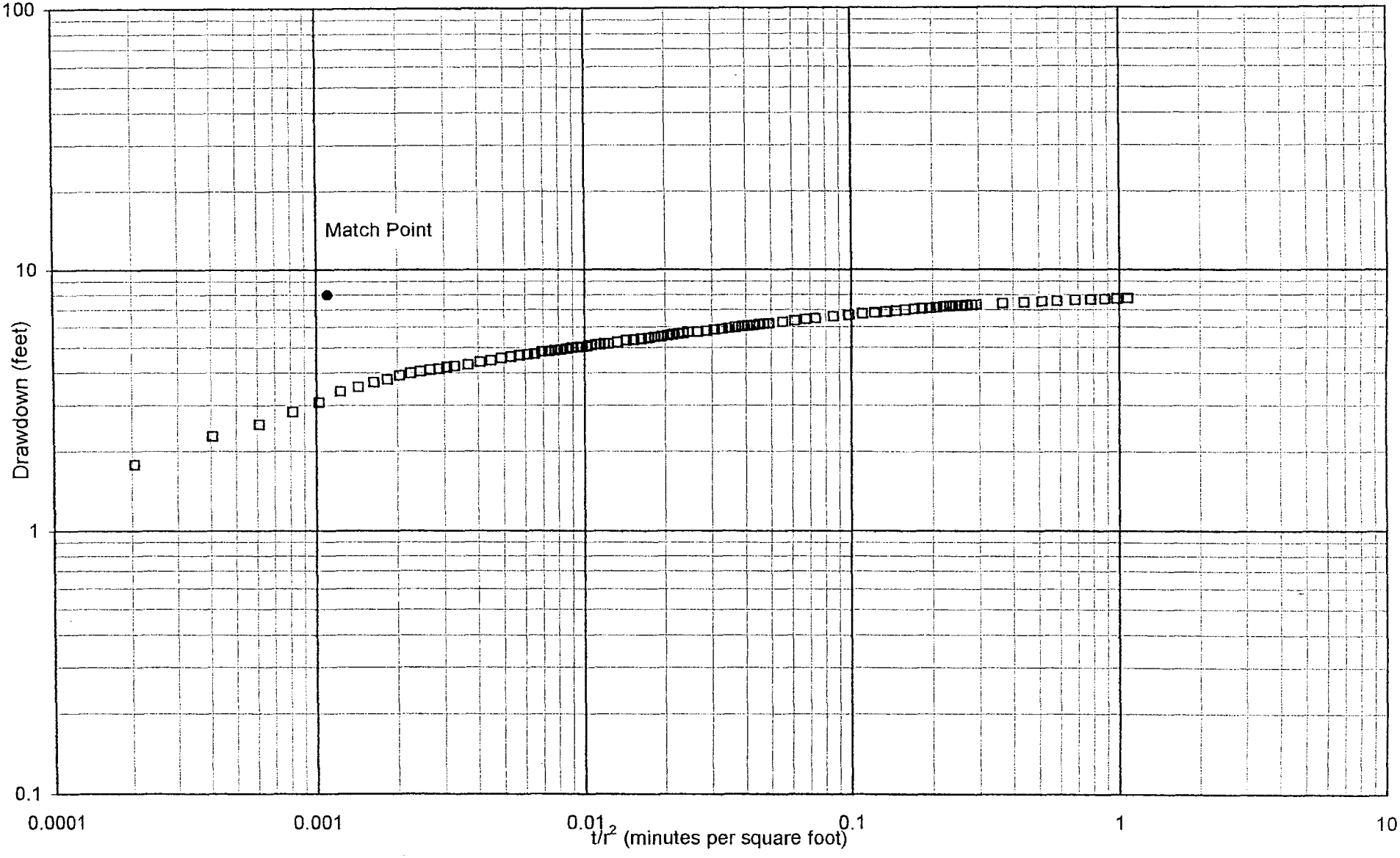
Meas. #	Time minutes	Field Meas. feet	Drawdown feet	Inflection Point:	3.95
				Calc. r/B ratio:	0.013
1)	1.00	18.30	1.78		
2)	2.00	18.80	2.28		
3)	3.00	19.05	2.53		
4)	4.00	19.35	2.83		
5)	5.00	19.60	3.08		
6)	6.00	19.90	3.38		
7)	7.00	20.05	3.53		
8)	8.00	20.20	3.68		
9)	9.00	20.30	3.78		
10)	10.00	20.42	3.90		
11)	11.00	20.50	3.98		
12)	12.00	20.57	4.05		
13)	13.00	20.62	4.10		
14)	14.00	20.65	4.13		
15)	15.00	20.72	4.20		
16)	16.00	20.76	4.24		
17)	18.00	20.80	4.28		
18)	20.00	20.91	4.39		
19)	22.00	20.98	4.46		
20)	24.00	21.07	4.55		
21)	26.00	21.12	4.60		
22)	28.00	21.19	4.67		
23)	30.00	21.22	4.70		
24)	32.00	21.24	4.72		
25)	34.00	21.33	4.81		
26)	36.00	21.35	4.83		
27)	38.00	21.39	4.87		
28)	40.00	21.42	4.90		
29)	42.00	21.45	4.93		
30)	44.00	21.51	4.99		
31)	46.00	21.53	5.01		
32)	48.00	21.55	5.03		

