

**HARDEE COUNTY REGIONAL SANITARY LANDFILL
GROUND-WATER MONITORING WELL INSTALLATION DATA REPORT**

Prepared For

BOARD OF COUNTY COMMISSIONERS
Hardee County, Florida

Prepared By

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Tampa, Florida

December 1987

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HARDEE COUNTY REGIONAL SANITARY LANDFILL
GROUND-WATER MONITORING WELL INSTALLATION DATA REPORT

INTRODUCTION

On November 29, 1984, Law Environmental, Inc. (formerly Seaburn an Robertson) was authorized by the Hardee County Board of Commissioners to prepare a ground-water monitoring plan for the Hardee County Regional Sanitary Landfill. This plan was submitted for approval to the Florida Department of Environmental Regulation (FDER) in June 1985. After that time, a major operational change was planned at the Hardee County Landfill which involves the collection and spraying of leachate onto an area adjacent to the south boundary of the landfill. A revised ground-water monitoring plan was requested by the FDER to monitor the environmental effects of sprayfield operation.

Law Environmental, Inc., was authorized by Hardee County on January 28, 1987, to make the necessary modifications to the original ground-water monitoring plan. An addendum to the original plan was prepared and submitted to the FDER in March 1987. The ground-water monitoring plan and addendum were reviewed by the FDER and approved as part of the landfill Operating Permit Number 5025-096551.

On July 23, 1987, Law Environmental, Inc., was authorized by Hardee County to implement the ground-water monitoring plan by installing monitor wells at the Hardee County Landfill. The approved monitoring plan was used as a guideline for monitor well location and well construction during field activities.

PURPOSE AND SCOPE

This data report summarizes the field activities associated with monitor well installation at the Hardee County Landfill (see Figure 1), and is intended to be submitted to the FDER. The report is submitted to satisfy Specific Conditions of the FDER Permit Number 5025-096551. The data submitted includes well identification, latitude and longitude, the aquifer monitored, screen length, screen type and slot size, geologic log, total well depth, casing diameter, casing type and length, SWFWMD well construction permit number, elevation at top of measuring point, elevation at land surface, elevation at top and bottom of collection zone, direction of ground-water flow in screened zone, and water level (N.G.V.D.).

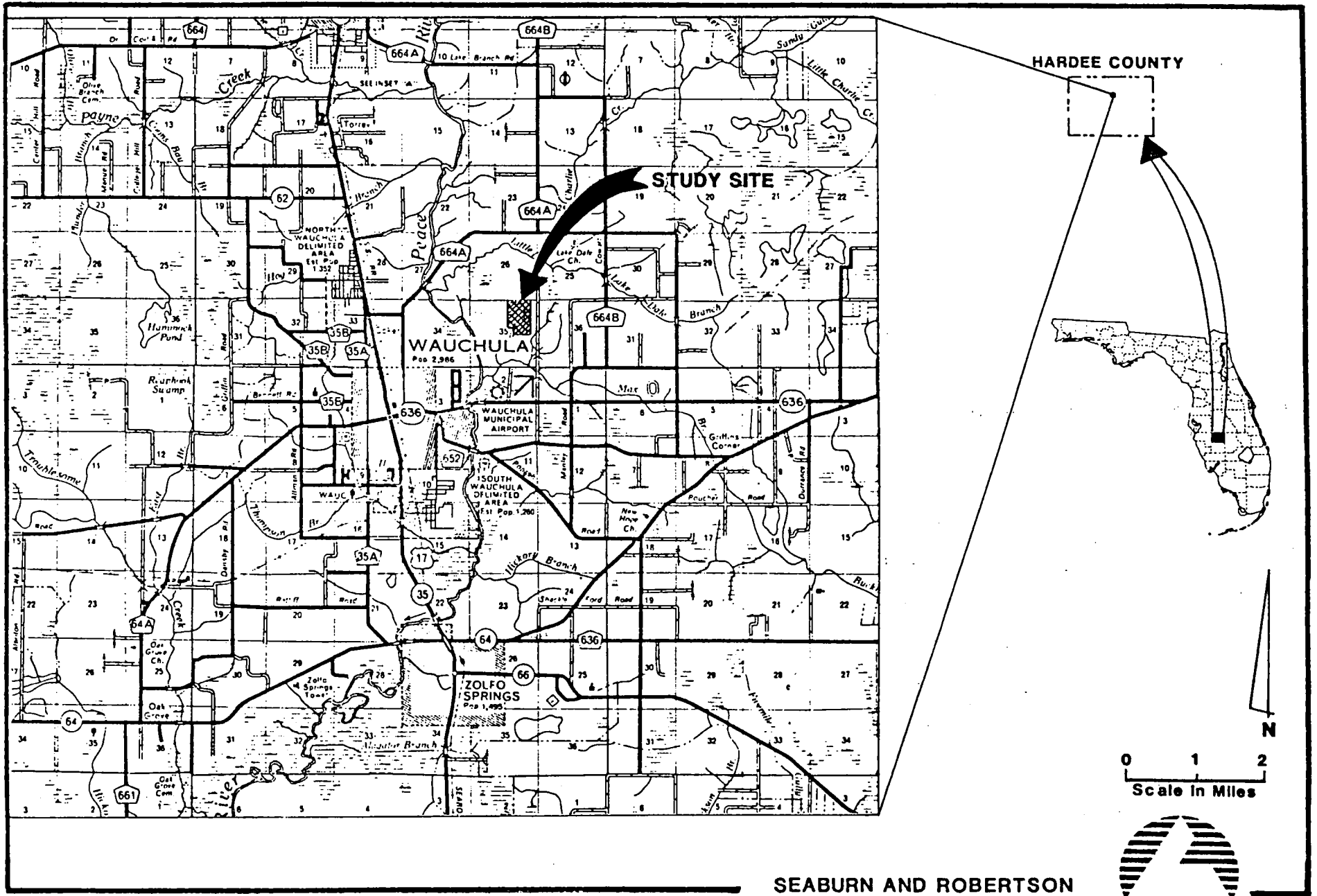


FIGURE 1.- LOCATION OF STUDY SITE.

SEABURN AND ROBERTSON
a division of Law Environmental, Inc.



