



# AQUATERRA

Environmental Consultants



## LETTER OF TRANSMITTAL

Date: May 23 1991

To: Larry Rose

From: Steve Czekański

Subject:

Well completion forms for MW-5a, MW-9 Bladen Co. Landfill

Enclosed please find the following material:

- Drawings
- Specifications
- Contracts
- Letters
- \_\_\_\_\_

forwarded to you for the following action:

- for your information
- for approval
- for checking
- \_\_\_\_\_
- review for construction
- review as noted
- review for function only

List Materials Below:

Sincerely,

Steve Czekański

Copies to: Mr. Steve Moffatt - Bladen Co. Fayetteville  
Mr. Jim Boles - DEHNR - DEM

TRANSMIT.doc

Corporate Office:

P O Box 50328  
Raleigh, NC 27650  
(919) 859-9987  
FAX (919) 859-9930

Charlotte Office:

P O Box 668107  
Charlotte, NC 28266-8107  
(704) 525-9680  
FAX (704) 527-2792

Greensboro Office:

P O Box 16241  
Greensboro, NC 27416-0241  
(919) 273-5003  
FAX (919) 271-8138

FOR OFFICE USE ONLY			
Quad. No.	_____	Serial No.	_____
Lat.	_____	Long.	_____ Pc _____
Minor Basin	_____		
Basin Code	_____		
Header Ent.	_____	GW-1 Ent.	_____

**WELL CONSTRUCTION RECORD** MW-5a

DRILLING CONTRACTOR Groundwater Protection  
 DRILLER REGISTRATION NUMBER 1105

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067-WM-0046

WELL LOCATION: (Show sketch of the location below)  
 Nearest Town: Elizabethtown  
US Hwy 701

County: Bladen

(Road, Community, or Subdivision and Lot No.)  
 OWNER Bladen County Health Dept.  
 ADDRESS P.O. Box 188  
Elizabethtown, NC 28337

Depth		DRILLING LOG Formation Description
From	To	
0	12	Brown to tan slty CLAY
12	16.5	Dark gray, cly f. SAND
16.5	27.5	Dark gray, f. sndy CLAY
27.5	40	Dark gray, slty CLAY

DATE DRILLED 4-5-91 USE OF WELL Monotor  
 TOTAL DEPTH 40 CUTTINGS COLLECTED  Yes  No

Boring terminated @ 40'

DOES WELL REPLACE EXISTING WELL?  Yes  No  
 STATIC WATER LEVEL: 22.45 FT.  above TOP OF CASING.  
 below  
 TOP OF CASING IS 2.0 FT. ABOVE LAND SURFACE.

YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_  
 WATER ZONES (depth): \_\_\_\_\_  
 CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_

1. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>-2.5</u> To <u>3.5</u> Ft.	<u>6"</u>		<u>Steel</u>
From <u>-2.0</u> To <u>20</u> Ft.	<u>2"</u>		<u>Sch 40 PVC</u>
From _____ To _____ Ft.			

If additional space is needed use back of form.  
**LOCATION SKETCH**  
 (Show direction and distance from at least two State Roads, or other map reference points)  
see back side

1. GROUT:

Depth	Material	Method
From <u>surf</u> To <u>8</u> Ft.	<u>No. 1 Port.</u>	<u>Pour</u>
From <u>8</u> To <u>10</u> Ft.	<u>bentonite</u>	<u>Pour</u>
From <u>30</u> To <u>32</u> Ft.	<u>bentonite</u>	<u>Pour</u>

2. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>20</u> To <u>30</u> Ft.	<u>2</u> in.	<u>0.01</u> in.	<u>PVC</u>
From _____ To _____ Ft.			
From _____ To _____ Ft.			

3. GRAVEL PACK:

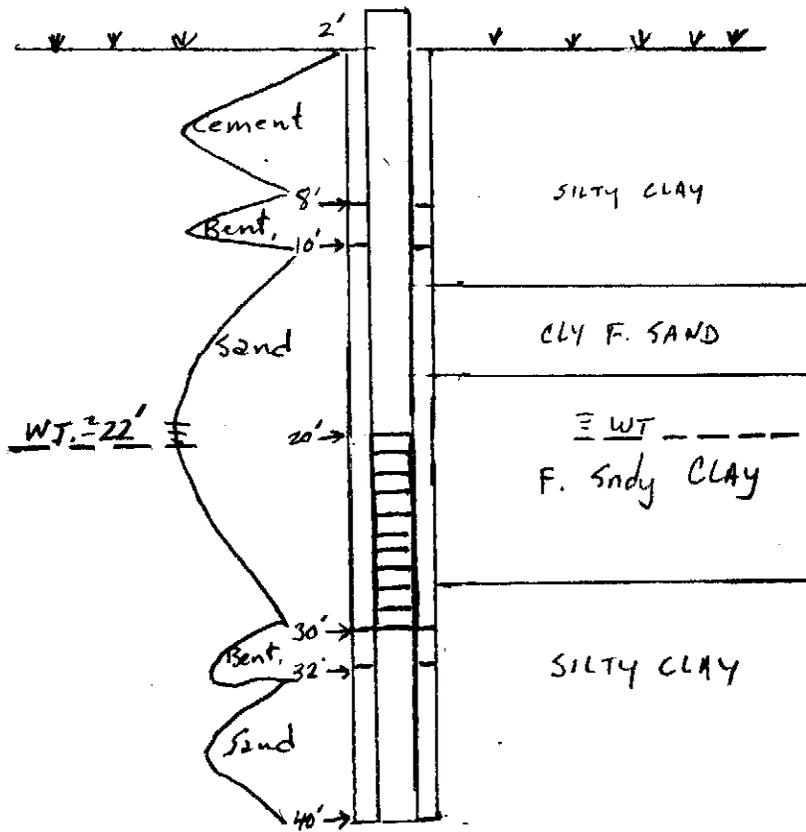
Depth	Size	Material
From <u>10</u> To <u>30</u> Ft.	<u>fine qtz.</u>	<u>sand</u>
From <u>32</u> To <u>40</u> Ft.	<u>fine qtz.</u>	<u>sand</u>

4. REMARKS: \_\_\_\_\_

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Steve Cypulski 4-18-91  
 SIGNATURE OF CONTRACTOR OR AGENT DATE

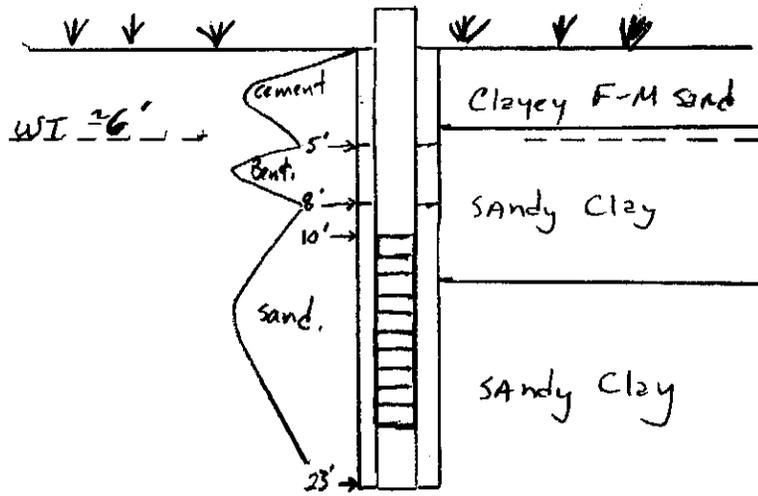
MW-5A



SCREENED - 20' - 30'



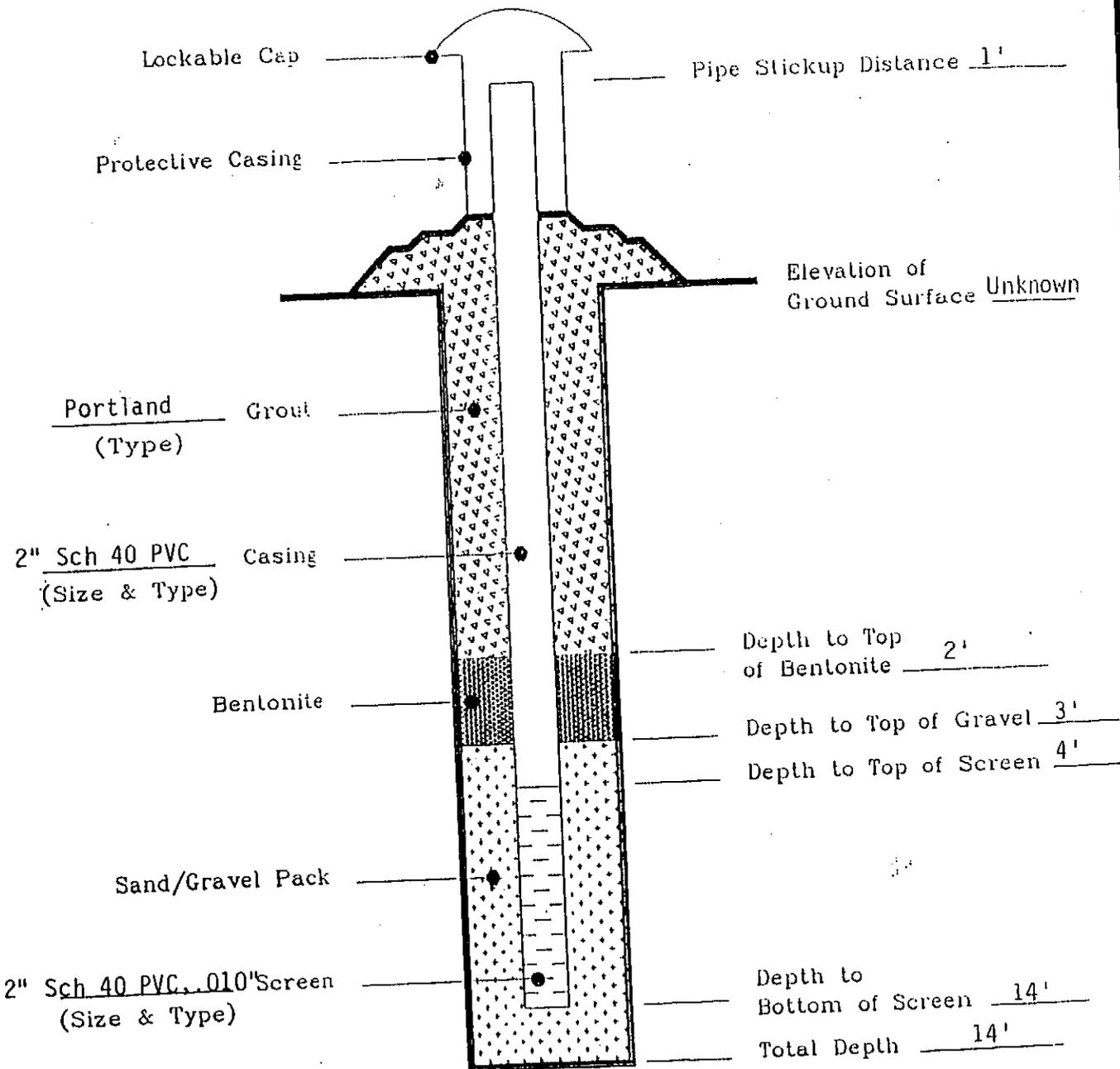
MW-9



SCREENED 10'-20'



Well Number MW-7 Drilling Method HSA  
 Date Started 2-22-88 Drilling Fluids None  
 Date Finished 2-22-88 Static Water Level N/A Date \_\_\_\_\_  
 Geologist T. A. Proctor All Depths Referenced From  
 Top of Casing



**PROJECT**

Bladen Co. Landfill  
 Elizabethtown, N.C.

**AQUATERRA, INC.**

RALEIGH, NORTH CAROLINA

JOB NUMBER: 200-87-112

SCALE: N.T.S.

FIGURE NUMBER:

MONITORING WELL INSTALLATION DATA

Well Number: MW-7 Ground Elevation: Unknown

Dated Started: 2-22-88 Date Completed: 2-22-88

Geologists: T. A. Proctor

Drillers: Carolina Drilling

Observed By: \_\_\_\_\_

Weather Conditions: Fair and cool

CASING: Depth From: \_\_\_\_\_ to \_\_\_\_\_

I.D.: 2.067 O.D.: 2.375 Type: Sch 40

Length Above Ground Surface: Approx. 1 foot

GROUT: Depth From: 0 to 2'

Material: Portland

SCREEN: Depth From: 4' to 14'

Type of Opening: Sch 40, 0.010 slot

\_\_\_\_\_  
(Describe End of Screen)

BENTONITE: Depth From: 2' to 3'

Type of Bentonite: 1/8" pellets

GRAVEL: Depth From: 3' to 14'

Depth Water Encountered: \_\_\_\_\_

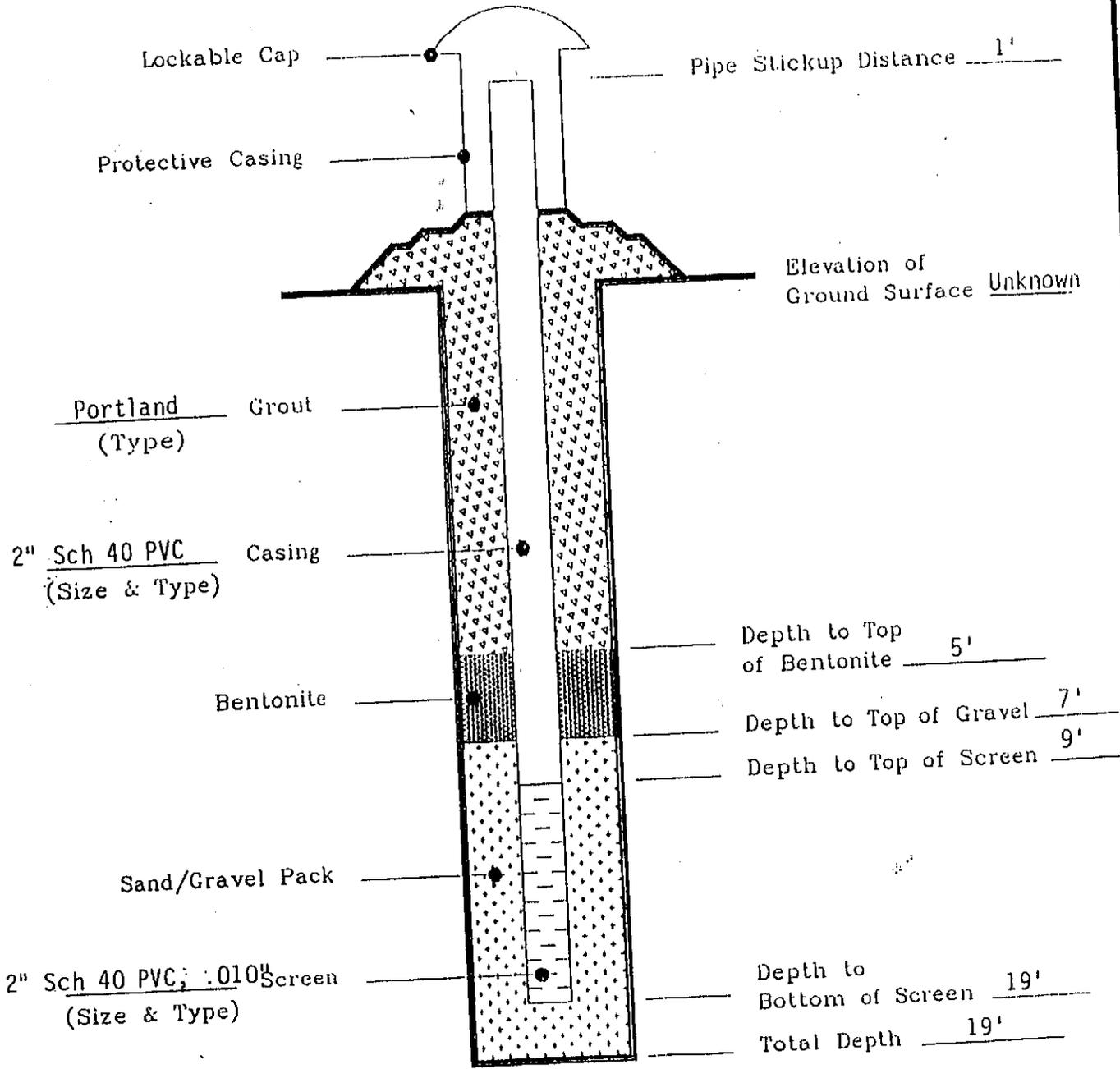
Static Water Level: \_\_\_\_\_ Date: \_\_\_\_\_

Drilling Mud Type/Brand: None

Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Well Number MW-8 Drilling Method HSA  
 Date Started 1-20-88 Drilling Fluids None  
 Date Finished 1-21-88 Static Water Level N/A Date \_\_\_\_\_  
 Geologist T. A. Proctor All Depths Referenced From  
 Top of Casing



PROJECT  
 Bladen Co. Landfill  
 Elizabethtown, N.C.