33)	50.00	21.57	5.05		
34)	52.00	21.61	5.09		
35)	54.00	21.64	5.12		
36)	56.00	21.65	5.13		
37)	58.00	21.68	5.16		
38)	60.00	21.70	5.18		
39)	65.00	21.75	5.23		
40)	70.00	21.83	5.31		
41)	75.00	21.87	5.35		
42)	80.00	21.91	5.39		
43)	85.00	21.96	5.44		
44)	90.00	22.00	5.48		
45)	95.00	22.02	5.50		
46)	100.00	22.06	5.54		
47)	105.00	22.12	5.60		
48)	110.00	22.16	5.64		
49)	115.00	22.19	5.67		
50)	120.00	22.25	5.73		
51)	130.00	22.25	5.73		
52)	140.00	22.30	5.78		
53)	150.00	22.37	5.85		
54)	160.00	22.41	5.89		
55)	170.00	22.45	5.93		
56)	180.00	22.50	5.98		
57)	190.00	22.54	6.02		
58)	200.00	22.58	6.06		
59)	210.00	22.60	6.08		
60)	220.00	22.64	6.12		
61)	230.00	22.67	6.15		
62)	240.00	22.70	6.18		
63)	270.00	22.79	6.27		
64)	300.00	22.86	6.34		
65)	330.00	22.93	6.41		
66)	360.00	22.99	6.47		
67)	420.00	23.10	6.58		
68)	480.00	23.17	6.65		
69)	540.00	23.25	6.73		
70)	600.00	23.31	6.79		
71)	660.00	23.38	6.86		
72)	720.00	23.44	6.92		
73)	780.00	23.49	6.97		
74)	840.00	23.54	7.02		
75)	900.00	23.58	7.06		
76)	960.00	23.61	7.09		
77)	1020.00	23.65	7.13		
78)	1080.00	23.69	7.17		
79)	1140.00	23.71	7.19		
80)	1200.00	23.74	7.22		
81)	1260.00	23.76	7.24		
82)	1320.00	23.79	7.27		
83)	1380.00	23.80	7.28		
84)	1440.00	23.82	7.30		
85)	1800.00	23.90	7.38		

86)	2160.00	23.98	7.46		
87)	2520.00	24.02	7.50		
88)	2880.00	24.07	7.55		
89)	3360.00	24.12	7.60		
90)	3840.00	24.17	7.65		
91)	4320.00	24.19	7.67		
92)	4800.00	24.21	7.69		
93)	5280.00	24.25	7.73		


Hantushs' Inflection Point Method
OW-0285
Drawdown (feet)
0
1
2
3
4
5
6
7
8
9
10
0.1
1
10
100
1000
10000
Time

