

**ADDENDUM REPORT
of
HYDROGEOLOGICAL ASSESSMENT
(PHASE II UNPERMITTED AREA)**

North Mecklenburg Landfill
15300 Holbrooks Road
Huntersville, North Carolina

ESI Project No. ES-0675

September 1, 1994

-Prepared for-

Mr. Larry Griffin, Sr.
19141 Highway 73 West
Davidson, North Carolina 28036

-Prepared by-

Ecological Services, Inc.
P. O. Box 12146
Charlotte, NC 28220

Paul A. Banks
Project Geologist

Thomas H. Bolyard, P.G.
Senior Hydrogeologist
N.C. Registration No. 0492

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	PREVIOUS INVESTIGATIONS	1
3.0	ADDENDUM FIELD ACTIVITIES	1
4.0	SOIL TEST RESULTS	4
5.0	CONCLUSIONS	4

TABLES:

- 1: Constant Head Permeability Testing Data
- 2: Summary of Grain Size Distribution Testing

FIGURES:

- 1: Site Location Map
- 2: Site Configuration Map
- 3: Soil Test Boring Location Map
- 4: Cross Section Designation Map
- 5: Cross Section A-A'
- 6: Cross Section B-B'

APPENDICES:

- A: Soil Boring Records
- B: Report of Laboratory Constant Head Permeability and Classification Tests for Soil Samples

1.0 INTRODUCTION

Ecological Services, Inc. (ESI) was contracted by Mr. Larry Griffin, Sr. to perform addendum hydrogeological assessment activities at the North Mecklenburg Landfill located at 15300 Holbrooks Road in Huntersville, North Carolina (Figure 1). Addendum assessment activities included the re-definition of depth to bedrock in the Phase II unpermitted area of the site, and soil sample collection and testing to confirm subsurface soil characteristic testing previously conducted at the site.

2.0 PREVIOUS INVESTIGATIONS

Initial hydrogeological assessment activities associated with the Phase II area were conducted by ESI in June and July, 1994. The initial assessment activities included the installation of seven soil test borings (B-4, B-5, B-6, B-7, SB-1, SB-2, and SB-3), five floor sample excavations (F-1 through F-5) to classify subsurface lithology and determine soil geotechnical characteristics, and seven temporary piezometers (PZ-1 through PZ-7) to assess depth to groundwater and direction of groundwater flow (Figures 2 and 3). Findings of the initial hydrogeological assessment were submitted to the North Carolina Department of Environment, Health and Natural Resources (NCDEHNR) as ESI Report of Hydrogeological Assessment (Phase II Unpermitted Area), dated July 8, 1994.

Based on a preliminary NCDEHNR review of the July 8, 1994 assessment report, it was determined that depth to bedrock required re-definition, and that undisturbed (Shelby Tube) soil samples would be required for the Phase II area to verify permeability test results previously obtained from remolded soil samples.

3.0 ADDENDUM FIELD ACTIVITIES

ESI advanced five soil borings (SB-1A, SB-2A, SB-3A, SB-3B and SB-3C) in the Phase II area on August 18, 1994. Each of the soil borings offset previously advanced soil borings which were

installed during the initial assessment activities conducted in the Phase II area. SB-1A offset SB-1, SB-2A offset SB-2, and SB-3A, SB-3B, and SB-3C offset SB-3 (Figure 3).

During the advancement of soil borings SB-1A, SB-2A, and SB-3A, split spoon soil samples were collected every five feet and standard penetration resistance data was recorded. Each soil sample collected was visually described in the field by an ESI staff geologist. Undisturbed Shelby Tube soil samples were collected from SB-2A and SB-3A for soil geotechnical testing per the following procedures:

ASTM D 5084	"Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter"
ASTM D 4318	"Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"
ASTM D 422	"Standard Test Method for Particle-Size Analysis of Soils"

Due to the undeveloped terrain of the Phase II area, initial soil borings SB-1, SB-2, and SB-3 were advanced with an all terrain auguring rig. During the installation of these borings it became apparent that the all terrain rig did not have sufficient drilling power to advance more than approximately 18 feet through the saprolite in the Phase II area of the site. Therefore, the off-set wells conducted during the addendum assessment activities were advanced with a "Cantera" auger drilling rig.

Depth to bedrock was re-defined in the areas of initial soil borings SB-1, SB-2, and SB-3. In the area of SB-1, soil boring SB-1A was advanced (Figure 3). During the advancement of SB-1A, soil samples were obtained every five feet, and penetration resistance blow counts were recorded. Auger refusal was encountered at 32 feet in SB-1A, whereas, auger refusal in SB-1 had previously been encountered at 18 feet. Due to the hardness of the subsurface material

recorded during the penetration resistance testing, a Shelby Tube could not be pushed and retrieved from the subsurface material in the area of SB-1A. Soil boring records for all addendum soil test borings are included as Appendix A of this report.

Soil boring SB-2A was located adjacent to the previous SB-2 location (Figure 3). Auger refusal in SB-2A was encountered at 39 feet, as compared with the previous refusal in this area encountered in SB-2 at 18 feet. One undisturbed Shelby Tube soil sample was obtained from SB-2A at a depth of 10 to 12 feet (Appendix A).

Three soil borings (SB-3A, SB-3B, and SB-3C) were advanced in the area of previous soil boring SB-3 due to the relatively shallow auger refusal obtained during the initial assessment activities (Figure 3). Soil Boring SB-3A was located approximately 2 feet from the original SB-3 location. Auger refusal in SB-3A was encountered at 14 feet, corresponding to the refusal depth obtained in SB-3 during the initial assessment activities. One undisturbed Shelby Tube soil sample was obtained from SB-3A at a depth of 12 to 13 feet (Appendix A). Two soil borings, in addition to SB-3A, were advanced in the immediate area surrounding the initial SB-3 location. These additional borings (SB-3B and SB-3C) were advanced to determine if the shallow depth to bedrock encountered in SB-3 and SB-3A was indicative of the depth to bedrock throughout the southern portion of the Phase II area, or if the shallow depth represented only a local undulation in the bedrock surface. Soil boring SB-3B, located 30 feet to the northeast of the SB-3A location, was advanced to an auger refusal depth of 14 feet (Figure 3). However, depth to bedrock in soil boring SB-3C, which was located 40 feet to the southeast of SB-3A, was encountered at 30 feet below ground surface. Soil samples were not collected from soil borings SB-3B and SB-3C due to their close proximity to the SB-3A sampling location. Based on the new depth to bedrock data collected during the addendum assessment activities, the geologic cross sections previously constructed during the initial Phase II assessment activities were reconstructed. The cross section traverse locations are indicated on Figure 4 of this report, which proceeds the A-A' and B-B' cross sections included as Figures 5 and 6, respectively. Lithologic tie lines connecting soil borings in cross sections A-A' and B-B' designate inferred lithologic changes in the residual soils located between borings. Actual lithologic changes may be more gradational or abrupt than depicted.

