Permit No.	Scan Date	DIN
5504	**March 15, 2011**	**13295**

55-04

BFI®

RECEIVED
N.C. Dept. of EHNR
JUN 14 1999
Winston-Salem
Regional Office

Fac/Perm/Co ID #	Date	Doc ID#
hu	06/11/99	DIN

June 11, 1999

NCDENR
Division of Solid Waste
[redacted]5 Waughtown Road
Winston-Salem, North Carolina 27107-2241

LAKE NORMAN
C&D Landfill
55-04
CENTRAL FILES

Attn: Mr. Tim Jewett
Western Area Engineer

Ref: Methane Migration Monitoring – Permit # 55-04

Dear Mr. Jewett,

Please find enclosed a methane monitoring well installation report.

Our plan is to check these monitoring points semi-annually with a MSA 62S gasscope. The on site buildings are monitored continuously with Macurco, Inc. GD-21 combustible gas monitors.

If you have any questions or comments, I can be reached at 704-822-3033.

Sincerely,

BFI/Lake Norman Landfill

David L Cradduck

David Cradduck
Facility Manager

Lake Norman C&D Landfill · 7099 Quarry Lane · Stanley, North Carolina 28164
Phone 704-822-3033 · Fax 704-822-3013
www.bfi.com

30% Post-Consumer

55-04

ESP ASSOCIATES, P.A.
engineering•surveying•planning

May 11, 1999

Lake Norman C&D Landfill
7099 Quarry Lane
Stanley, North Carolina 28164

Attention: Mr. David Cradduck

Reference: **METHANE MONITORING WELLS MMW-1, 2, 3, 4, 5 & 6**
LAKE NORMAN C&D LANDFILL
ESP JOB NO. ND35

Dear Mr. Cradduck:

Methane monitoring wells MMW- 1, 2, 3, 4, 5 & 6 were installed on May 6, 1999 by Geologic Exploration, Inc. at the Lake Norman C&D Landfill at the request of Mr. David Cradduck with BFI. ESP Associates, P.A. personnel observed the installation of each well. Monitoring wells MMW-1 through MMW-5 were installed to 10 feet below ground surface and MMW-6 to 15 feet below ground surface. Attached with this letter are completed well construction records and typical as-built drawing for the methane monitoring wells. Also attached with this letter is a "Methane Monitoring Well Locations" plan based on approximate field locations and site plan provided by others. This plan was developed by modifying the "Water Quality Monitoring Plan" (S&ME Inc. 2/98) made available to us by BFI.

Corporate Office
10915 Southern Loop Boulevard, Pineville, NC 28134
(704) 583-4949 Fax (704) 583-4950

Raleigh Office
1150 S. E. Maynard Rd., Ste. 240, Cary, NC 27511
(919) 467-9613 Fax (919) 467-9614

