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ALAMANCE COUNTY, NORTH CAROLINA

APPLICATION FOR LANDFILL

EXTENSION SITE APPROVAL

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	/ /	DIN

FEBRUARY, 1988

HAZEN AND SAWYER, P.C.
ENGINEERS
RALEIGH, NORTH CAROLINA

ALAMANCE COUNTY, NORTH CAROLINA

APPLICATION FOR LANDFILL

EXTENSION SITE APPROVAL

General

Alamance County owns and contracts operation of the existing 165 acre landfill located south of NC 54 and east of SR 2164 with access from SR 2164. The existing landfill site is rapidly approaching its maximum permitted disposal capacity. To alleviate this potential problem, the County is obtaining a 92.5 acre site directly north of and bordering the existing landfill site. This additional area will extend the service life of the landfill by approximately five (5) years.

The proposed landfill extension site (92.5 acres) is a portion of a 205-acre tract of land being acquired by Alamance County. A blueprint of the boundary survey is in Appendix A with the proposed landfill site noted.

This report together with the enclosed drawings is submitted for site approval in accordance with 10 NCAC 10G; North Carolina Solid Waste Management Rules, North Carolina Department of Human Resources, Division of Health Services.

This report addresses the siting requirements in accordance with Section .0504, Application Requirements for Sanitary Landfills, Part 1. Part 2 will be addressed by the construction plan application report and drawings.

Aerial Photograph (.0504 1a)

The proposed landfill site is shown on the aerial photograph blueprint in Appendix B. The blueprint is marked to indicate the property boundary of the existing landfill and proposed landfill extension site and the locations of all homes, buildings, utilities, roads, wells, watercourses and Haw Creek floodplain within one-quarter (1/4) mile of the site.

Area Map (.0504 1b)

The overall area within two (2) miles of the proposed landfill site is shown on the USGS maps in Appendix C. Within this two (2) mile area, the following items are marked: 1) new subdivisions approved by the County; 2) portions of the Orange-Alamance water system, and 3) the 9.5 mgd Burlington South Wastewater Treatment Plant on the western side of the Haw River.

The water supply for the Orange-Alamance water system is Corporation Lake in Orange County. The Orange-Alamance water system provides water to Swepsonville, Wilson School on NC 54, individual homes and the existing landfill site as marked on the USGS maps.

Wastewater treatment for the area consists of individual septic tanks except for a municipal collection system in Swepsonville. Swepsonville's gravity

collection system also serves Wilson School at the intersection of NC 54 and NC 119 and the Honda Plant on NC 119. The wastewater from this system is treated in the Burlington South Wastewater Treatment Plant.

There are no significant groundwater users other than individual wells for private dwellings. There are no other potential or existing sources of groundwater or surface water pollution within the general site area. Additionally, there are no airports with the two (2) mile radius of the proposed landfill site.

Geological and Hydrological Site Data (.0504 1c)

The complete geological and hydrological site evaluation for the proposed landfill extension site is included in Appendix D. In general, the site evaluation indicates that the proposed site has several characteristics which are considered favorable for its use as a sanitary landfill. These include the availability of soil material that is appropriate both as a daily and final cover, suitable underlying bedrock formations and significant depth to groundwater over much of the proposed site.

Conceptual Design Plan (.0504 1d)

The proposed landfill expansion site is bounded by SR 2164 in the west, private property in the north, Haw Creek to the east and by the existing landfill in the south. A three-hundred (300) foot undisturbed buffer will be maintained in the west and north and a fifty (50) foot, minimum, undisturbed buffer will be maintained in the east (Haw Creek). No buffer is proposed between the existing landfill and the proposed landfill site. The proposed site is intended to extend the life of the landfilling operation at this site for approximately five (5) years. Detailed calculations based on the County's waste generation rate will be included in the construction plan submission.

The construction plan submission will also include a sequence plan of operation which will address the sequencing of clearing and grubbing activities, structure demolition (and/or reuse), site fencing, surface drainage in conjunction with the existing landfill drainage, intermediate and final vegetation cover, erosion control devices, access to proposed site and the waste disposal sequence of operational units. In general, it is anticipated that the disposal activities will progress in a west to east direction with initial clearing and grubbing activities immediately preceding the operational unit opening.

The only potential design problem anticipated is drainage of the proposed site in conjunction with the existing 48-inch diameter concrete drainage pipe that intersects the existing landfill site. Surface runoff from the proposed site drains through the existing 48-inch concrete pipe.

Disposal operations will use a combination of the Area Approach (Appendix E) and the Trench Approach (Appendix F). The Trench Approach will be used initially along the present drainage channels until the elevation reaches a point which facilitates the use of the Area Approach. Cell construction and the building block cell concept, as detailed in Appendix G will be the procedures used in the Area Approach.

The intermediate cover will be 8-inches, nominal thickness, to maintain a minimum 6-inch thickness between successive cells. Final cover on the landfill area will be a minimum of two (2) feet thick and will be composed of the finest grain soil material available on site to minimize surface infiltration.

Zoning (.0504 1e)

The proposed landfill extension site is not zoned and there are no County Ordinances prohibiting the proposed site's use as a sanitary landfill. A letter from Mr. M. M. Way, Administrative Officer II, Alamance County, and a blueprint of the referenced tax map is included in Appendix H for reference.

General Siting (.0504 1f)

The proposed site except for the buffer area along Haw Creek is above the floodplain for the 100-year flood as indicated on the aerial photograph blueprint in Appendix B. By being above the floodplain, the proposed landfill site and disposal activities is not expected to restrict the 100-year flood flow or reduce the temporary storage capacity of the Haw Creek.

The proposed site is not expected to adversely impact or pose a threat to any endangered species of plants, fish, or wiidlife and will not result in the destruction or adverse modification of the critical habitat of an endangered or threatened species, as identified in 50 CFR Part 17. This is based on an assessment by the N.C. Natural Heritage program. Department of Natural Resources and Community Development, included in Appendix I.

An investigation by the Department of Cultural Resources, Archaeology and Historic Preservation Section, indicated that there are no known archaelogical or historical sites on the proposed landfill site. The assessment documentation is included in Appendix I for reference. Additionally, there are no state parks, recreation or scenic areas or any other lands included in the State nature and historic preserve within or adjacent to the proposed landfill site.

There are no airports, as shown on the USGS Maps in Appendix C, within two (2) miles of the site. The closest airport is the Burlington Municipal Airport which is approximately seven (7) miles from the proposed landfill site.

Population, Service Area and Nature of Waste (.0504 1g)

Alamance County encompasses an area of approximately 428 square miles. The proposed landfill site will serve the estimated 104,000 residents of the County. The proposed landfill will continue to accept all household, commercial, office and industrial solid wastes. Liquid waste and waste classified as hazardous waste will not be accepted for disposal.

Manpower and Equipment (.0504 1g)

Alamance County presently contracts the operation of the existing landfill with a private company and is expected to continue with contract operation on the proposed landfill extension site. The proposed landfill extension site is

not expected to significantly impact the present operational staff or increase the need for any additional equipment other than some equipment necessary for the clearing and grubbing activities. As the County grows and the waste loads increase, additional personnel and equipment will be required.

A listing of the present operational staff and equipment is in Appendix J.

Groundwater Monitoring (.0504 1g)

The Geological and Hydrological site study in Appendix D includes preliminary monitoring well locations, and a schematic indicating the proposed screened interval, depth and construction.

LIST OF APPENDIXES

APPENDIX A

BOUNDARY SURVEY OF PROPOSED LANDFILL SITE

APPENDIX B

SITE LOCATION ON AERIAL PHOTOGRAPH BLUEPRINT

APPENDIX C

USGS AREA MAPS

APPENDIX D

GEOLOGICAL AND HYDROLOGICAL SITE STUDY

PROPOSED SANITARY LANDFILL
SITE EVALUATION
ALAMANCE COUNTY, NORTH CAROLINA

Prepared For

Hazen and Sawyer
Raleigh, North Carolina

Prepared By

Aquaterra, Inc.
Raleigh, North Carolina

February 8, 1988

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

February 8, 1988

Hazen and Sawyer
4300 Glenwood Avenue
P.O. Box 30428
Raleigh, North Carolina 27622

Attention: Mr. Bob Difiore

Subject: Proposed Sanitary Landfill Site Evaluation
Alamance County, North Carolina
Aquaterra Job #200-87-136

Dear Mr. Difiore:

Based upon your authorization, Aquaterra, Inc. has completed a sanitary landfill site evaluation for a proposed 92-acre tract located off State Road 2164 near Graham, North Carolina, as shown in Figure 1. The purpose of this study is to describe the soil, rock, ground water, topography and geologic conditions encountered by the test borings, shallow wells, and site reconnaissance completed in accordance with the North Carolina Solid and Hazardous Waste Management Branch (SHWMB) regulations for Solid Waste Management 10 NCAC 10G.0504(i),(iii) and (iv) and a conversation with Mr. Gordon Layton and Mr. Jim Coffey (SHWMB). Conclusions will also be provided detailing the suitability and limitations of this site for landfilling purposes based on the preliminary data. The purpose of this feasibility study is to develop soil, ground water and other physical data for the property to be used by Hazen and Sawyer for completion of the application requirements for a sanitary landfill. It is our present understanding that this application will be classified as a horizontal extension of the existing landfill and will utilize the aforementioned regulations as specified in the October 30, 1987, correspondence from Mr. Gordon Layton (SHWMB) shown in Attachment A. It is also our understanding that this landfill is proposed to be used for the disposal of residential and non-toxic industrial wastes. No hazardous waste would be disposed at this site.

1.0 Site Investigation

1.1 Regional Geology

The proposed site lies in the Piedmont physiographic province of North Carolina. According to the 1985 "Geologic Map of North Carolina", the site is located in a suite of rocks known as the Carolina Slate Belt, a northeast-striking series of rocks composed of chiefly felsic to mafic volcanic sedimentary rocks of early Paleozoic to late Precambrian in age. These rocks tend to be massive to schistose and have undergone strong metamorphism producing well defined slaty cleavage. A series of igneous intrusions have been mapped across the slate belt consisting chiefly of granites, diorites and gabbros of mid-Paleozoic age. These intrusive rocks generally tend to be massive, showing minor effects of metamorphism. More specifically, the site lies in an area mapped as a diorite. Initial field observations of outcrops indicate that the body is a gray-green, medium-grained massive to slightly schistose rock.

Topographically, the site is characterized by two perennial streams, one flowing to the southeast through the southwestern portion of the site and one flowing approximately to the south through the eastern third of the site, and Haw Creek flowing to the south at the extreme easternmost boundary of the site. The site is dominated by a large hill approximately 614 feet above mean sea level at the northeastern portion of the property with ridges that slope moderately to the east-southeast to an elevation of approximately 460 feet at Haw Creek.

1.2 Previous Field Exploration

Two previous investigations were conducted on this property with a reported total of eight piezometers emplaced in the study area. The first investigation was conducted in December, 1985, by Atlantic Coast Engineering and Testing where four boring and piezometers were emplaced as shown in Figure 2 (C-1, C-2, C-3 and C-4) with the boring log records shown in Attachment B. The second investigation was conducted by Fisher Associates with four borings emplaced also as shown in Figure 2 (L-1, L-2, L-3 and L-4) with well construction details shown in Attachment C.

In an effort to utilize all possible previous data, a geologist was mobilized by Aquaterra to locate and sound all available piezometers. Based upon the information gathered by the geologist compared to the map location and well construction details, only piezometers L-1 and L-2 could be used for soil boring and water level information and C-1 and L-3 only for their soil boring information since the ground water level was below the total depth of the well. Another piezometer, identified as P-1, did not coincide with the reported locations from the previous reports but was sounded, and it was decided to utilize it for ground water level information only.

2.0 Field Investigation

2.1 Soil Borings and Piezometer Installation

During January, 1988, Aquaterra mobilized two drilling rigs and a geologist to the site. Based upon the existing site and the location of the previous piezometers deemed as usable information, four additional test boring locations were selected and staked in the field by a representative of Aquaterra as shown in Figure 3.

Based upon the proximity of previous borings which did not encounter ground water at the soil/bedrock interface (C-1 and L-3), boring B-1, B-2 and B-3 were emplaced with an air rotary drilling rig with two of the locations adjacent to C-1 and L-3. One additional boring, shown as B-4, was emplaced with a CME-45 drill rig mounted on an all-terrain carrier. Representative samples were obtained at approximate 5-foot intervals by means of the split barrel sampling procedure (ASTM D-1586). Soil samples were collected in the field and classified according to the Unified Soil Classification System (ASTM D-2487-85) and recorded on the Test Boring Records, shown in Attachment D.

Generally, the soils ranged from silty clays to clayey silty sands with an overall progression from the finer to coarse-grained soils with depth which is characteristic of Piedmont geology.

Based upon the soil borings and utilizing portions of the previous investigations' boring data, a cross-section location map and three cross-sections are shown in Figures 4 through 7. At the completion of drilling each borehole, a temporary piezometer was constructed by placing a .75-inch diameter, two-foot screen on the bottom of the boring connected to a .75-inch riser pipe to the ground surface, with the exception of B-2 which was installed with a 2-inch well. After placing in the PVC screen and riser, the boring was then filled by a medium-grained sand to approximately two feet above the screened section followed by an approximately two-foot hydrated bentonite plug. Each boring was then backfilled with cuttings to the ground surface.

The piezometers were surveyed for horizontal and vertical control by representatives of Hazen and Sawyer. Upon stabilization of the water levels for a minimum of one week, a geologist was mobilized on February 4, 1988, to record ground water levels which are shown in Table 1. Utilizing this data, an approximate shallow ground water contour map is shown in Figure 8.

2.2 Hydraulic Conductivity

To help evaluate deep ground water flow in the bedrock, one in-situ hydraulic conductivity test was performed. One piezometer, B-2, was selected for testing. This particular well was selected for testing since it was screened in the bedrock. A falling head recovery test was conducted by a slug injection and withdrawal of water. By plotting the rate of decline and recovery of water levels [y(t)] versus time, a ratio of the amount of decline and recovery per unit time was obtained. Attachment E shows the Y(t) versus time plots for the piezometers used in the calculations. The decline and recovery/time ratio was inserted into formulas provided by Bureau of Mines "Field Permeability Test Methods with Applications to Solution Mining" (1977) and solved for the hydraulic conductivity (K) of the aquifer. Based upon the formulas, the hydraulic conductivity at B-2 in the bedrock has been calculated to range from 1.2 (recovery) to 1.34 (falling head) x 10^{-4} centimeters per second.

2.3 Soil Laboratory Testing

Based upon SHWMB Solid Waste regulations .0504 (c)(i)(B), (E) and (F), several selected soil samples were submitted to a soil analytical laboratory for particle size analysis, Atterberg Limits (cover soil) and remolded saturated hydraulic conductivity (cover soil). Tabulation of the analytical results in shown in Table 2 and documented in Attachment F. Based upon literature reference and past hydrogeologic investigations, it is estimated that the effective porosity of these soils will range from 0.20 to 0.30 (Freeze and Cherry, 1979).

3.0 Evaluation of Site

To consider siting of a sanitary landfill, several technical factors must be considered such as ground water levels, ease of excavation, availability and suitability of cover soils, permeability of landfill base and environmental protection and monitoring. We will discuss each of these factors so that an initial determination can be made as to the suitability of expanding the existing sanitary landfill.

3.1 Ground Water

Ground water was observed in seven piezometers ranging between 0.16 to 37.33 feet below ground surface. Levels may be expected to fluctuate due to rainfall, temperature, seasonal surface drainage, infiltration and other factors. The piezometers exhibiting shallow water levels, L-1, L-2, P-1 and B-4, all lie in the relatively flat area within 75 feet of a perennial creek flowing southward through the eastern third of the property as shown in Figure 3. Assuming sufficient buffer to allow for a maximum vertical separation of 4 feet of any solid waste from the seasonal high ground water table is required in the low lying area along the creek, the maximum depth of excavation for this site will be between 0 and 33 feet. The horizontal hydraulic gradient can be determined from the shallow potentiometric surface map shown in Figure 8. The average hydraulic gradient of the shallow ground water surface is approximately 2.5×10^{-2} in a southeasterly direction.

3.2 Excavation

One of the major considerations regarding the use of a landfill site is whether difficult excavation will be encountered due to weathered or sound rock. Although some rock outcrops were encountered during site reconnaissance, the boring logs indicate that the general depth of residual soils ranges from 8 to 40 feet below land surface. Based upon the depth to rock versus the depth of ground water, the ground water will apparently will be the limiting criteria.