4.0 SOIL TEST RESULTS

Results of the Constant Head Permeability Testing and Grain Size Distribution Testing on the Shelby Tube samples collected from soil borings SB-2A and SB-3A are summarized in Tables 1 and 2, respectively. The sample intervals selected should be representative of the material in the deeper section of our auger profile. The Report of Laboratory Constant Head Permeability and Classification Tests (Law Job No. 226-09423-01, dated August 30, 1994) is included as Appendix B.

Constant head permeability test results for the Shelby Tube soil samples collected from SB-2A and SB-3A indicate smaller coefficient of permeability values than the re-formed soil samples collected during the initial studies of the Phase II area. The average coefficient of permeability value of five re-formed floor soil samples collected from the Phase II area during the initial investigation was 6.51×10^{-5} cm/sec. In contrast, the average coefficient of permeability value of the two Shelby Tube soil samples is 3.7×10^{-7} cm/sec.

5.0 CONCLUSIONS

Based on the geotechnical results obtained from soil borings SB-1A, SB-2A and SB-3A advanced during this additional assessment, depth to bedrock and subsurface permeability were re-defined for the Phase II area.

Depth to bedrock appears to have some correspondence to the natural topographic changes within the Phase II area. In general, the bedrock appears to be more shallow in the central southern portion of the Phase II area where the natural topography is the highest. However, due to the nature of pluton emplacement, the bedrock surface is expected to be very undulatory, as indicated by the 15 foot drop in bedrock elevation between SB-3A and SB-3C, which are only 40 feet apart. For this reason the vertical fill limits may need to be modified as cell excavation progresses and additional data is obtained.

Based on the coefficient of permeability and grain size distribution test reports, the subsurface in the areas of SB-2A and SB-3A are expected to transmit fluids at a relatively slow rate. Penetration resistance testing collected during the advancement of SB-1A, SB-2A, and SB-3A indicates that the unconsolidated portion of the subsurface is highly competent and is considered "hard" by ASTM standards.

TABLES

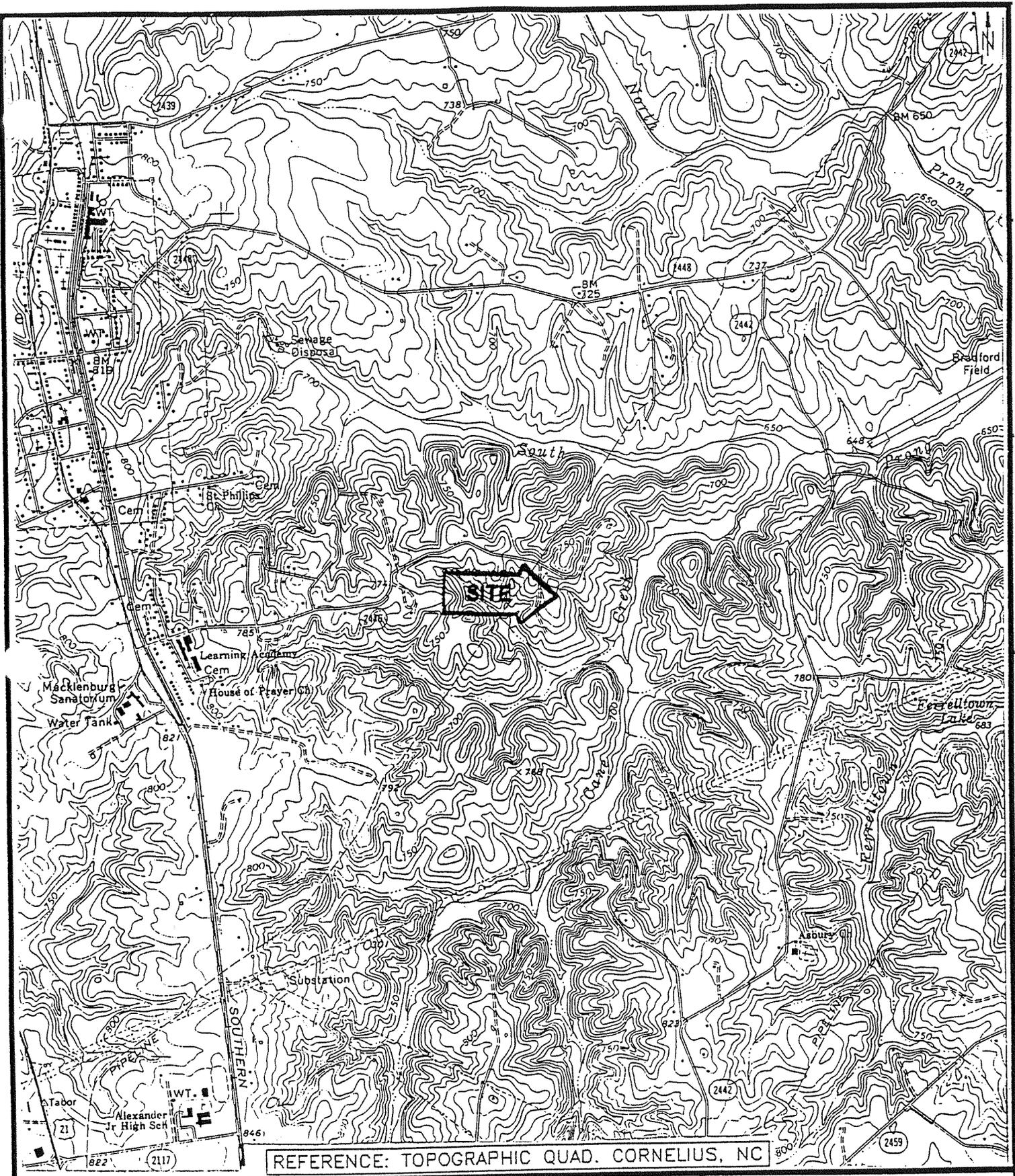
TABLE 1
CONSTANT HEAD PERMEABILITY TESTING DATA
North Mecklenburg Landfill
Huntersville, North Carolina

Sample I.D.	Coefficient of Permeability (cm/sec)
SB-2A	3.0×10^{-7}
SB-3A	4.3×10^{-7}

TABLE 2
SUMMARY OF GRAIN SIZE DISTRIBUTION TESTING
North Mecklenburg Landfill
Huntersville, North Carolina