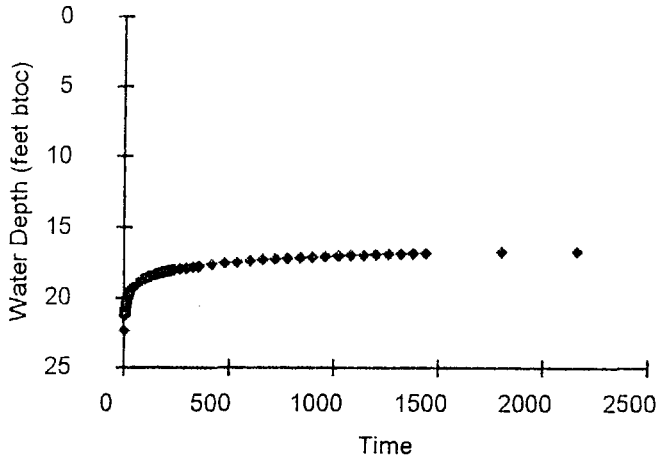
Coopers' Method for Calculating Transmissivity, Storage and Leakance
OW-0285



AQUIFER RECOVERY TEST DATA ENTRY FORM

Client Name: St. Johns County | Well Number: OW-0284 | Test Type: Recovery Test
Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C
Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Date Started: 1/1/98

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	90
Static W/L-Depth (ft.):	16.52
Riser Pipe Diameter (feet):	0.3333
Initial Depth Value (feet):	16.52
TOC Elevation (feet):	100
Intake/Pack Diameter (feet):	0.3333
Depth to Top of Pack (feet):	0
Pack/Intake Length (feet):	30
Saturated Aqu. Thickness (ft.):	30
Distance to Pumping Well (ft.):	71
Pumping Rate (ft^3/min):	41.4
Pumping Duration (min.):	5280



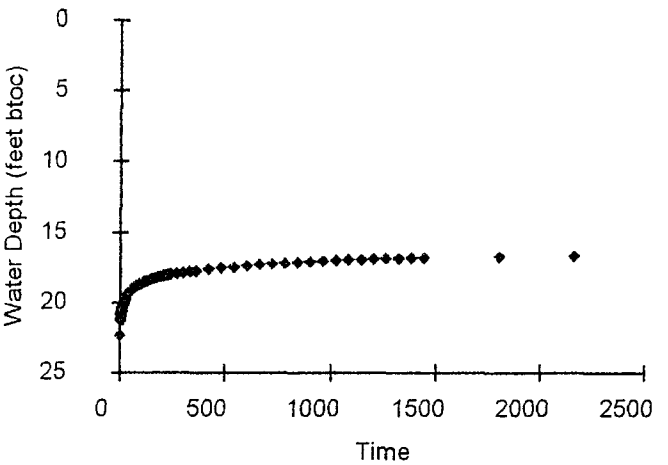
AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
1	22.301122	130	18.410184				
2	21.251202	140	18.350142				
3	21.198706	150	18.300271				
4	21.100276	160	18.270085				
5	20.939507	170	18.220214				
6	20.801705	180	18.160172				
7	20.729523	190	18.129987				
8	20.650779	200	18.109973				
9	20.519539	210	18.069944				
10	20.430952	220	18.040087				
11	20.339084	230	18.01023				
12	20.26034	240	17.980045				
13	20.191439	270	17.899989				
14	20.119257	300	17.850117				
15	20.060199	330	17.760218				
16	20.020827	360	17.710019				
18	19.89943	420	17.600105				
20	19.820686	480	17.510206				
22	19.7501445	540	17.430149				
24	19.6700881	600	17.330079				
26	19.6100458	660	17.280208				
28	19.5103034	720	17.220165				
30	19.4702752	780	17.160123				
32	19.430247	840	17.109924				
34	19.3800477	900	17.069896				
36	19.3400195	960	17.029867				
38	19.2803053	1020	16.990167				

AQUIFER RECOVERY TEST DATA ENTRY FORM

Client Name: St. Johns County | Well Number: OW-0284 | Test Type: Recovery Test
Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C
Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Date Started: 1/1/98

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	90
Static W/L-Depth (ft.):	16.52
Riser Pipe Diameter (feet):	0.3333
Initial Depth Value (feet):	16.52
TOC Elevation (feet):	100
Intake/Pack Diameter (feet):	0.3333
Depth to Top of Pack (feet):	0
Pack/Intake Length (feet):	30
Saturated Aqu. Thickness (ft.):	30
Distance to Pumping Well (ft.):	71
Pumping Rate (ft^3/min):	41.4
Pumping Duration (min.):	5280