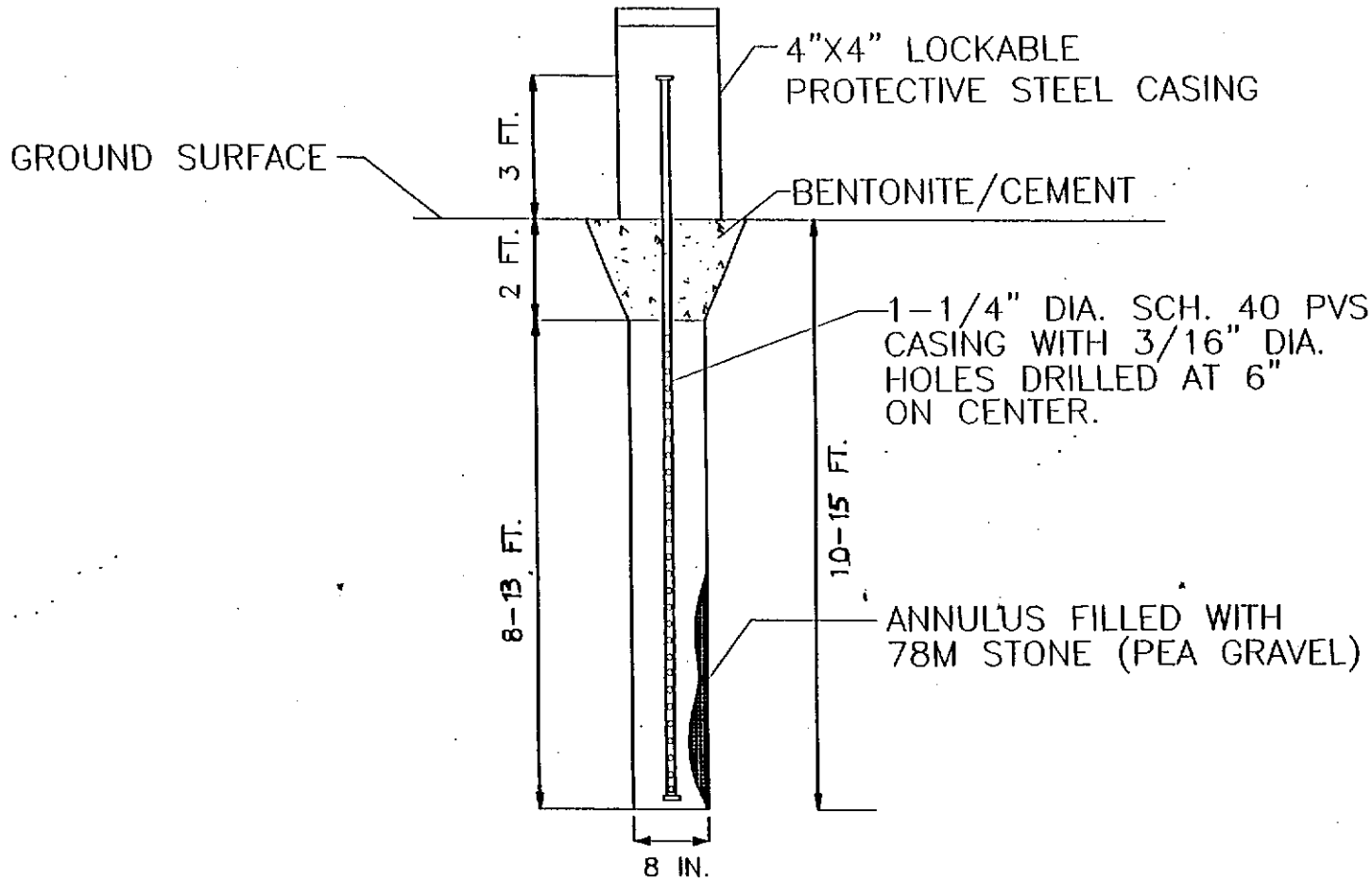
Geotechnical Engineering Office
372 Crompton Street, Charlotte, NC 28241
(704) 504-1015 Fax (704) 504-0917

If you should have any questions or require additional information concerning this letter or attachments, please contact me.

Sincerely,

ESP Associates, P.A.

David W. Wasiela, P.E.
Project Engineer



LAKE NORMAN METHANE MONITORING WELLS

N.T.S.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFICE USE ONLY
Quad No._____ Serial No._____
Lat._____ Lon._____ Pc._____
Minor Basin_____
Basin Code_____
Header Ent._____ GW-1 Ent_____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Geologic Exploration, Inc.

DRILLER REGISTRATION NUMBER 1175

STATE WELL CONSTRUCTION PERMIT NUMBER N/A

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Lowesville
Highway 16
(Road, Community, or Subdivision and Lot No.)

County: Lincoln

2. OWNER Lake Norman Landfill, Inc.

ADDRESS 7099 Quarry Lane
(Street or Rourte No.)
Stanley, NC 28164
City or Town State Zip Code

3. DATE DRILLED 5/6/99 USE OF WELL Methane Monitoring

4. TOTAL DEPTH 10 CUTTINGS COLLECTED ____ YES X NO

5. DOES WELL REPLACE EXISTING WELL? ____ YES X NO

6. STATIC WATER LEVEL: N/A FT ___ ABOVE TOP OF CASING
___ BELOW
TOP OF CASING IS 3 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth) N/A

9. CHLORINATION: Type N//A Amount N/A

10. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	2		1 ¼	SCH 40	PVC

11. GROUT:

Depth From	To	Ft	Material	Method
0	2		Portland	cement

12. SCREEN:

Depth From	To	Ft	Diameter	Slot Size	Material
2	10		1 ¼ in.	3/16 in.	PVC
			in.	in.	
			in.	in.	