3.3 Cover Soils

Generally the soils at the site are residual clayey silts and silty clays with varying amounts of fine to medium sands. Four soil samples representative of the residual soils across the site were submitted to a soil test laboratory for grain size analysis and a composite bag sample of soil collected from 1 to 5 feet was submitted for Atterberg Limits, a standard Proctor test and a remolded hydraulic conductivity analysis with the results shown in Table 2 and Attachment F. It is felt that the exceptionally low hydraulic conductivity found in the sample obtained at borehole B-4 is in part due to the favorable nature of the clayey soils, but it also due to the limitations of the laboratory procedure used to determine the hydraulic conductivity. However, even if it were found in the field to be one or two orders of magnitude higher, these soils would still be considered quite favorable. Therefore, the silty clay found at boring B-4 would be quite suitable for final cover if a sufficient volume can be located across the site. The clayey sandy silts would be suitable for daily cover.

3.4 Bedrock Quality

Based upon visual observations, the rock outcrops at the site do not exhibit evidence of extensive deformation, fracturing or jointing with an in-situ hydraulic conductivity of approximately 1.28×10^{-4} centimeters per second. Rock bodies observed appeared to occur in rounded masses, typical of the diorite units in the Carolina Slate Belt which tends to be a massive and relatively undeformed rock unit. The adjoining property east of the Haw Creek appears to be in the felsic volcanic units which has undergone more intense deformation associated with the formation of the Carolina Slate Belt. It is felt that the diorite unit presents the more suitable rock unit for sanitary landfilling.

3.5 Environmental Protection and Monitoring

Due to the potential of ground water contravention from any sanitary landfilling system, a ground water monitoring network must be emplaced and sampled to detect leachate infiltrating into the ground water. The proposed monitoring well network at the site shown in Figure 9 will adequately monitor the hydraulically upgradient and downgradient conditions for the most sensitive shallow ground water hydrologic unit, with the screened interval intersecting the shallow aquifer. It is also felt that several monitoring wells be emplaced and screened in the upper portion of the bedrock unit which would serve to identify any vertical migration of degradation moving in this deeper aquifer. If degradation is detected in subsequent monitoring, further assessment measures can be proposed. Proposed monitoring well construction diagrams are shown in Figure 10 and 11.

4.0 Conclusions and Recommendations

Overall, the site has several suitable characteristics for the horizontal extension of the present sanitary landfill. Based upon the soil borings, the soils appear to be of a favorable nature with a portion of the surficial soils with exceptionally low hydraulic conductivities definitely suitable for final cover with remaining soils apparently sufficient for daily cover. The depth of excavation at the site appears to be only limited by the depth of ground water across the site. The bedrock quality is dominated on site by a diorite unit which are generally more suitable as a sanitary landfill basement bedrock than the remaining felsic to mafic volcanic units which appear to be just east of the site. These felsic to mafic volcanic units are the dominant rock units in the Carolina Slate Belt found over a majority of Alamance County. Therefore, it is felt that if the lateral extension of the existing landfill is confined to overlying this unit and with proper landfill construction and monitoring, sanitary landfilling can be successfully completed at this site.

If there are any questions concerning this report, please contact us.

Sincerely,

AQUATERRA, INC.

Phillip L. Rahn, P.G.
Senior Hydrogeologist

PLR/ltr

R161-88

Attachments

TABLES

TABLE 1

Surface and Ground Water Elevation Data
Alamance County Proposed Sanitary Landfill
Graham, North Carolina
Aquaterra Job #200-87-136

Well No.	TOC Elevation	TOC W.L. (2-4-88)	Ground Water Elevation
L-1	523.44	8.08'	515.36
L-2	538.80	4.33'	534.47
B-1	572.80	38.83'	533.97
B-2	571.90	21.58'	550.32
B-3	570.0	37.10'	532.9
B-4	527.54	1.5'	526.04
P-1	531.66	4.42'	527.24

TABLE 2

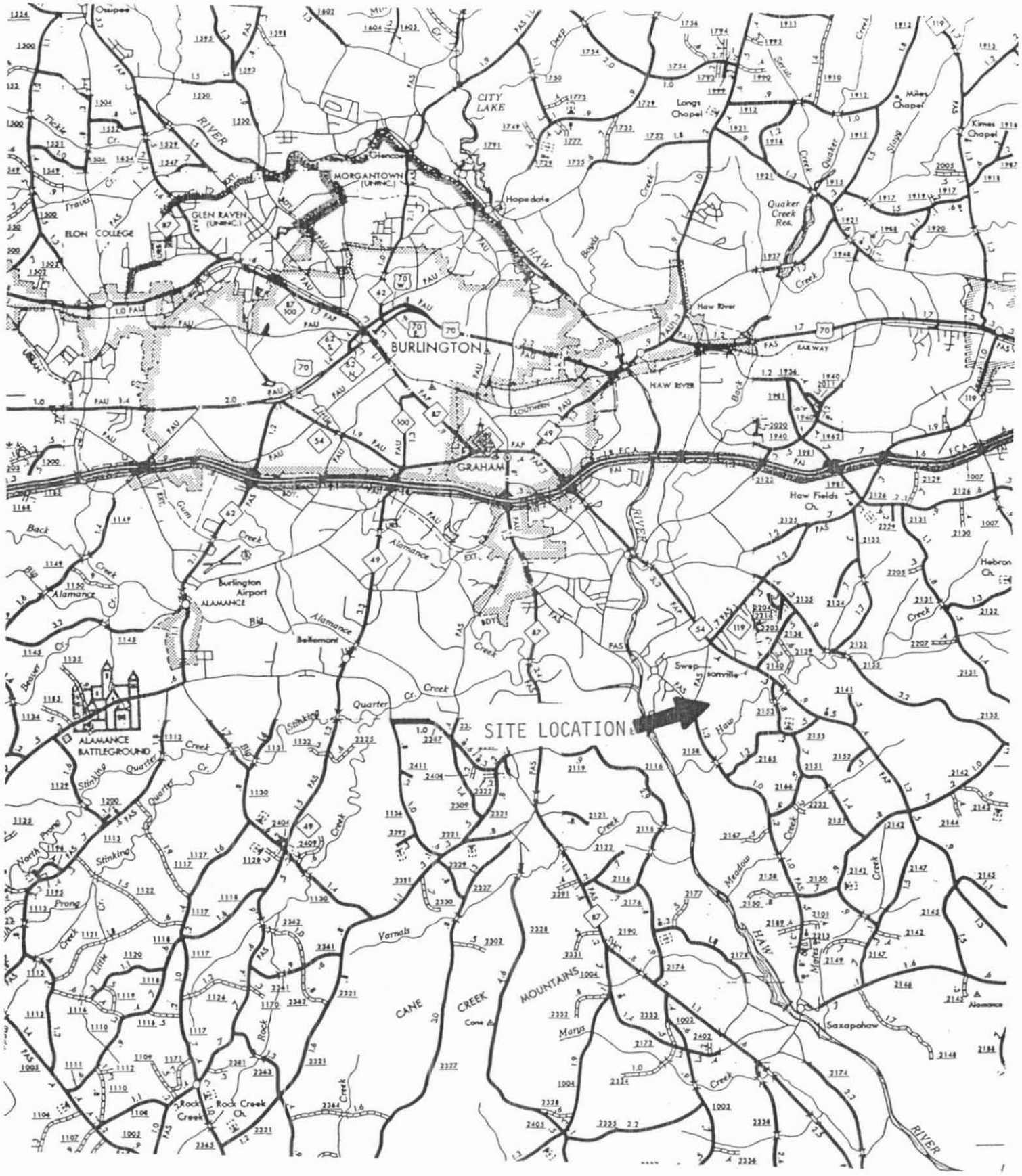
Soil Analytical Testing Data Sheet
Alamance County Sanitary Landfill
Graham, North Carolina
Aquaterra Job #200-87-136

Grain Size

Boring	Depth(ft)	Sample	% Passing #200	% Passing #40	% Passing #4	Description
B-3	3.5 - 5.0	Bag	84.0			Br Red Sandy Clay
B-3	28.5 - 30.0	Bag	63.2			L Br Sandy Clayey SILT
B-4	1.0 - 5.0	Bag	51.6	86.1	99.2	B & Y Silty Sandy CLAY
B-4	3.5 - 5.0	Shelby	71.5			Br-B-Wh Clayey SILT
B-4	13.0 - 15.0	Shelby	19.8			Br Micaceous Clayey Silty SAND

		PI Data			Proctor	
Boring	Depth(ft)	LL	PL	PI	Max Dry Density (PCF)	Optimum Moisture %
B-4	1.0 - 5.0	32	24	8	110.6	18.3

Analytical Laboratory: ATEC Associates, Inc.

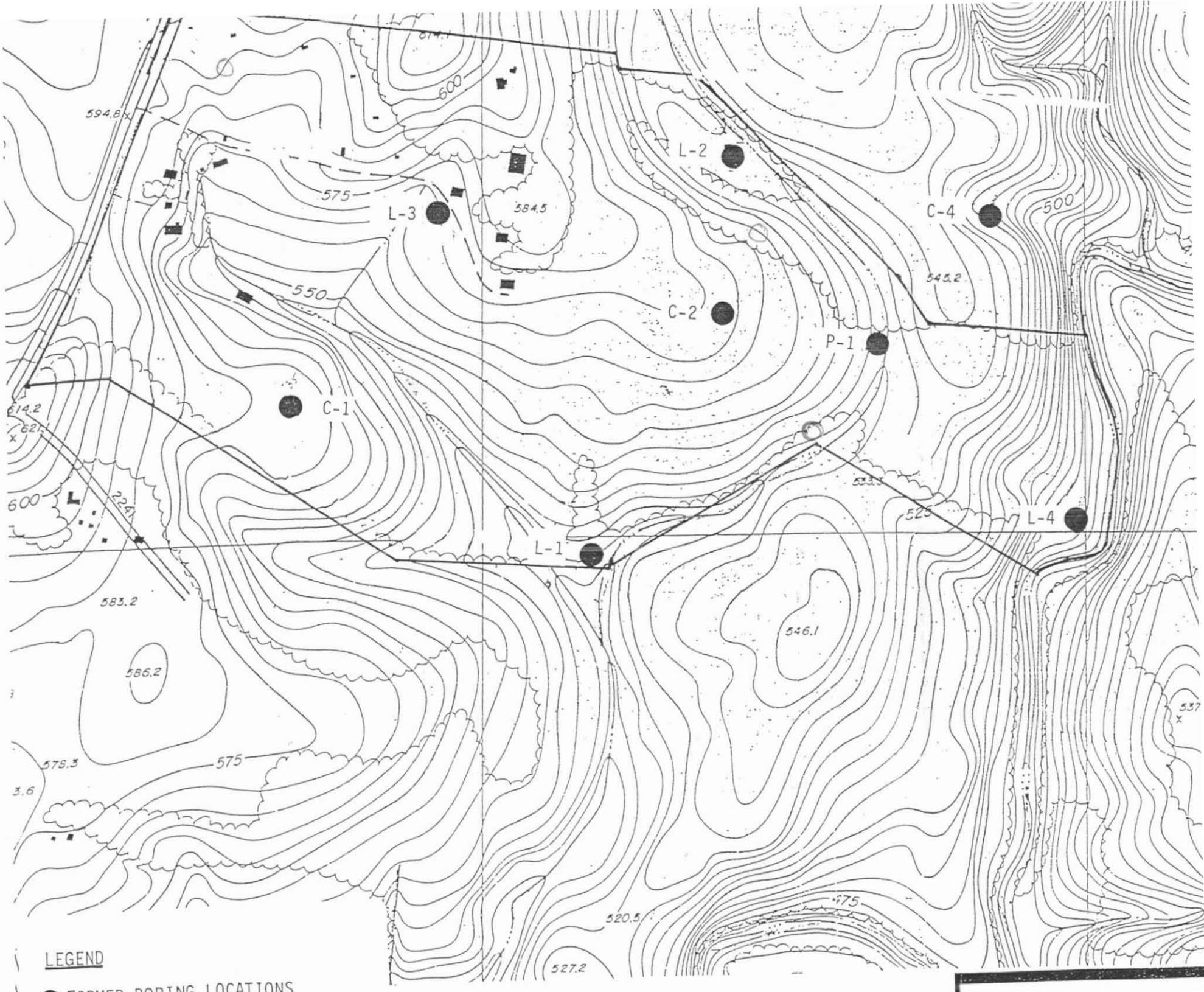


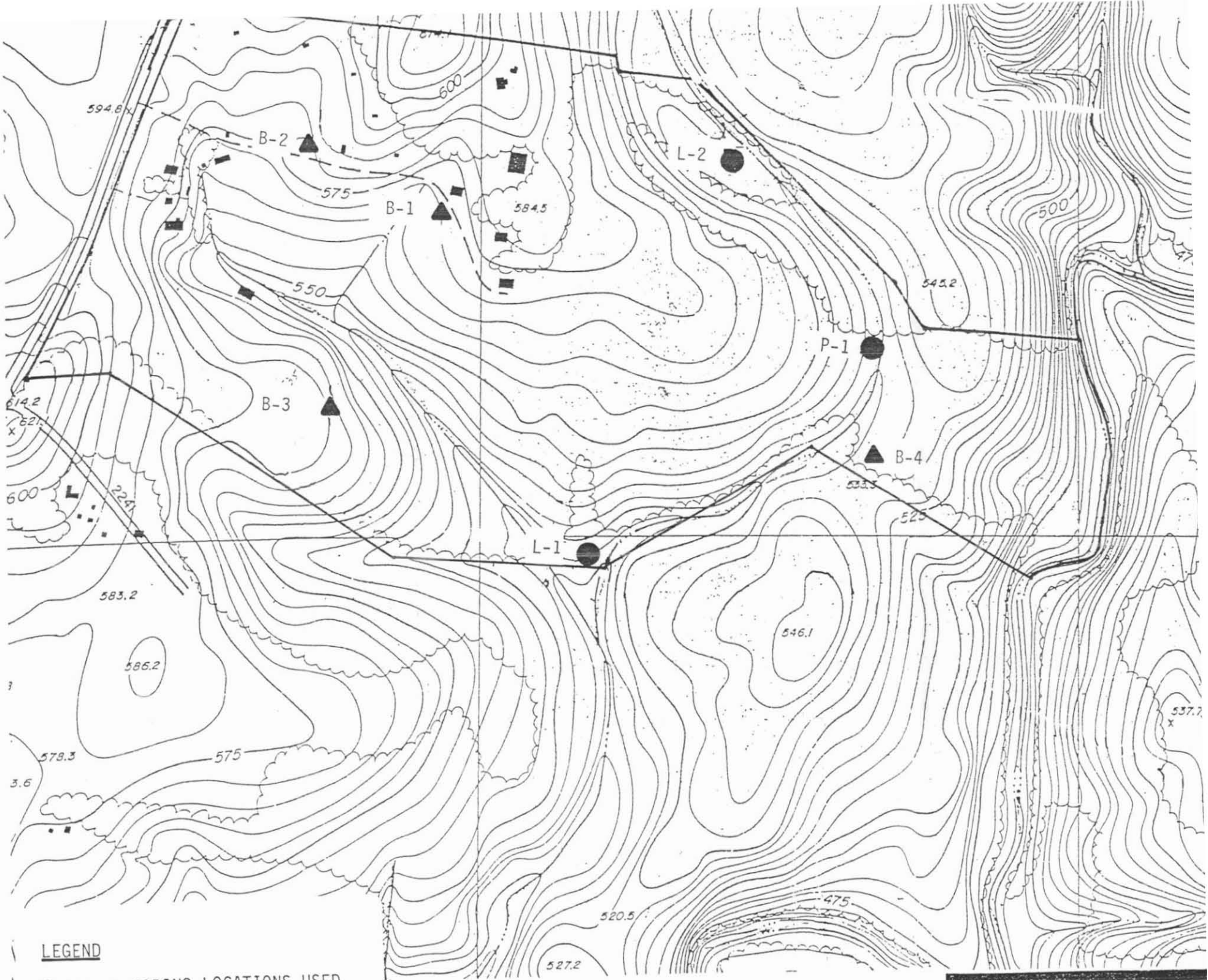
PROJECT

ALAMANCE CO. SANITARY LANDFILL
GRAHAM, NORTH CAROLINA

AQUATERRA, INC.
RALEIGH, NORTH CAROLINA

JOB NUMBER 200-87-136
SCALE As Shown
FIGURE NUMBER 1


L-2
C-4
L-3
C-2
P-1
C-1
L-1
L-4
600
575
550
500
525
594.8
584.5
583.2
586.2
578.3
546.1
520.5
527.2
LEGEND
FORMER BORING LOCATIONS