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
40	19.2501201	1080	16.950139				
42	19.220263	1140	16.919954				
44	19.1802348	1200	16.890097				
46	19.1402066	1260	16.859912				
48	19.1201925	1320	16.840029				
50	19.1001784	1380	16.800033				
52	19.0601502	1440	16.790026				
54	19.020122	1800	16.710003				
56	19.0001079	2160	16.630012				
58	18.9702508						
60	18.9502367						
65	18.9000374						
70	18.8399951						
75	18.800295						
80	18.7500957						
85	18.7100675						
90	18.6601963						
95	18.6300111						
100	18.600154						
105	18.5601258						
110	18.5200976						
115	18.4902405						
120	18.4502123						

Theis' Recovery Method for Calculating Transmissivity

Project Name: Tillman Ridge APT Project No.: 6334-13658-042

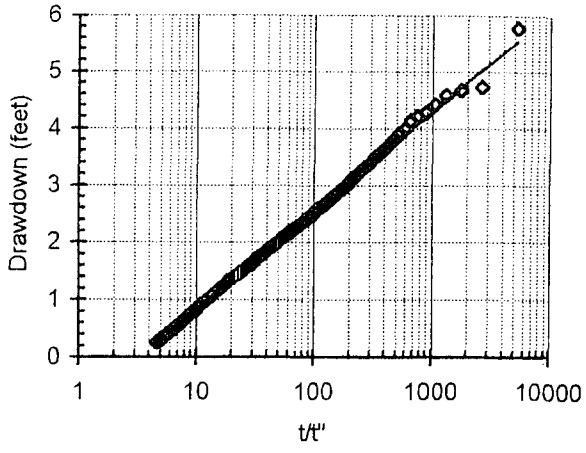
Client Name: St. Johns County

Analysis By: L. Wiseman

Run Date: 5/20/98

Identification: OW-0284

Pump Rate:	4.14E+01	ft^3/min
Pumping Duration:	5280.00	minutes
Static Water Level:	16.52	feet
Unconfined Correction:	N	Y or N
Starting No.:	10	Min 1 to
Ending No.:	84	Max 86
Output Units:	3	1 to 9
Calculated Transmissivity		
Transmissivity:	6.31E+03	ft^2/day
Error of Fit:	0.0692	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	t/t'	Calc. Drawdown feet
1)	1.00	22.30	5.78	5281.0	5.53
2)	2.00	21.25	4.73	2641.0	5.01
3)	3.00	21.20	4.68	1761.0	4.71
4)	4.00	21.10	4.58	1321.0	4.49
5)	5.00	20.94	4.42	1057.0	4.32
6)	6.00	20.80	4.28	881.0	4.19
7)	7.00	20.73	4.21	755.3	4.07
8)	8.00	20.65	4.13	661.0	3.97
9)	9.00	20.52	4.00	587.7	3.88
10)	10.00	20.43	3.91	529.0	3.80
11)	11.00	20.34	3.82	481.0	3.73
12)	12.00	20.26	3.74	441.0	3.67
13)	13.00	20.19	3.67	407.2	3.61
14)	14.00	20.12	3.60	378.1	3.55
15)	15.00	20.06	3.54	353.0	3.50
16)	16.00	20.02	3.50	331.0	3.45
17)	18.00	19.90	3.38	294.3	3.36
18)	20.00	19.82	3.30	265.0	3.29
19)	22.00	19.75	3.23	241.0	3.21
20)	24.00	19.67	3.15	221.0	3.15
21)	26.00	19.61	3.09	204.1	3.09
22)	28.00	19.51	2.99	189.6	3.03
23)	30.00	19.47	2.95	177.0	2.98
24)	32.00	19.43	2.91	166.0	2.93
25)	34.00	19.38	2.86	156.3	2.89
26)	36.00	19.34	2.82	147.7	2.85
27)	38.00	19.28	2.76	139.9	2.81
28)	40.00	19.25	2.73	133.0	2.77
29)	42.00	19.22	2.70	126.7	2.73
30)	44.00	19.18	2.66	121.0	2.70
31)	46.00	19.14	2.62	115.8	2.66
32)	48.00	19.12	2.60	111.0	2.63
33)	50.00	19.10	2.58	106.6	2.60