13. GRAVEL PACK:

Depth From	To	Ft.	Size	Material
2	10		78M	Stone

DRILLING LOG

Depth From	To	Formation Description
0	6	Red Brown slightly sandy clayey SILT
6	10	Red Brown fine sandy SILT

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)

14. REMARKS:

Well No. MMW – 1

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

5/11/99

SIGNATURE OF CONTACTOR OR AGENT DATE

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFICE USE ONLY
Quad No._____ Serial No._____
Lat._____ Lon._____ Pc._____
Minor Basin_____
Basin Code_____
Header Ent._____ GW-1 Ent_____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Geologic Exploration, Inc.

DRILLER REGISTRATION NUMBER 1175

STATE WELL CONSTRUCTION
PERMIT NUMBER N/A

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Lowesville
Highway 16
(Road, Community, or Subdivision and Lot No.)

County: Lincoln

2. OWNER Lake Norman Landfill, Inc.

ADDRESS 7099 Quarry Lane
(Street or Rourte No.)
Stanley, NC 28164
City or Town State Zip Code

3. DATE DRILLED 5/6/99 USE OF WELL Methane Monitoring

4. TOTAL DEPTH 10 CUTTINGS COLLECTED ____ YES X NO

5. DOES WELL REPLACE EXISTING WELL? ____ YES X NO

6. STATIC WATER LEVEL: N/A FT __ ABOVE TOP OF CASING
__ BELOW
TOP OF CASING IS 3 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth) N/A

9. CHLORINATION: Type N//A Amount N/A

10. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	2		1 ¼	SCH 40	PVC

11. GROUT:

Depth From	To	Ft.	Material	Method
0	2		Portland	cement

12. SCREEN:

Depth From	To	Ft.	Diameter	Slot Size	Material
2	10		1 ¼ in.	3/16 in.	PVC
			in.	in.	
			in.	in.	

13. GRAVEL PACK:

Depth From	To	Ft.	Size	Material
2	10		78M	Stone

Depth From	To	DRILLING LOG Formation Description
0	5	Red Brown slightly sandy clayey SILT
5	10	Red Brown to Brown slightly clayey SILT w/ some Mica

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)

14. REMARKS:

Well No. MMW – 2

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

5/11/99

SIGNATURE OF CONTACTOR OR AGENT DATE

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFICE USE ONLY
Quad No._____ Serial No._____
Lat._____ Lon._____ Pc._____
Minor Basin_____
Basin Code_____
Header Ent._____ GW-1 Ent_____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Geologic Exploration, Inc.

DRILLER REGISTRATION NUMBER 1175

STATE WELL CONSTRUCTION PERMIT NUMBER N/A

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Lowesville
Highway 16
(Road, Community, or Subdivision and Lot No.)

County: Lincoln

2. OWNER Lake Norman Landfill, Inc.

ADDRESS 7099 Quarry Lane
(Street or Rourte No.)
Stanley, NC 28164
City or Town State Zip Code

3. DATE DRILLED 5/6/99 USE OF WELL Methane Monitoring

4. TOTAL DEPTH 10 CUTTINGS COLLECTED ____ YES X NO

5. DOES WELL REPLACE EXISTING WELL? ____ YES X NO

6. STATIC WATER LEVEL: N/A FT ___ ABOVE TOP OF CASING
___ BELOW
TOP OF CASING IS 3 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth) N/A

9. CHLORINATION: Type N//A Amount N/A

10. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	2		1 ¼	SCH 40	PVC

11. GROUT:

Depth From	To	Ft.	Material	Method
0	2		Portland	cement

12. SCREEN:

Depth From	To	Ft	Diameter	Slot Size	Material
2	10		1 ¼ in.	3/16 in.	PVC
			in.	in.	
			in.	in.	

13. GRAVEL PACK:

Depth From	To	Ft.	Size	Material
2	10		78M	Stone

14. REMARKS:

Well No. MMW – 3

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

5/11/99

SIGNATURE OF CONTACTOR OR AGENT DATE

Depth From	To	DRILLING LOG Formation Description
0	6.5	Red Brown slightly sandy clayey SILT
6.5	10	Light Gray slightly sandy clayey SILT

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)

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFICE USE ONLY
Quad No._____Serial No._____
Lat._____Lon._____Pc._____
Minor Basin_____
Basin Code_____
Header Ent._____GW-1 Ent_____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Geologic Exploration, Inc.