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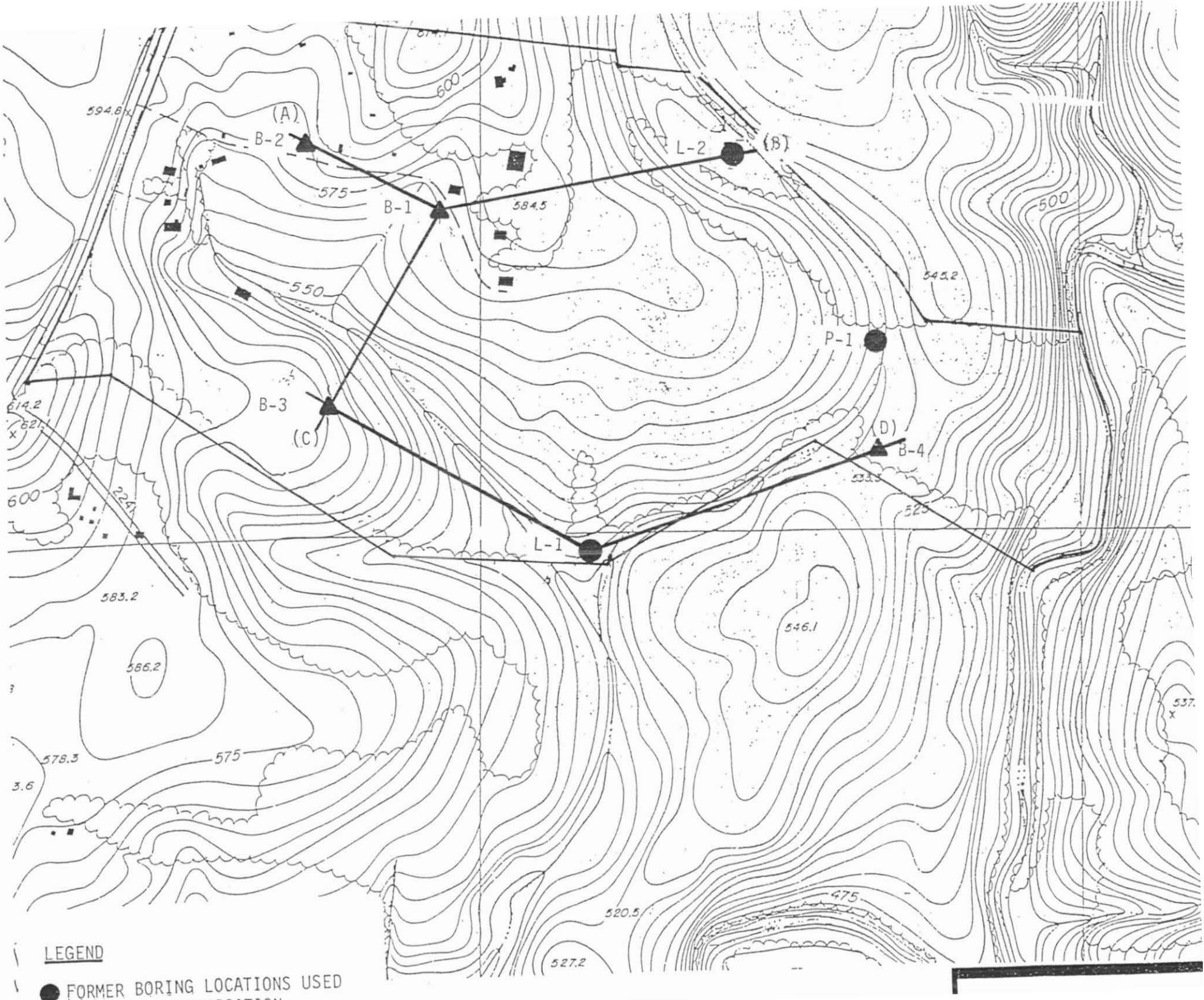
● FORMER BORING LOCATIONS USED FOR THIS INVESTIGATION



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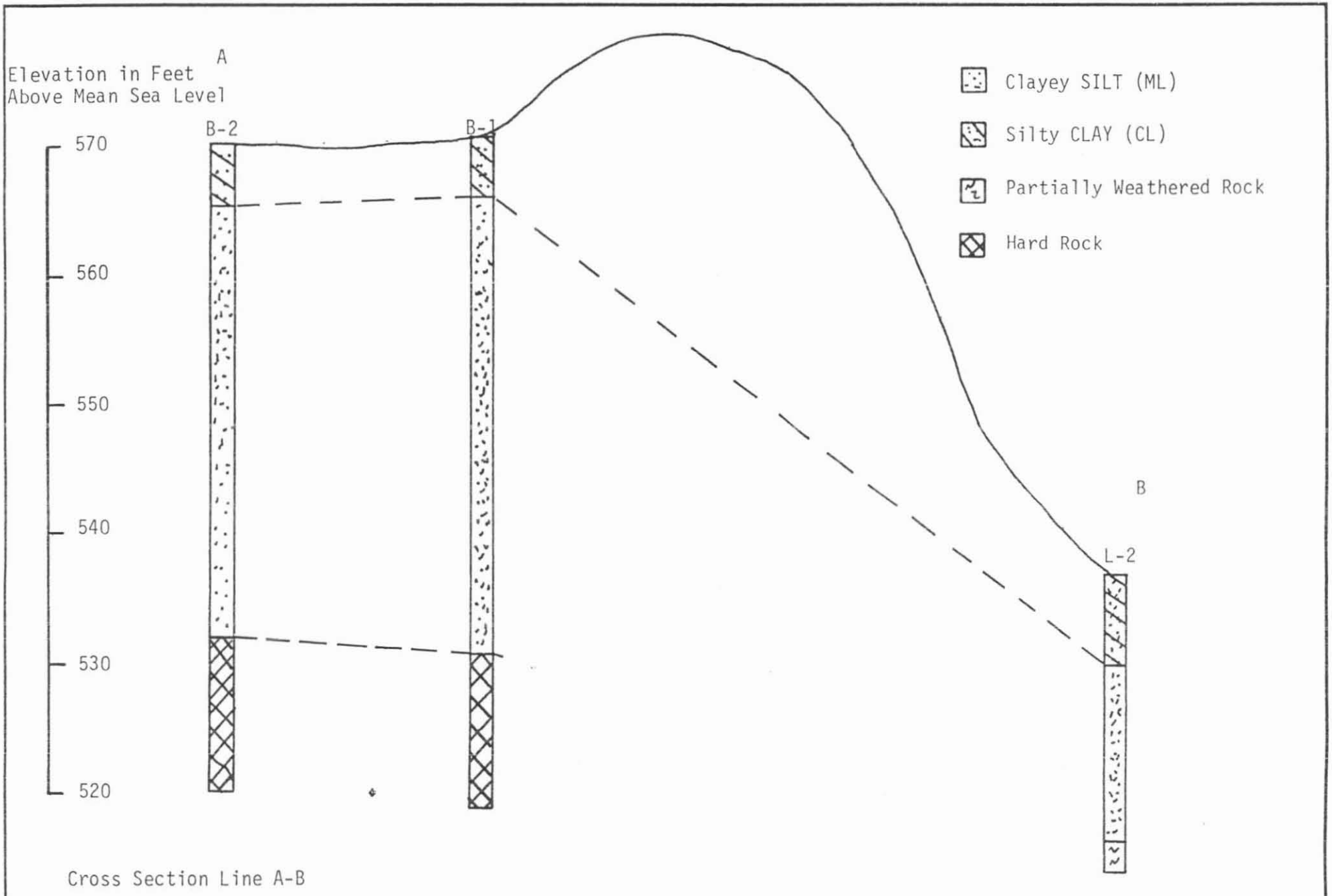
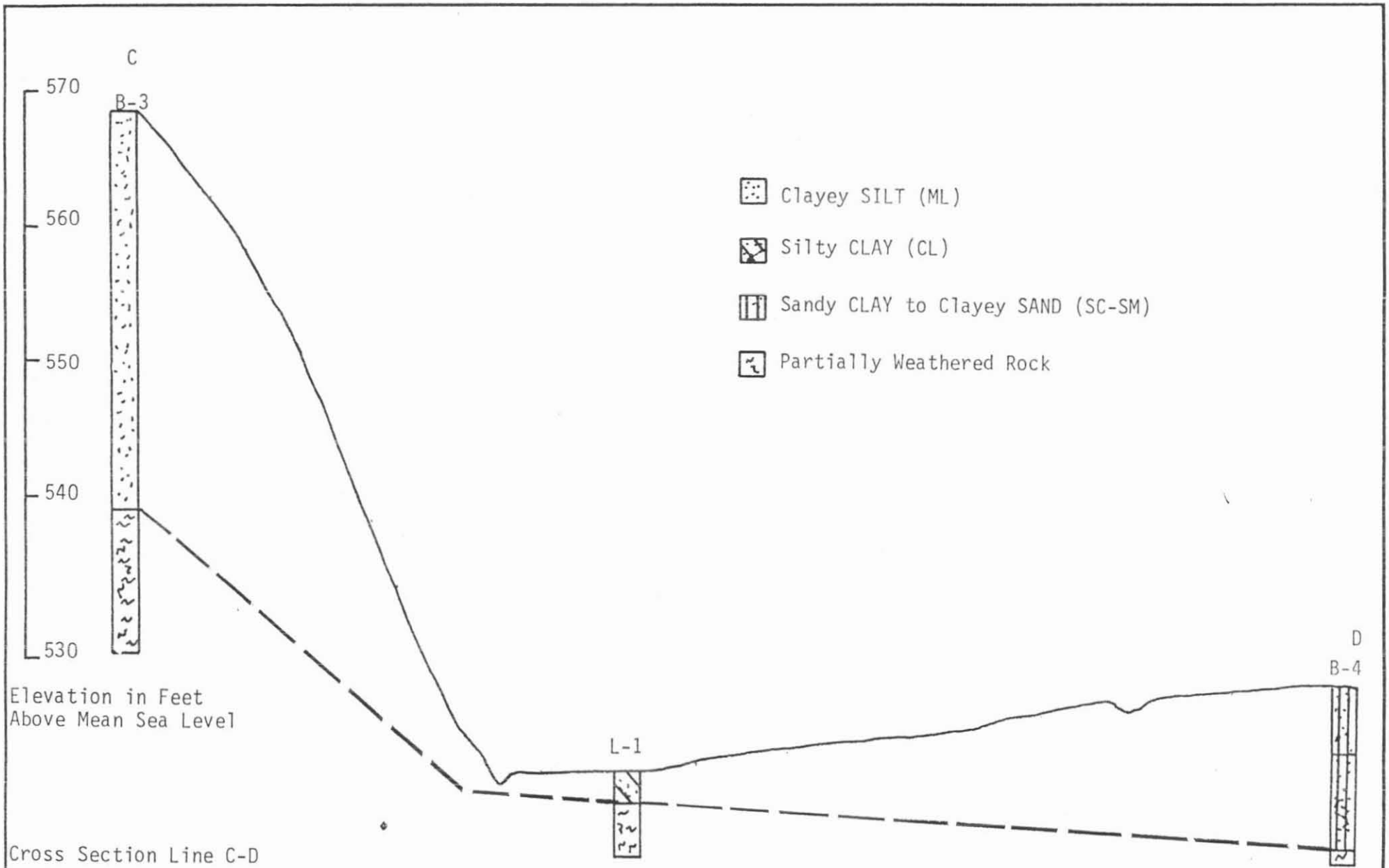


Cross Section Line A-B

PROJECT
ALAMANCE COUNTY SANITARY LANDFILL
GRAHAM, NORTH CAROLINA

AQUATERRA, INC.
RALEIGH, NORTH CAROLINA

JOB NUMBER: 200-87-136
SCALE: 1" = 20'
FIGURE NUMBER: 5



PROJECT

ALAMANCE COUNTY SANITARY LANDFILL

GRAHAM, NORTH CAROLINA

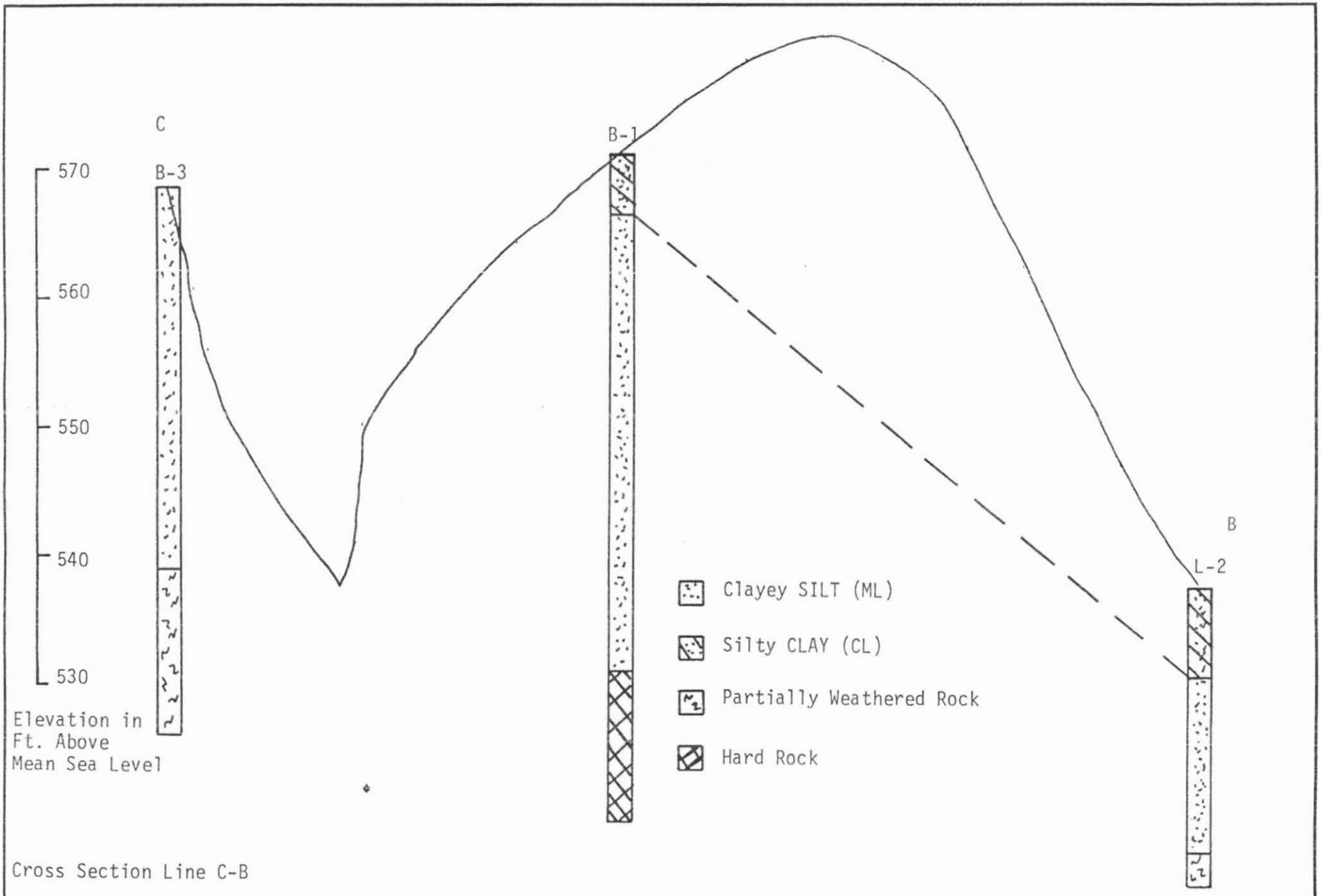
AQUATERRA, INC.