Sample I.D.	% + 3"	% Gravel	% Sand	% Silt and Clay
SB-2A	0.0	0.4	51.1	48.5
SB-3A	0.0	2.1	58.3	39.6

FIGURES



DATE: 07-07-94
 SCALE 1:24,000



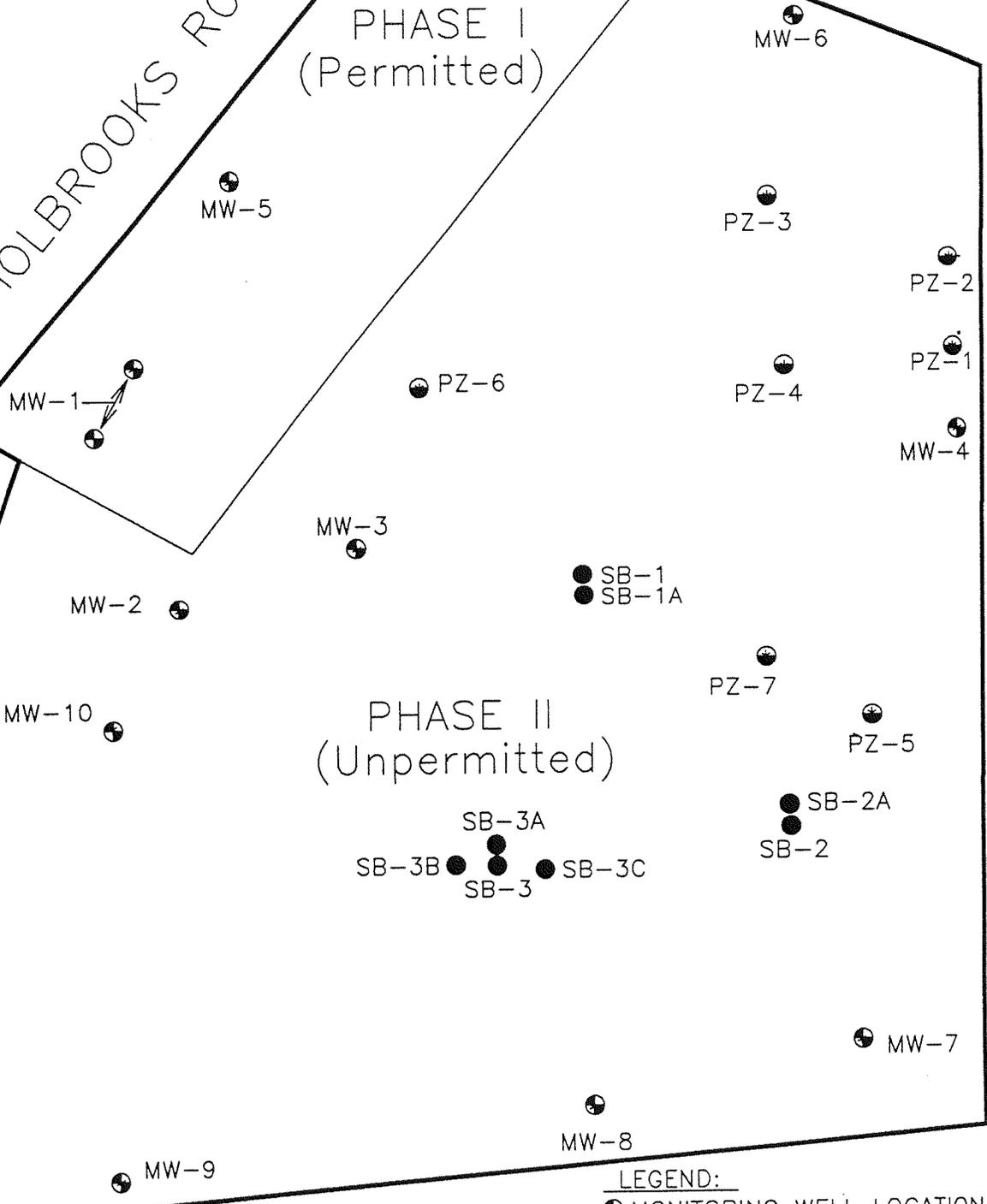
FIGURE 1: SITE LOCATION
 MAP
 N. MECK. LANDFILL
 HUNTERSVILLE, NC



HOLBROOKS ROAD

PHASE I
(Permitted)

PHASE II
(Unpermitted)



LEGEND:

- ⊕ MONITORING WELL LOCATION
- ⊖ PIEZOMETER WELL LOCATION
- SOIL BORING

DATE: 07-05-94
 SCALE: 1" = 200'
 DWG. NO.: ES-675-2



FIGURE 2: SITE CONFIGURATION
 MAP
 N. MECK. LANDFILL
 HUNTERSVILLE, NC



HOLBROOKS ROAD

PHASE I
(Permitted)

□ B-4 □ B-6

□ B-7 □ B-5

● SB-1
● SB-1A

F-1
△

F-2
△

PHASE II
(Unpermitted)

F-3
△

● SB-2A
● SB-2

SB-3A
● SB-3B ● SB-3 ● SB-3C

F-4
△

F-5
△

LEGEND:

- COVER SAMPLE LOCATION
- △ FLOOR SAMPLE LOCATION
- SOIL BORING LOCATION

DATE: 07-05-94

SCALE: 1" = 200'