DRILLER REGISTRATION NUMBER 1175

STATE WELL CONSTRUCTION
PERMIT NUMBER N/A

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Lowesville
Highway 16
(Road, Community, or Subdivision and Lot No.)

County: Lincoln

2. OWNER Lake Norman Landfill, Inc.

ADDRESS 7099 Quarry Lane
(Street or Rourte No.)
Stanley, NC 28164
City or Town State Zip Code

3. DATE DRILLED 5/6/99 USE OF WELL Methane Monitoring

4. TOTAL DEPTH 10 CUTTINGS COLLECTED ____ YES X NO

5. DOES WELL REPLACE EXISTING WELL? ____ YES X NO

6. STATIC WATER LEVEL: N/A FT ___ ABOVE TOP OF CASING
___ BELOW
TOP OF CASING IS 3 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth) N/A

9. CHLORINATION: Type N//A Amount N/A

10. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	2		1 ¼	SCH 40	PVC

11. GROUT:

Depth From	To	Ft.	Material	Method
0	2		Portland	cement

12. SCREEN:

Depth From	To	Ft	Diameter	Slot Size	Material
2	10		1 ¼ in.	3/16 in.	PVC
			in.	in.	
			in.	in.	

13. GRAVEL PACK:

Depth From	To	Ft.	Size	Material
2	10		78M	Stone

14. REMARKS:

Well No. MMW – 4

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

Depth From	To	DRILLING LOG Formation Description
0	3	Brown sandy SILT w/ rock fragments
3	5	Brown slightly clayey sandy SILT w/ Mica
5	10	Red Brown and Brown slightly sandy clayey SILT w/ Mica

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)

5/11/99
SIGNATURE OF CONTACTOR OR AGENT DATE

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFICE USE ONLY
Quad No._____ Serial No._____
Lat._____ Lon._____ Pc._____
Minor Basin_____
Basin Code_____
Header Ent._____ GW-1 Ent_____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Geologic Exploration, Inc.

DRILLER REGISTRATION NUMBER 1175

STATE WELL CONSTRUCTION PERMIT NUMBER N/A

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Lowesville
Highway 16
(Road, Community, or Subdivision and Lot No.)

County: Lincoln

2. OWNER Lake Norman Landfill, Inc.

ADDRESS 7099 Quarry Lane
(Street or Rourte No.)
Stanley, NC 28164
City or Town State Zip Code

3. DATE DRILLED 5/6/99 USE OF WELL Methane Monitoring

4. TOTAL DEPTH 10 CUTTINGS COLLECTED ___ YES X NO

5. DOES WELL REPLACE EXISTING WELL? ___ YES X NO

6. STATIC WATER LEVEL: N/A FT ___ ABOVE ___ BELOW TOP OF CASING
TOP OF CASING IS 3 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth) N/A

9. CHLORINATION: Type N//A Amount N/A

10. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	2		1 ¼	SCH 40	PVC

11. GROUT:

Depth From	To	Ft.	Material	Method
0	2		Portland	cement

12. SCREEN:

Depth From	To	Ft	Diameter	Slot Size	Material
2	10		1 ¼ in.	3/16 in.	PVC
			in.	in.	
			in.	in.	

13. GRAVEL PACK:

Depth From	To	Ft.	Size	Material
2	10		78M	Stone

DRILLING LOG

Depth From	To	Formation Description
0	2	Red Brown slightly clayey sandy SILT w/ Mica
2	10	Red Brown sandy clayey SILT w/some Mica

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)

14. REMARKS:

Well No. MMW – 5

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 CONTACTOR OR AGENT 5/11/99 DATE

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, NC 27611-7687
PHONE (919)733-3221

FOR OFICE USE ONLY
Quad No._____ Serial No._____
Lat._____ Lon._____ Pc._____
Minor Basin_____
Basin Code_____
Header Ent._____ GW-1 Ent_____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Geologic Exploration, Inc.