RALEIGH, NORTH CAROLINA

JOB NUMBER: 200-87-136

SCALE: 1" = 20'

FIGURE NUMBER: 6

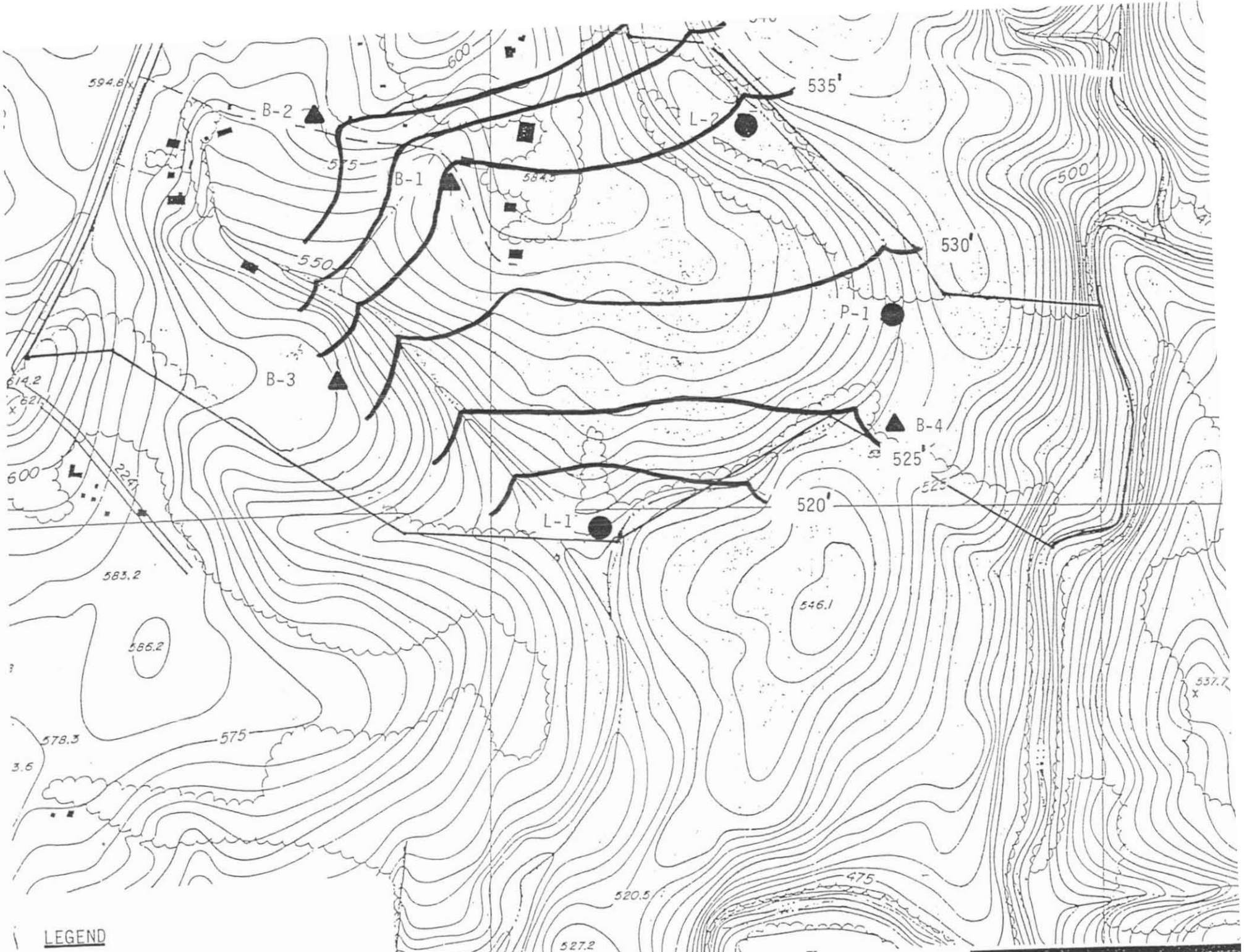


PROJECT

ALAMANCE COUNTY SANITARY LANDFILL
GRAHAM, NORTH CAROLINA

AQUATERRA, INC.
RALEIGH, NORTH CAROLINA

JOB NUMBER: 200-87-136
SCALE: 1" = 20'
FIGURE NUMBER: 7



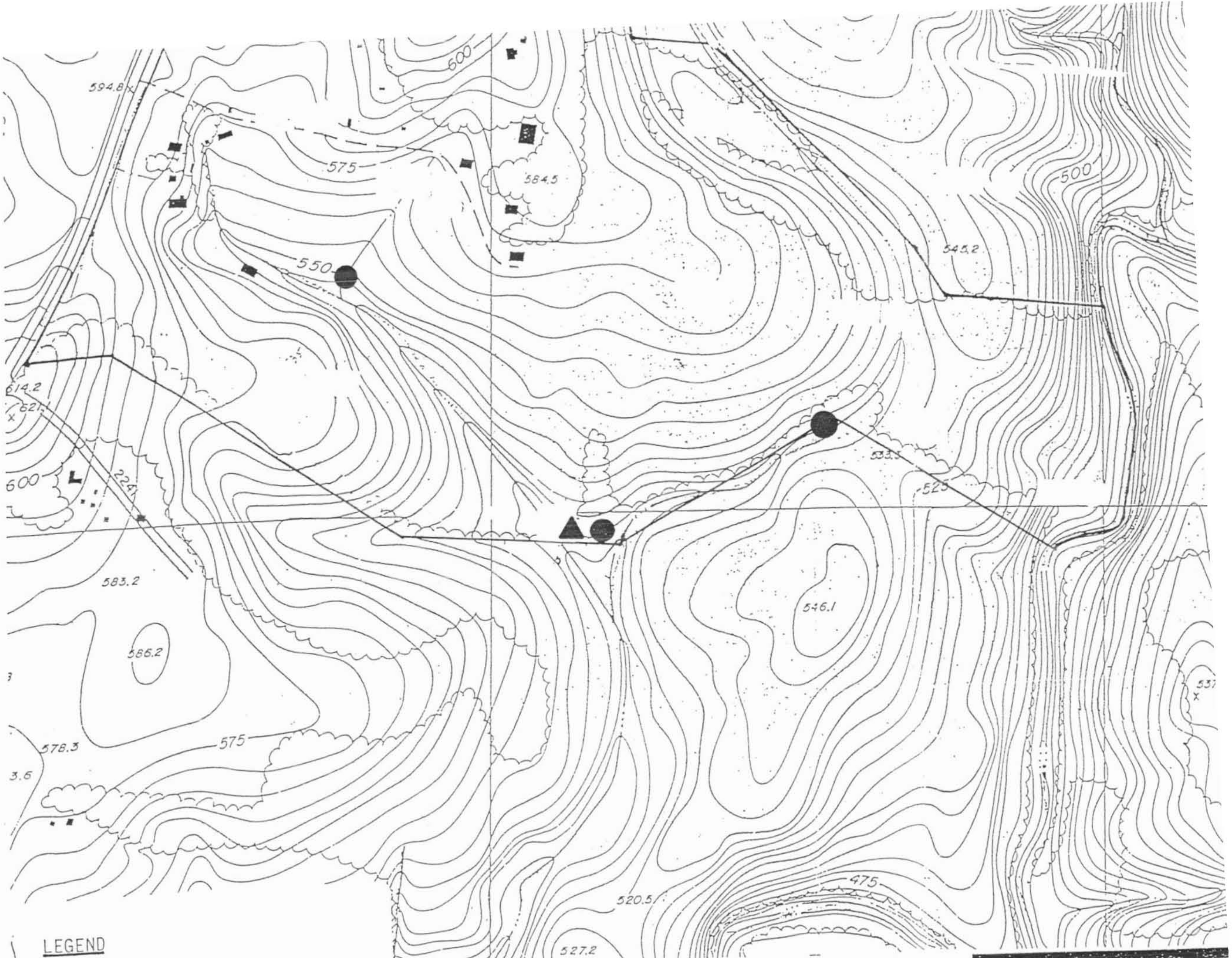
LEGEND

● FORMER BORING LOCATIONS USED FOR THIS INVESTIGATION

▲ BORING LOCATIONS EMPLACED FOR

SHALLOW GROUND WATER CONTOUR MAP
AS OF 2-4-88

PROJECT



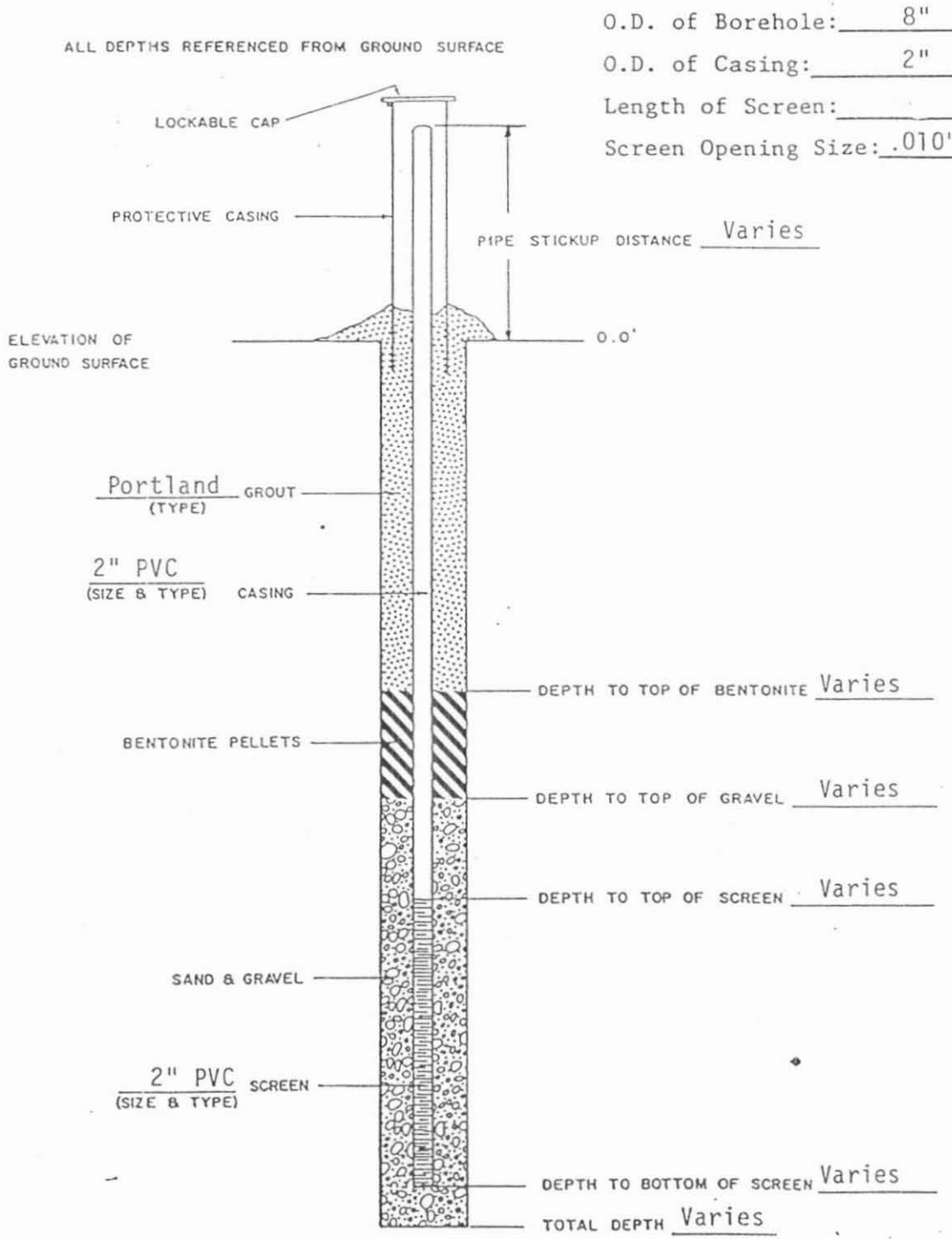
LEGEND

● Proposed Shallow Monitoring Well

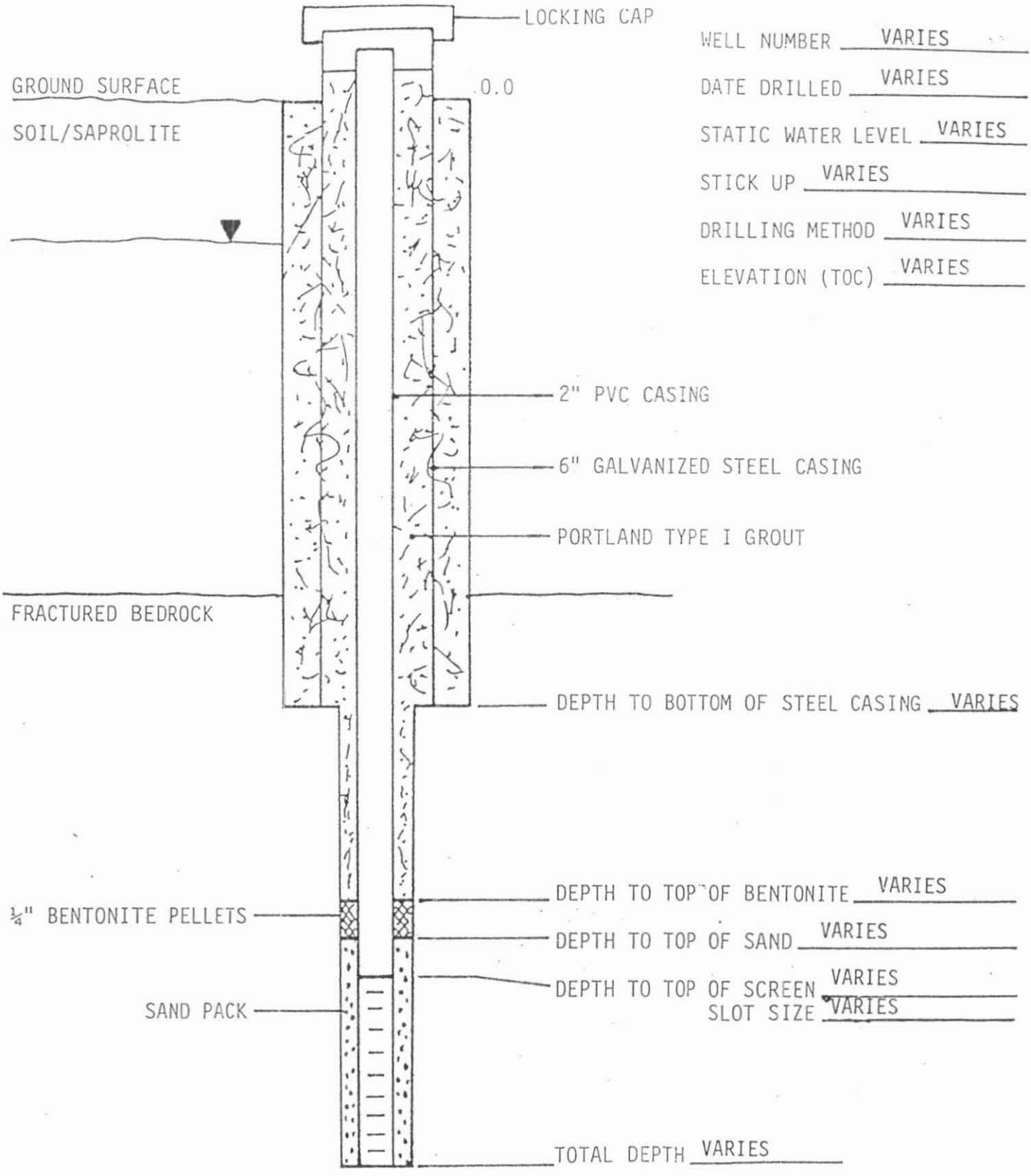
▲ Proposed Bedrock Monitoring Well

PROJECT

SHALLOW MONITORING WELL SCHEMATIC



PROJECT	AQUATERRA, INCORPORATED	SCALE: As Shown
ALAMANCE COUNTY SANITARY LANDFILL GRAHAM, NORTH CAROLINA	RALEIGH, NORTH CAROLINA	JOB NO: 200-87-136 FIGURE NO: 10



WELL NUMBER VARIES

DATE DRILLED VARIES

STATIC WATER LEVEL VARIES

STICK UP VARIES

DRILLING METHOD VARIES

ELEVATION (TOC) VARIES

DEEP MONITORING WELL SCHEMATIC

PROJECT

ALAMANCE COUNTY SANITARY LANDFILL
GRAHAM, NORTH CAROLINA

AQUATERRA, INC.
RALEIGH, NORTH CAROLINA

JOB NUMBER 200-87-136
SCALE AS SHOWN
FIGURE NUMBER 11

ATTACHMENT A
MEMORANDUM FROM SHWMB FOR SANITARY LANDFILL LATERAL AND VERTICAL EXTENSIONS

FY 1
62

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

October 30, 1987

Mr. R.C. Smith, County Manager
Alamance County
124 W. Elm St.
Graham, N.C. 27253

Dear Mr. Smith

This is in response to your recent inquiry concerning expansion of existing landfills onto adjacent property.

The Solid & Hazardous Waste Management Branch realizes that in order for counties to meet the standards for a new landfill or major expansion (Memo #6) certain lead time is necessary. Therefore, the Branch is approving permit amendments, not to exceed five years, as follows:

(1) Vertical expansions by additional lifts, and
(2) Horizontal expansions.

These activities can be approved under conventional landfilling standards, when siting criteria is met in accordance with 10 NCAC 10G .0504 (1).

If an expansion area is approved, only the area necessary for accommodating disposal for five years will be permitted in accordance with 10 NCAC 10G .0504. Additional acreage can be approved as a soil borrow area.

If the county pursues this option, the five year period should be utilized to explore alternative technologies and to develop a long range solid waste management plan.

If you have questions please advise.