AQUATERRA, INC.  
 RALEIGH, NORTH CAROLINA

JOB NUMBER: 200-87-112  
 SCALE: N.T.S.  
 FIGURE NUMBER:

MONITORING WELL INSTALLATION DATA

Well Number: MW-8 Ground Elevation: Unknown

Dated Started: 1-21-88 Date Completed: 1-22-88

Geologists: Tom Proctor

Drillers: Carolina Drilling

Observed By: \_\_\_\_\_

Weather Conditions: Rainy and cool

CASING: Depth From: \_\_\_\_\_ to \_\_\_\_\_  
I.D.: 2.067 O.D.: 2.375 Type: Sch 40  
Length Above Ground Surface: 1 foot

GROUT: Depth From: 0 to 75  
Material: Portland

SCREEN: Depth From: 9 to 19  
Type of Opening: Sch 40; 0.010 slot  
\_\_\_\_\_  
(Describe End of Screen)

BENTONITE:  Depth From: 8 to 15  
Type of Bentonite: 1/8" pellets

GRAVEL: Depth From: 7 to 19

Depth Water Encountered: N/A

Static Water Level: N/A Date: \_\_\_\_\_

Drilling Mud Type/Brand: None

Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ATTACHMENT A**  
**WELL CONSTRUCTION RECORDS,**  
**SCHEMATICS AND INSTALLATION DATA**



# AQUATERRA

Aquaterra, Inc. • P.O. Box 50328 • Raleigh, NC 27650 • 919-839-0199

Greensboro 919 273 5003

273 - 5348

August 18, 1989



North Carolina Department of Human Resources  
Division of Health Services  
Solid Waste Management Section  
P.O. Box 2091  
Raleigh, North Carolina 27602-2091

Attention: Mr. Bobby Lutfy

Re: Documentation for Ground Water Monitoring Wells  
Bladen County Landfill Site 09-01  
Elizabethtown, North Carolina  
Aquaterra Job No. 7

Dear Mr. Lutfy:

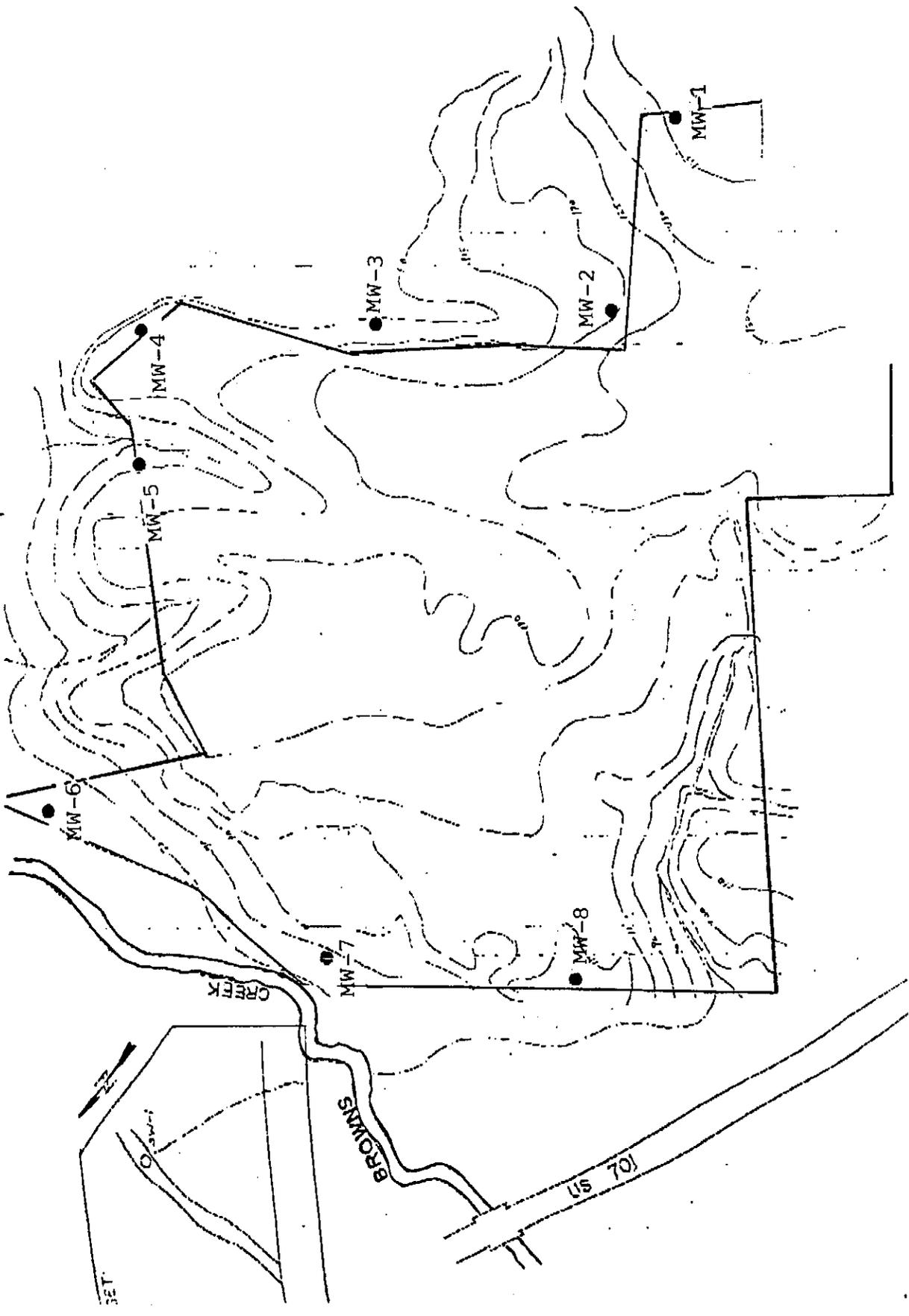
Aquaterra, Inc. (Aquaterra) has been contracted by the Bladen County Health Department to manage the annual ground water and surface water monitoring program at the Bladen County Landfill. As requested by your memo to Mr. Steven L. Moffat, Director of Health Services, Bladen County Health Department, we have enclosed the information requested in items 1, 2e, and 3. Our schedule will continue to include annual ground and surface water sampling. Samples will be collected for analysis on the third Friday of September. This information was supplied to the Solid and Hazardous Waste Management Branch in a memo to Mr. Mike Babuin dated September 14, 1987, which also includes the parameters to be tested for.

If you have any questions, please do not hesitate to contact us.

Sincerely,

AQUATERRA, INC.  
*Susan Kite*  
Susan Kite, P.G.  
Staff Geologist

cc: C. Earl Jones (Aquaterra)  
Steven L. Moffat  
(Bladen County Health Department)



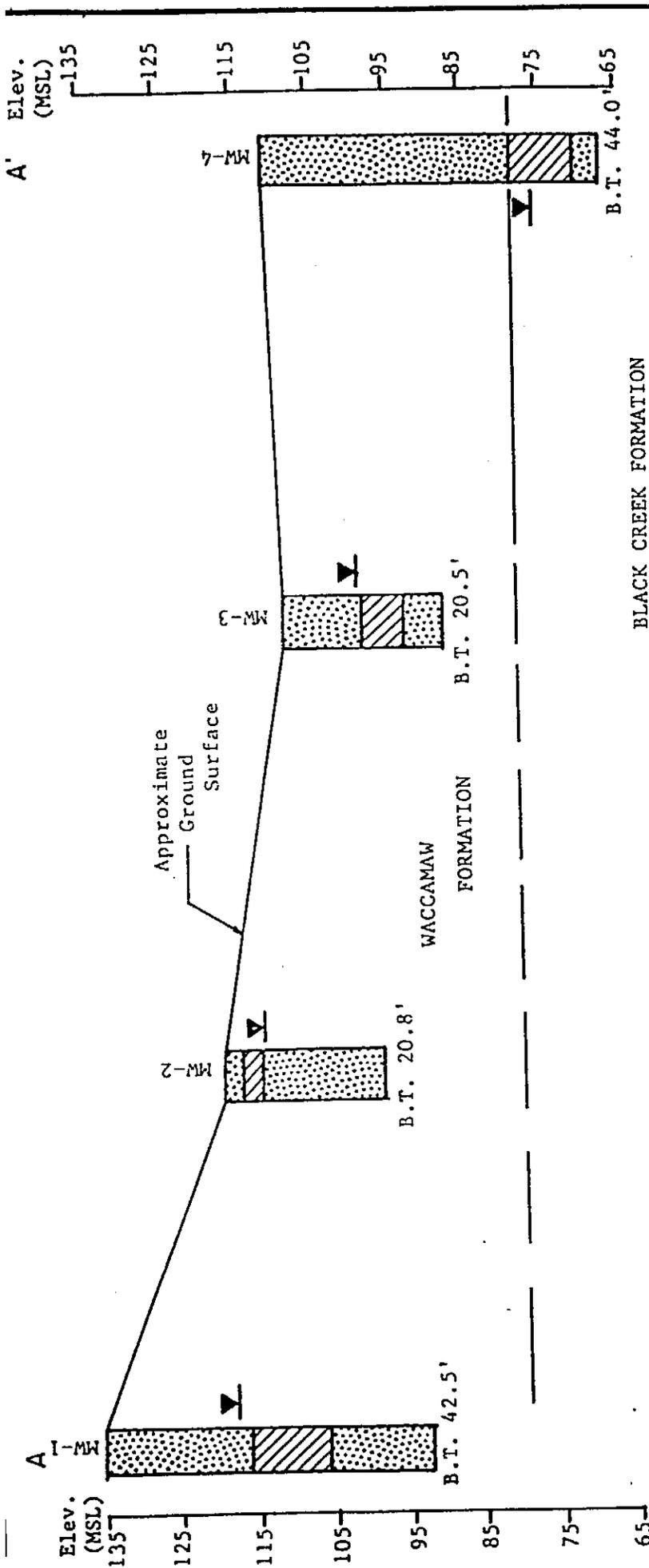
**AQUATERRA, INC.**  
 RALEIGH, NORTH CAROLINA

**PROJECT:** Bladen County Landfill  
 Elizabethtown, NC 09-01

**JOB #** 7      **FIGURE #** 1      **SCALE:** 0 50 100 FT.

**LEGEND:**

- Topographic Contour
- Landfill Boundary

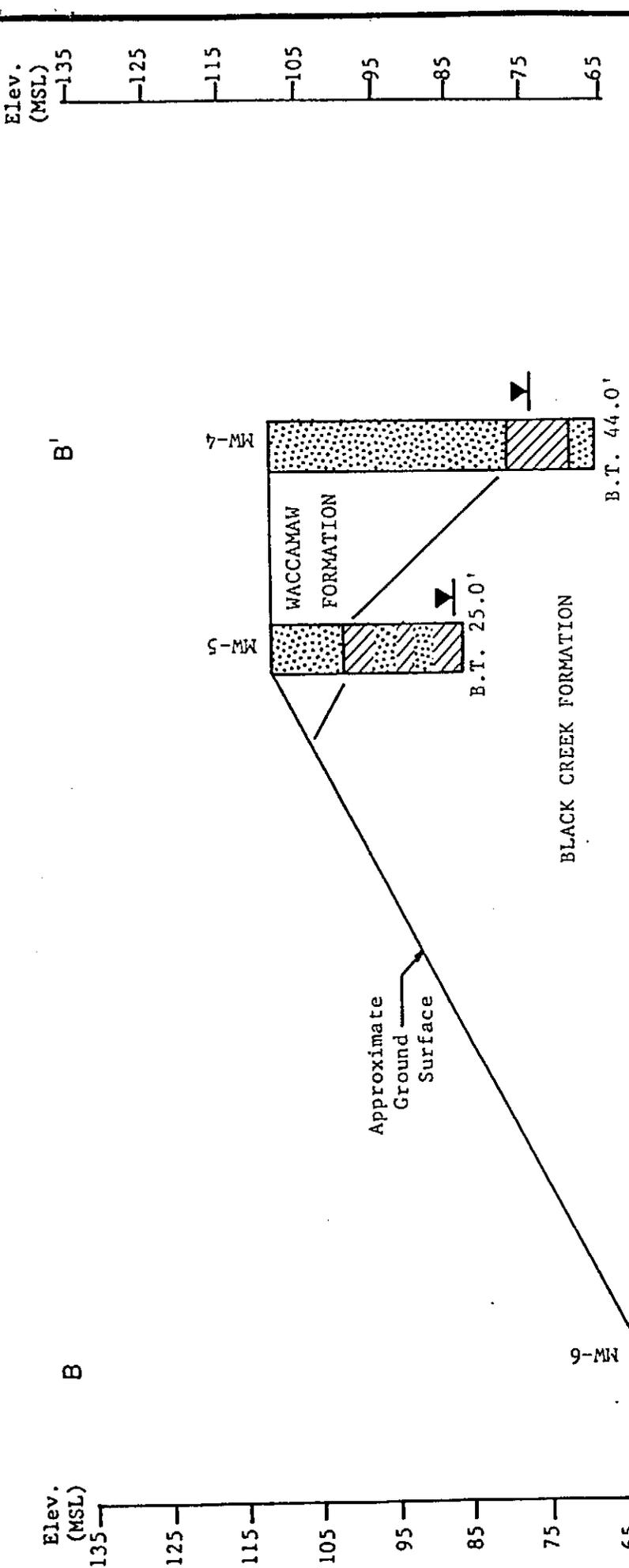


CROSS - SECTION ALONG A TO A'  
 (Elevations of Borings are approximate)

SCALE

Horizontal 1" = 200'  
 Vertical 1" = 20'

<b>PROJECT</b> Bladen County Landfill Elizabethtown, N.C.	SCALE: As Shown
	JOB NO: 7
	FIG NO: 4



**CROSS - SECTION ALONG B TO B'**

(Elevations of Borings are approximate)

**SCALE**

Horizontal 1" = 200'  
Vertical 1" = 20'