DRILLER REGISTRATION NUMBER 1175

STATE WELL CONSTRUCTION
PERMIT NUMBER N/A

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Lowesville
Highway 16
(Road, Community, or Subdivision and Lot No.)

County: Lincoln

2. OWNER Lake Norman Landfill, Inc.

ADDRESS 7099 Quarry Lane
(Street or Rourte No.)
Stanley, NC 28164
City or Town State Zip Code

3. DATE DRILLED 5/6/99 USE OF WELL Methane Monitoring

4. TOTAL DEPTH 15 CUTTINGS COLLECTED ____ YES X NO

5. DOES WELL REPLACE EXISTING WELL? ____ YES X NO

6. STATIC WATER LEVEL: N/A FT ___ ABOVE TOP OF CASING
___ BELOW
TOP OF CASING IS 3 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): N/A METHOD OF TEST N/A

8. WATER ZONES (depth) N/A

9. CHLORINATION: Type N//A Amount N/A

10. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	2		1 ¼	SCH 40	PVC

11. GROUT:

Depth From	To	Ft.	Material	Method
0	2		Portland	cement

12. SCREEN:

Depth From	To	Ft.	Diameter	Slot Size	Material
2	10		1 ¼ in.	3/16 in.	PVC
			in.	in.	
			in.	in.	