DWG. NO.: ES-675-3



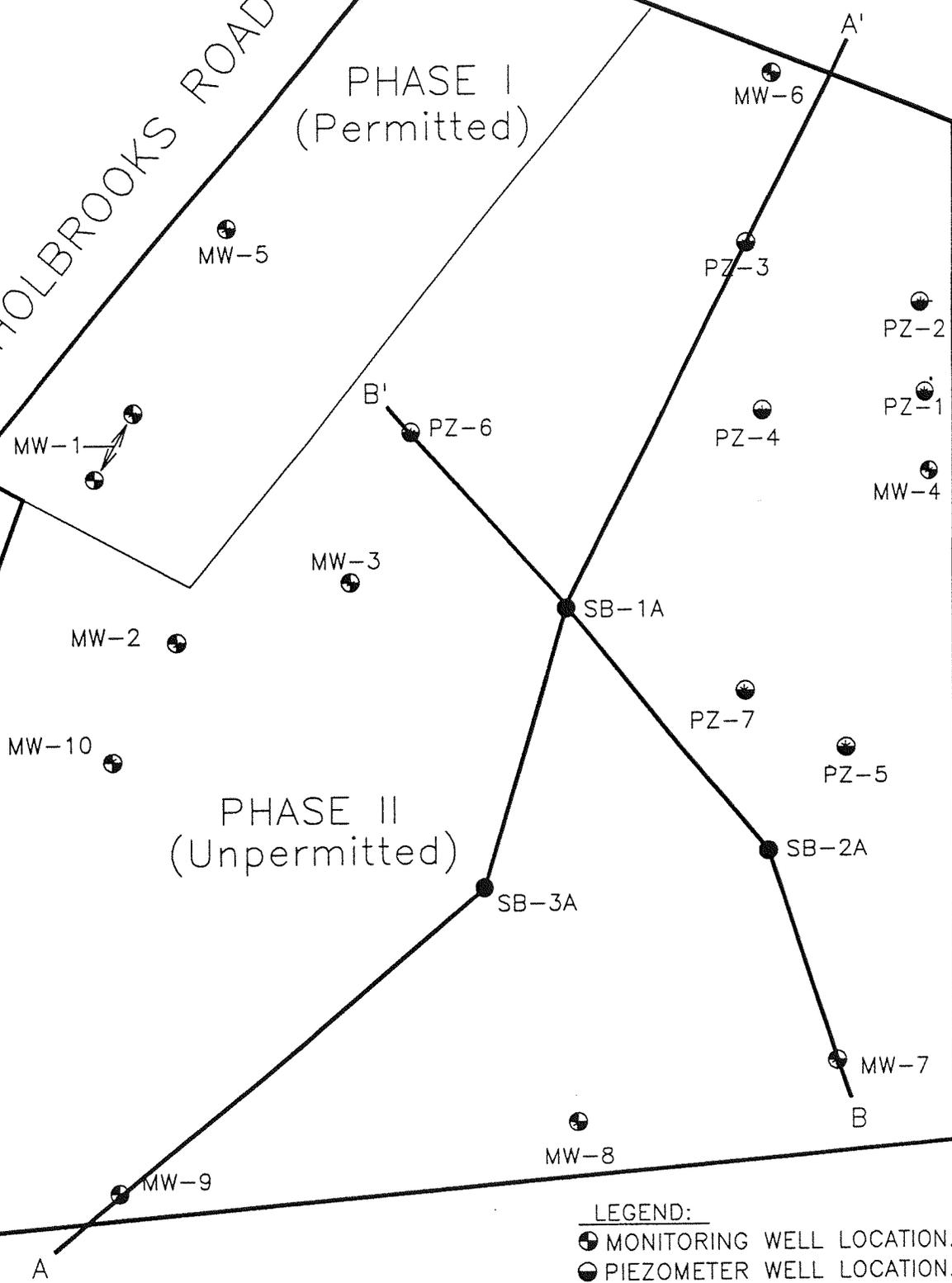
FIGURE 3: SOIL TEST BORING
LOCATION MAP
N. MECK. LANDFILL
HUNTERVILLE, NC



HOLBROOKS ROAD

PHASE I
(Permitted)

PHASE II
(Unpermitted)

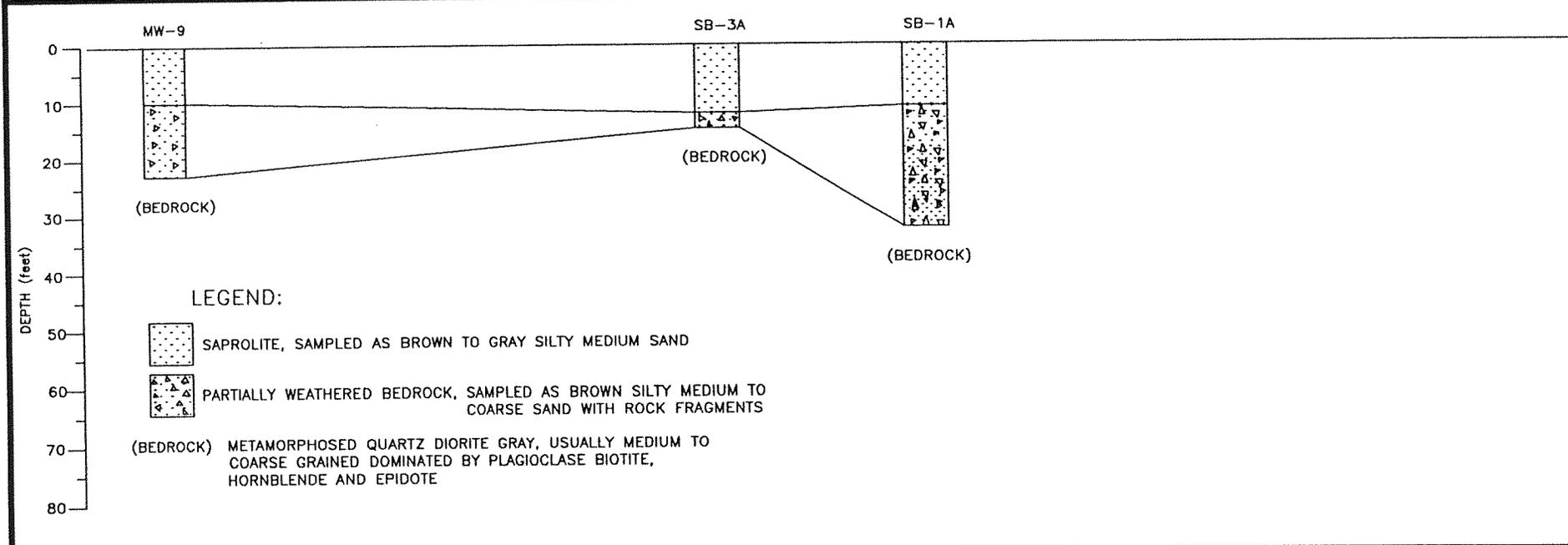
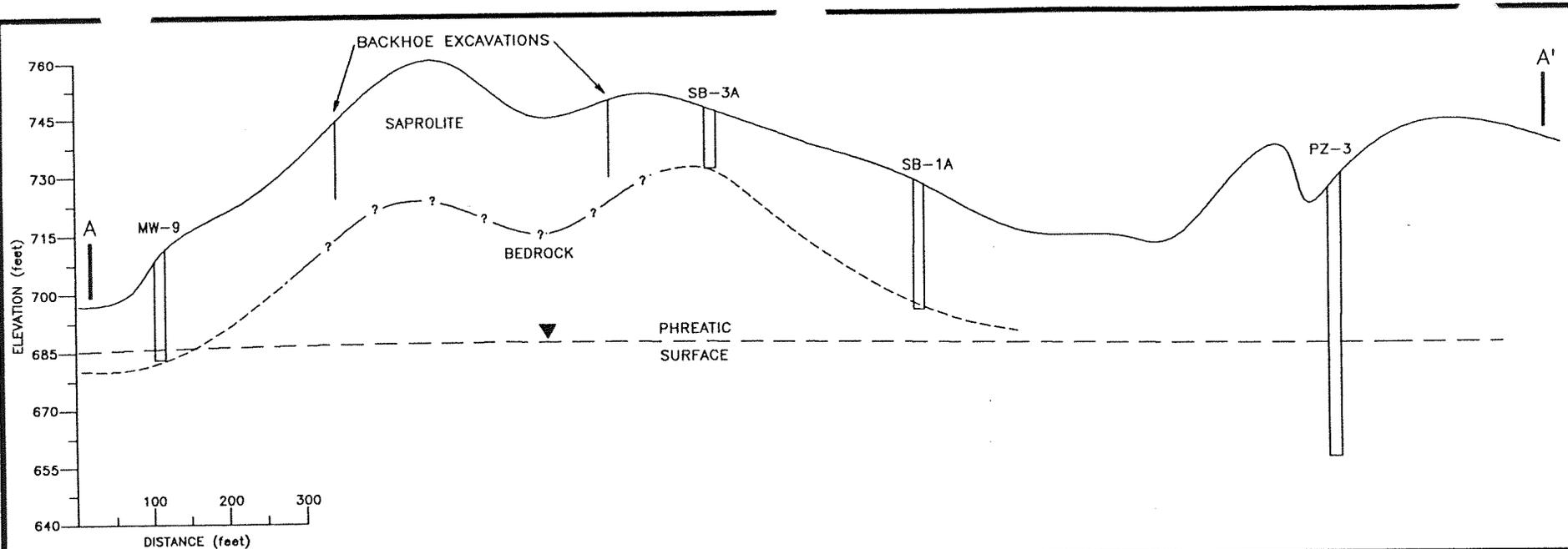