Sincerely,

J. Gordon Layton, Environmental Engineer
Solid & Hazardous Waste Management Branch
Environmental Health Section

JGL/mj

cc: Terry Waddell
Julian Foscue

ATTACHMENT B
ATLANTIC COAST ENGINEERING
AND TESTING DATA

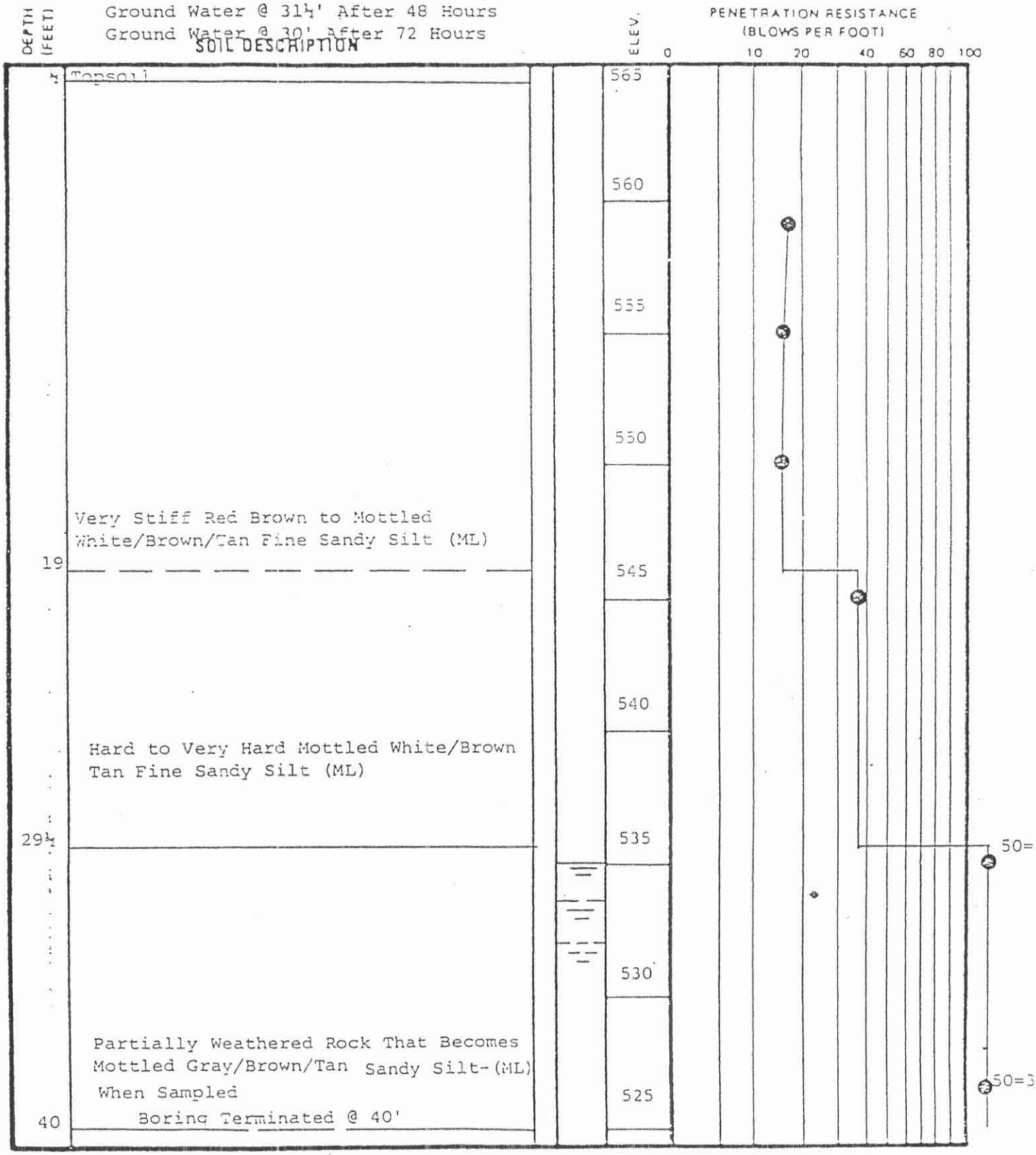
REMARKS: Alamance County Landfill Expansion

Project No. AC-525

Ground Water @ 33' Time of Boring
Ground Water @ 31¼' After 48 Hours
Ground Water @ 30' After 72 Hours

BORING NO. C-1

BORING TERMINATED 12/23/85



TEST BORING RECORD

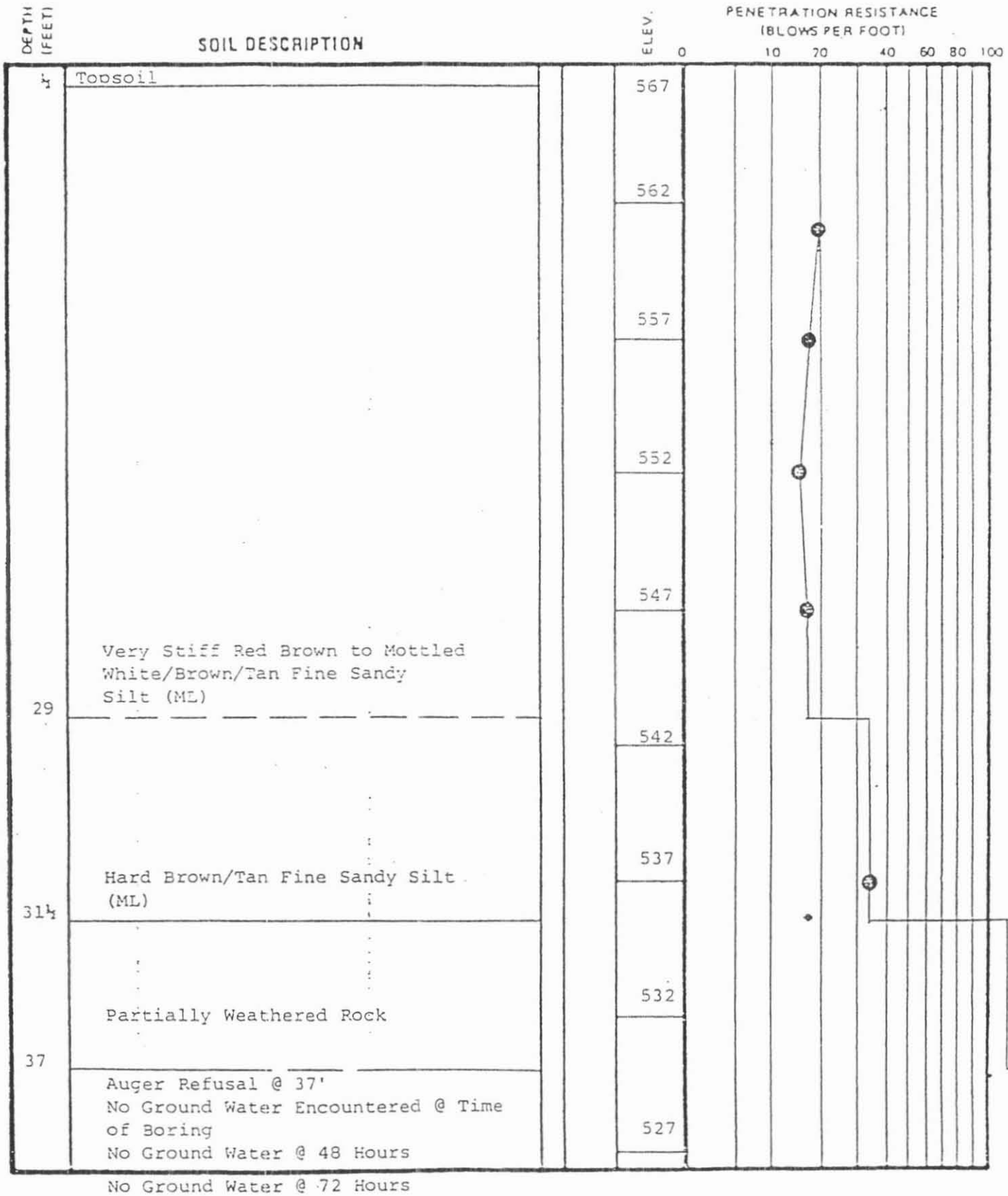
SHEET OF

ATLANTIC COAST ENGINEERING AND TESTING, INC.

REMARKS: Alamance County Landfill Expansion
Project No. AC-525

BORING NO. C-2

BORING TERMINATED 12/23/85



TEST BORING RECORD

SHEET OF

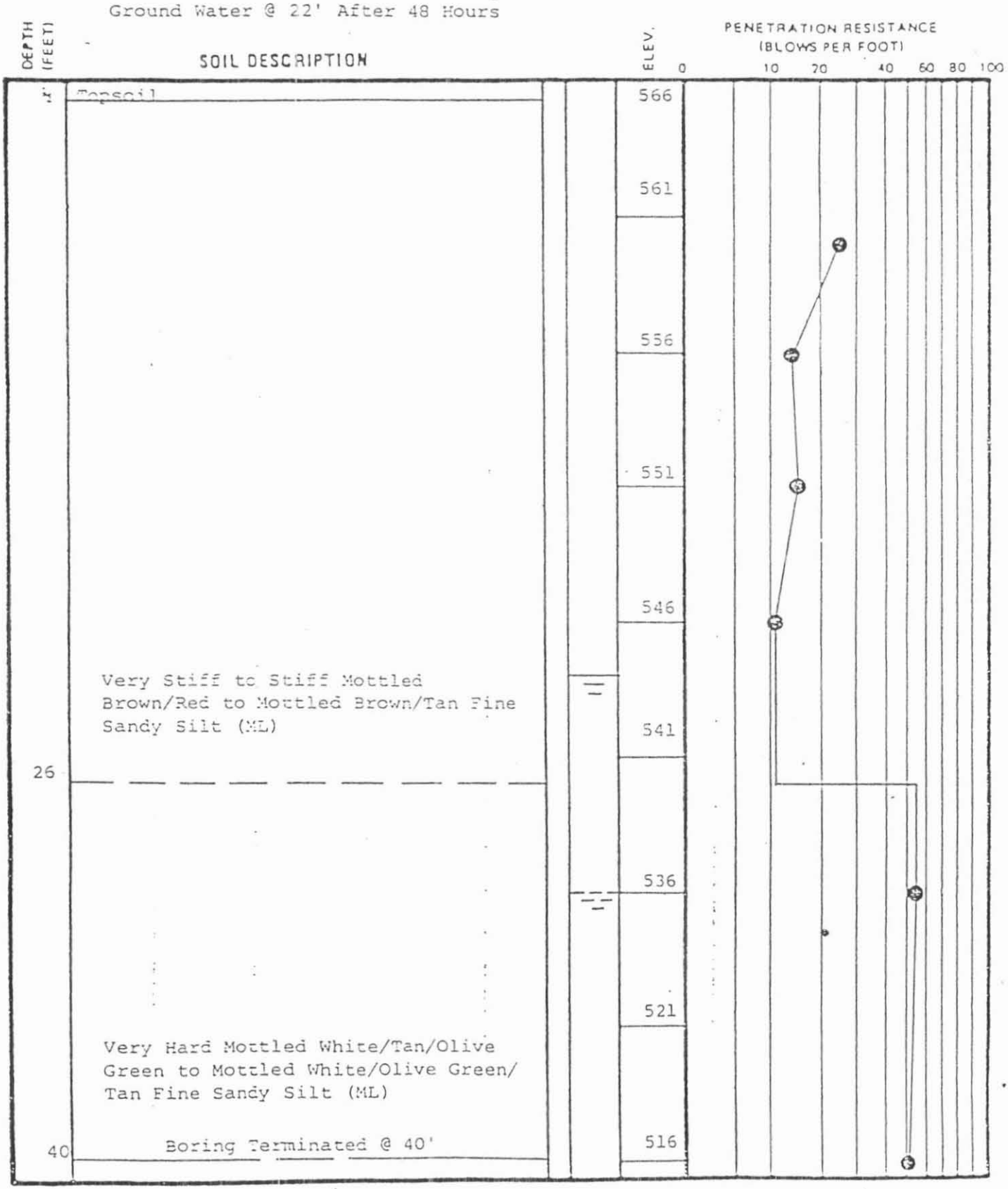
ATLANTIC COAST ENGINEERING AND TESTING, INC.

REMARKS: Alamance County Landfill Expansion
Project No. AC-525

Ground Water @ 30' Time of Boring
Ground Water @ 22' After 48 Hours

BORING NO. C-3

BORING TERMINATED 12/24/85



TEST BORING RECORD

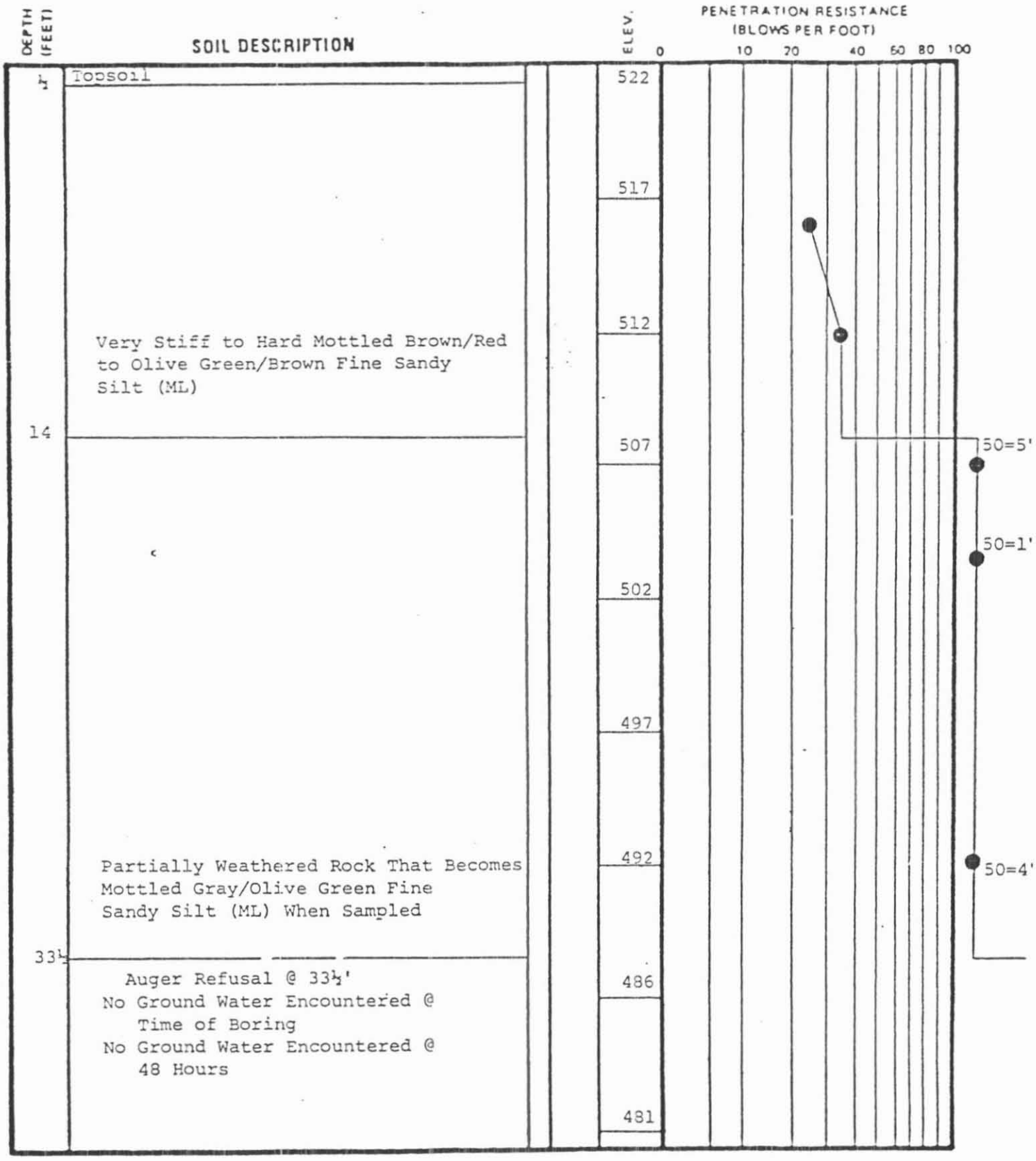
SHEET OF

ATLANTIC COAST ENGINEERING AND TESTING, INC.

REMARKS: Alamance County Landfill Expansion
Project No. AC-525

BORING NO. C-4

BORING TERMINATED 12/24/85



TEST BORING RECORD

SHEET OF

ATLANTIC COAST ENGINEERING AND TESTING, INC.