PRE-EXISTING MONITOR WELLS

Three pre-existing wells at the Hardee County Landfill were incorporated into the ground-water monitoring plan. These wells were installed in October 1983, during construction of the landfill. These wells are designated MW-1, MW-2 and MW-3, and locations of the wells are shown on Figure 2. For construction details of the pre-existing wells refer to Table 1. Additional information on the pre-existing wells can be found in the Hardee County Ground-Water Monitoring Plan (Seaburn and Robertson, 1985) and Addendum to Ground-Water Monitoring Plan (Seaburn and Robertson, 1987).

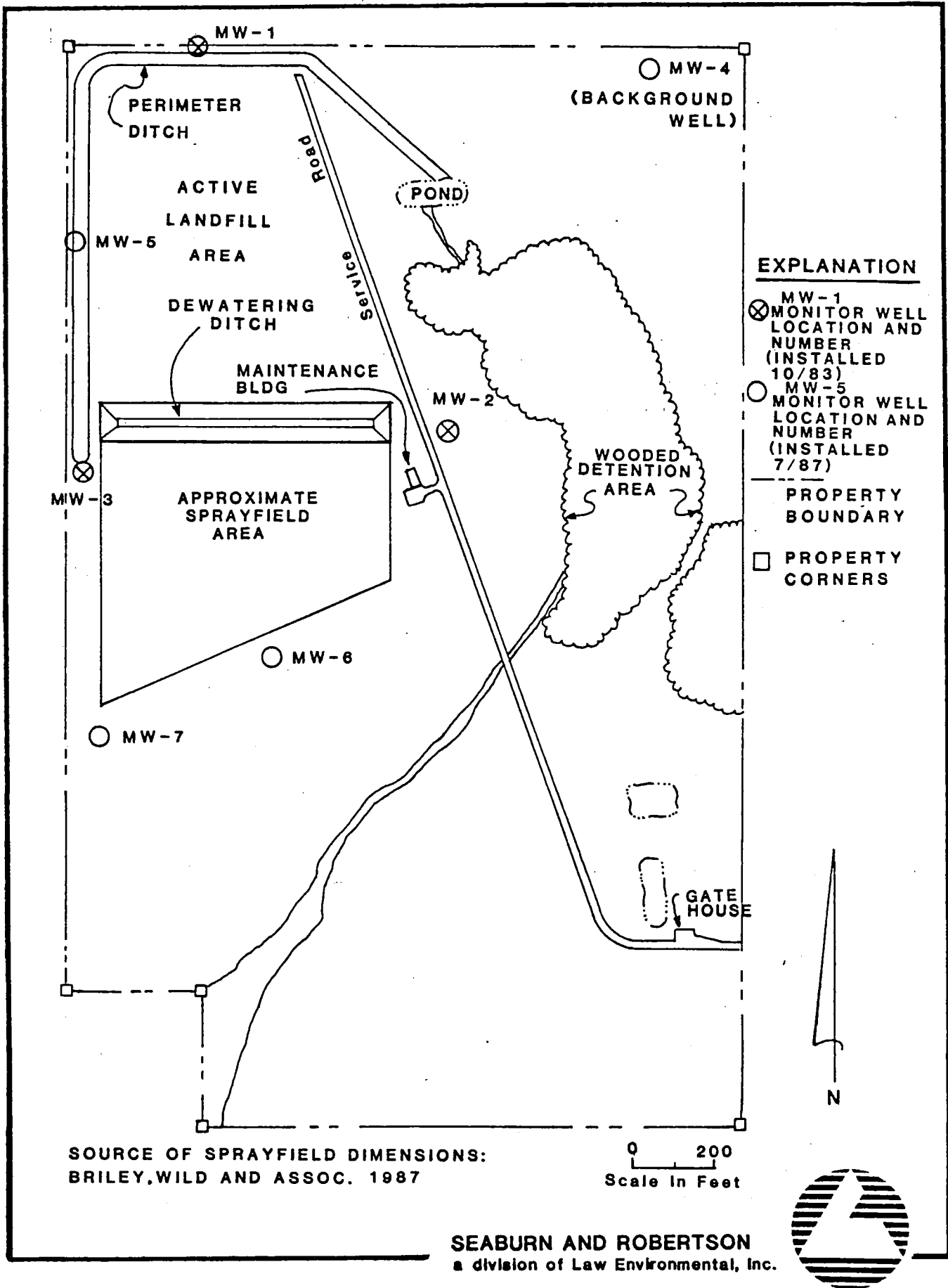


FIGURE 2.- LOCATION OF MONITOR WELLS.

Table 1. - Monitor Well Construction Data

Well ID.	Latitude/ Longitude	Total Depth (ft blw LS)	Height of well (ft abv LS)	Well Diam. (inch)	Casing Length (feet)	Combine Casing and Screen Materials	Screen Length (Feet)	Aquifer Monitored	SWFWMD Well Const. Permit No.
MW-1	27 34' 25" 81 47' 01"	11.0	1.79	4	7.8	Threaded Flush Joint Schedule 80 PVC, .010-inch Slotted Screen	5	Surficial	384056-20
MW-2	27 34' 13" 81 46' 53"	10.5	2.33	4	7.8	Threaded Flush Joint Schedule 80 PVC, .010-inch Slotted Screen	5	Surficial	384055-20
MW-3	27 34' 13" 81 47' 04"	15.2	1.82	4	12.0	Threaded Flush Joint Schedule 80 PVC, .010-inch Slotted Screen	5	Surficial	384054-20
MW-4	27 34' 25" 81 46' 50"	18.9	3.32	2	12.2	Threaded Flush Joint Schedule 40 PVC, .010-inch Slotted Screen	10	Surficial	435610-20
MW-5	27 34' 20" 81 47' 04"	18.1	2.95	2	11.0	Threaded Flush Joint Schedule 40 PVC, .010-inch Slotted Screen	10	Surficial	435611-20
MW-6	27 34' 10" 81 46' 58"	21.0	3.30	2	14.3	Threaded Flush Joint Schedule 40 PVC, .010-inch Slotted Screen	10	Surficial	435612-20
MW-7	27 34' 08" 81 47' 03"	21.0	3.16	2	14.2	Threaded Flush Joint Schedule 40 PVC, .010-inch Slotted Screen	10	Surficial	435613-20