LEGEND:
● MONITORING WELL LOCATION.
⊙ PIEZOMETER WELL LOCATION.

DATE: 07-05-94
SCALE: 1" = 200'
DWG. NO.: ES-675-4



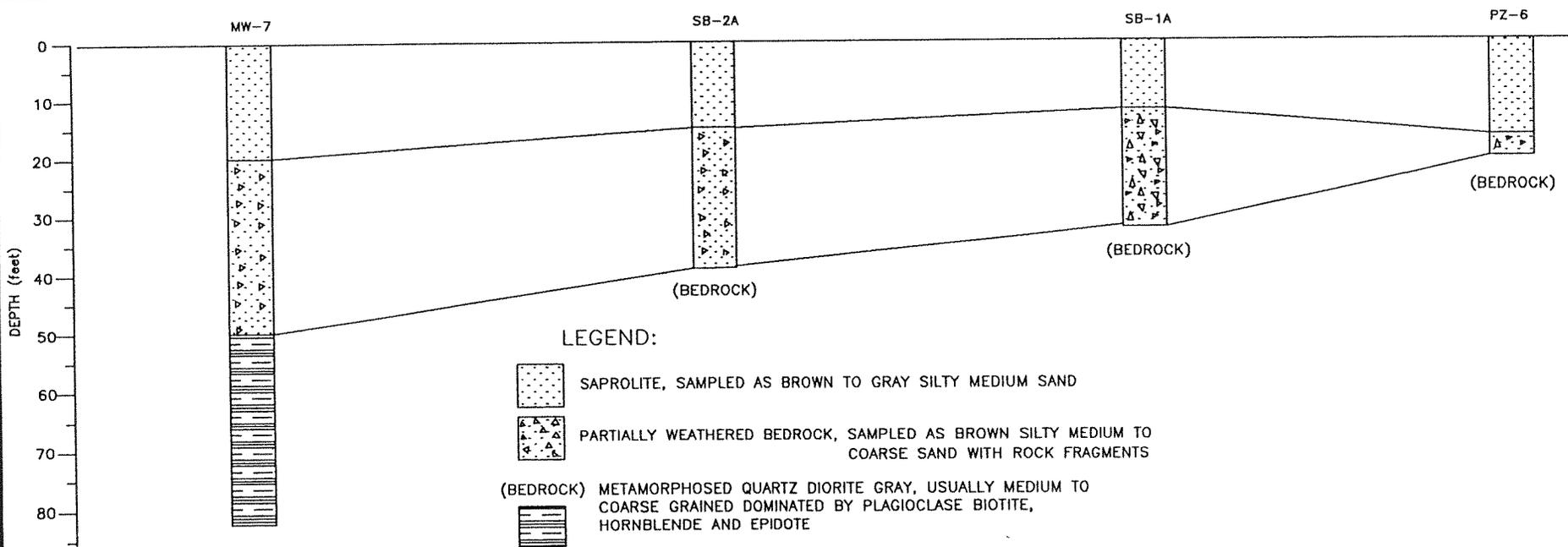
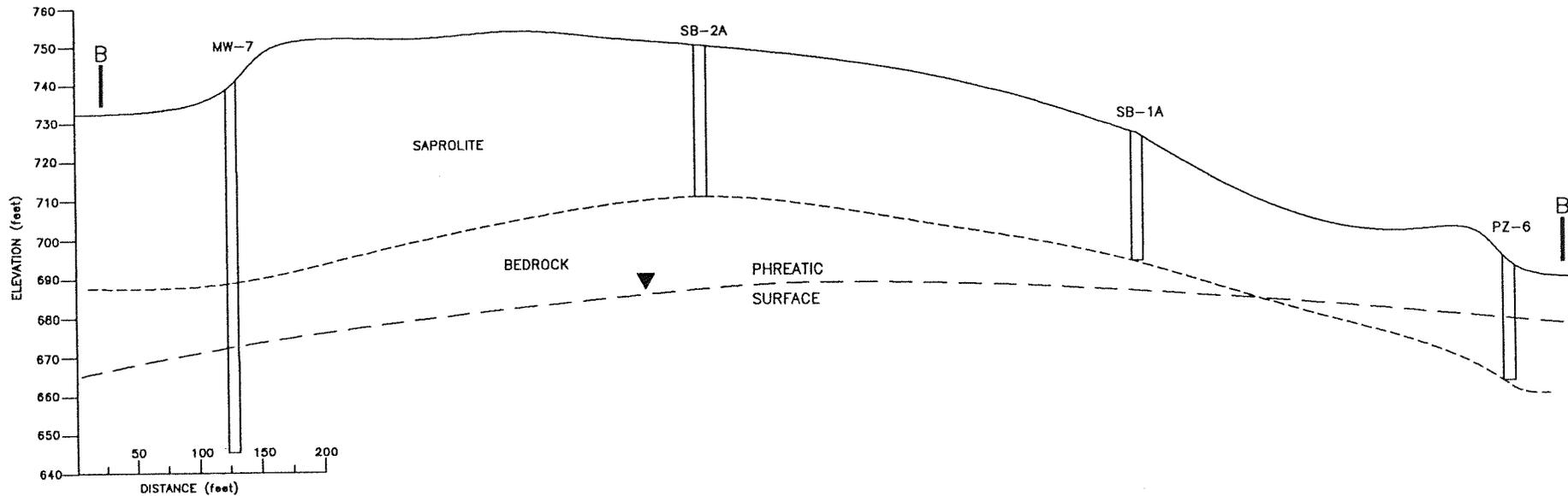
FIGURE 4: CROSS SECTION
DESIGNATION MAP
N. MECK. LANDFILL
HUNTERVILLE, NC