**LEGEND:**

- SAND
- CLAY
- 24 HR. Water Level
- B.T. Boring Terminated

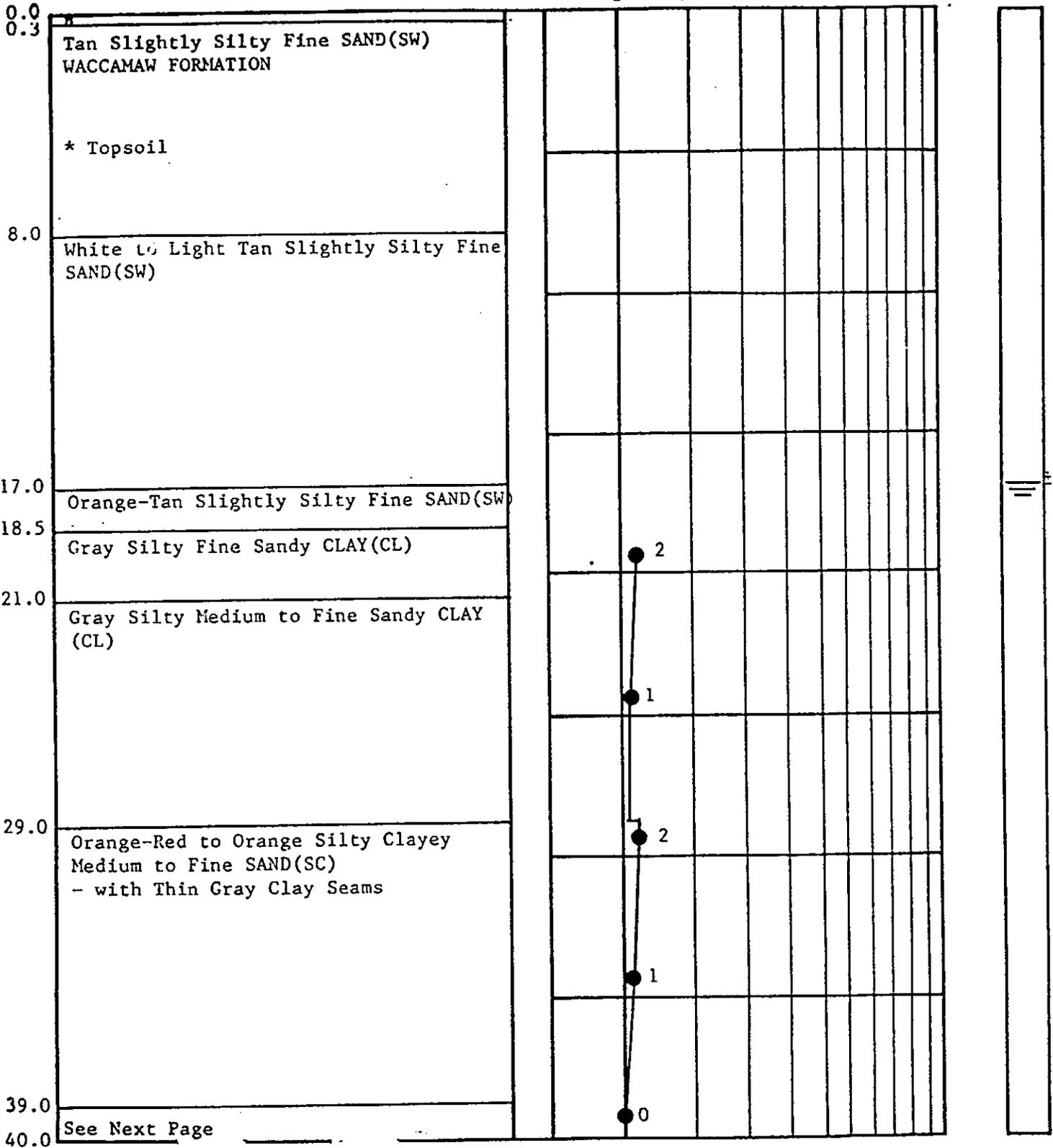
<b>PROJECT</b> Bladen County Landfill Elizabethtown, N.C.	SCALE: As Shown
	JOB NO: 7
	FIG NO: 5

DEPTH  
FT.

DESCRIPTION

ELEV. ● PENETRATION-BLOWS PER FT.

0 10 20 30 40 60 80 100



### TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586  
CORE DRILLING MEETS ASTM D-2113

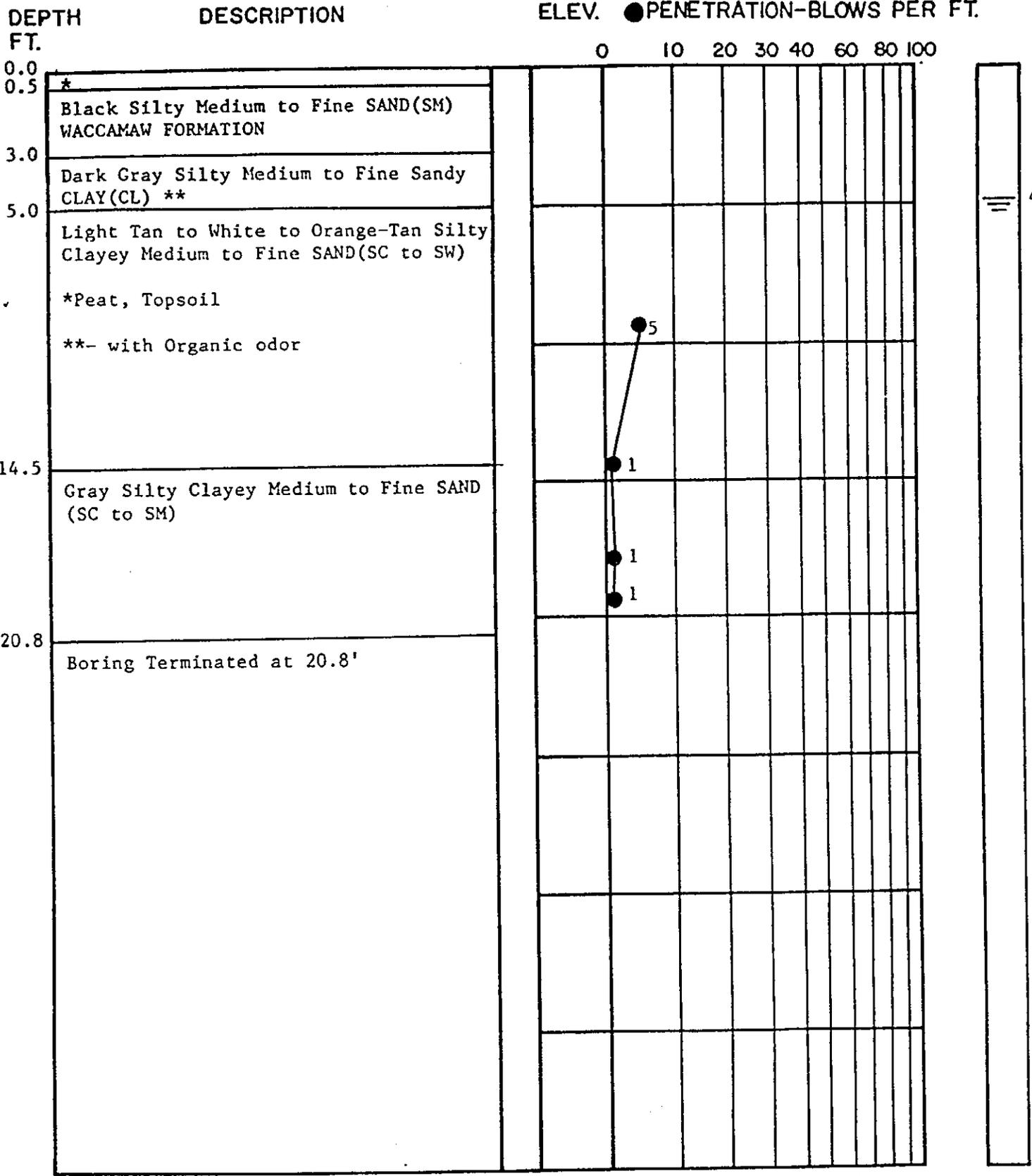
PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER  
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-1  
DATE DRILLED 8-5-86  
JOB NO. 7

■ UNDISTURBED SAMPLE      ≡ WATER TABLE-24HR.  
50% ROCK CORE RECOVERY      ≡ WATER TABLE-1HR.

SM-14





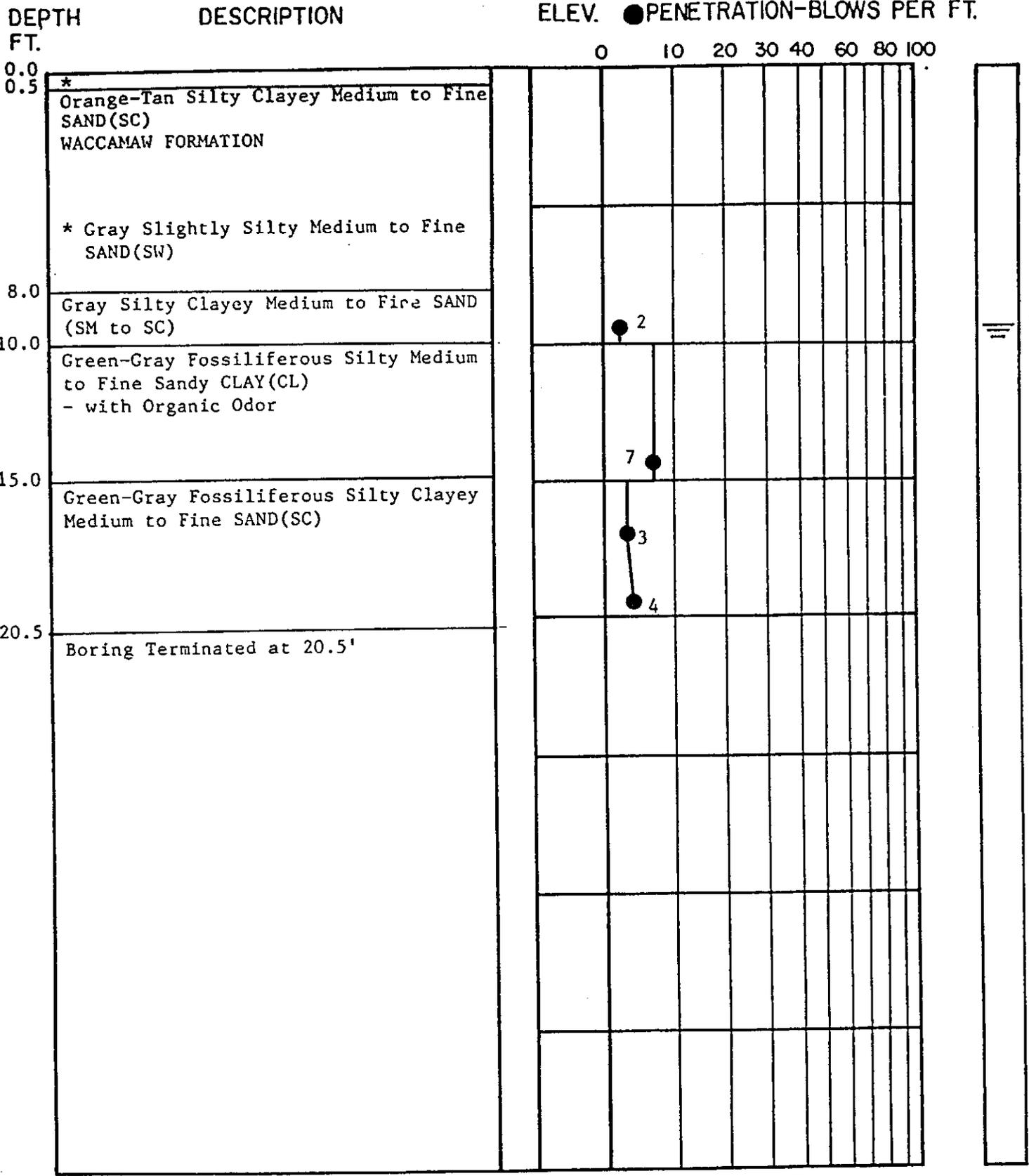
TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586  
 CORE DRILLING MEETS ASTM D-2113  
 PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER  
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-2  
 DATE DRILLED 8-6-86  
 JOB NO. 7

SM-14

UNDISTURBED SAMPLE      WATER TABLE-24HR.  
 50% ROCK CORE RECOVERY      WATER TABLE-1HR.



**TEST BORING RECORD**

BORING AND SAMPLING MEETS ASTM D-1586  
 CORE DRILLING MEETS ASTM D-2113  
 PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER  
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-3  
 DATE DRILLED 8-6-86  
 JOB NO. 7

SM-14

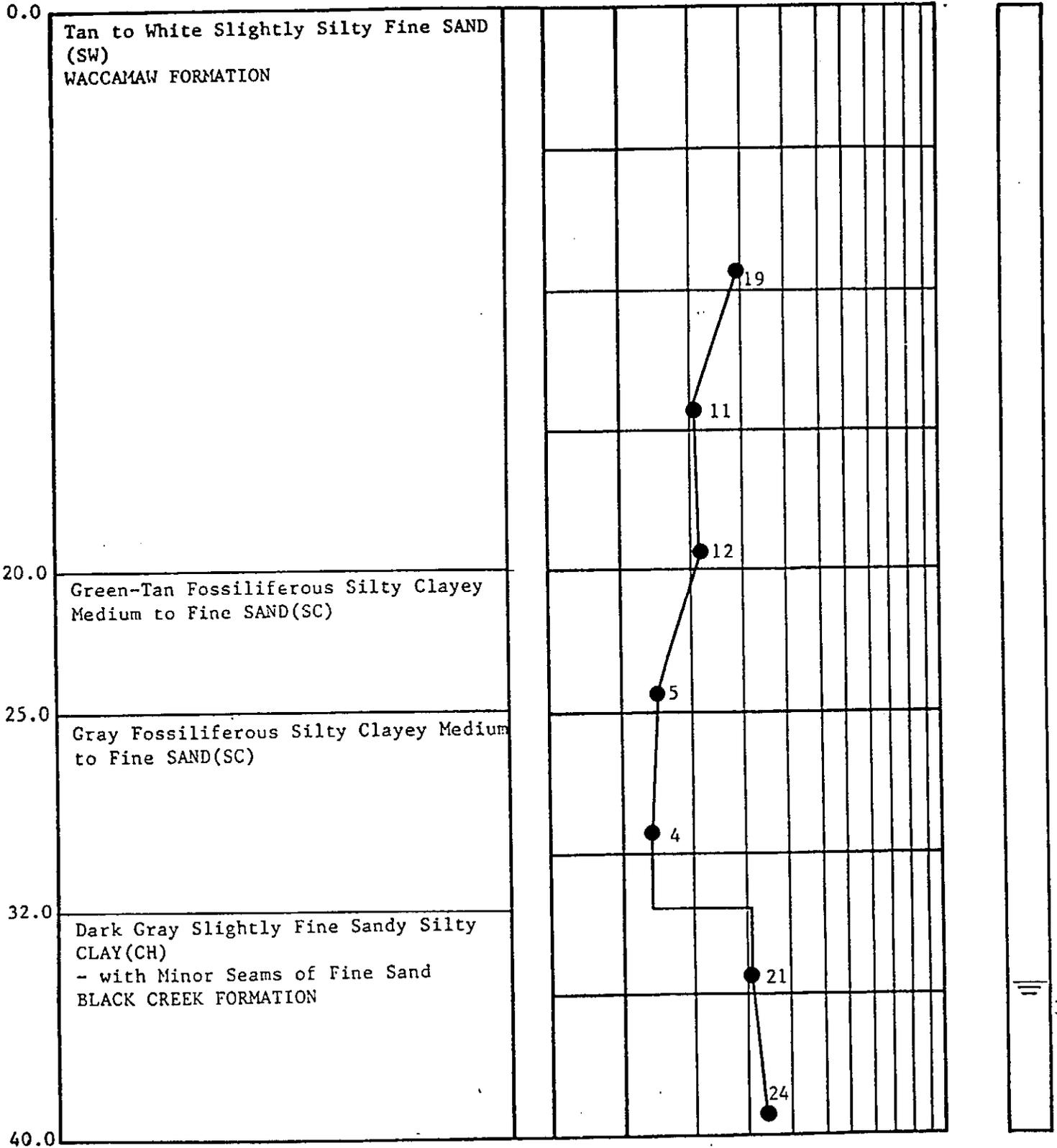
- UNDISTURBED SAMPLE
- WATER TABLE-24HR.
- 50% ROCK CORE RECOVERY
- WATER TABLE-1HR.
- LOSS OF DRILLING WATER

DEPTH  
FT.