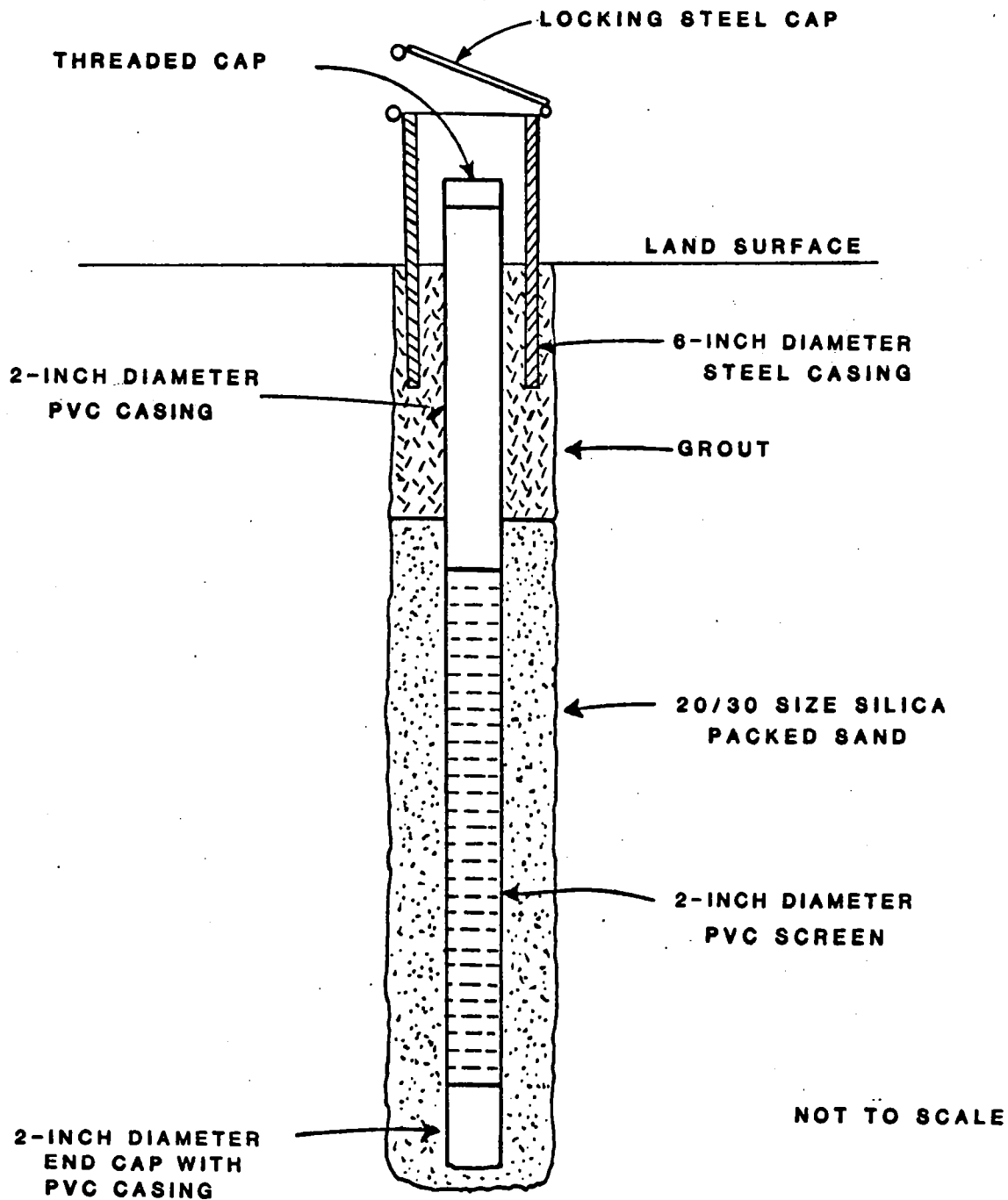
No sand seal data

WELL INSTALLATION

Field activities at the Hardee County Regional Sanitary Landfill started on Monday, July 27, 1987, and were completed on Wednesday, July 29, 1987. During this time, four shallow monitor wells, designated MW-4, MW-5, MW-6 and MW-7 were installed at the locations shown on Figure 2.

Prior to well installation, a Standard Penetration Test (SPT) boring was performed adjacent to each proposed monitor well location. Geologic information provided by each SPT boring (see Appendix I) was used to help determine the final design of each monitor well. Figure 3 shows the typical monitor well construction. All monitor wells were installed in the surficial aquifer using 6 and 7/8 inch (outside diameter) continuous flight hollow stem augers to depths ranging from 18.1 to 21.0 feet below land surface. No drilling fluids were used during monitor well construction. Monitor well construction data can be found in Table 1. Individual monitor well installation records can be found in Appendix II while SWFWMD Permit records are found in Appendix III.

Upon completion of the monitor well installation, all newly installed wells were pumped with a centrifugal pump until clear, non-turbid water of stable pH and specific conductance was produced. The pre-existing monitor wells were also pumped,



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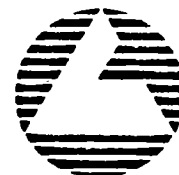


FIGURE 3.- TYPICAL MONITOR WELL CONSTRUCTION.

however, the wells proved to be poor producers with slow recharge rates. A clear non-turbid discharge was not observed by the field representative of Law Environmental, Inc. Additional well development was performed by Envirolab, Inc., prior to initial ground-water sampling completed during August, 1987.

FIELD PROCEDURES

During construction of the four additional monitor wells, precautions were taken to prevent cross contamination between drilling sites. All augers, drill pipe, drill bits, split spoon samplers, hoses, PVC well pipe and screen, along with the rig itself were steam cleaned between holes.

Upon completion of the monitor well construction, all wells were surveyed by Aim Engineering Company. Pertinent elevation, water level and latitude longitude data can be found in Table 2. The survey document prepared by Aim Engineering is located in Appendix IV.

Table 2. - Monitor Well Water Level, Elevation Data.