34)	52.00	19.06	2.54	102.5	2.57
35)	54.00	19.02	2.50	98.8	2.54
36)	56.00	19.00	2.48	95.3	2.52
37)	58.00	18.97	2.45	92.0	2.49
38)	60.00	18.95	2.43	89.0	2.47
39)	65.00	18.90	2.38	82.2	2.41
40)	70.00	18.84	2.32	76.4	2.35
41)	75.00	18.80	2.28	71.4	2.30
42)	80.00	18.75	2.23	67.0	2.25
43)	85.00	18.71	2.19	63.1	2.21
44)	90.00	18.66	2.14	59.7	2.17
45)	95.00	18.63	2.11	56.6	2.13
46)	100.00	18.60	2.08	53.8	2.09
47)	105.00	18.56	2.04	51.3	2.05
48)	110.00	18.52	2.00	49.0	2.02
49)	115.00	18.49	1.97	46.9	1.99
50)	120.00	18.45	1.93	45.0	1.95
51)	130.00	18.41	1.89	41.6	1.90
52)	140.00	18.35	1.83	38.7	1.84
53)	150.00	18.30	1.78	36.2	1.79
54)	160.00	18.27	1.75	34.0	1.74
55)	170.00	18.22	1.70	32.1	1.70
56)	180.00	18.16	1.64	30.3	1.66
57)	190.00	18.13	1.61	28.8	1.62
58)	200.00	18.11	1.59	27.4	1.58
59)	210.00	18.07	1.55	26.1	1.55
60)	220.00	18.04	1.52	25.0	1.51
61)	230.00	18.01	1.49	24.0	1.48
62)	240.00	17.98	1.46	23.0	1.45
63)	270.00	17.90	1.38	20.6	1.37
64)	300.00	17.85	1.33	18.6	1.29
65)	330.00	17.76	1.24	17.0	1.22
66)	360.00	17.71	1.19	15.7	1.16
67)	420.00	17.60	1.08	13.6	1.05
68)	480.00	17.51	0.99	12.0	0.96
69)	540.00	17.43	0.91	10.8	0.88
70)	600.00	17.33	0.81	9.8	0.81
71)	660.00	17.28	0.76	9.0	0.75
72)	720.00	17.22	0.70	8.3	0.69
73)	780.00	17.16	0.64	7.8	0.63
74)	840.00	17.11	0.59	7.3	0.59
75)	900.00	17.07	0.55	6.9	0.54
76)	960.00	17.03	0.51	6.5	0.50
77)	1020.00	16.99	0.47	6.2	0.46
78)	1080.00	16.95	0.43	5.9	0.43
79)	1140.00	16.92	0.40	5.6	0.39
80)	1200.00	16.89	0.37	5.4	0.36
81)	1260.00	16.86	0.34	5.2	0.33
82)	1320.00	16.84	0.32	5.0	0.30
83)	1380.00	16.80	0.28	4.8	0.28
84)	1440.00	16.79	0.27	4.7	0.25
85)	1800.00	16.71	0.19	3.9	0.12
86)	2160.00	16.63	0.11	3.4	0.02

APPENDIX G

Aquifer performance test analyses for well OW-0286 [SJ-0286]