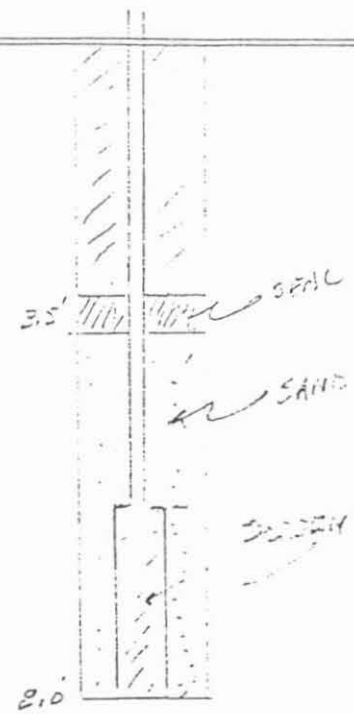
ATTACHMENT C
FISHER ASSOCIATES TEST
BORING DATA

Sheet ____ of ____

PROJECT	TOTAL DEPTH	SURFACE ELEVATION	BORING NO.
ALAMANCE Co. LANDFILL - 500 N SITE	8'-0" FT. DATUM	535	L-1 L-1A

SIZE & TYPE OF BIT	JOB NO.	WATER TABLE DATA — DEPTH BELOW SURFACE	DATE STARTED
SPT	85-021	DRY @ 0 HRS. ____ @ ____ HRS.	11/17/86
DRILLING METHOD	DRILLER	____ @ ____ HRS. AFTER BAILING	DATE COMPLETED
HSA	SEILER		

DEPTH In Feet	CLASSIFICATION	Sample No.	From To	Blows/Ft. ASTM D1586-58T
	RED SILTY CLAY w. ROCK FRAGMENTS	1		24
	BOULDER			
	YELLOW GRAY SILT w. ROCK FRAGMENTS	1A		50/.5
5.0	WEATHERED ROCK BOULDERS			
	B. T.			
10.0				
15.0				



Sheet ____ of ____

PROJECT	TOTAL DEPTH ____ FT. DATUM	SURFACE ELEVATION	BORING NO.
ALAMANCE COUNTY LANDFILL ZOOA SITE		540	L-2

SIZE & TYPE OF BIT	JOB NO.	WATER TABLE DATA — DEPTH BELOW SURFACE	DATE STARTED
SPT	95-021	15.5' @ 0 HRS. ____ @ ____ HRS.	11/17/95
DRILLING METHOD	DRILLER	____ @ ____ HRS. AFTER BAILING	DATE COMPLETED
HSA	SCHLEIF		

DEPTH In Feet	CLASSIFICATION	Sample No.	From To	Blows/Ft. ASTM D1586-84	
5	YELLOW GREY SILTY CLAY	1		11	
		2		10	
	WITH COARSE SAND	3		8	
	RED BROWN TO DARK GREY COARSE SANDY, CLAYEY SILT	4		33	
10	GREY BROWN FINE SANDY SILT WITH ROCK FRAGMENTS	5		34	10.0 SCH.
		6		28	
	MOIST YELLOW BROWN SILTY CLAY WITH ROCK FRAGMENTS	7		6	
15	BROWN TO GREY COARSE SANDY, CLAYEY SILT MOIST	8		8	SAND
	MOIST YELLOW BROWN CLAYEY SILT WITH ROCK FRAGMENTS	9		47	
20	DAMP BROWN FINE SANDY SILT	10		73	SCREEN
	WITH ROCK FRAGMENTS	11		50/.4	73.0

AUGER REFUSAL 50/.1

Sheet ____ of ____

PROJECT	TOTAL DEPTH	SURFACE ELEVATION	BORING NO.
ALAMANCE COUNTY LANDFILL 2004 SITE	26.7 FT.	565	L-3

SIZE & TYPE OF BIT	JOB NO.	WATER TABLE DATA — DEPTH BELOW SURFACE	DATE STARTED
3¼	05-021	DRY @ 0 HRS. ____ @ ____ HRS.	11/17/05
DRILLING METHOD	DRILLER	____ @ ____ HRS. AFTER BAILING	DATE COMPLETED
H.S.A.	SHULER		

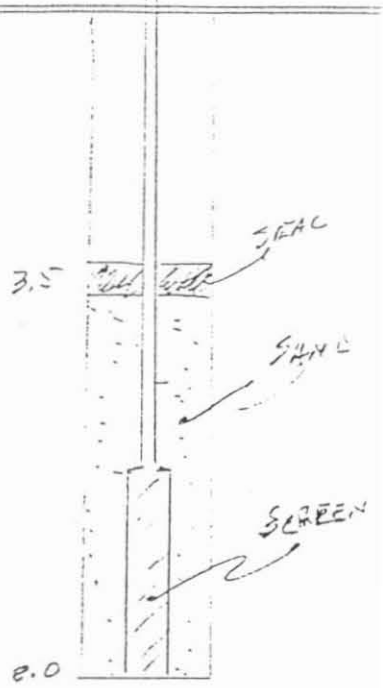
DEPTH In Feet	CLASSIFICATION	Sample No.	From To	Blows/Ft. ASTM D1586-84	
	RED SILT-CLAY STIFF	1		15	
		2	4	41	
5	ORANGE RED CLAYEY SILT	3		29	
		4		22	
10	RED CLAYEY SILT	5		15	
		6		18	
	YELLOW & RED CLAYEY SILT WITH BLACK SECONDARY MINERALIZATION	7		12	
15	RED CLAYEY SILT	8		13	
	DAMP YELLOW SILT WITH ROCK FRAGMENTS	9		18	19.0 SEAL
20		10		61	
		11		50/.2	21.2 SAND SCREEN

Sheet ____ of ____

PROJECT	TOTAL DEPTH	SURFACE ELEVATION	BORING NO
ALAMANCE COUNTY LANDFILL ZOOM SITE	8.0 FT. DATUM	475	L-4

SIZE & TYPE OF BIT	JOB NO.	WATER TABLE DATA — DEPTH BELOW SURFACE	DATE STARTED
SPT	85-021	DRY @ 0 HRS. ____ @ ____ HRS.	11/11/86
DRILLING METHOD	DRILLER	____ @ ____ HRS. AFTER BAILING	DATE COMPLETED
HSA	SCALES		

DEPTH In Feet	CLASSIFICATION	Sample No.	From To	Blows/Ft. ASTM D1586-58T
	GREY SILT AND WEATHERED ROCK FRAGMENTS	1		19
	MOIST RED BROWN TO YELLOW GRAY COARSE SANDY SILT WITH CLAYEY SEAMS OR CLODS	2		10
		3		34
	BECOMES YELLOW BROWN WITH INCREASING DEPTH	4		50/1"
				50/0
	A.R.			



ATTACHMENT D
AQUATERRA TEST BORING RECORDS

DEPTH FT.	DESCRIPTION	ELEV.	● PENETRATION–BLOWS PER FT. 0 10 20 30 40 60 80 100
	Drilling utilizing an air rotary rig -- soil sampling utilizes boring L-3		
		36.8	⏚
40.0			

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.

UNDISTURBED SAMPLE

50 % ROCK CORE RECOVERY

⏚ WATER TABLE–24 HR.

⏚ WATER TABLE–1 HR.

TEST BORING RECORD

BORING NO. B-1
DATE DRILLED 12-22-87
JOB NO. 200-87-136

DEPTH FT.	DESCRIPTION	ELEV.	● PENETRATION–BLOWS PER FT. 0 10 20 30 40 60 80 100
	Bedrock -- sampled as chloride hornblende-diopside rich diorite		
52.0	Boring terminated @ 52.0'		

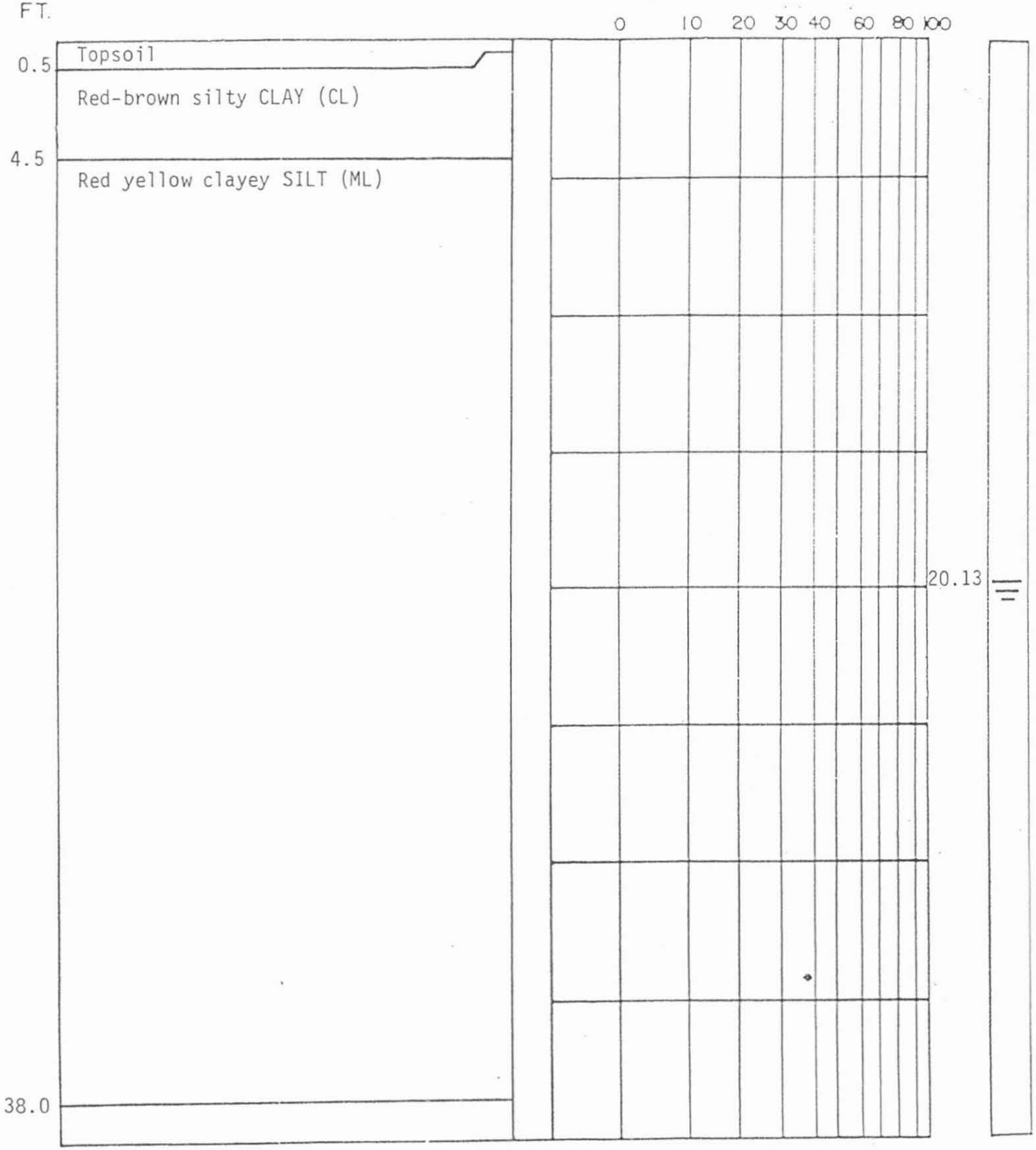
TEST BORING RECORD

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.

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

BORING NO. B-1
DATE DRILLED 12-22-87
JOB NO. 200-87-136



TEST BORING RECORD

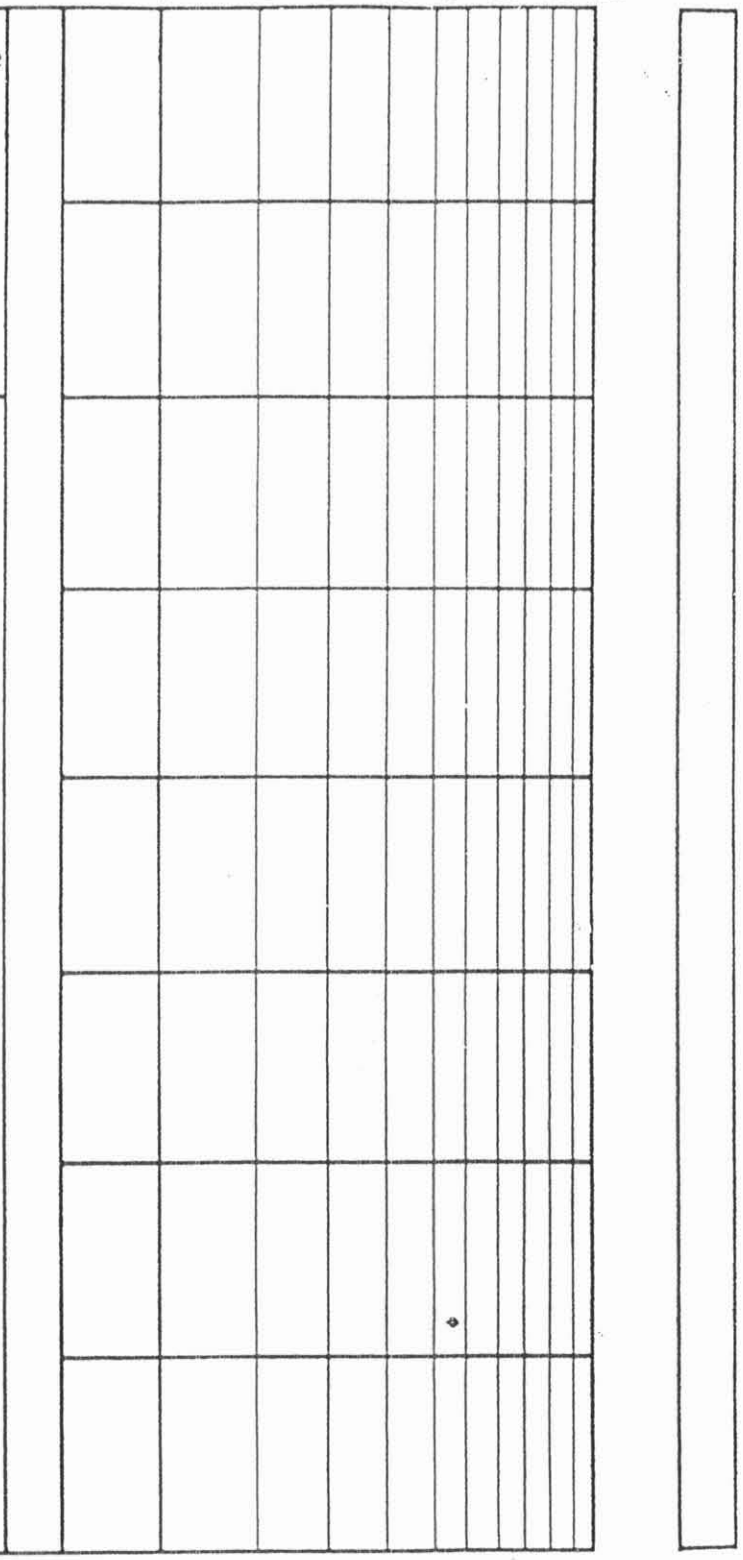
BORING AND SAMPLING MEETS ASTM D-1586
CORE DRILLING MEETS ASTM D-2113

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

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

BORING NO. B-2
DATE DRILLED 12-23-87
JOB NO. 200-87-136

DEPTH FT.	DESCRIPTION	ELEV.	● PENETRATION–BLOWS PER FT. 0 10 20 30 40 60 80 100
	Bedrock sampled as diopside-hornblende rich diorite		
50.0	Boring terminated @ 50.0'		



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.

UNDISTURBED SAMPLE

50% ROCK CORE RECOVERY

WATER TABLE–24 HR.

WATER TABLE–1 HR.

TEST BORING RECORD

BORING NO. B-2
DATE DRILLED 12-23-87
JOB NO. 200-87-136

DEPTH FT.	DESCRIPTION	ELEV.	PENETRATION-BLOWS PER FT. 0 10 20 30 40 60 80 100
	Drilled with an air rotary drilling rig -- soil sampling utilizing boring C-1		
		35.8	

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.