Well ID.	Elevation Top of Casing *	Elevation at Land Surface *	Elevation Top of Collection Zone *	Elevation Bottom of Collection Zone *	Direction of Ground-Water Flow in Screened Zone	Ground-Water Elevation 7/29/87 *
MW-1	87.97	86.17	79.2	74.2	Southwest	81.21
MW-2	85.86	83.46	77.0	72.0	Southwest	79.20
MW-3	87.75	85.95	74.8	69.8	Southwest	78.64
MW-4	87.16	83.86	77.2	67.2	Southwest	79.90
MW-5	88.76	85.66	78.7	68.7	Southwest	78.23
MW-6	87.94	84.64	76.6	66.6	Southwest	77.27
MW-7	87.51	84.31	74.3	64.3	Southwest	77.55

*WL
data*

* Feet above Mean Sea Level (MSL).

REFERENCES

Briley, Wild and Associates, 1987, Preliminary Design Drawing Hardee County Sanitary Landfill, Hardee County, Florida, Project No. 86073-6.

Seaburn and Robertson, 1985, Ground-Water Monitoring Plan, Hardee County Regional Sanitary Landfill, Hardee County, Florida, June 1985, 55 p.

Seaburn and Robertson, 1987, Addendum to Ground-Water Monitoring Plan, Hardee County Regional Sanitary Landfill, Hardee County, Florida, March 1987, 19 p.

APPENDICES

APPENDIX I
TEST BORING RECORDS

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.)					BLOWS PER SIX IN.	REC (IN.)
			0	10	20	30	50		
0.0	SAND - Lt. gray-tan, f. gr., w. sorted, mod. loose, quartz; no odor.	78.0						6-4-5	1E
4.5									
6.5	SANDY CLAY - Mottled tan, gray-tan, and red-orange, v. sandy, mod. stiff, sticky, sl. plastic.	73.0						9-5-16	1E
12.0									
18.9	SAND and SANDY CLAY - Tan, f. to med. gr. quartz sand, with mottled green-gray and orange sandy clay seams.	68.0						11-15-16	1E
18.9									
	SAND - Med. tan-gray, med. to coarse gr., sl. clayey; no odor.	63.0							
			58.0						
			53.0						
			48.0						
	BORING TERMINATED AT 18.9 FEET.	43.0							

JOB NUMBER
BORING NUMBER
DATE

84056-002
MW-4
7-29-87

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.)					BLOWS PER SIX IN.	REC (IN.)
			0	10	20	30	50		
0.0	SAND - Dk.gray-brown to orange-tan, f.gr.w.sorted, quartz; no odor.								
4.0		79.0			●			3-10-8	18
6.0	SILTY SAND - Lt.tan-orange, f.gr., w.sorted, some large iron cemented sand nodules.								
9.5		74.0			●			8-12-12	18
13.0	SANDY CLAY - Blue-green to tan-gray, stiff, v.sandy, sl. silty, sl.plastic, no odor.								
13.0		69.0			●			7-9-13	18
21.0	SANDY CLAY and SAND - Lt. tan-gray, interbedded, med.gr sand, mod.stiff clay. BORING TERMINATED AT 21.0 FEET.								
		64.0							
		59.0							
		54.0							
		49.0							
		44.0							

JOB NUMBER 84056-002
BORING NUMBER MW-6
DATE 7-28-87

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.)	BLOWS PER SIX IN.	REC (IN.)
			0 10 20 30 50		
0.0	SAND - Lt.tan-gray to dark brown-gray, f.gr., w.sorted, quartz; no odor.	80.0		4-6-10	18
3.5				5-5-5	18
4.5	SILTY CLAY - Gray-tan to gray-brown, sl.plastic.	75.0		2-6-14	18
7.5				4-6-7	18
11.5	SANDY CLAY - Tan-gray, stiff mod.plastic, minor organic sand seams; no odor.	70.0		14-12-7	18
14.5				3-5-8	18
16.0	PHOSPHATIC SAND - Med.tan-gray, coarse gr., poor.sort., sl.clayey.	65.0			
18.0					
	CLAY - Green, v.stiff, plast. sl.odor.	60.0			
	SILTY SANDY CLAY - Mottled orange and gray-green, very stiff, sl.plastic, minor sand seams; no odor.	55.0			
	BORING TERMINATED AT 18.0 FEET.	50.0			
		45.0			

JOB NUMBER 84056-002
 BORING NUMBER MW-5
 DATE 7-28-87

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.)	BLOWS PER SIX IN.	REC (IN.)	
			0 10 20 30 50			
0.0	SAND - Tan-gray to brown-tan, f.gr., w. sorted, quartz; some organic silt; no odor.	79.0	10	6-6-6	18	
6.0		74.0	25	8-13-15	18	
12.0		69.0	25	4-10-20	18	
15.0		64.0				
21.0		59.0				
	SANDY CLAY - Mottled gray-tan and gray-green, v. sandy, stiff, v. sl. plastic.	54.0				
		49.0				
		44.0				
		BORING TERMINATED AT 21.0 FEET.				