DATE: 08-23-94
 SCALE: ON DRAWING
 DWG. NO.: ES675-5A

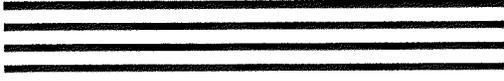
ESI 
 ECOLOGICAL SERVICES, INC.

FIGURE 5: CROSS SECTION A - A'
 NORTH MECKLENBURG LANDFILL
 HUNTERVILLE, NC



DATE: 08-23-94
 SCALE: ON DRAWING
 DWG. NO.: ES675-6a

ESI



ECOLOGICAL SERVICES, INC.

FIGURE 6: CROSS SECTION B - B'
 NORTH MECKLENBURG LANDFILL
 HUNTERVILLE, NC

APPENDIX A

Soil Boring Records

Geologist Log

Ecological Services, Inc

Job #: ES-0675		North Mecklenburg Landfill		Well #: SB-1A		Page 1 of 1	
County: Mecklenburg		State: NC		Date Began: 8/18/94		Date End: 8/18/94	
Casing Height:		Drilled By: Badger Well Drilling		Static Water Level:			
Lat.:		Long.:		Logged By: Ben Hope		Development Method:	
Grid Coord.:		Drilling Method: Hollow Stem Auger		Sampling Method:			
Grout: 5% bentonite		Seal: bentonite		Gravel Pack: 8/20 silica sand			
Casing Type: Sch 40 PVC		Diameter: 2"		Depth:		Hole Diameter: 4-1/4"	
Screen Type: Sch 40 PVC		Diameter: 2"		Slot: 0.010-inch		Depth:	
						Total Depth: 32 ft	
PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Lithology/Remarks	Well Completion			
		0					
	11-22-31-38	5	5 - 7 ft: Saprolite; Brownish Gray Fine to Medium Grained Silty Sand				
	13-50/6"	10	10 - 12 ft: Saprolite; Gray Medium Grained Silty Sand			10	
	27-50/3"	15	15 - 17 ft: Saprolite; Brown Medium Grained Silty Sand				
	50/6"	20	20 - 22 ft: Brown Fine Grained Silty Sand			20	
	50/5"	25	25 - 27 ft: Brown Fine Grained Silty Sand				
	17-50/2"	30	30 - 32 ft: Saprolite; Brown Medium Grained Silty Sand			30	
		32	32 ft: Bedrock Encountered, Boring Terminated				
		40				40	
		50				50	

Geologist Log

Ecological Services, Inc

Job #: ES-0675		North Mecklenburg Landfill		Well #: SB-3A		Page 1 of 1	
County: Mecklenburg		State: NC		Date Began: 8/18/94		Date End: 8/18/94	
Casing Height:		Drilled By: Badger Well Drilling		Static Water Level:			
Lat.: Long.:		Logged By: Ben Hope		Development Method:			
Grid Coord.:		Drilling Method: Hollow Stem Auger		Sampling Method:			
Tests:		Grout: 5% bentonite		Seal: bentonite		Gravel Pack: 8/20 silica sand	
Casing Type: Sch 40 PVC		Diameter: 2"		Depth:		Hole Diameter: 4-1/4"	
Screen Type: Sch 40 PVC		Diameter: 2"		Slot: 0.010-inch		Depth: Total Depth: 14 ft	
PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Lithology/Remarks	Well Completion			
		0		0			
	13 - 50/4"	3	3 - 5 ft: Brown Medium Grained Sand with Little Silt and Clay				
	50/4"	5	5 - 7 ft: Saprolite; Brown Medium Grained Silty Sand				
	50/6"	8	8 - 10 ft: Saprolite; Brown Medium to Coarse Grained Sand with Little Clay				
	22 - 50/2"	10	10 - 12 ft: Saprolite; Brown Medium to Coarse Grained Silty Sand with Rock Fragments	10			
	50/2"	12	12 - 14 ft: Shelby Tube				
		13	13 - 14 ft: Saprolite; Brownish Gray Medium Grained Silty Sand				
		14	14 ft: Bedrock Encountered, Boring Terminated				
		20		20			
		30		30			
		40		40			
		50		50			

APPENDIX B

Report of Laboratory Constant Head Permeability
and
Classification Tests for Soil Samples



LAW

ENGINEERING AND ENVIRONMENTAL SERVICES

August 30, 1994

Mr. Paul Banks
Ecological Services, Inc.
P.O. Box 12146
Charlotte, North Carolina 28220

Subject: **Report of Laboratory
Constant Head Permeability and
Classification Tests
Ecological Services, Inc.
Charlotte, North Carolina
Law Engineering Project 226-09423-01**

Dear Mr. Banks:

As authorized by the acceptance of our Work Authorization Sheet dated December 30, 1993, Law Engineering has completed requested laboratory testing on the two soil samples submitted to our laboratory by Mr. Paul Banks. Testing was performed according to the following ASTM standards:

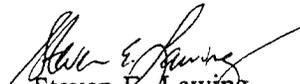
ASTM D 5084	"Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter"
ASTM D 4318	"Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils"
ASTM D 422	"Standard Test Method for Particle-Size Analysis of Soils"

The results of our testing are summarized on the enclosed data sheets.

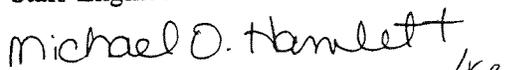
We appreciate the opportunity to be of service to you with this project. If you should have any questions concerning this report, or if we may be of further service to you, please do not hesitate to contact this office at (704) 357-8600.

Sincerely,

LAW ENGINEERING, INC.


Steven E. Lawing

Staff Engineer


Michael O. Hamlett

Michael O. Hamlett, C.E.T.
Laboratory Services Manager

SEL/MOH:kac
Enclosure

LAW ENGINEERING, INC.