DESCRIPTION

ELEV. ● PENETRATION-BLOWS PER FT.

0 10 20 30 40 60 80 100



### TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586

CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-4

DATE DRILLED 8-7-86

JOB NO. 7

■ UNDISTURBED SAMPLE

≡ WATER TABLE-24HR.

50% ROCK CORE RECOVERY

≡ WATER TABLE-1HR.

▲ LOSS OF DRILLING WATER

DEPTH FT.	DESCRIPTION	ELEV. ● PENETRATION-BLOWS PER FT.													
		0	10	20	30	40	60	80	100						
40.0	Dark Gray Slightly Silty Fine SAND(SW)										60				
44.0	Boring Terminated at 44.0'														

TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586  
 CORE DRILLING MEETS ASTM D-2113  
 PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER  
 FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-4(cont'd)  
 DATE DRILLED 8-7-86  
 JOB NO. 7

SM-14

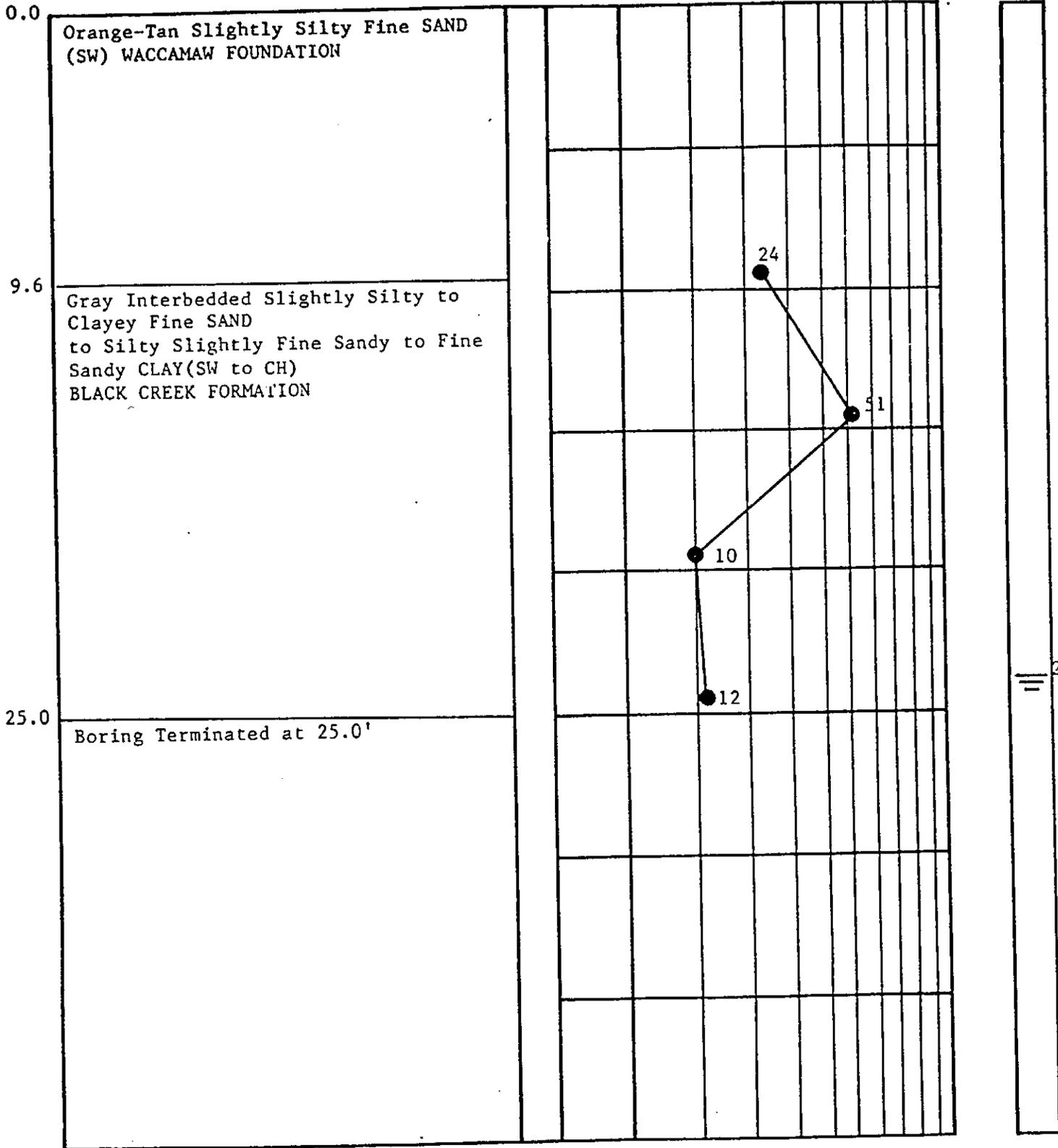
 UNDISTURBED SAMPLE     
  WATER TABLE-24HR.  
 50% ROCK CORE RECOVERY     
  WATER TABLE-1HR.  
 1.000 GALLON OF DRILLING WATER

DEPTH  
FT.

DESCRIPTION

ELEV. ● PENETRATION-BLOWS PER FT.

0 10 20 30 40 60 80 100



### TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586  
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER  
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-5  
DATE DRILLED 8-7-86  
JOB NO. 7

■ UNDISTURBED SAMPLE  
50% ROCK CORE RECOVERY

≡ WATER TABLE-24HR.  
≡ WATER TABLE-1HR.

SM-14

DEPTH  
FT.

DESCRIPTION

ELEV. ● PENETRATION-BLOWS PER FT.

0 10 20 30 40 60 80 100

0.0

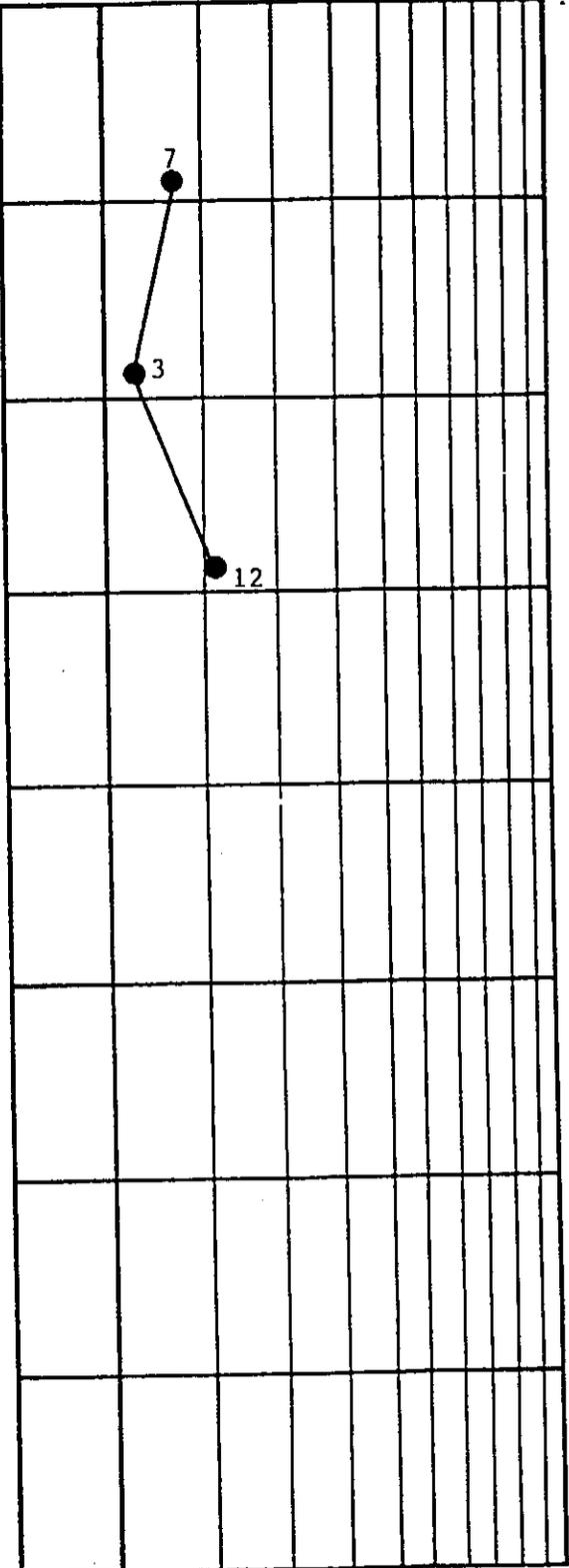
Gray Slighty Silty Fine SAND(SW)  
BLACK CREEK FORMATION

6.0

Gray Silty Clayey Medium to Fine SAND  
(SW)  
- with Clay Lenses and Lignite

15.0

Boring Terminated at 15.0'



### TEST BORING RECORD

BORING AND SAMPLING MEETS ASTM D-1586  
CORE DRILLING MEETS ASTM D-2113

PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER  
FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

BORING NO. MW-6  
DATE DRILLED 8-7-86  
JOB NO. 7

UNDISTURBED SAMPLE  
50% ROCK CORE RECOVERY

WATER TABLE-24HR.  
WATER TABLE-1HR.

SM-14

MONITORING WELL INSTALLATION DATA

Well Number: MW-7 Ground Elevation: Unknown

Dated Started: 2-22-88 Date Completed: 2-22-88

Geologists: T. A. Proctor

Drillers: Carolina Drilling

Observed By: \_\_\_\_\_

Weather Conditions: Fair and cool

CASING: Depth From: \_\_\_\_\_ to \_\_\_\_\_

I.D.: 2.067 O.D.: 2.375 Type: Sch 40

Length Above Ground Surface: Approx. 1 foot

GROUT: Depth From: 0 to 2'

Material: Portland

SCREEN: Depth From: 4' to 14'

Type of Opening: Sch 40, 0.010 slot

\_\_\_\_\_  
(Describe End of Screen)

BENTONITE: Depth From: 2' to 3'

Type of Bentonite: 1/8" pellets

GRAVEL: Depth From: 3' to 14'

Depth Water Encountered: \_\_\_\_\_

Static Water Level: \_\_\_\_\_ Date: \_\_\_\_\_

Drilling Mud Type/Brand: None

Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

MONITORING WELL INSTALLATION DATA

Well Number: MW-8 Ground Elevation: Unknown

Dated Started: 1-21-88 Date Completed: 1-22-88

Geologists: Tom Proctor

Drillers: Carolina Drilling

Observed By: \_\_\_\_\_

Weather Conditions: Rainy and cool

CASING: Depth From: \_\_\_\_\_ to \_\_\_\_\_

I.D.: 2.067 O.D.: 2.375 Type: Sch 40

Length Above Ground Surface: 1 foot

GROUT: Depth From: 0 to 5

Material: Portland

SCREEN: Depth From: 9 to 19

Type of Opening: Sch 40; 0.010 slot

(Describe End of Screen)

BENTONITE: Depth From: 5 to 7

Type of Bentonite: 1/8" pellets

GRAVEL: Depth From: 7 to 19

Depth Water Encountered: N/A

Static Water Level: N/A Date: \_\_\_\_\_

Drilling Mud Type/Brand: None

Remarks: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

FOR OFFICE USE ONLY	
Quad. No. _____	Serial No. _____
Lat. _____	Long. _____ Pc _____
Minor Basin _____	
Basin Code _____	
Header Ent. _____	GW-1 Ent. _____

**WELL CONSTRUCTION RECORD MW-1**

DRILLING CONTRACTOR Soil & Material Engineers, Inc.  
 DRILLER REGISTRATION NUMBER 728

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067-WM-0031

1. WELL LOCATION: (Show sketch of the location below)  
 Nearest Town: Elizabethtown, NC  
701 South, Bladen Co. Landfill.  
 (Road, Community, or Subdivision and Lot No.)  
 2. OWNER Bladen Co. Health Dept.  
 ADDRESS P.O. Box 188  
Elizabethtown (Street or Route No.) NC 28337  
 City or Town State Zip Code  
 3. DATE DRILLED 8-5-86 USE OF WELL Monitor  
 4. TOTAL DEPTH 42.5' CUTTINGS COLLECTED  Yes  No  
 5. DOES WELL REPLACE EXISTING WELL?  Yes  No  
 6. STATIC WATER LEVEL: 18.22 FT.  above TOP OF CASING.  
 TOP OF CASING IS 1.25 FT.  below ABOVE LAND SURFACE.  
 7. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_  
 8. WATER ZONES (depth): 8.5-18.5, 21-25, 30-42.5

Depth		DRILLING LOG
From	To	Formation Description
0.0	0.3	Topsoil
0.3	8.0	Tan Slightly Silty Fine SAND
8.0	17.0	White to Light Tan Slightly Silty Fine SAND
17.0	18.5	Orange-Tan Slightly Silty SAND
18.5	21.0	Gray Silty Fine Sandy CLAY
21.0	29.0	Gray Silty Medium Fine Sand CLAY
29.0	39.0	Orange-Red to Orange Silty Clayey Medium-Fine SAND with clay seams
39.0	42.5	Gray Silty Clayey Medium-Fine SAND

9. CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_  
 10. CASING:  

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>+1.25</u> To <u>35.51</u> Ft.	<u>2.375</u>	<u>.308</u>	<u>Sch 40</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.

**LOCATION SKETCH**

(Show direction and distance from at least two State Roads or other map reference points)

11. GROUT:  

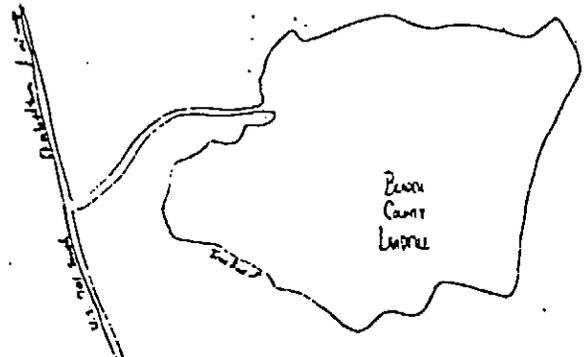
Depth	Material	Method
From <u>0.0</u> To <u>25.0</u> Ft.	<u>#1 Portland</u>	<u>Tremie</u>
From _____ To _____ Ft.	_____	_____

12. SCREEN:  

Depth	Diameter	Slot Size	Material
From <u>35.51</u> To <u>40.42</u> Ft.	<u>2.375</u> in.	<u>.015</u> in.	<u>Sch 40</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:  

Depth	Size	Material
From <u>30.0</u> To <u>42.5</u> Ft.	<u>Formation material</u>	_____
From _____ To _____ Ft.	_____	_____



14. REMARKS: \_\_\_\_\_

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT [Signature] DATE October 16, 1986

FOR OFFICE USE ONLY

Quad. No. \_\_\_\_\_ Serial No. \_\_\_\_\_  
 Lat. \_\_\_\_\_ Long. \_\_\_\_\_ Pc \_\_\_\_\_  
 Minor Basin \_\_\_\_\_  
 Basin Code \_\_\_\_\_  
 Header Ent. \_\_\_\_\_ GW-1 Ent. \_\_\_\_\_

**WELL CONSTRUCTION RECORD** MW-2

DRILLING CONTRACTOR Soil & Material Engineers, Inc.  
 DRILLER REGISTRATION NUMBER 728

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067-WM-0031

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Elizabethtown, NC  
701 South, Bladen Co. Landfill  
 (Road, Community, or Subdivision and Lot No.)