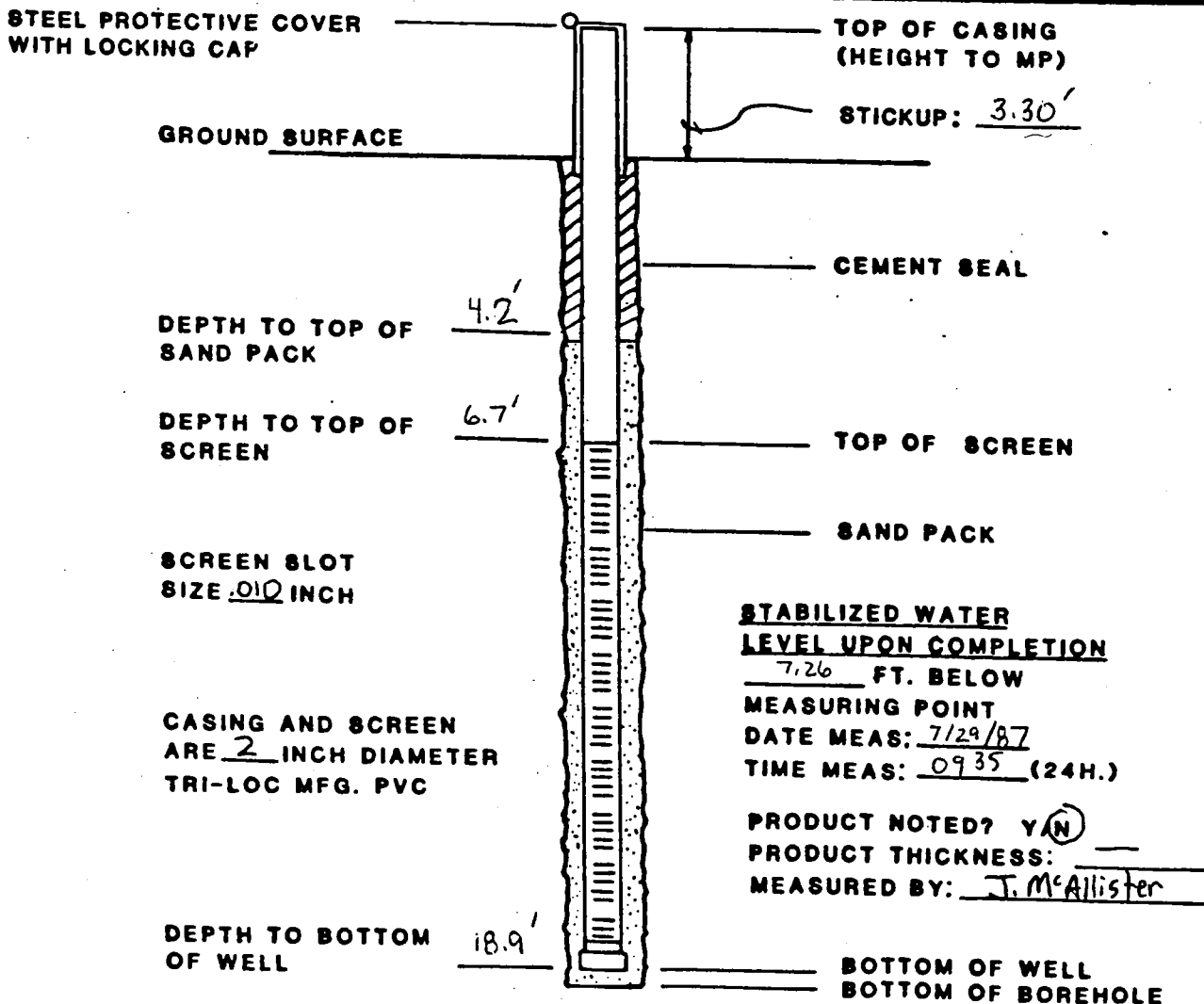
JOB NUMBER 84056-002
 BORING NUMBER MW-7
 DATE 7-28-87

APPENDIX II

MONITOR WELL INSTALLATION RECORDS

TYPE II MONITORING WELL INSTALLATION RECORD

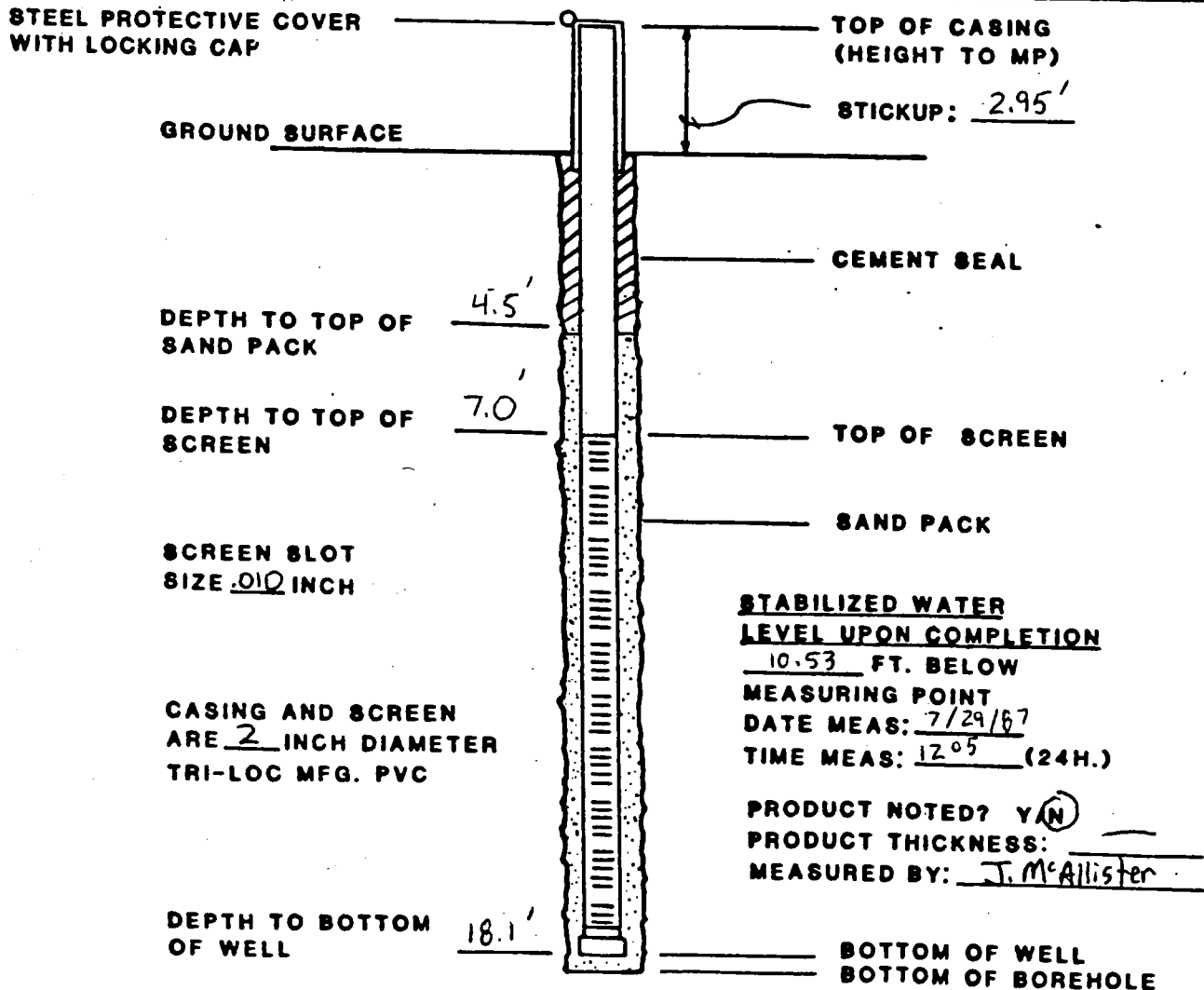
JOB NAME Hardee County Landfill JOB NUMBER 84056-002
 BORING/WELL NUMBER MW-4 DATE INSTALLED 7/29/87
 LOCATION Hardee County Landfill
 DRILLING CONTRACTOR Law Engineering DRILLING METHOD Hollow stem Auger
 BOREHOLE DIAMETER 8" LAW FIELD REPRESENTATIVE J. McAllister
 ELEVATION OF MEASURING POINT 87.16 EST SURVEYED
 LOCK KEY CODE/COMBINATION DATE DEVELOPED 7/29/87