2801 YORKMONT ROAD, SUITE 100 • CHARLOTTE, NC 28208
P.O. BOX 11297 • CHARLOTTE, NC 28220
(704) 357-8600 • FAX (704) 357-8639

ONE OF THE LAW COMPANIES 

SUMMARY OF LABORATORY TESTING

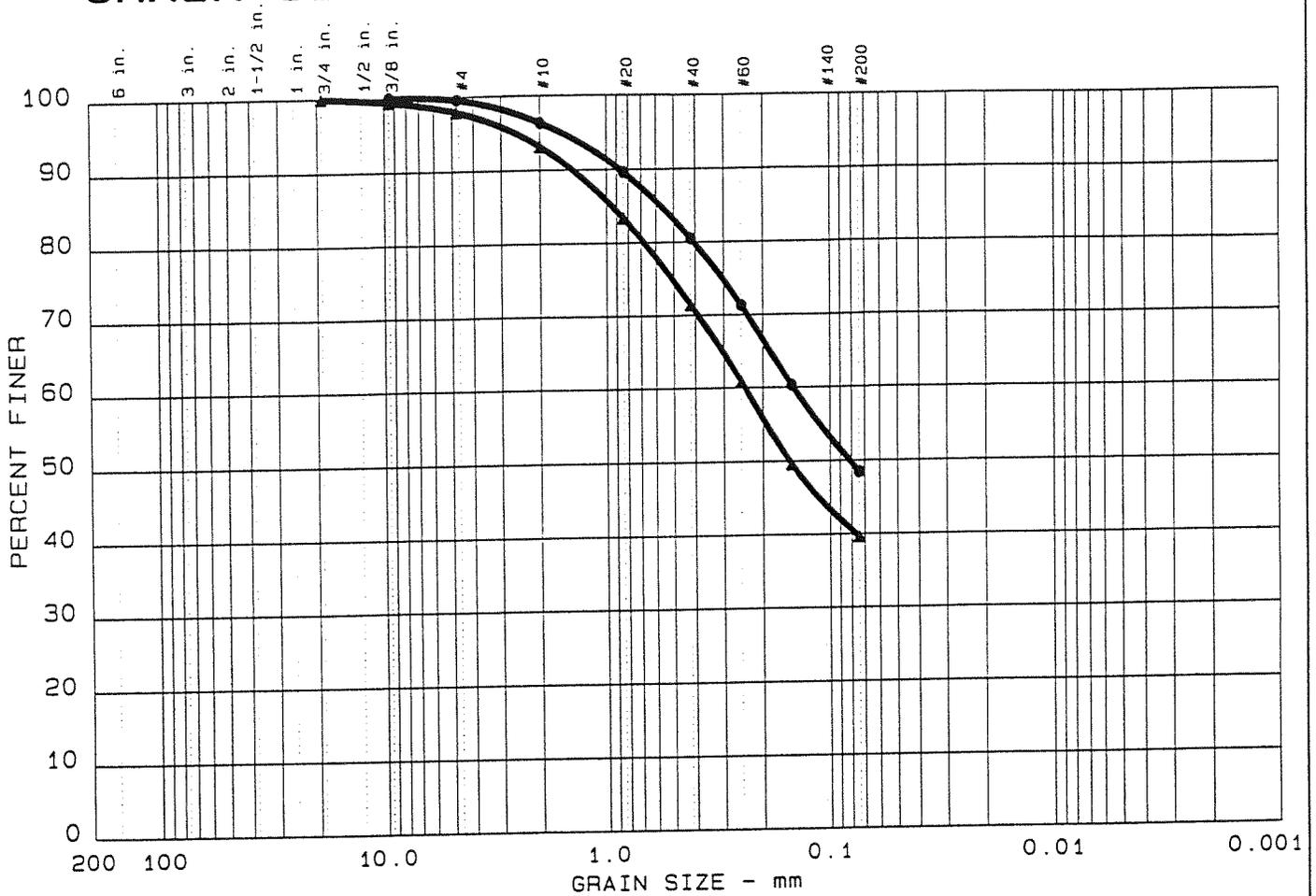
Constant Head Permeability and Classification Tests

Law Engineering Project 226-09423-01

Sample ID	Dry Density (pcf)	Moisture Content (%)	Coefficient of Permeability (cm/sec)	Head (cm)
SB-2A	102.5	8.9	3.0×10^{-7}	140.68
SB-3A	102.1	6.9	4.3×10^{-7}	140.68

Comments: Tested at 2 psi head difference.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	0.0	0.4	51.1	48.5	
▲	0.0	2.1	58.3	39.6	

	LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
●	26	11	0.57	0.15	0.08					
▲	24	9	0.93	0.24	0.15					

MATERIAL DESCRIPTION	USCS	AASHTO
●		
▲		

Project No.: 226-09423-01
 Project: ECOLOGICAL SERVICES, INC.
 ● Location: SB-2A
 ▲ Location: SB-3A
 Date: AUGUST 29, 1994

GRAIN SIZE DISTRIBUTION TEST REPORT
LAW ENGINEERING

Remarks:

Figure No. _____

Geologist Log

Ecological Services, Inc

Job #: ES-0673		North Mecklenburg Landfill		Well #: MW-2	Page 1 of 1
County: Mecklenburg	State: NC	Date Begin:	Date End:	Casing Height:	Land Surface Elevation:
Lat:	Long:	Drilled By: Graham & Currie		Static Water Level:	
Grid Coord:		Logged By: Ben Hope		Development Method:	
Tests:		Drilling Method: Hollow Stem		Sampling Method:	
Grout: 5% bentonite 0 - 4.5 ft		Seat: 4.5 - 7 ft		Gravel Pack: FX 50 sand 7 - 19 ft	
Casing Type: Sch 40 PVC		Diameter: 2"	Depth: 0 - 9 ft		Hole Dia.: 4"
Screen Type: Sch 40 PVC		Diameter: 2"	Slot 0.010-inch	Depth: 9 - 19 ft	Total Depth: 19 ft
PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Lithology/Remarks		Well Completion
		0	0 - 19.0 ft: Grayish Brown Sandy Fine Silt		
					Grout (0 - 4.5 ft)
					Bentonite (4.5 - 7 ft)
					Casing to 9 ft
		10			
					Sand (7 - 19 ft)
			Boring Terminated at 19 ft		Screen (9 - 19 ft)
		20			
		30			
		40			
		50			
		60			

Geologist Log

Job #:	ES-0675	North Mecklenburg Landfill	Well #:	MW-3	Page 1 of 1
County:	Mecklenburg	State:	NC	Date Begin:	Date End:
Lat:	Long:	Drilled By:	Graham & Currie		
Grid Coord:	Logged By:	Paul Banks		Development Method:	
Tests:	Drilling Method:	Hollow Stem		Sampling Method:	