County: Bladen

2. OWNER Bladen Co. Health Dept.

ADDRESS P.O. Box 188  
Elizabethtown NC 28337  
 (Street or Route No.)  
 City or Town State Zip Code

Depth		DRILLING LOG
From	To	Formation Description
0.0	0.5	Peat, Topsoil
0.5	3.0	Black Silty Medium-Fine SAND
3.0	5.0	Dark Gray Silty Medium-Fine Sandy CLAY
5.0	14.5	Light Tan-White to Orange-T Silty Clayey Medium-Fine SAND
14.5	20.8	Gray Silty Clayey Medium-Fine SAND

3. DATE DRILLED 8-6-86 USE OF WELL Monitor

4. TOTAL DEPTH 20.8 CUTTINGS COLLECTED  Yes  No

5. DOES WELL REPLACE EXISTING WELL?  Yes  No

6. STATIC WATER LEVEL: 6.31 FT.  above TOP OF CASING.  
1.50 FT. ABOVE LAND SURFACE.  below

7. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

8. WATER ZONES (depth): 6-20'

9. CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_

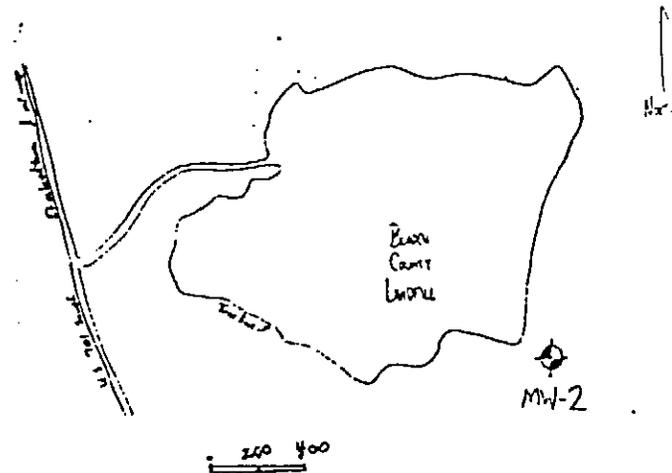
10. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>+1.50</u> To <u>15.86</u> Ft.	<u>2.375</u>	<u>.308</u>	<u>Sch 40</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)



11. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>6.0</u> Ft.	<u>#1 Portland</u>	<u>Tremie</u>
From _____ To _____ Ft.	_____	_____

12. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>15.86</u> To <u>20.77</u> Ft.	<u>2.375</u> in.	<u>.010</u> in.	<u>Sch 40</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

Depth	Size	Material
From <u>9.7</u> To <u>20.8</u> Ft.	<u>Torpedo Sand</u>	<u>Quartz</u>
From _____ To _____ Ft.	_____	_____

14. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

DATE

*Parish Dumbell*

October 16, 1986

FOR OFFICE USE ONLY			
Quad. No. _____	Serial No. _____		
Lat. _____	Long. _____	Pc _____	
Minor Basin _____			
Basin Code _____			
Header Ent. _____		GW-1 Ent. _____	

**WELL CONSTRUCTION RECORD**

MW-3

DRILLING CONTRACTOR Soil & Material Engineers, Inc.

DRILLER REGISTRATION NUMBER 728

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067-WM-0031

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Elizabethtown, NC  
701 South, Bladen Co. Landfill  
 (Road, Community, or Subdivision and Lot No.)

County: Bladen

2. OWNER Bladen Co. Health Dept.

ADDRESS P.O. Box 188  
 (Street or Route No.)  
Elizabethtown NC 28337  
 City or Town State Zip Code

Depth		DRILLING LOG
From	To	Formation Description
0.0	0.5	Gray Slightly Silty Medium-Fine SAND
0.5	8.0	Orange Tan Silty Clayey Medium-Fine SAND
8.0	10.0	Gray Silty Clayey Medium-Fine SAND
10.0	15.0	Green-Gray Fossil. Silty Medium-Fine Sandy CLAY with Organic Odor
15.0	20.5	Green-Gray Fossil. Silty Clay Medium-Fine SAND

3. DATE DRILLED 8-6-86 USE OF WELL Monitor

4. TOTAL DEPTH 20.5 CUTTINGS COLLECTED  Yes  No

5. DOES WELL REPLACE EXISTING WELL?  Yes  No

6. STATIC WATER LEVEL: 11.15 FT.  above TOP OF CASING.  
 below TOP OF CASING IS 1.59 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

8. WATER ZONES (depth): 8-20'

9. CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_

10. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>+1.59</u> To <u>15.15</u> Ft.	<u>2.375</u>	<u>.308</u>	<u>Sch 40</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

11. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>9.6</u> Ft.	<u>#1 Portland</u>	<u>Tremie</u>
From _____ To _____ Ft.	_____	_____

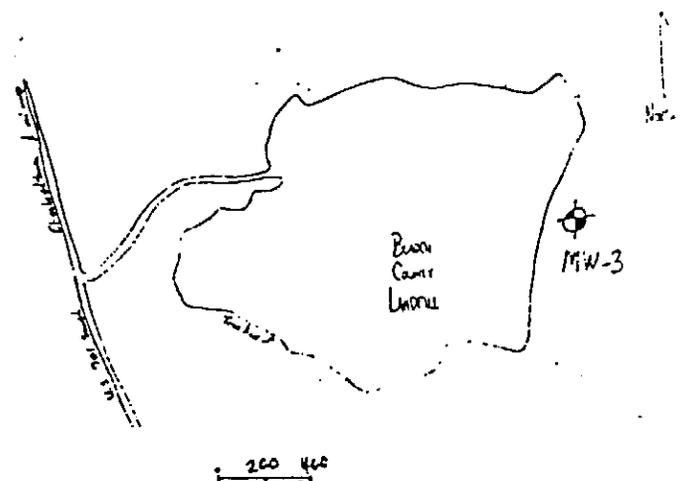
12. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>15.15</u> To <u>20.06</u> Ft.	<u>2.375</u> in.	<u>.010</u> in.	<u>Sch 40</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

Depth	Size	Material
From <u>11.0</u> To <u>20.5</u> Ft.	<u>Torpedo Sand</u>	<u>Quartz</u>
From _____ To _____ Ft.	_____	_____

14. REMARKS: \_\_\_\_\_



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT David L. Dunch DATE October 16, 1986

FOR OFFICE USE ONLY

Quad. No. \_\_\_\_\_ Serial No. \_\_\_\_\_  
 Lat. \_\_\_\_\_ Long. \_\_\_\_\_ Pc \_\_\_\_\_  
 Minor Basin \_\_\_\_\_  
 Basin Code \_\_\_\_\_  
 Header Ent. \_\_\_\_\_ GW-1 Ent. \_\_\_\_\_

**WELL CONSTRUCTION RECORD**

MW-4

DRILLING CONTRACTOR Soil & Material Engineers, Inc.

DRILLER REGISTRATION NUMBER 728

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067-WM-0031

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Elizabethtown, NC  
701 South, Bladen Co. Landfill  
 (Road, Community, or Subdivision and Lot No.)

County: Bladen

2. OWNER Bladen Co. Health Dept.

ADDRESS P.O. Box 188  
Elizabethtown NC 28337  
 (Street or Route No.)  
 City or Town State Zip Code

Depth		DRILLING LOG
From	To	Formation Description
0.0	20.0	Tan to White Slightly Silty Fine SAND
20.0	25.0	Green-Tan Fossil. Silty Clay Medium-Fine SAND
25.0	32.0	Gray Fossil. Silty Clayey Med Fine SAND
32.0	40.0	Dark Gray Slightly Fine Sand Silty CLAY with Fine Sand Se
40.0	44.0	Dark Gray Slightly Silty Fine SAND

3. DATE DRILLED 8-7-86 USE OF WELL Monitor

4. TOTAL DEPTH 44.0 CUTTINGS COLLECTED  Yes  No

5. DOES WELL REPLACE EXISTING WELL?  Yes  No

6. STATIC WATER LEVEL: 36.38 FT.  above TOP OF CASING,  below TOP OF CASING IS 1.53 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

8. WATER ZONES (depth): 26-32'  
40-44'

9. CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_

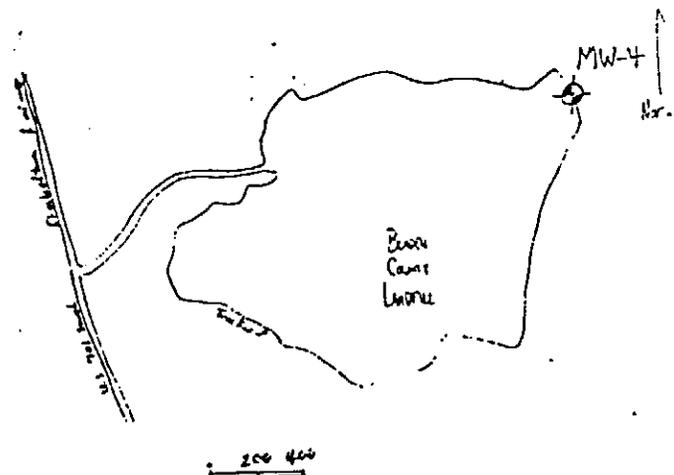
10. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>+1.53</u> To <u>38.09</u> Ft.	<u>2.375</u>	<u>.308</u>	<u>Sch 40</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)



11. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>32.8</u> Ft.	<u>#1 Portland</u>	<u>Tremie</u>
From _____ To _____ Ft.	_____	_____

12. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>38.09</u> To <u>43.0</u> Ft.	<u>2.375</u> in.	<u>.010</u> in.	<u>Sch 40</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

Depth	Size	Material
From <u>34.5</u> To <u>44.0</u> Ft.	<u>Torpedo Sand</u>	<u>Quartz</u>
From _____ To _____ Ft.	_____	_____

14. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT David D. Smith DATE October 16, 1986

FOR OFFICE USE ONLY

Quad. No. \_\_\_\_\_ Serial No. \_\_\_\_\_  
 Lat. \_\_\_\_\_ Long. \_\_\_\_\_ Pc \_\_\_\_\_  
 Minor Basin \_\_\_\_\_  
 Basin Code \_\_\_\_\_  
 Header Ent. \_\_\_\_\_ GW-1 Ent. \_\_\_\_\_

**WELL CONSTRUCTION RECORD**

MW-5

DRILLING CONTRACTOR Soil & Material Engineers, Inc.

DRILLER REGISTRATION NUMBER 728

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067-WM-0031

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Elizabethtown, NC  
701 South, Bladen Co. Landfill  
 (Road, Community, or Subdivision and Lot No.)

County: Bladen

2. OWNER Bladen Co. Health Dept.

ADDRESS P.O. Box 188  
 (Street or Route No.)  
Elizabethtown NC 28337  
 City or Town State Zip Code

DRILLING LOG  
 Formation Description

Depth		Formation Description
From	To	
0.0	9.6	Orange-Tan Slightly Silty Fi SAND
9.6	25.0	Gray Interbedded Slightly Si to Clayey Fine SAND to Silty Slightly Fine Sand to Fine S CLAY

3. DATE DRILLED 8-7-86 USE OF WELL Monitor

4. TOTAL DEPTH 25.0' CUTTINGS COLLECTED  Yes  No

5. DOES WELL REPLACE EXISTING WELL?  Yes  No

6. STATIC WATER LEVEL: 25.04 FT.  above TOP OF CASING,  below TOP OF CASING IS 1.10 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

8. WATER ZONES (depth): 8.0-11.0

9. CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_

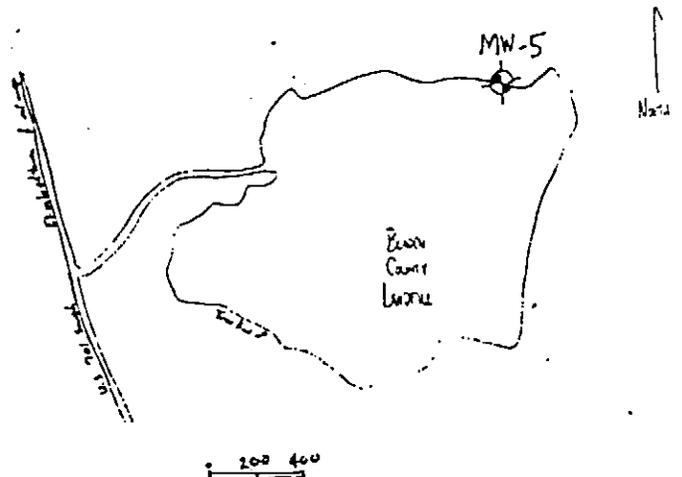
10. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>+1.10</u> To <u>19.36</u> Ft.	<u>2.375</u>	<u>.308</u>	<u>Sch 40</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)



11. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>15.0</u> Ft.	<u>#1 Portland</u>	<u>Tremie</u>
From _____ To _____ Ft.	_____	_____

12. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>19.36</u> To <u>24.27</u> Ft.	<u>2.375</u> in.	<u>.010</u> in.	<u>Sch 40</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

Depth	Size	Material
From <u>17.0</u> To <u>25.0</u> Ft.	<u>Torpedo Sand</u>	<u>Quartz</u>
From _____ To _____ Ft.	_____	_____

14. REMARKS: \_\_\_\_\_

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

DATE

Submit original to Division of Environmental Management and copy to well owner.

FOR OFFICE USE ONLY

Quad. No. \_\_\_\_\_ Serial No. \_\_\_\_\_  
 Lat. \_\_\_\_\_ Long. \_\_\_\_\_ Pc \_\_\_\_\_  
 Minor Basin \_\_\_\_\_  
 Basin Code \_\_\_\_\_  
 Header Ent. \_\_\_\_\_ GW-1 Ent. \_\_\_\_\_

**WELL CONSTRUCTION RECORD** MW-6

DRILLING CONTRACTOR Soil & Material Engineers, Inc.

DRILLER REGISTRATION NUMBER 728

STATE WELL CONSTRUCTION PERMIT NUMBER: 08-0067 - WM-0031

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Elizabethtown, NC  
701 South, Bladen Co. Landfill  
 (Road, Community, or Subdivision and Lot No.)