TYPE II MONITORING WELL INSTALLATION

RECORD

JOB NAME Hardee County Landfill JOB NUMBER 84056-002
 BORING/WELL NUMBER MW-5 DATE INSTALLED 7/28/87
 LOCATION Hardee County Landfill
 DRILLING CONTRACTOR Law Engineering DRILLING METHOD Hollow Stem Auger
 BOREHOLE DIAMETER 8" LAW FIELD REPRESENTATIVE J. McAllister
 ELEVATION OF MEASURING POINT 88.76 EST SURVEYED
 LOCK KEY CODE/COMBINATION DATE DEVELOPED 7/28/87



TYPE II MONITORING WELL INSTALLATION

RECORD

JOB NAME Hardee County Landfill JOB NUMBER 84056-002
BORING/WELL NUMBER MW-6 DATE INSTALLED 7/28/87
LOCATION Hardee County Landfill
DRILLING CONTRACTOR Law Engineering DRILLING METHOD Hollow Stem Auger
BOREHOLE DIAMETER 8" LAW FIELD REPRESENTATIVE J. McAllister
ELEVATION OF MEASURING POINT 87.94 EST SURVEYED
LOCK KEY CODE/COMBINATION DATE DEVELOPED 7/28/87

STEEL PROTECTIVE COVER
WITH LOCKING CAP

TOP OF CASING
(HEIGHT TO MP)

GROUND SURFACE

STICKUP: 3.45

DEPTH TO TOP OF
SAND PACK 7.0'

CEMENT SEAL

DEPTH TO TOP OF
SCREEN 10.0'

TOP OF SCREEN

SCREEN SLOT
SIZE .010 INCH

SAND PACK

CASING AND SCREEN
ARE 2 INCH DIAMETER
TRI-LOC MFG. PVC

STABILIZED WATER
LEVEL UPON COMPLETION

10.67 FT. BELOW

MEASURING POINT

DATE MEAS: 7/29/87

TIME MEAS: 1256 (24H.)

PRODUCT NOTED? YAN

PRODUCT THICKNESS:

MEASURED BY: J. McAllister

DEPTH TO BOTTOM
OF WELL 21.0'

BOTTOM OF WELL
BOTTOM OF BOREHOLE

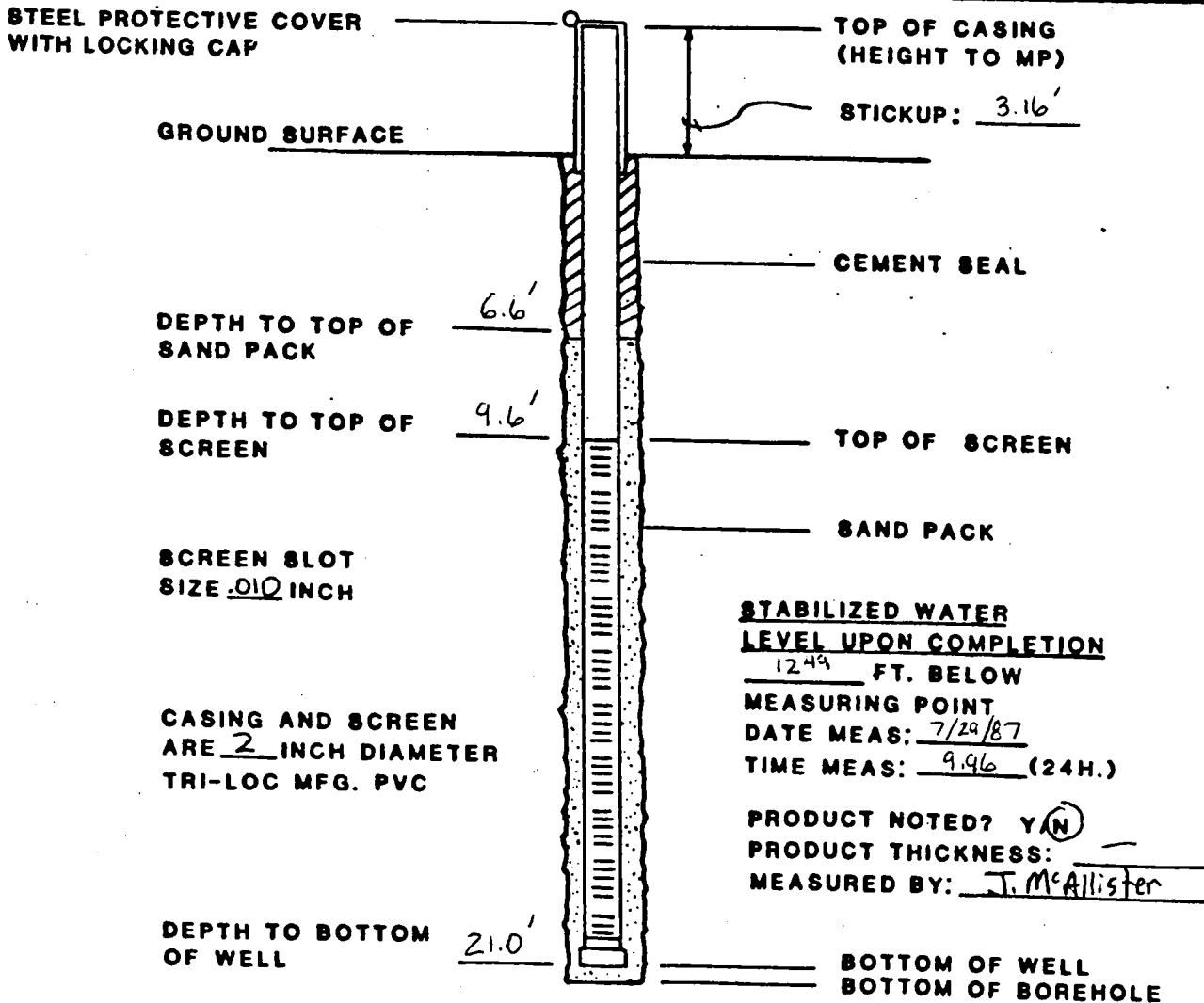
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TYPE II MONITORING WELL INSTALLATION