UNDISTURBED SAMPLE

50% ROCK CORE RECOVERY

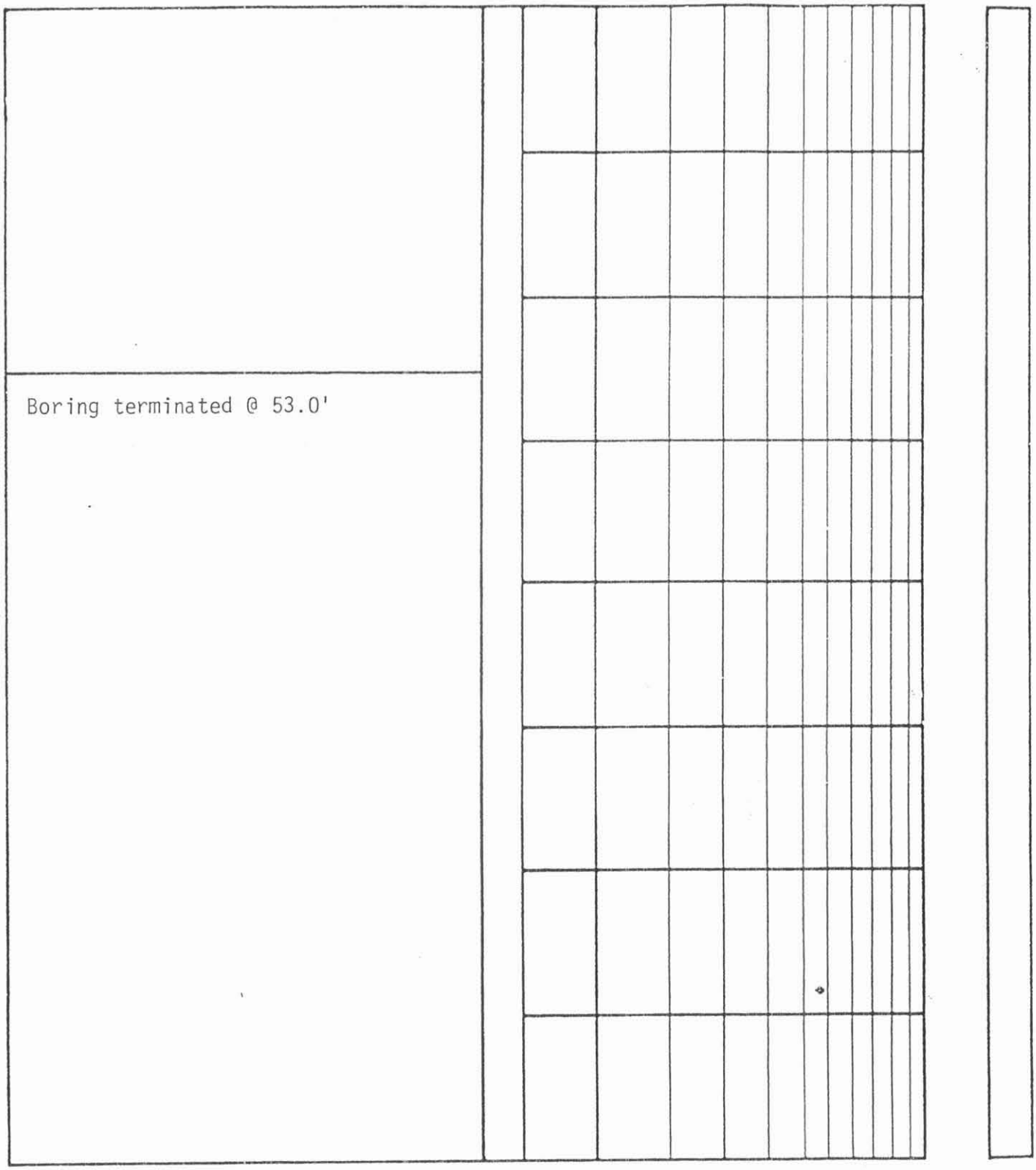
WATER TABLE-24HR.

WATER TABLE-1HR.

TEST BORING RECORD

BORING NO. B-3
DATE DRILLED 1-7-88
JOB NO. 200-87-136

DEPTH FT.	DESCRIPTION	ELEV.	● PENETRATION-BLOWS PER FT. 0 10 20 30 40 60 80 100
53.0	Boring terminated @ 53.0'		



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

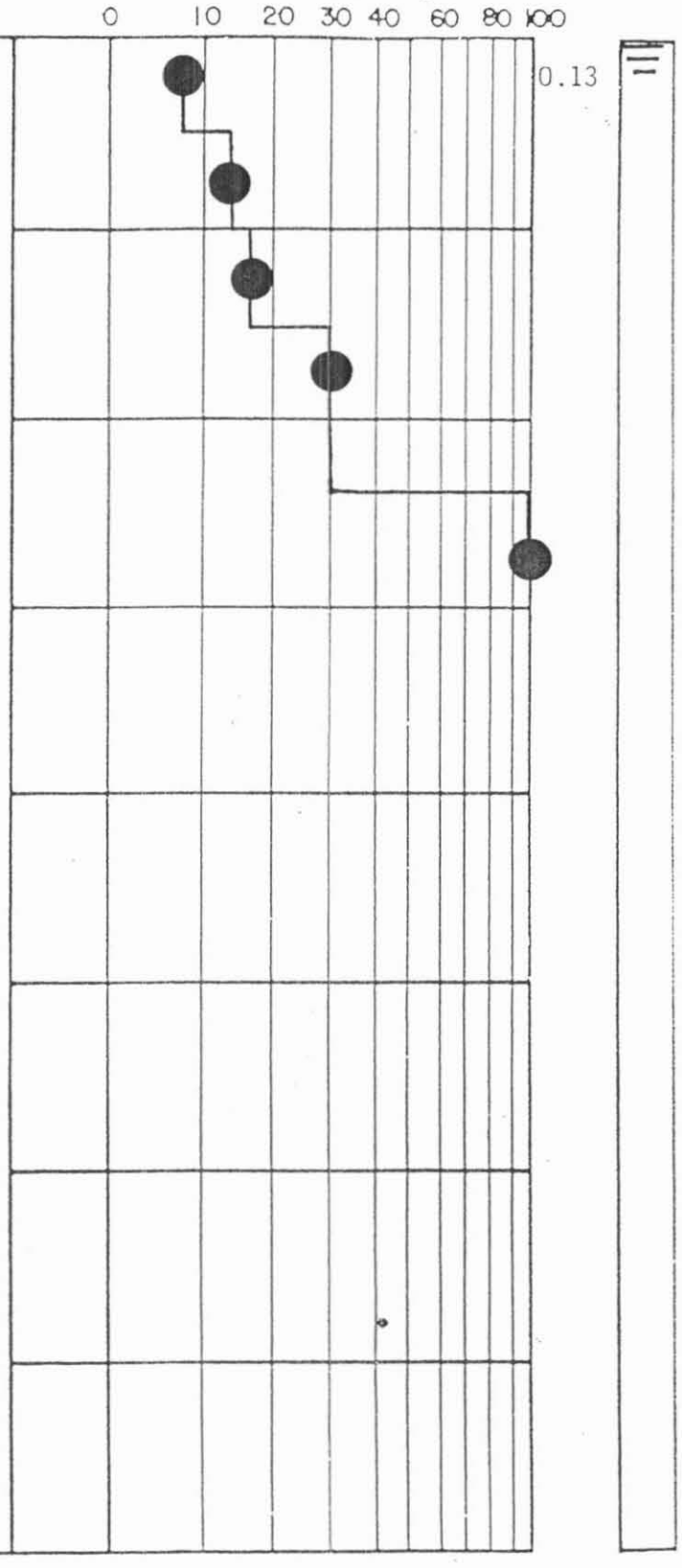
PENETRATION IS THE NUMBER OF BLOWS OF 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE 1.4 IN. I.D. SAMPLER 1 FT.

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

TEST BORING RECORD

BORING NO. B-3
DATE DRILLED 1-7-88
JOB NO. 200-87-136

DEPTH FT.	DESCRIPTION	ELEV.
	Tan to red brown clayey fine to medium SAND (SC)	
2.5	Brown fine to medium CLAY (CL) with rock fragments	
5.0	Brown clayey fine to medium SILT (ML)	
7.5	Tan brown micaceous silty medium to coarse SAND (SM)	
12.0	Partially weathered rock -- sampled as dark brown clay	
	Boring terminated @ 15.0'	



TEST BORING RECORD

BORING NO. B-4
DATE DRILLED 1-11-88
JOB NO. 200-87-136

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.

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

ATTACHMENT E
HYDRAULIC CONDUCTIVITY CALCULATIONS

$$K = \frac{r^2}{2L} \ln\left(\frac{L}{R}\right) \frac{\ln(H_1/H_2)}{t_2 - t_1}$$

$$= (2.44 \times 10^{-4}\ \text{ft})(2.08)\left(\frac{1.51}{2.9}\right)$$

$$= 2.64 \times 10^{-4}\ \text{ft/min}$$

$$= 4.4 \times 10^{-6}\ \text{ft/sec}$$

$$= 1.34 \times 10^{-4}\ \text{cm/sec}$$

FALLING HEAD TEST

$H_1 = 1.0$

$t_1 = 1.5$

$H_2 = .22$

$t_2 = 3.4$

46 4970

KEUFFEL & ESSER CO. MADE IN U.S.A. SEMI-LOGARITHMIC • 2 CYCLES X 70 DIVISIONS

JOB NO. 200-EC-13

SHEET NO. 1

DATE 2-8-88

JOB NAME ALAMANCE CO. LANDFILL

COMPUTED BY E. JONES

SUBJECT FALLING HEAD PERMEABILITY TEST

CHECKED BY

TIME	W.L.	r^2	L	r	H_t	H_o	H_t/H_o		
PRE TEST	21.26	9.76×10^{-4}	2.0'	.25'					
0	20.75				.51	.50	1.0		
.5	20.77				.49		.96		
1.0	20.83				.43		.84		
1.5	20.98				.28		.55		
2.0	21.04				.22		.43		
2.5	21.06				.20		.39		
3.0	21.13				.13		.25		
3.5	21.15				.11		.22		
4.0	21.19				.07		.14		
4.5	21.21				.05		.10		
5.0	21.23				.03		.06		
5.5	21.25				.01		.02		
6.0	21.25				.01		.02		
6.5	21.27								
8.0	21.29								

$$K = \frac{r^2}{2L} \ln\left(\frac{L}{R}\right) \left\{ \frac{\ln(H_1/H_2)}{t_2 - t_1} \right\}$$

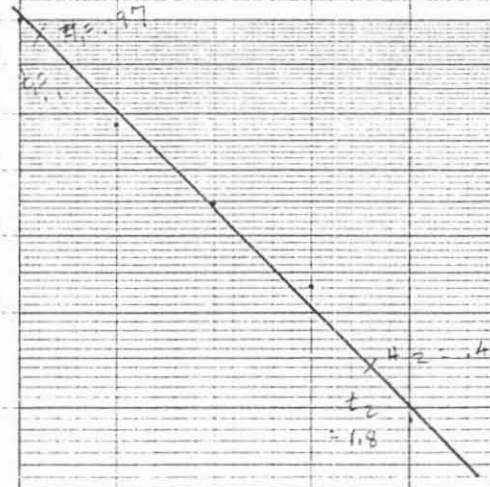
$$= (2.44 \times 10^{-4}\ \text{ft})(2.08)\left(\frac{.79}{1.7}\right)$$

$$= 2.35 \times 10^{-4}\ \text{ft/min}$$

$$= 3.93 \times 10^{-6}\ \text{ft/sec}$$

$$= 1.20 \times 10^{-4}\ \text{cm/sec}$$

RISING HEAD TEST



46 4970

KEUFFEL & ESSER CO. SEMI-LOGARITHMIC • 7 CYCLES X 70 DIVISIONS MADE IN U.S.A.

JOB NO. 200-87-136

SHEET NO. 2

DATE 2-8-88

JOB NAME ALAMANCE Co. LANDFILL

COMPUTED BY E JONES

SUBJECT RISING HEAD TEST

CHECKED BY

$$K = \frac{r^2}{2L} \ln\left(\frac{L}{R}\right) \left[\frac{\ln(H_1/H_2)}{(t_2 - t_1)}\right]$$

Time	W.L.	r^2	L	R	H_t	H_0	H_t/H_1	K	
PRE TEST	21.39	9.76×10^{-4}	2.0'	.25'		.49		K	
0	21.88				.49		1		
.5	21.77				.38		.78		
1.0	21.71				.32		.65		
1.5	21.65				.26		.53		
2.0	21.58				.19		.39		
2.5	21.52				.13		.27		
3.0	21.50				.11		.22		
3.5	21.48				.09		.18		
4.0	21.44				.05		.10		
4.5	21.42				.03		.06		
5.0	21.40				.01		.02		
5.5	21.38				.01		.02		
6.0	21.38				.01		.02		
6.5	21.38				.01		.02		
7.0	21.35				0		0		
7.5	21.35				0		0		
8.0	21.35				0		0		
8.5	21.35				0	↓	0		
9.0									
9.5									
10.0									

ATTACHMENT F

SOIL LABORATORY TEST DATA SHEETS

ATEC Associates, Inc.

of North Carolina
6814 Davis Circle
Raleigh, North Carolina 27612
919-782-2832 Raleigh
919-223-3519 Newport

Corporate Office:
Indianapolis, IN

Offices:
Atlanta, GA
Baltimore, MD
Birmingham, AL
Chicago, IL
Cincinnati, OH
Dallas, TX
Dayton, OH
Denver, CO
Ft. Wayne, IN
Gaithersburg, MD
Griffin, IN
Huntsville, AL
Lakeland, FL
Lexington, KY
Longmont, CO
Louisville, KY
Montgomery, AL
Nashville, TN
Raleigh, NC
Salisbury, MD
Savannah, GA
Toledo, OH
Washington, DC

Affiliates:
Alexandria, VA
Chantilly, VA
Newport News, VA
Norfolk, VA

January 29, 1988

Mr. Phil Rahn
c/o Aquaterra, Inc.
P. O. Box 50328
Raleigh, NC 27650

RE: Laboratory Soil Testing
Alamance County Landfill
ATEC Job No. 35-82602

Dear Phil:

Enclosed are the results of requested laboratory tests on the samples you submitted to us for the Alamance County Landfill project. The results of the tests are presented on the attached Soil Data Summary Sheet. Also attached are the individual report sheets for the Standard Proctor Moisture-Density Relationship Test and a calculation sheet for the Falling-Head Permeability Test you requested for the bag sample identified as Sample No. C-5.

As I discussed with you prior to proceeding with the falling-head permeability test, we compacted the permeability test sample to approximately 95 percent of the Standard Proctor maximum dry density (105.1 lbs/cu ft) at a moisture content of 21.8 percent, ie. approximately 3.5 percentage points wet of the optimum moisture content. Compaction at a moisture content wet of optimum generally causes clayey particles to align themselves in a more parallel fashion, essentially increasing the micro flow paths that water particles must follow in flowing through a soil material. This increased length of micro flow paths results in a greater time being required for water to flow through the macro thickness of a soil layer, thus resulting in a decreased permeability rate. If the soil materials are compacted at, or dry, of the optimum moisture content for the soil, then higher permeability rates can be anticipated. Also, if soils are compacted at moisture contents much greater than 3 to 4 percentage points wet of the optimum moisture content, then extreme difficulty can be expected in obtaining a degree of compaction of 95 percent.

Do not hesitate to contact us if you have questions concerning the laboratory test results. We appreciate the opportunity to serve you and we hope to be of similar service in the future.

Very truly yours,

ATEC ASSOCIATES, INC.

John D. Woodburn, P.E.
Vice President
District Manager

JDW/tf

Attachments

ATEC Associates, Inc.
of NORTH CAROLINA
6814 Davis Circle
Raleigh, NC 27612

SOIL DATA SUMMARY SHEET

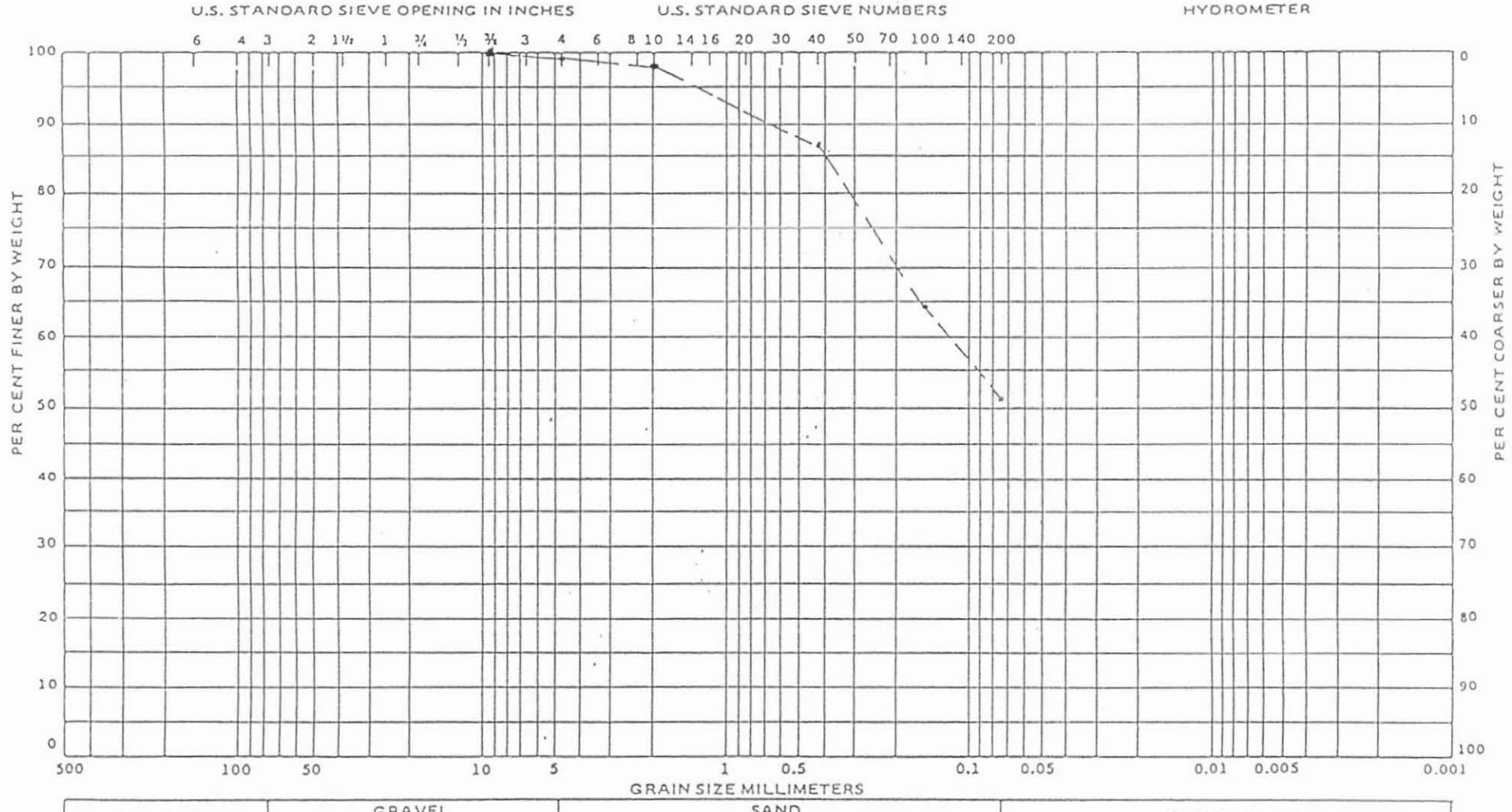
JOB NO. 82602 JOB NAME Alamance County Landfill LOCATION Alamance County, NC DATE 1-20-88

SORING NO.	SAMPLE NO.	DEPTH (FT)	DESCRIPTION	NATURAL MOISTURE (%)	PI DATA LL	PL	PI	GRAIN SIZE % PASSING #200	% PASSING #40	% PASSING #4	PROCTOR * MAX DRY DENSITY (PCF)	OPTIMUM MOISTURE (%)	CBR
C1-A		3.5-5.0	Brownish red sandy CLAY					84.0					
C1-A		28.5-30.0	Light brown sandy clayey SILT					63.2					
B-5		13.0-15.0	Brown, micaceous clayey silty SAND					19.8					
B-5		3.5-5.0	Brown-black-white clayey SILT					71.5					
(BAG)	C-5	1.0-5.0	Brown & Yellow silty sandy CLAY		32	24	8	51.6	86.1	99.2	110.6	18.3	

* Standard Proctor (ASTM D-698)

Falling head Permeability Test - Bag Sample C-5 (1.0-5.0)
$K=1.3 \times 10^{-8}$ cm/sec Molded @ 105.1 pcf @ 21.8% moisture Content

GRADATION CURVES



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

BORING NO	ELEV OR DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
BAG C-5	1.0' - 5.0'		32	24	8	Brown & yellow, silty sandy CLAY (CL)

JOB NO. 35-82602

ATEC

ATEC Associates, Inc.