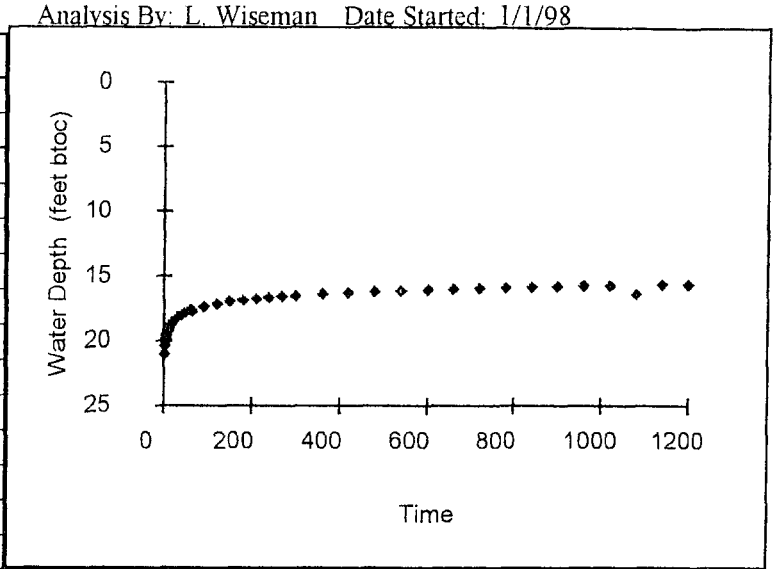
AQUIFER RECOVERY TEST DATA ENTRY FORM

Client Name: St. Johns County | Well Number: OW-0286 | Test Type: Recovery Test

Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C

Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Date Started: 1/1/98

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (ft.):	15.54
Riser Pipe Diameter (feet):	0.8333
Initial Depth Value (feet):	15.54
TOC Elevation (feet):	100
Intake/Pack Diameter (feet):	0.83333
Depth to Top of Pack (feet):	0
Pack/Intake Length (feet):	35
Saturated Aqu. Thickness (ft.):	30
Distance to Pumping Well (ft.):	0
Pumping Rate (ft^3/min):	41.4
Pumping Duration (min.):	5280



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
1	20.999584						
2	20.369632						
3	20.031689						
4	19.788895						
5	19.601878						
6	19.431266						
7	19.309869						
8	19.201596						
9	19.099885						
10	19.021141						
11	18.939116						
12	18.870215						
13	18.8003297						
14	18.7402874						
15	18.6802451						
20	18.450247						
30	18.1300214						
40	17.9200374						
50	17.7500816						
60	17.6099829						
65	17.6801963						
90	17.3202706						
120	17.1201296						
150	16.9600168						
180	16.8399322						
210	16.7300187						
240	16.6401193						

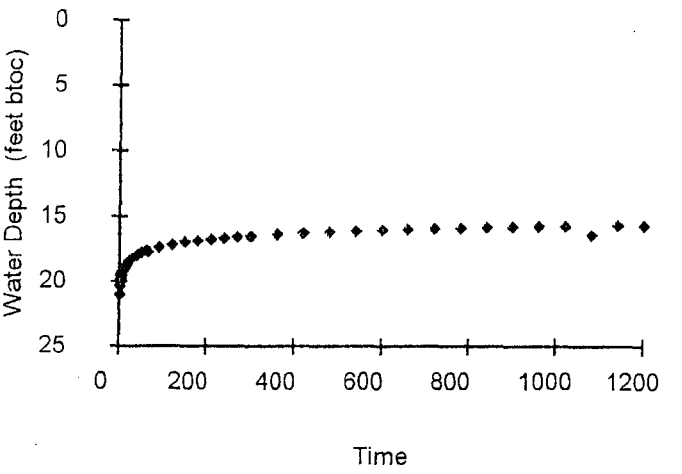
AQUIFER RECOVERY TEST DATA ENTRY FORM

Client Name: St. Johns County | Well Number: OW-0286 | Test Type: Recovery Test

Project No.: 6334-13658-042 | Topo. Elev.: 42 feet | Weather: See Appendix C

Project Name: Tillman Ridge APT | Analysis By: L. Wiseman | Date Started: 1/1/98

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	2
Well Depth - TOC (feet):	90
Static W/L-Depth (ft.):	15.54
Riser Pipe Diameter (feet):	0.8333
Initial Depth Value (feet):	15.54
TOC Elevation (feet):	100
Intake/Pack Diameter (feet):	0.83333
Depth to Top of Pack (feet):	0
Pack/Intake Length (feet):	35
Saturated Aqu. Thickness (ft.):	30
Distance to Pumping Well (ft.):	0
Pumping Rate (ft^3/min):	41.4
Pumping Duration (min.):	5280



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
270	16.5502199						
300	16.5000206						
360	16.3500789						
420	16.2500084						
480	16.1499379						
540	16.1000667						
600	15.9999962						
660	15.950125						
720	15.8700686						
780	15.8100263						
840	15.7800052						
900	15.7300027						
960	15.7000144						
1020	15.660019						
1080	16.3399078						
1140	15.5900024						
1200	15.560001						