RECORD

JOB NAME Hardee County Landfill JOB NUMBER 84056-002
 BORING/WELL NUMBER MW-7 DATE INSTALLED 7/28/87
 LOCATION Hardee County Landfill
 DRILLING CONTRACTOR Law Engineering DRILLING METHOD Hollow Stem Auger
 BOREHOLE DIAMETER 8" LAW FIELD REPRESENTATIVE J. McAllister
 ELEVATION OF MEASURING POINT 87.51' EST SURVEYED
 LOCK KEY CODE/COMBINATION DATE DEVELOPED 7/28/87



APPENDIX III
SOUTHWEST FLORIDA WATER MANAGEMENT
DISTRICT WELL COMPLETION REPORTS

Please complete in black ink or type
WELL COMPLETION REPORT

Owner's Name Hardee County
 Permit Number: 435610-20 MW-4
 X Herman Dangle 8/3/87
 Water Well Contractor's Signature Completion Date
 License No. 2825

SURFACE CASING, CASING AND LINER MATERIAL:

Types	Diam. (In.)	From (Ft.)	To (Ft.)
PVC	2"	0	22
Neat Cement: No. of Bags		From (Ft.)	To (Ft.)
3		10	0

IRON: ___ ppm SULFATES: ___ ppm CHLORIDES: ___ ppm
 FINISH: Screen: 10 (Ft.) Open Hole: ___ (Ft.)

WELL LOCATION

___ % ___ % ___ % of Section 35

<u>33</u>	<u>S</u>	<u>25</u>	<u>E</u>	Locate in Section
Township (N-S)	Range	(E-W)		
Latitude				Optional may be required
	Deg.	Min.	Sec.	
Longitude				

DRILL METHOD

Rotary Cable Tool Jet Auger Other _____
 Measured Static Water Level _____ + _____ - _____ Ft.
 Measured Pumping Water Level _____ + _____ - _____ Ft.
 After _____ Hours At _____ G.P.M.
 Measuring Pt. (Describe): GL
 Which is NA Ft. Above Below Land Surface

Depth (Ft.)		Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
From	To	
0	3	Sand
3	8.5	Sandy silty clay
8.5	13	Silty clay
13	15	Clay with phosphate
15	20	Clay

Driller's Name R. Swint

Please complete in black ink or type

WELL COMPLETION REPORT

Owner's Name Hardee County
 Permit Number: 435611-20 MW-5
 X [Signature] 8/3/87
 Water Well Contractor's Signature Completion Date
 License No. 2825

SURFACE CASING, CASING AND LINER MATERIAL:

Types	Diam. (In.)	From (Ft.)	To (Ft.)
PVC	2"	0	18
Neat Cement: No. of Bags		From (Ft.)	To (Ft.)
2		6	0

IRON: _____ ppm SULFATES: _____ ppm CHLORIDES: _____ ppm
 FINISH: Screen: 10 (Ft.) Open Hole: _____ (Ft.)

WELL LOCATION

____ % ____ % ____ % of Section 35

<input type="text" value="3"/> <input type="text" value="3"/>	<input type="text" value="S"/>	<input type="text" value="2"/> <input type="text" value="5"/>	<input type="text" value="E"/>	Locate in Section
Township	(N-S)	Range	(E-W)	
Latitude	<input type="text"/>	<input type="text"/>	<input type="text"/>	} Optional may be required
	Deg.	Min.	Sec.	
Longitude	<input type="text"/>	<input type="text"/>	<input type="text"/>	

DRILL METHOD

Rotary Cable Tool Jet Auger Other _____
 Measured Static Water Level _____ + _____ - _____ Ft.
 Measured Pumping Water Level _____ + _____ - _____ Ft.
 After _____ Hours At _____ G.P.M.
 Measuring Pt. (Describe): GL
 Which is NA Ft. Above Below Land Surface

Depth (Ft.)		Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
From	To	
0	9	Sand
9	12	Sandy clay
12	18	Clay with phosphate

Driller's Name R. Swint

Please complete in black ink or type
WELL COMPLETION REPORT

Form No. 25-18-5/83

Owner's Name Hardee County
 Permit Number: 435612-20 MW-6
 X Forman Rangel 8/4/87
 Water Well Contractor's Signature Completion Date
 License No. 2825

SURFACE CASING, CASING AND LINER MATERIAL:

Types	Diam. (In.)	From (Ft.)	To (Ft.)
PVC	2"	0	21
Neat Cement: No. of Bags		From (Ft.)	To (Ft.)
4		0	9

IRON: _____ ppm SULFATES: _____ ppm CHLORIDES: _____ ppm
 FINISH: Screen: 10 (Ft.) Open Hole: _____ (Ft.)