County: Bladen

2. OWNER Bladen Co. Health Dept.

ADDRESS P.O. Box 188  
Elizabethtown NC 28337  
 (Street or Route No.)  
 City or Town State Zip Code

Depth		DRILLING LOG
From	To	Formation Description
0.0	6.0	Gray Slightly Silty Fine SA
6.0	15.0	Gray Silty Clayey Medium-Fir SAND with Clay Seams and Lignite

3. DATE DRILLED 8-7-86 USE OF WELL Monitor

4. TOTAL DEPTH 15.0' CUTTINGS COLLECTED  Yes  No

5. DOES WELL REPLACE EXISTING WELL?  Yes  No

6. STATIC WATER LEVEL: 4.18 FT.  above TOP OF CASING,  below  
 TOP OF CASING IS 1.73 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): \_\_\_\_\_ METHOD OF TEST \_\_\_\_\_

8. WATER ZONES (depth): 3.5-15.0'

9. CHLORINATION: Type \_\_\_\_\_ Amount \_\_\_\_\_

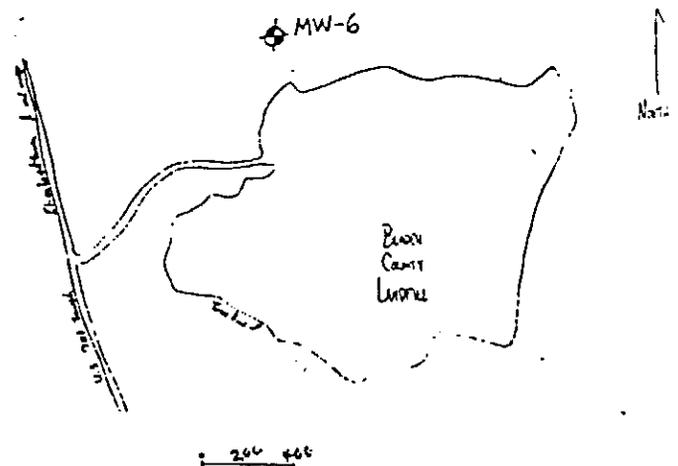
10. CASING:

Depth	Diameter	Wall Thickness or Weight/Ft.	Material
From <u>+1.73</u> To <u>9.17</u> Ft.	<u>2.375</u>	<u>.308</u>	<u>Sch 40</u>
From _____ To _____ Ft.	_____	_____	_____
From _____ To _____ Ft.	_____	_____	_____

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)



11. GROUT:

Depth	Material	Method
From <u>0.0</u> To <u>3.5</u> Ft.	<u>#1 Portland</u>	<u>Tremie</u>
From _____ To _____ Ft.	_____	_____

12. SCREEN:

Depth	Diameter	Slot Size	Material
From <u>9.17</u> To <u>14.08</u> Ft.	<u>2.375</u> in.	<u>.010</u> in.	<u>Sch 40</u>
From _____ To _____ Ft.	_____ in.	_____ in.	_____
From _____ To _____ Ft.	_____ in.	_____ in.	_____

13. GRAVEL PACK:

Depth	Size	Material
From <u>5.5</u> To <u>15.0</u> Ft.	<u>Formation Material</u>	_____
From _____ To _____ Ft.	_____	_____

14. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

DATE

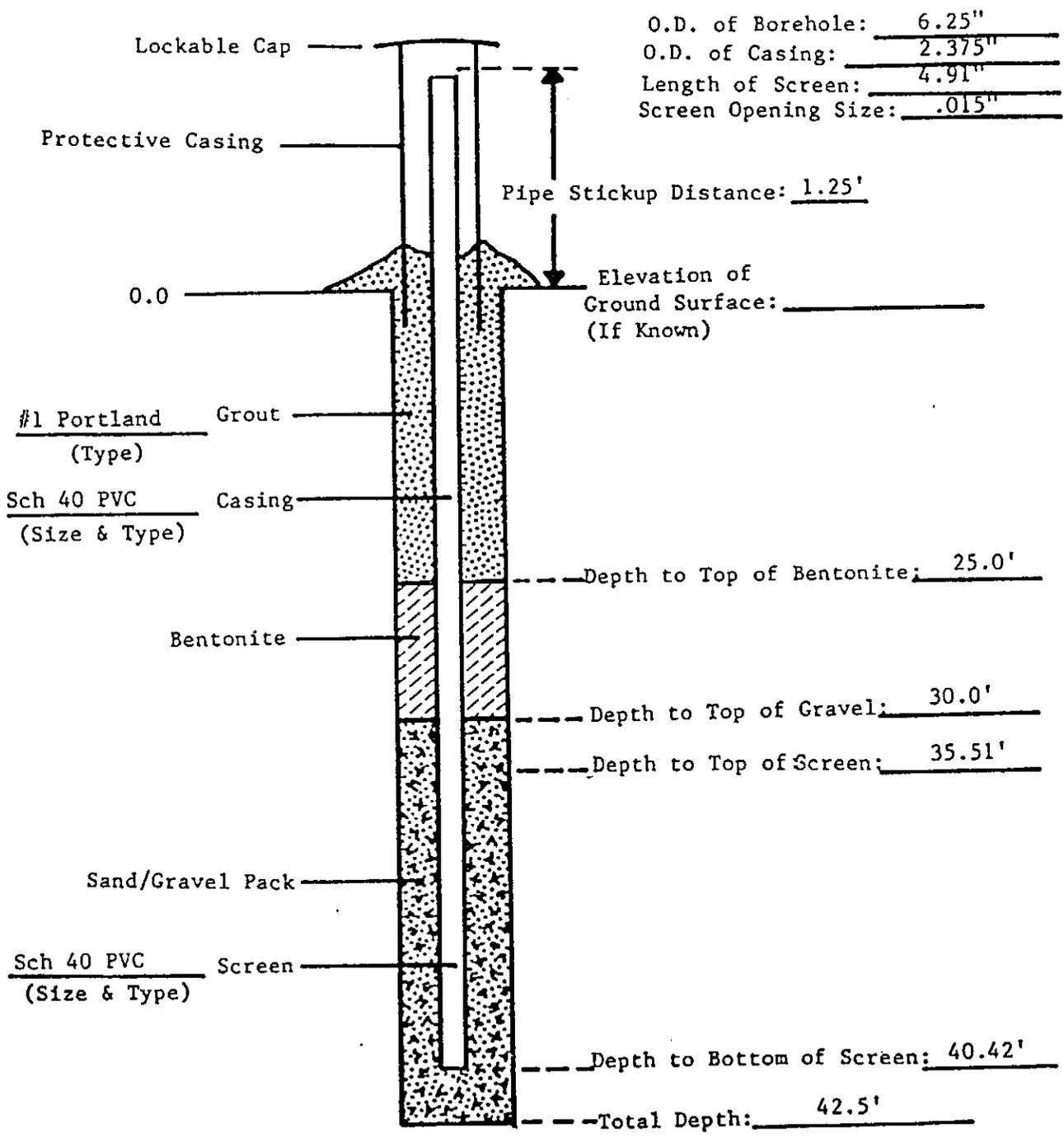
Submit original to Division of Environmental Management and copy to well owner





Well Number: MW-1 Drilling Method: 6 1/2" O.D. Hollow Stem Augers  
 Date Started: 8-5-86 Drilling Fluids: None  
 Date Finished: 8-5-86 Static Water Level: 18.22 Date: 8-8-86  
 Geologist/Engineer: D. Duncklee Observed by: \_\_\_\_\_  
 Remarks: One well volume equals 6.93 gallons given filter pack porosity of 20%

ALL DEPTHS REFERENCED FROM GROUND SURFACE



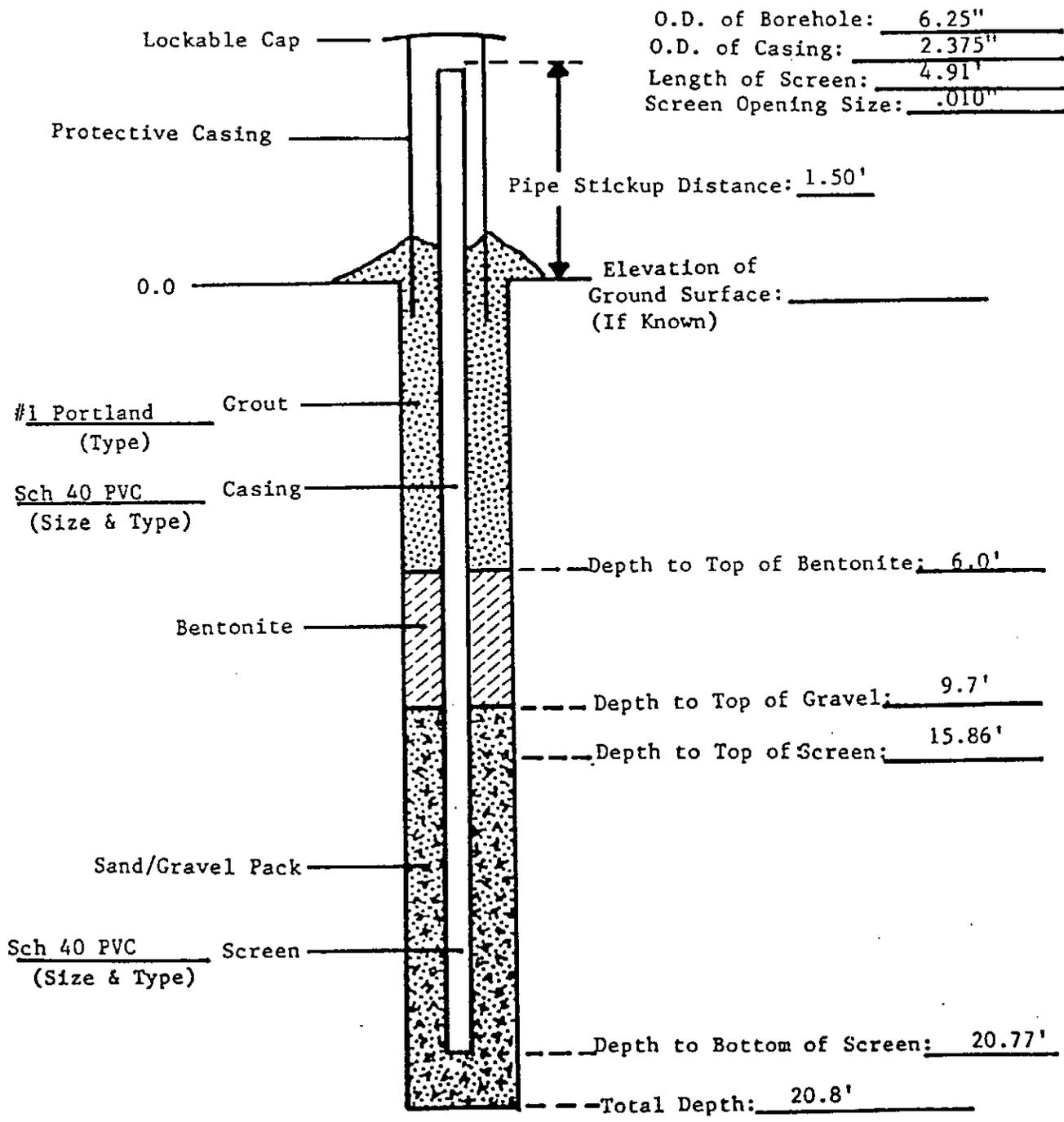
AQUATERRA, INC.  
 Raleigh, North Carolina  
 SCHEMATIC OF MONITOR WELL

PROJECT:  
 Bladen Co. Landfill

SCALE: Not To Scale  
 JOB NO.: 7  
 FIGURE NO.:

Well Number: MW-2 Drilling Method: 6 1/2" O.D. Hollow Stem Augers  
 Date Started: 8-5-86 Drilling Fluids: None  
 Date Finished: 8-5-86 Static Water Level: 6.31 Date: 8-7-86  
 Geologist/Engineer: D. Duncklee Observed by: \_\_\_\_\_  
 Remarks: One well volume equals 5.80 gallons given filter pack porosity of 20%

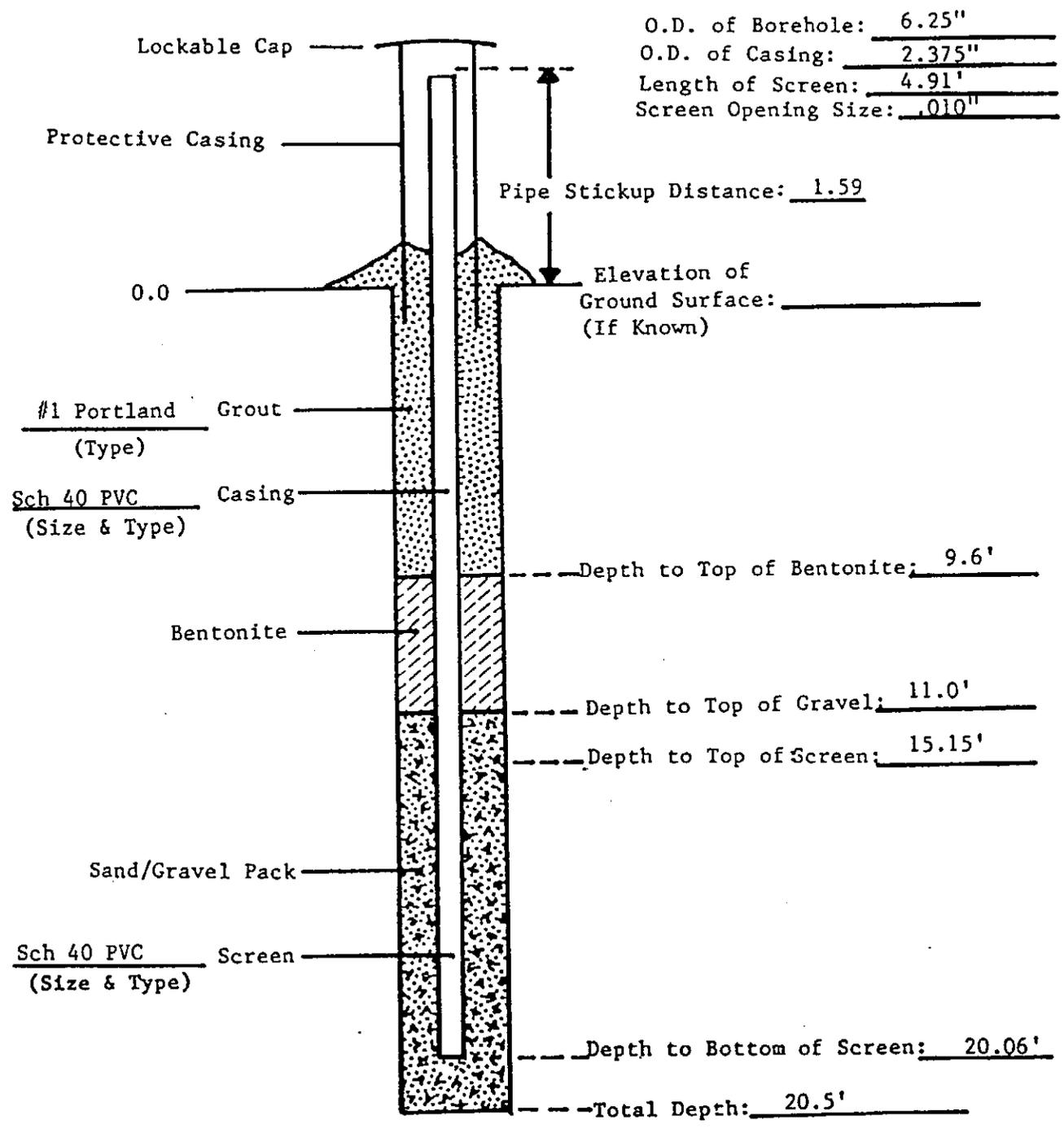
ALL DEPTHS REFERENCED FROM GROUND SURFACE



<p>AQUATERRA, INC.        Raleigh, North Carolina        SCHEMATIC OF MONITOR WELL</p>	<p>PROJECT:        Bladen Co. Landfill</p>	<p>SCALE: Not To Scale        JOB NO. 7        FIGURE NO.:</p>
------------------------------------------------------------------------------------------------	------------------------------------------------	------------------------------------------------------------------------

Well Number: MW-3 Drilling Method: 6 1/2" O.D. Hollow Stem Augers  
 Date Started: 8-6-86 Drilling Fluids: None  
 Date Finished: 8-6-86 Static Water Level: 11.15 Date: 8-12-86  
 Geologist/Engineer: D. Duncklee Observed by: \_\_\_\_\_  
 Remarks: One well volume equals 4.30 gallons given filter pack porosity of 20%