Theis' Recovery Method for Calculating Transmissivity

Project Name: Tillman Ridge APT Project No.: 6334-13658-042

Client Name: St. Johns County

Analysis By: L. Wiseman

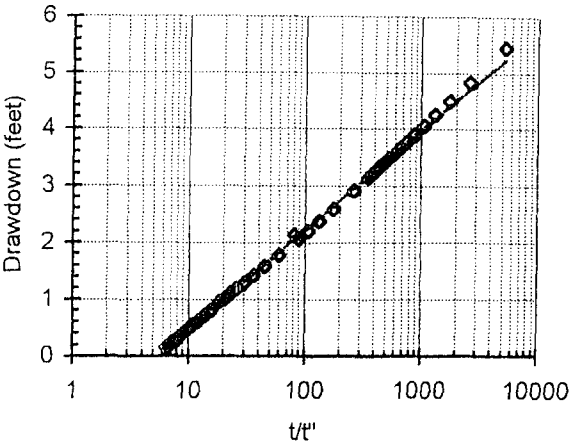
Run Date: 5/15/98

Identification: OW-0286

Pump Rate:	4.14E+01	ft^3/min
Pumping Duration:	5280	minutes
Static Water Level:	15.54	feet
Unconfined Correction:	N	Y or N
Starting No.:	4	Min 1 to
Ending No.:	40	Max 44
Output Units:	3	1 to 9

Calculated Transmissivity

Transmissivity:	6.25E+03	ft^2/day
Error of Fit:	0.0382	



Meas. #	Time minutes	Field Meas. feet	Drawdown feet	t/t"	Calc. Drawdown feet
1)	1.00	21.00	5.46	5281.0	5.22
2)	2.00	20.37	4.83	2641.0	4.70
3)	3.00	20.03	4.49	1761.0	4.39
4)	4.00	19.79	4.25	1321.0	4.17
5)	5.00	19.60	4.06	1057.0	4.00
6)	6.00	19.43	3.89	881.0	3.86
7)	7.00	19.31	3.77	755.3	3.75
8)	8.00	19.20	3.66	661.0	3.65
9)	9.00	19.10	3.56	587.7	3.56
10)	10.00	19.02	3.48	529.0	3.48
11)	11.00	18.94	3.40	481.0	3.40
12)	12.00	18.87	3.33	441.0	3.34
13)	13.00	18.80	3.26	407.2	3.28
14)	14.00	18.74	3.20	378.1	3.22
15)	15.00	18.68	3.14	353.0	3.17
16)	20.00	18.45	2.91	265.0	2.95
17)	30.00	18.13	2.59	177.0	2.65
18)	40.00	17.92	2.38	133.0	2.43
19)	50.00	17.75	2.21	106.6	2.26
20)	60.00	17.61	2.07	89.0	2.12
21)	65.00	17.68	2.14	82.2	2.06
22)	90.00	17.32	1.78	59.7	1.82
23)	120.00	17.12	1.58	45.0	1.61
24)	150.00	16.96	1.42	36.2	1.44
25)	180.00	16.84	1.30	30.3	1.31
26)	210.00	16.73	1.19	26.1	1.20
27)	240.00	16.64	1.10	23.0	1.10
28)	270.00	16.55	1.01	20.6	1.01
29)	300.00	16.50	0.96	18.6	0.94
30)	360.00	16.35	0.81	15.7	0.81
31)	420.00	16.25	0.71	13.6	0.70
32)	480.00	16.15	0.61	12.0	0.60
33)	540.00	16.10	0.56	10.8	0.52

34)	600.00	16.00	0.46	9.8	0.45
35)	660.00	15.95	0.41	9.0	0.39
36)	720.00	15.87	0.33	8.3	0.33
37)	780.00	15.81	0.27	7.8	0.27
38)	840.00	15.78	0.24	7.3	0.23
39)	900.00	15.73	0.19	6.9	0.18
40)	960.00	15.70	0.16	6.5	0.14
41)	1020.00	15.66	0.12	6.2	0.10
42)	1080.00	16.34	0.80	5.9	0.06
43)	1140.00	15.59	0.05	5.6	0.03
44)	1200.00	15.56	0.02	5.4	0.00