WELL LOCATION

____ % ____ % ____ % of Section 35

3	3	S	2	5	E
---	---	---	---	---	---

Township (N-S) Range (E-W) Locate in Section

Latitude Deg. Min. Sec. N } Optional may be required
 Longitude Deg. Min. Sec. W }

DRILL METHOD

Rotary Cable Tool Jet Auger Other _____
 Measured Static Water Level _____ + _____ - _____ Ft.
 Measured Pumping Water Level _____ + _____ - _____ Ft.
 After _____ Hours At _____ G.P.M.
 Measuring Pt. (Describe): GL
 Which is NA Ft. [] Above [] Below Land Surface

Depth (Ft.)		Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
From	To	
0	9	Sand
9	12.5	Sandy clay
12.5	21	Clay with phosphate

Driller's Name R. Swint

Please complete in black ink or type

WELL COMPLETION REPORT

Owner's Name Hardee County
 Permit Number: 435613-20 MW-7
 X Herman Lange 8/4/87
 Water Well Contractor's Signature Completion Date
 License No. 2825

SURFACE CASING, CASING AND LINER MATERIAL:

Types	Diam. (In.)	From (Ft.)	To (Ft.)
PVC	2"	21.75	0
Neat Cement: No. of Bags		From (Ft.)	To (Ft.)
4		9	0

IRON: ___ ppm SULFATES: ___ ppm CHLORIDES: ___ ppm
 FINISH: Screen: 10 (Ft.) Open Hole: ___ (Ft.)

WELL LOCATION

___ % of Section 35

Township (N-S) Range (E-W) Locate in Section

Latitude N } Optional
 Deg. Min. Sec. may be
 Longitude W } required

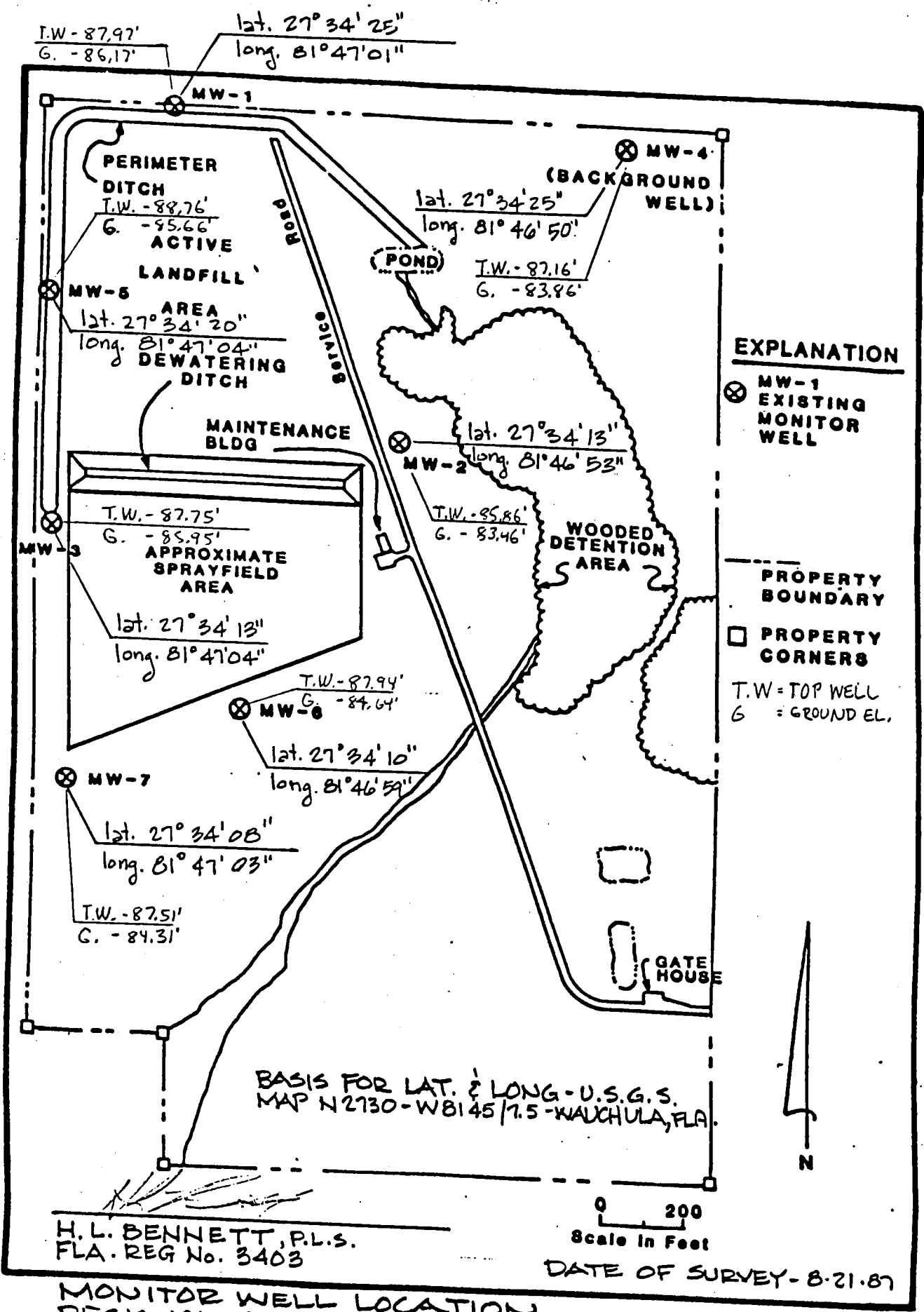
DRILL METHOD

Rotary Cable Tool Jet Auger Other ___
 Measured Static Water Level ___ + ___ - ___ Ft.
 Measured Pumping Water Level ___ + ___ - ___ Ft.
 After ___ Hours At ___ G.P.M.
 Measuring Pt. (Describe): GL
 Which is NA Ft. [] Above [] Below Land Surface

Depth (Ft.)		Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
From	To	
0	8	Sand
8	14	Sandy clay
14	22	Clay with phosphate

Driller's Name R. Swint

APPENDIX IV
MONITOR WELL SURVEY INFORMATION



H. L. BENNETT, P.L.S.
FLA. REG No. 3403

**MONITOR WELL LOCATION
REGIONAL SANITARY LANDFILL, HARDEE COUNTY, FLA.**

REVISED 11-23-87
CORRECTED GRD. EL. AT MW-6