ALL DEPTHS REFERENCED FROM GROUND SURFACE



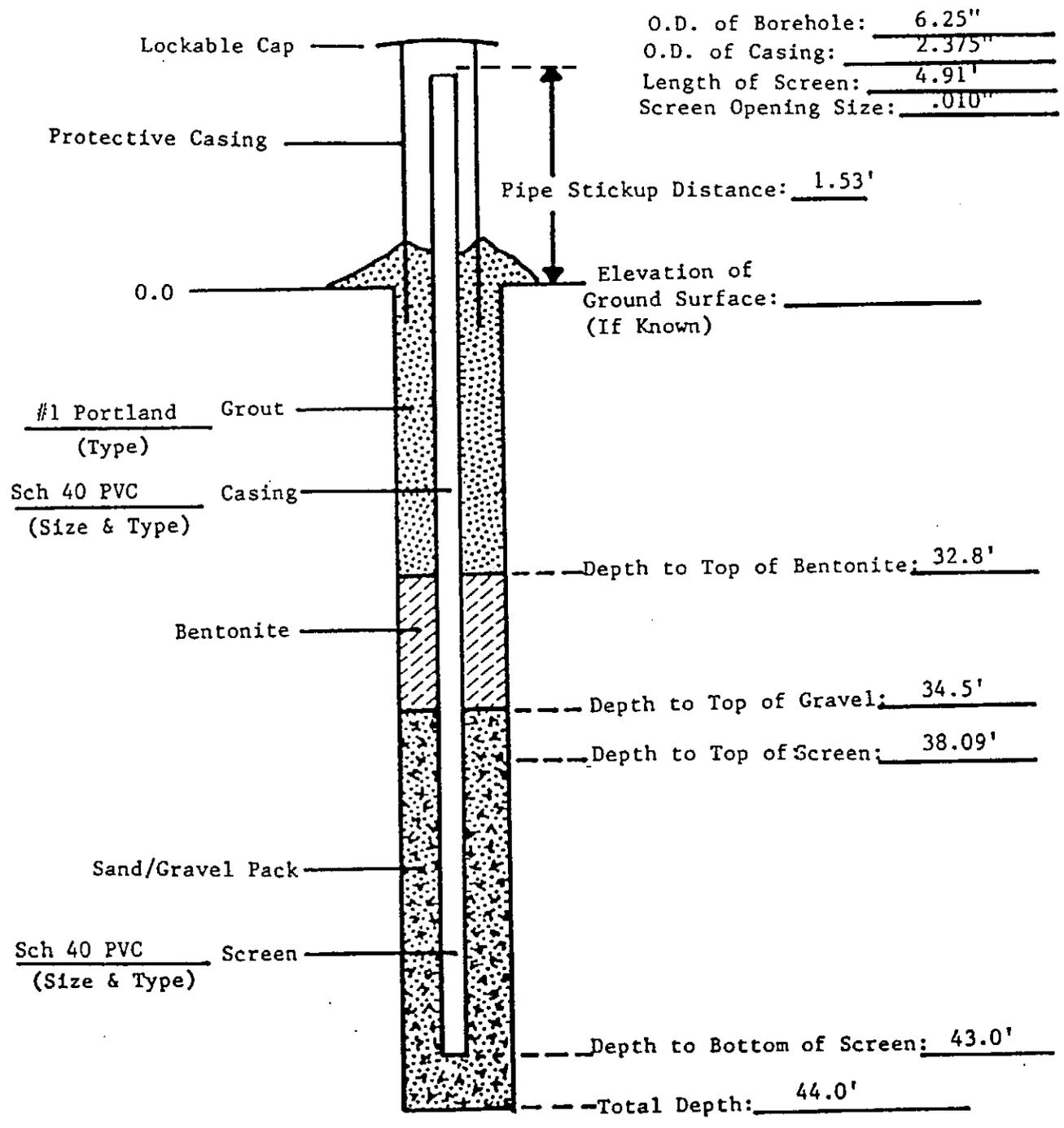
AQUATERRA, INC.  
 Raleigh, North Carolina  
 SCHEMATIC OF MONITOR WELL

PROJECT:  
 Bladen Co. Landfill

SCALE: Not To Scale  
 JOB NO.: 7  
 FIGURE NO.:

Well Number: MW-4 Drilling Method: 6 1/4" O.D. Hollow Stem Augers  
 Date Started: 8-6-86 Drilling Fluids: None  
 Date Finished: 8-7-86 Static Water Level: 36.38 Date: 8-13-86  
 Geologist/Engineer: D. Duncklee Observed by: \_\_\_\_\_  
 Remarks: One well volume equals 3.64 gallons given filter pack porosity of 20%

ALL DEPTHS REFERENCED FROM GROUND SURFACE



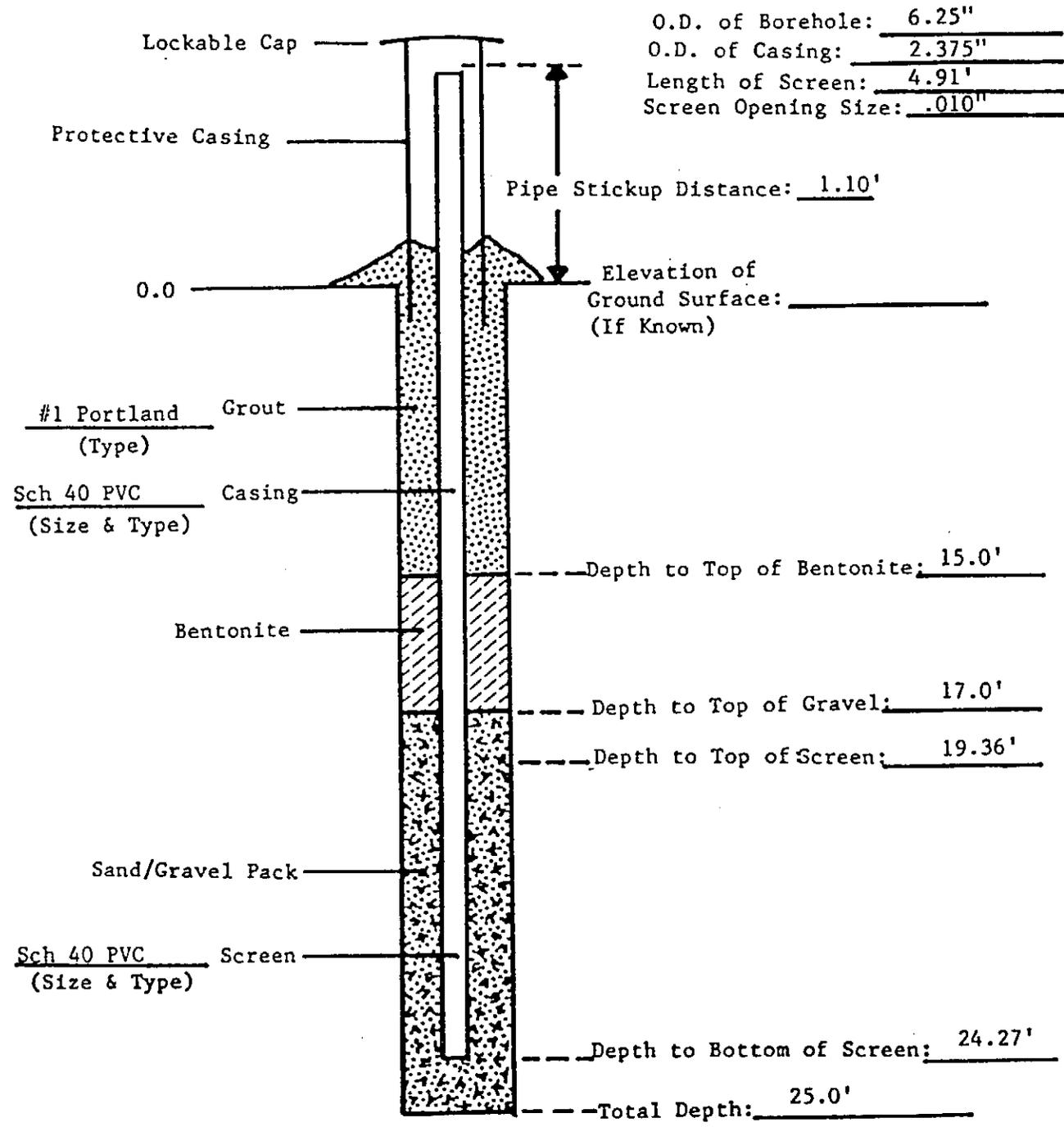
AQUATERRA, INC.  
 Raleigh, North Carolina  
 SCHEMATIC OF MONITOR WELL

PROJECT:  
 Bladen Co. Landfill

SCALE: Not To Scale  
 JOB NO.: 7  
 FIGURE NO.:

Well Number: MW-5 Drilling Method: 6 1/2" O.D. Hollow Stem Augers  
 Date Started: 8-7-86 Drilling Fluids: None  
 Date Finished: 8-7-86 Static Water Level: 25.04 Date: 8-13-86  
 Geologist/Engineer: D. Duncklee Observed by: \_\_\_\_\_  
 Remarks: One well volume equals .15 gallons given filter pack porosity of 20%

ALL DEPTHS REFERENCED FROM GROUND SURFACE



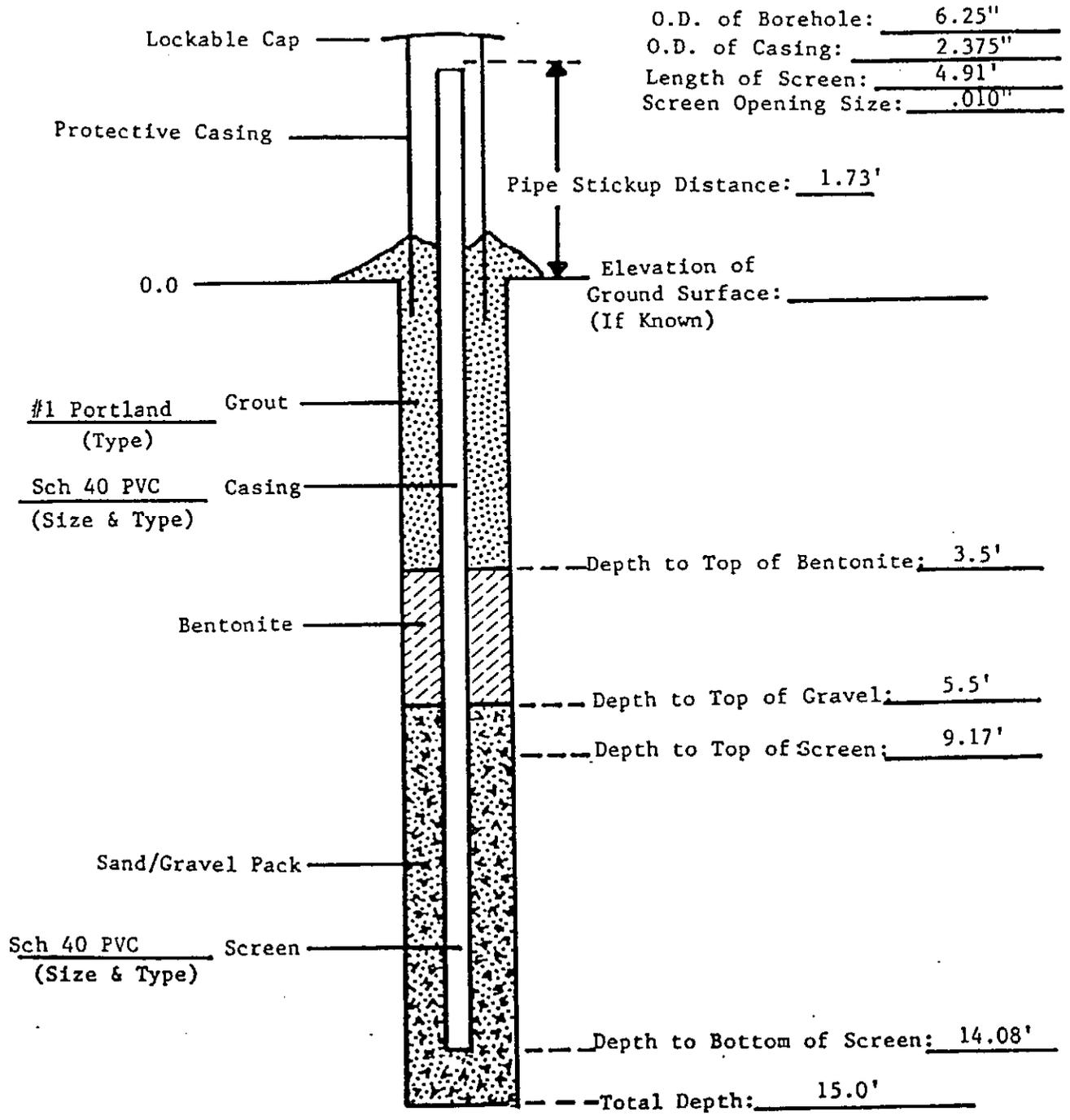
AQUATERRA, INC.  
 Raleigh, North Carolina  
 SCHEMATIC OF MONITOR WELL

PROJECT:  
 Bladen Co. Landfill

SCALE: Not To Scale  
 JOB NO.: 7  
 FIGURE NO.:

Well Number: MW-6 Drilling Method: 6 1/2" O.D. Hollow Stem Augers  
 Date Started: 8-7-86 Drilling Fluids: None  
 Date Finished: 8-7-86 Static Water Level: 4.18 Date: 8-13-86  
 Geologist/Engineer: D. Duncklee Observed by: \_\_\_\_\_  
 Remarks: One well volume equals 4.37 gallons given filter pack porosity of 20%

ALL DEPTHS REFERENCED FROM GROUND SURFACE

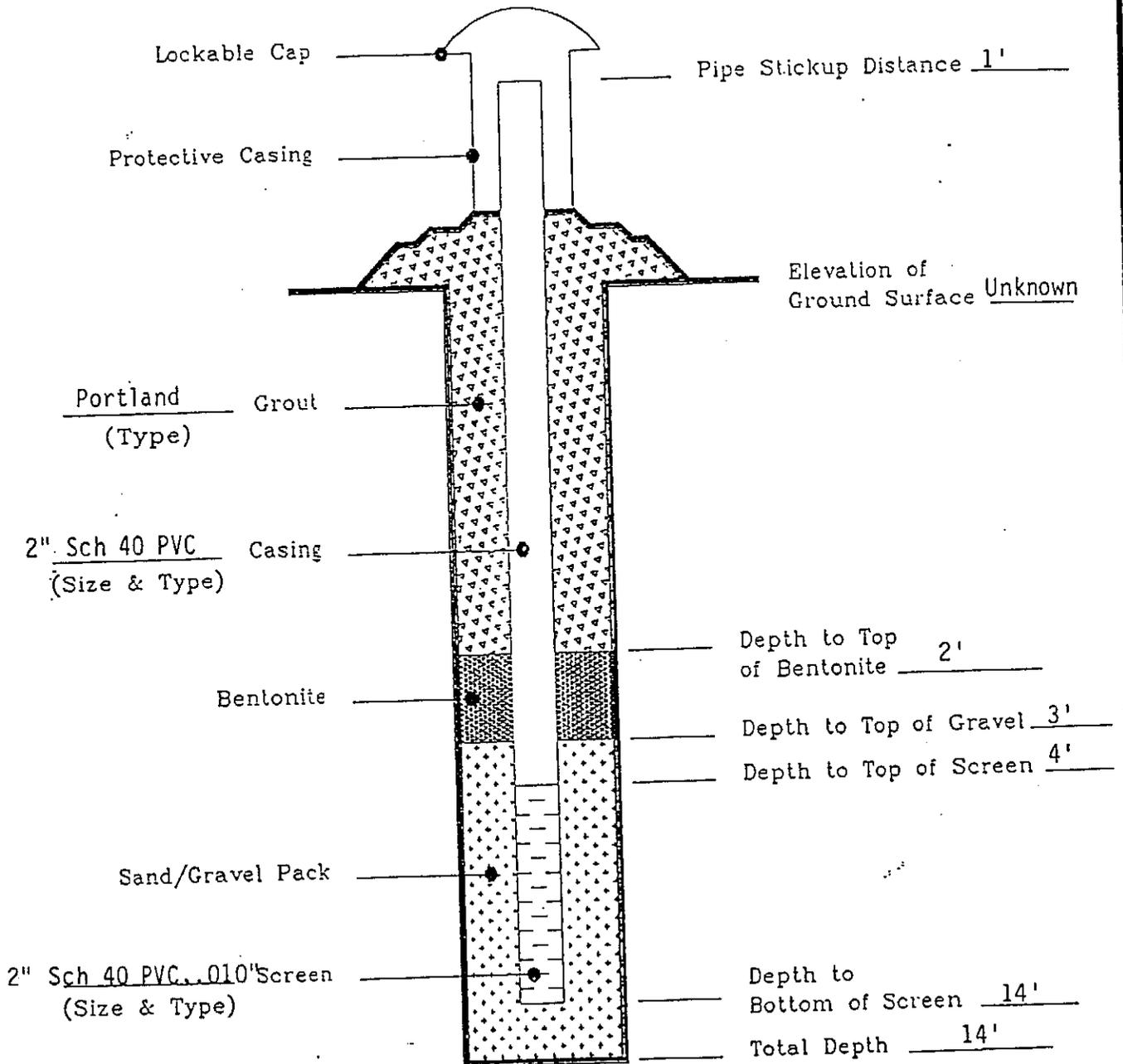


AQUATERRA, INC.  
 Raleigh, North Carolina  
 SCHEMATIC OF MONITOR WELL

PROJECT:  
 Bladen Co. Landfill

SCALE: Not To Scale  
 JOB NO.: 7  
 FIGURE NO.:

Well Number MW-7 Drilling Method HSA  
 Date Started 2-22-88 Drilling Fluids None  
 Date Finished 2-22-88 Static Water Level N/A Date \_\_\_\_\_  
 Geologist T. A. Proctor All Depths Referenced From  
 Top of Casing

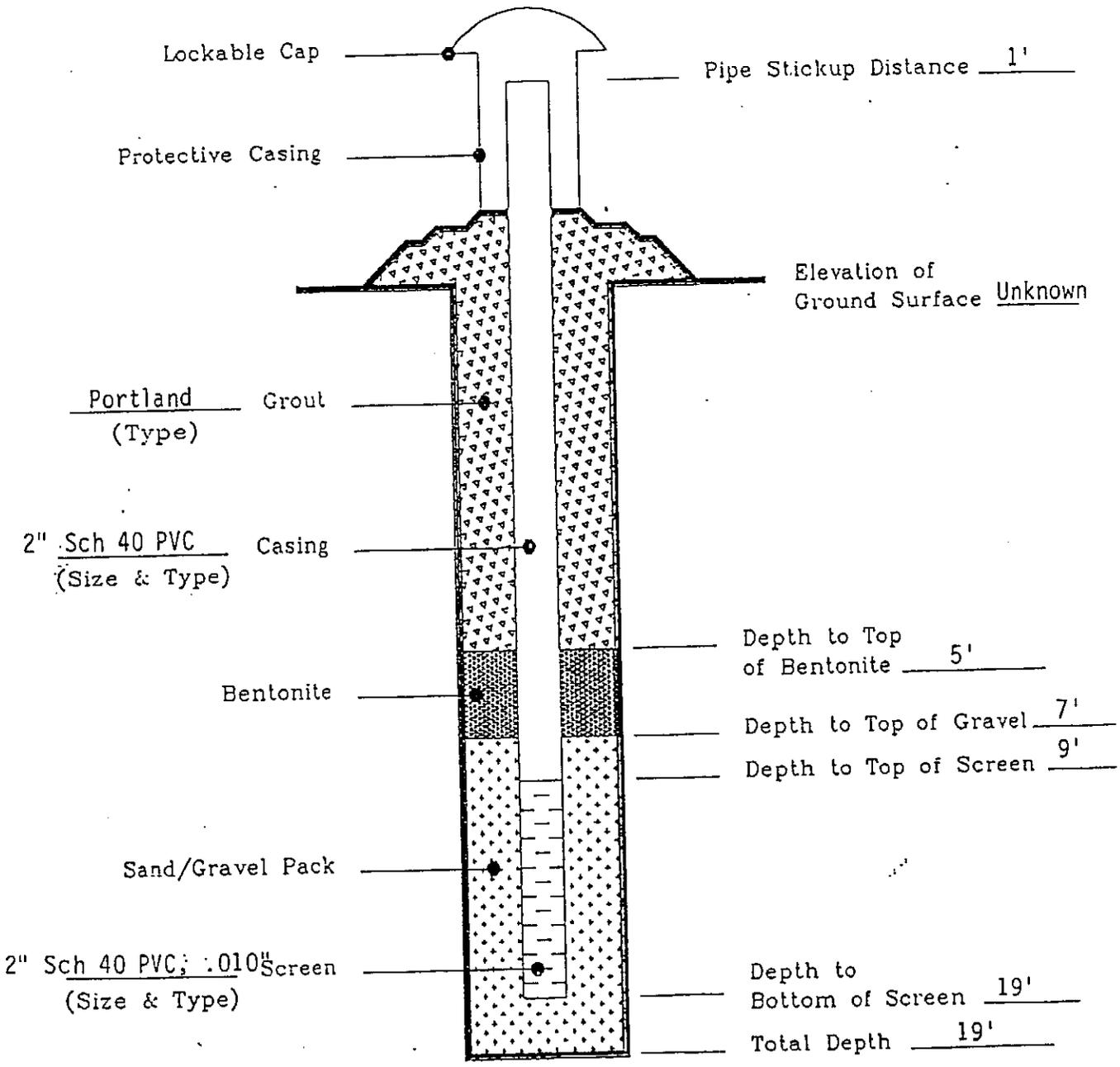


**PROJECT**  
 Bladen Co. Landfill  
 Elizabethtown, N.C.

**AQUATERRA, INC.**  
 RALEIGH, NORTH CAROLINA

JOB NUMBER: 7  
 SCALE: N.T.S.  
 FIGURE NUMBER: \_\_\_\_\_

Well Number MW-8 Drilling Method HSA  
 Date Started 1-20-88 Drilling Fluids None  
 Date Finished 1-21-88 Static Water Level N/A Date \_\_\_\_\_  
 Geologist T. A. Proctor All Depths Referenced From  
 Top of Casing



**PROJECT**  
 Bladen Co. Landfill  
 Elizabethtown, N.C.

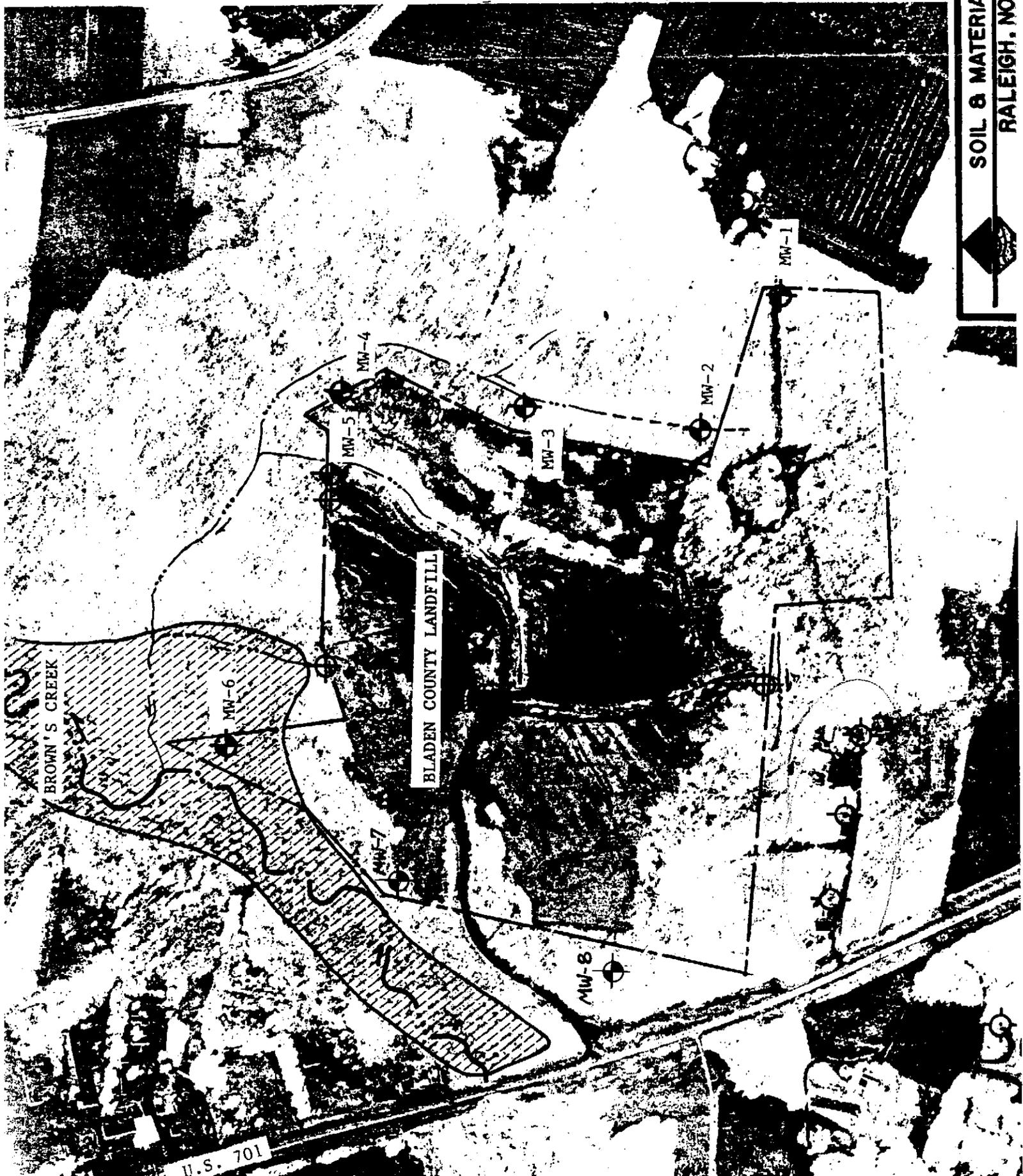
**AQUATERRA, INC.**  
 RALEIGH, NORTH CAROLINA

JOB NUMBER: 7  
 SCALE: N.T.S.  
 FIGURE NUMBER:

09-01  
Bladen Co. LF

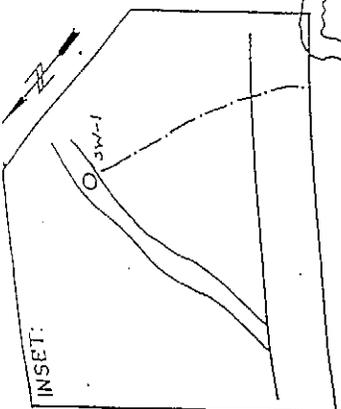
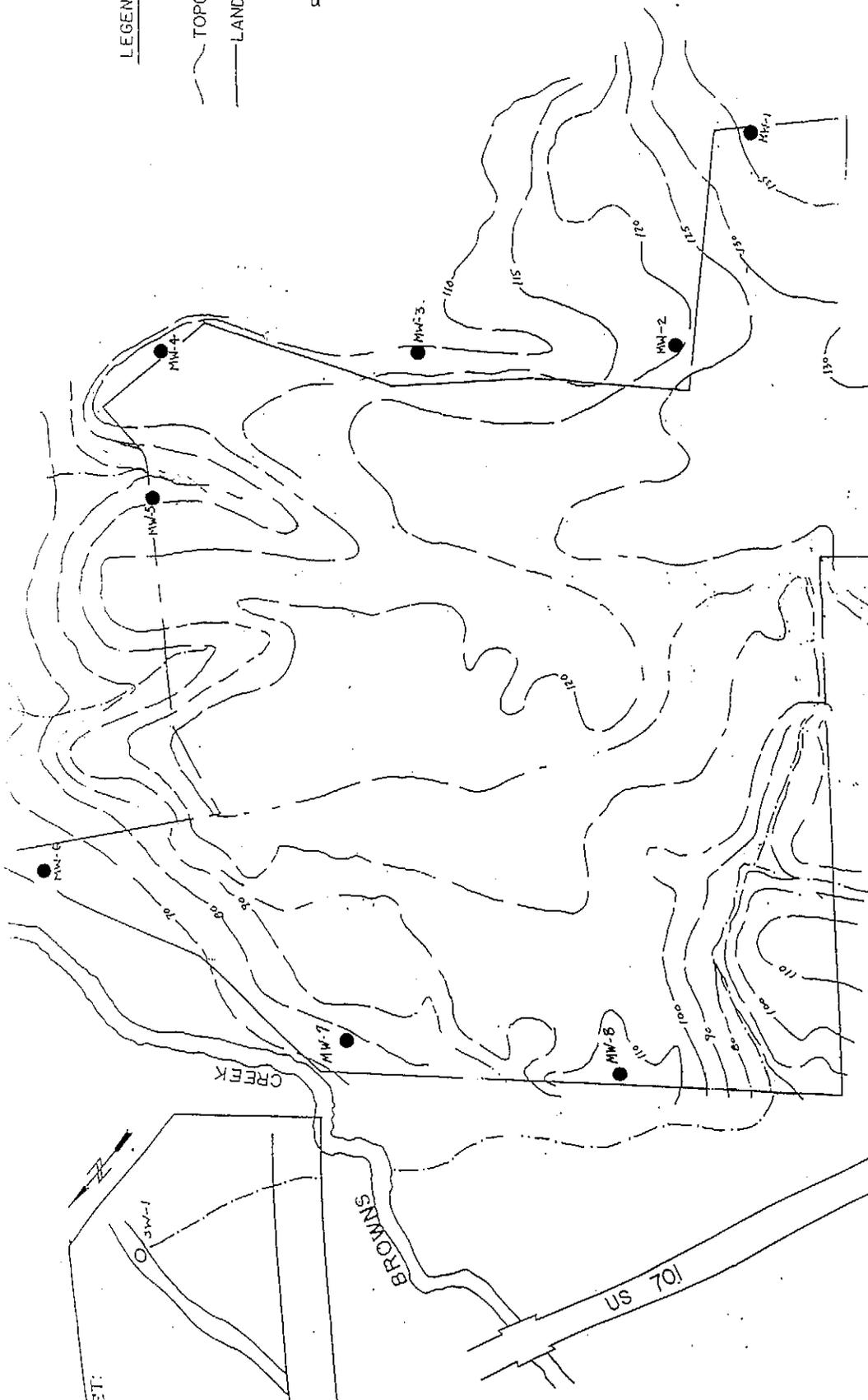
**LEGEND:**

-  FLOODPLA
-  PERMANEN
-  EXISTING
-  PROPERTY
-  WATERCO
-  DRY RUN
-  PREVIOUS



LEGEND:

- TOPOGRAPHIC CONTOUR LINE
- LANDFILL BOUNDARY LINE



PROJECT	AQUATERRA, INCORPORATED	SCALE: As Shown
Bladen County Landfill Elizabethtown, N.C.	RALEIGHNORTH CAROLINA	JOB NO: 200-87-312
		FIGURE NO: 2

16.3  
3.7

12  $\overline{)7.500}$   
72  
30  
24  
60

Robert Morris  
N.C. project officer  
EPA Atlanta  
404 - 347-5065

request report

Baileys — Brainard Kilman

Copy of NUS to Steve Moffat

Steve Moffat - Health Dept  
Bobby Kennon L.F. operator

NUS Corp.  
1927 Lakeside Parkway  
Suite 614  
Tucker, Georgia 30084  
(404) 938-7710  
Kent Hankinson - Geologist