13. GRAVEL PACK:

Depth From	To	Ft.	Size	Material
2	10		78M	Stone

14. REMARKS:

Well No. MMW – 6

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

5/11/99

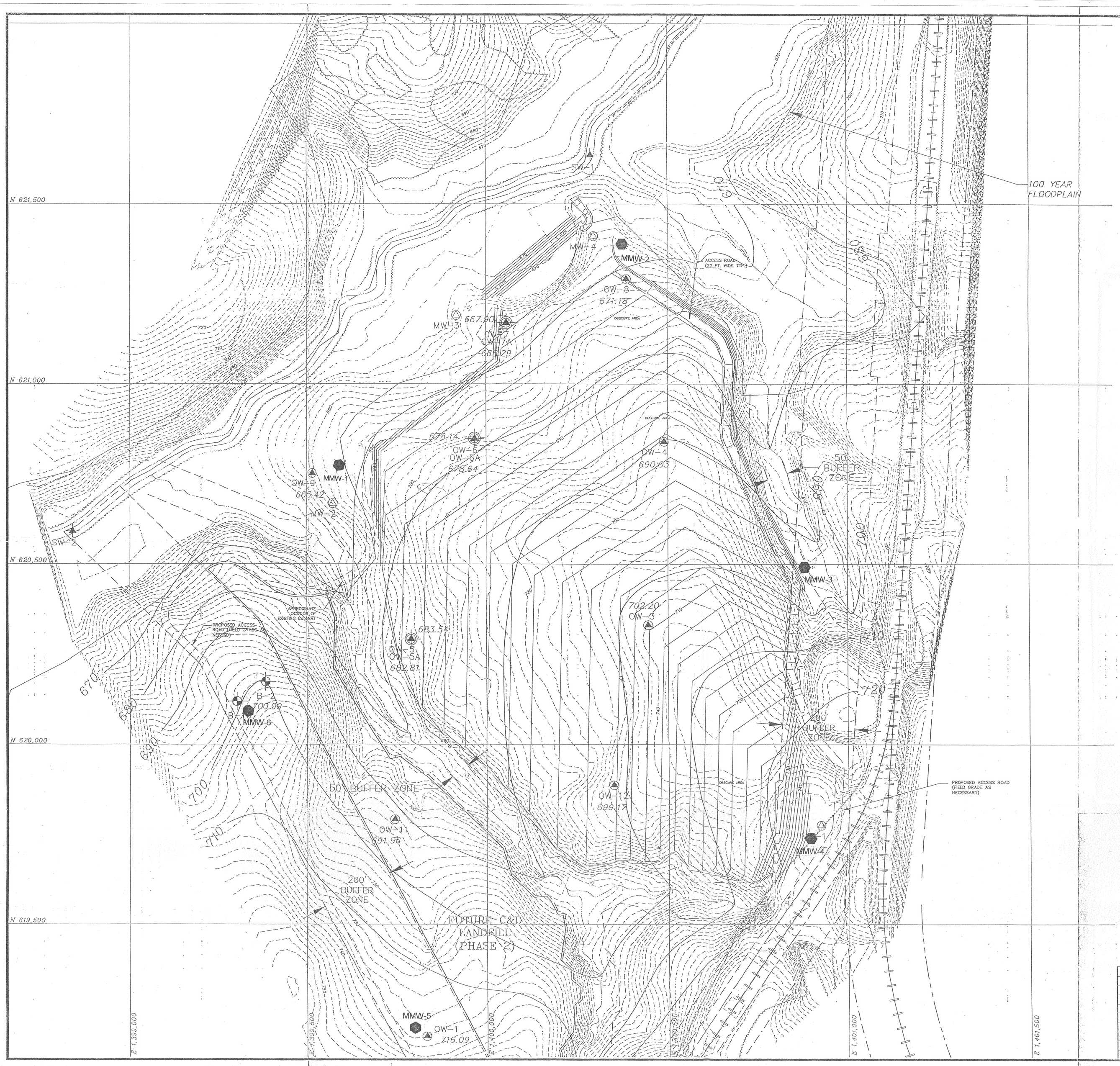
SIGNATURE OF CONTACTOR OR AGENT DATE

Depth From	To	DRILLING LOG Formation Description
0	2	Red Brown slightly sandy clayey SILT w/ Topsoil
2	11	Reddish brown to Brown slightly sandy to Sandy silty CLAY
11	15	Grayish Brown sandy SILT

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)



COORDINATES FOR OBSERVATION WELLS AND BORINGS

Boring	Northing	Easting	Ground Elevation (MSL)	Top of Casing Elevation (MSL)
OW-1	619,190.21	1,399,831.34	735.91	738.49
B-2	620,174.86	1,399,380.05	723.18	N/A
OW-3	620,330.01	1,400,447.96	739.84	742.67
OW-4	620,840.97	1,400,489.71	720.44	722.99
OW-5	620,288.25	1,399,787.48	695.04	698.13
OW-5A	620,295.39	1,399,791.93	695.25	697.42
OW-6	620,844.01	1,399,972.14	697.01	700.34
OW-6A	620,854.97	1,399,962.16	697.97	699.76
OW-7	621,175.01	1,400,061.07	684.37	687.45
OW-7A	621,163.88	1,400,051.91	683.22	685.72
OW-8	621,291.08	1,400,387.44	690.18	693.18
OW-9	620,753.40	1,399,516.15	677.34	680.59
B-10	620,120.00	1,399,305.00	723.00	N/A
OW-11	679,790.45	1,399,743.79	702.49	706.19
OW-12	619,887.08	1,400,350.87	728.11	731.48

LEGEND

- 700 — POTENTIOMETRIC SURFACE
- EXISTING GRADE CONTOUR
- PROPOSED CONSTRUCTION CONTOUR
- PROPERTY LINE
- 100 YEAR FLOODPLAIN
- PROPOSED MONITORING WELL LOCATION
- PROPOSED SURFACE WATER SAMPLING LOCATION
- EXISTING OBSERVATION WELL
- EXISTING BORING LOCATION
- MMW-1 METHANE MONITORING WELL LOCATION

NORTH CAROLINA LICENSED SEAL 1133 GEOLOGIST ALL QUARLES

2/20/98

REFERENCE:

1. TOPOGRAPHIC SURVEY FOR LAKE NORMAN LANDFILL, INC. BY SUTTLES SURVEYING, P.A., DATED SEPTEMBER 4, 1997.
2. TOPOGRAPHIC SURVEY BASED ON BENCHMARK #6 NORTHING 618,090.43 EASTING 1,400,164.48 COORDINATES AT ELEVATION 784.94 MSL. PROVIDED BY SUTTLES SURVEYING, P.A.

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

NO.	DATE:	DESCRIPTION	BY

S&ME
ENVIRONMENTAL SERVICES
ENGINEERING / TESTING

WATER QUALITY MONITORING PLAN
LAKE NORMAN LANDFILL, INC.
LINCOLN COUNTY, NORTH CAROLINA

SCALE: AS SHOWN	DRAWN BY: CLD	CHECKED BY: WAD	
JOB NO. 1356-97-394	DATE: 2-18-98	SHEET 9 OF 12	