Grout:	5% Bentonite	Seal:	6 - 8 ft	Gravel Pack:	80/20 Silica Sand (8 to 20 ft)
Casing Type:	Diameter:	Depth:	0 - 10 ft	Hole Dia.:	4"
Screen Type:	Diameter:	Slot:	0.010 inch	Depth:	9 - 19 ft
				Total Depth:	20 ft

PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Lithology/Remarks	Well Completion
		0		
		3.0 - 5.0 ft	Brownish Green Fine Grained Sand with Little Silt	Grout (0 - 6 ft)
		8.0 - 10.0 ft	Sapropite: Greenish Brown Fine Grained Silty Sand with Trace Clay	Bentonite (6 to 8 ft)
		13.0 - 15.0 ft	Sapropite: Greenish Brown Fine Grained Silty Sand with Trace Clay	Casing (0 to 10 ft)
		18.0 - 20.0 ft	Partially Weathered Bedrock: Brown Silty Coarse Sand with Rock Fragments	Sand (8 - 20 ft)
		20	Boring Terminated at 20 ft	Screen (10 to 20 ft)
		30		
		40		
		50		
		60		

Geologist Log

Ecological Services, Inc

Job #:	ES-0675	North Mecklenburg Landfill	Well #: MW-4	Page 1 of 1
County:	Mecklenburg	State: NC	Date Begin:	Date End:
Lat:	Long:	Drilled By: Graham & Currie	Casing Height:	Land Surface Elevation:
Grid Coord:	Logged By: Ben Hope	Static Water Level:	Development Method:	
Tests:	Drilling Method: Air Rotary	Sampling Method:		
Grout: 5% bentonite	Seal: 40-44 ft	Gravel Pack: FX 50 sand 44-67 ft		
Casing Type: Sch 40 PVC	Diameter: 2"	Depth: 0-47 ft	Hole Dia.: 6"	
Screen Type: Sch 40 PVC	Diameter: 2"	Slot: 0.010-inch	Depth: 47-67 ft	Total Depth: 67 ft
PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Libology/Remarks	Well Completion
		0	0 - 30.0 ft: Tan Silty Fine Sand	
		10		
		20		
		30	30.0 - 40.0 ft: Brown Silty Fine Sand	
		40	40.0 - 50.0 ft: Partly Weathered Bedrock Sampled as Tan Silty Fine Medium Sand with Rock Fragments	Grout (0 - 40 ft)
				Bentonite (40 - 44 ft)
				Casing to 47 ft
		50	50.0 - 67.0 ft: Gray Silty Medium Sand with Rock Fragments	
		60		
			Boring Terminated at 67.0 ft	Sand (44 - 67 ft)
				Screen (47 - 67 ft)
		70		

Job #: ES-0675		North Mecklenburg Landfill		Well #: MW-5		Page 1 of 2	
County: Mecklenburg		State: NC		Date Begin:		Date End:	
Casing Height:		Land Surface Elevation:					
Lat:		Long.:		Drilled By: Graham & Currie		Static Water Level:	
Grid Coord.:		Logged By: Ben Hope				Development Method:	
Tests:		Drilling Method: Air Rotary		Sampling Method:			
Grout: 5% bentonite 0-52 ft		Seal: 47-52 ft		Gravel Pack: FX 50 sand 40-75 ft			
Casing Type: Sch 40 PVC		Diameter: 2"		Depth: 0-45 ft		Hole Dia.: 6"	
Screen Type: Sch 40 PVC		Diameter: 2"		Slot: 0.010-inch		Depth: 55-75 ft	
						Total Depth: 75 ft	
PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Lithology/Remarks		Well Completion		
		0	0 - 10.0 ft: Light Tan Silty Fine Sand		0		
		10	10.0 - 20.0 ft: Light Gray Silty Fine Sand		10		
		20	20.0 - 70.0 ft: Bedrock Sampled as Gray Silty Coarse Sand with Rock Fragments Adundant		20		
		30			30		
		40			40		
						Grout (0 - 47 ft)	
						Bentonite (47 - 52 ft)	
						Casing to 55 ft	
		60			60		

Geologist Log

Ecological Services, Inc

Job #: ES-0675		North Mecklenburg Landfill		Well #: MW-5		Page 2 of 2	
County: Mecklenburg		State: NC		Date Begin:		Date End:	
Casing Height:		Land Surface Elevation:		Drilled By: Graham & Currie		Static Water Level:	
Lat.:		Long.:		Logged By: Ben Hope		Development Method:	
Grid Coord.:		Drilling Method: Air Rotary		Sampling Method:			
Group: 5% bentonite 0-52 ft		Seal: 47-52 ft		Gravel Pack: FX 50 sand 40-75 ft			
Casing Type: Sch 40 PVC		Diameter: 2"		Depth: 0-45 ft		Hole Dia.: 6"	
Screen Type: Sch 40 PVC		Diameter: 2"		Slot: 0.010-inch		Depth: 45-75 ft	
						Total Depth: 75 ft	
PID/FID Reading (ppm)	Penetration Resistance	Depth (ft)	Lithology/Remarks	Well Completion	Well Completion		
		60		60			
		70	70 - 75 ft: Gray Silty Medium Sand with a Few Pebbles	70			
			Boring Terminated at 75 ft	Sand (52 - 75 ft)	Screen (55 - 75 ft)		
		80		80			
		90		90			
		100		100			
		110		110			
		120		120			

September 1, 1994

Mr. Larry Griffin, Sr.
19141 Highway 73 West
Davidson, North Carolina 28036

Subject: Report of Hydrogeological Assessment Addendum
(Phase II Unpermitted Area)
North Mecklenburg Landfill
15300 Holbrooks Road
Huntersville, North Carolina
ESI Project No. ES-0675

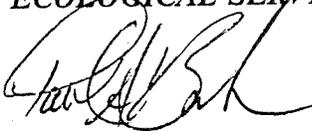
Dear Mr. Griffin:

Based on your authorization to proceed, Ecological Services, Inc. (ESI) has completed addendum hydrogeological assessment activities associated with the Phase II unpermitted area at the subject site. During the addendum activities, depth to bedrock was re-assessed and undisturbed soil samples were obtained. This report describes the work performed during the addendum assessment and presents the results obtained from additional soil testing.

We appreciate the opportunity to continue to provide our environmental services on this project. Please do not hesitate to contact me if you have any questions.

Sincerely,

ECOLOGICAL SERVICES, INC.



Paul A. Banks
Project Geologist

Enc(s)