MOISTURE DENSITY RELATIONSHIP

JOB NAME: Alamance County Landfill

JOB NUMBER: 35-82602

CLIENT: Aquaterra

DATE SAMPLED:

MOISTURE DENSITY RELATIONSHIP NO.: 1

SOURCE OF MATERIAL: Borrow Site
Sample C-5, 1'-5'

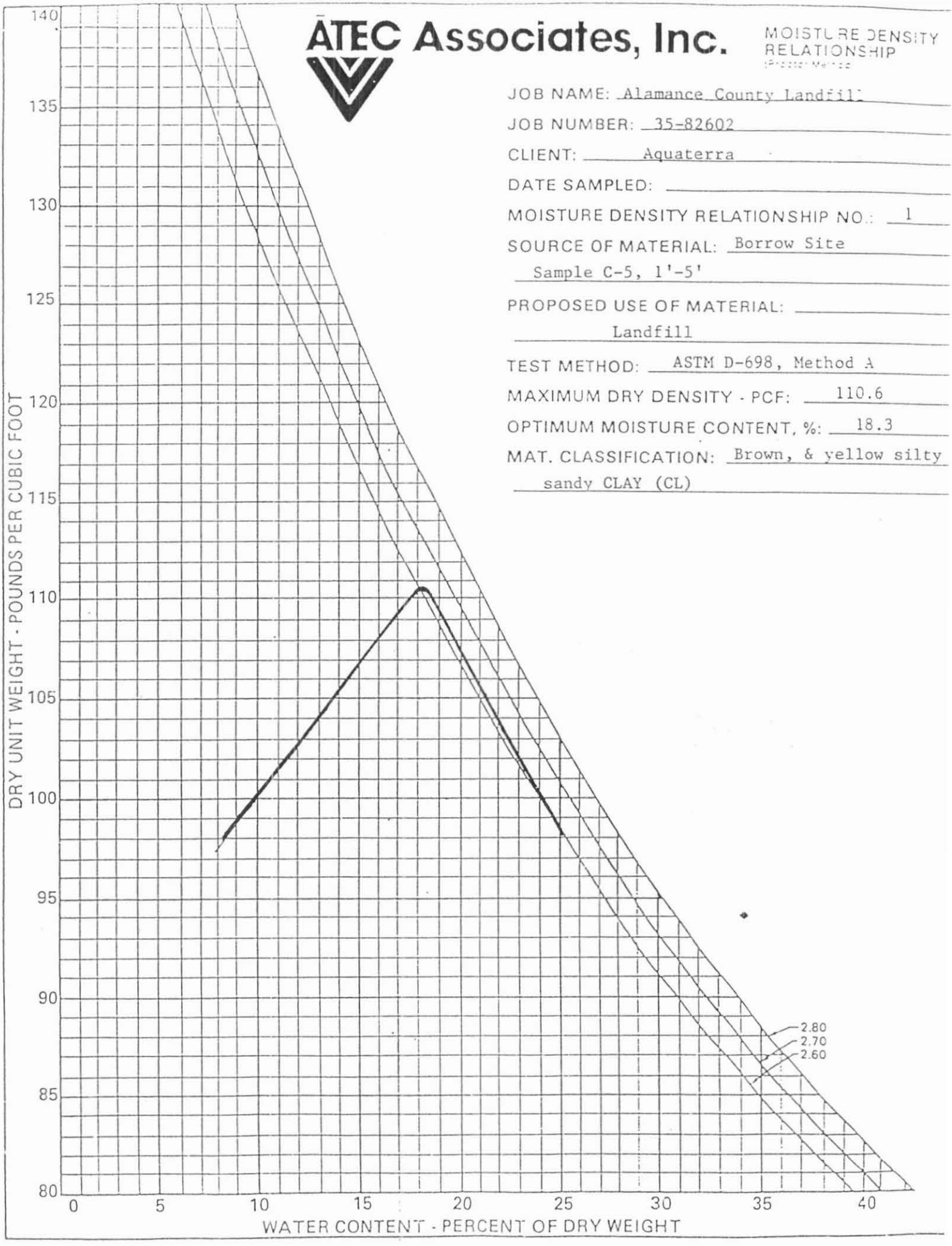
PROPOSED USE OF MATERIAL:
Landfill

TEST METHOD: ASTM D-698, Method A

MAXIMUM DRY DENSITY - PCF: 110.6

OPTIMUM MOISTURE CONTENT, %: 18.3

MAT. CLASSIFICATION: Brown, & yellow silty sandy CLAY (CL)



FALLING HEAD PERMIABILITY

JOB #: 35-8260Z

NAME: ALAMANCE COUNTY LANDFILL

CLIENT: AQUA TERRA

CS: BROWN, YELLOW M-F SA CL S

$L = 10.34\,cm$

$A = 41.14\,cm^2$

$a = 1.30\,cm^2$

$\eta_T/\eta_{20} = 1.077$ (VISCOSITY CORRECTION)

$H_1 = 353.39\,cm$ (1-21-88, 2:00 pm.)

H_2 = REFER TO EACH READING DATE

t = TIME IN SECONDS, ELAPSED

$K = \frac{aL}{At} \ln \frac{H_1}{H_2} \eta_T/\eta_{20}$

(A) 1-25-88, 10:00 AM. $H_1 = 353.39\,cm.$

$H_2 = 348.93\,cm.$

$$K_A = \frac{(1.30\,cm^2)(10.34\,cm)}{(41.14\,cm^2)(331{,}200\,s)} \ln\left(\frac{353.39\,cm}{348.93\,cm}\right)(1.077)$$

$$\therefore \boxed{K_A = 1.3 \times 10^{-8}\,cm/s}$$

(B) 1-26-88, 4:55 pm. $H_1 = 353.39\,cm.$

$H_2 = 347.68\,cm.$

$$K_B = \frac{(1.30\,cm^2)(10.34\,cm)}{(41.14\,cm^2)(442{,}500\,s)} \ln\left(\frac{353.39\,cm}{347.68\,cm}\right)(1.077)$$

$$\therefore \boxed{K_B = 1.3 \times 10^{-8}\,cm/s}$$

(C) 1-28-88, 8:00 AM. $H_1 = 353.39\,cm.$

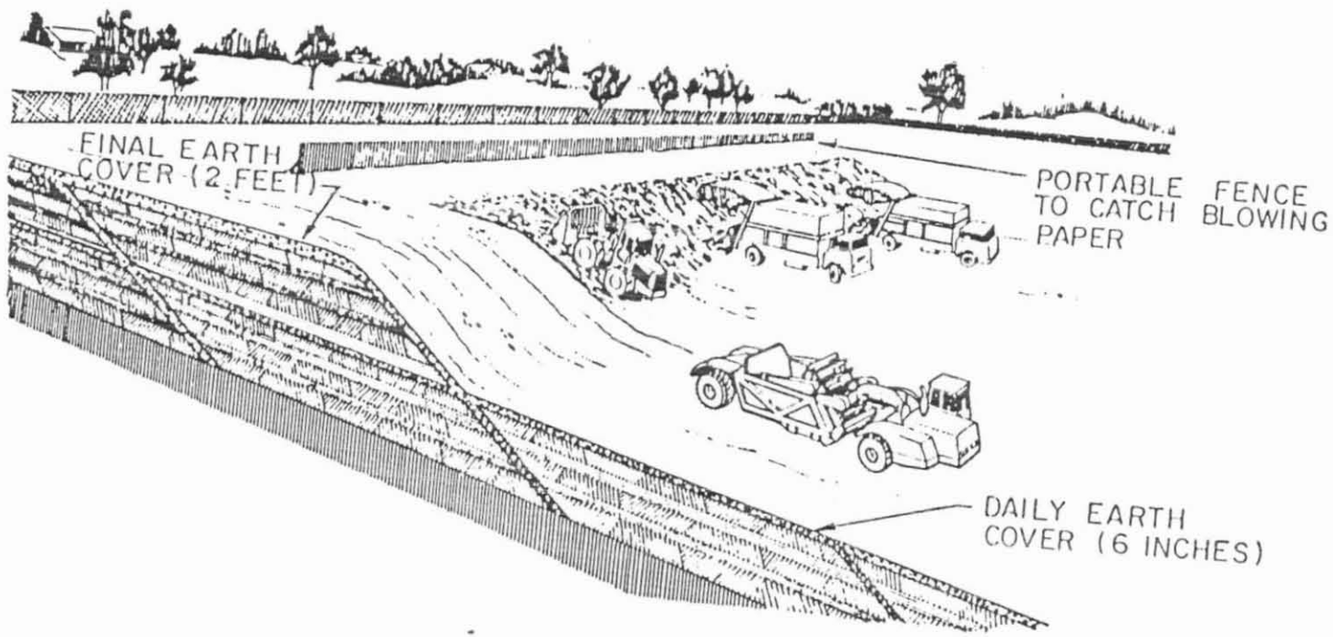
$H_2 = 345.77\,cm$

$$K_C = K_{FINAL} = \frac{(1.30\,cm^2)(10.34\,cm)}{(41.14\,cm^2)(583200\,s)} \ln\left(\frac{353.39\,cm}{345.77\,cm}\right)(1.077)$$

$$\therefore \boxed{K_f = 1.3 \times 10^{-8}\,cm/s}$$

APPENDIX E

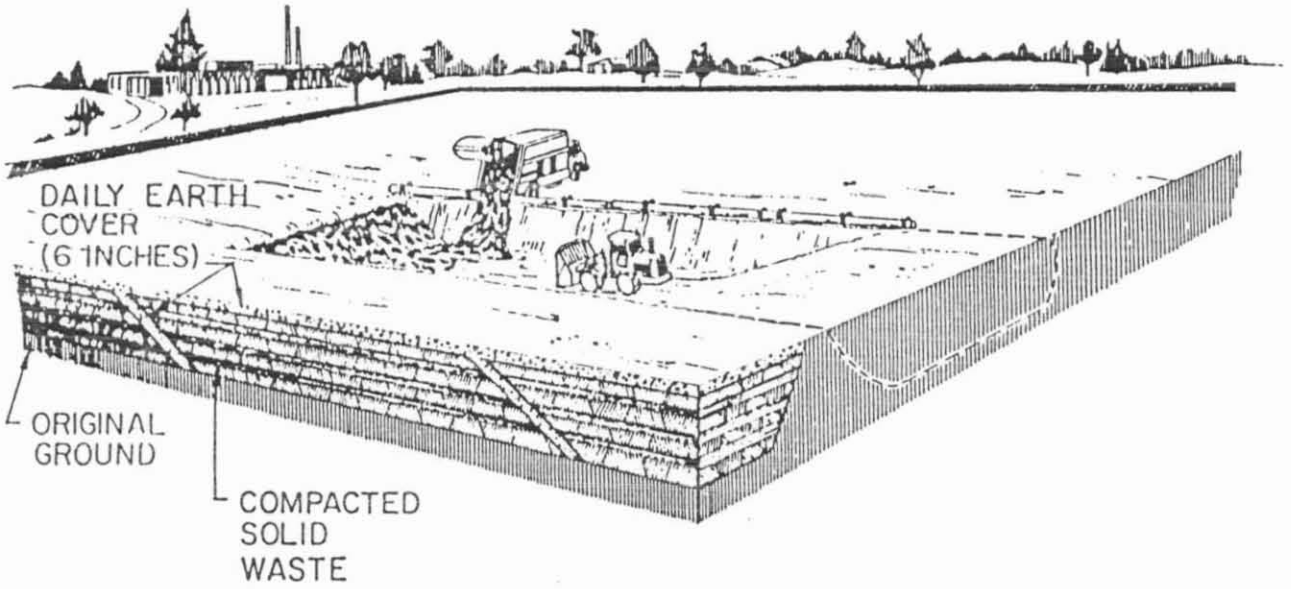
AREA APPROACH FOR WASTE DISPOSAL



AREA APPROACH

APPENDIX F

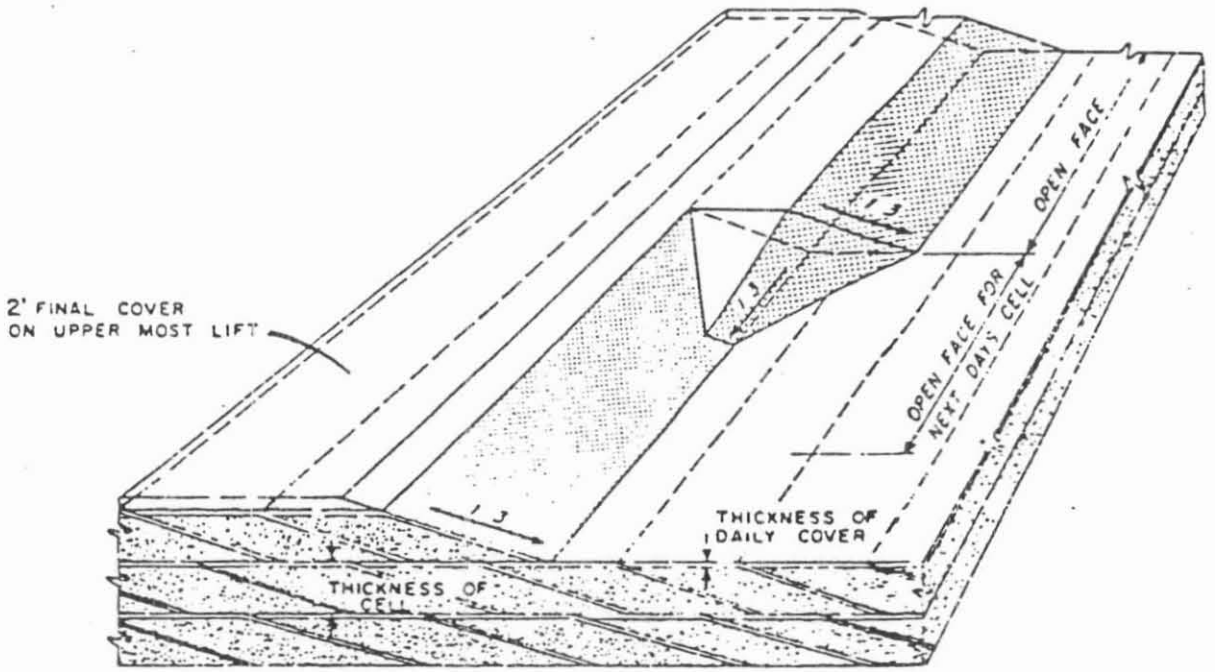
TRENCH APPROACH FOR WASTE DISPOSAL



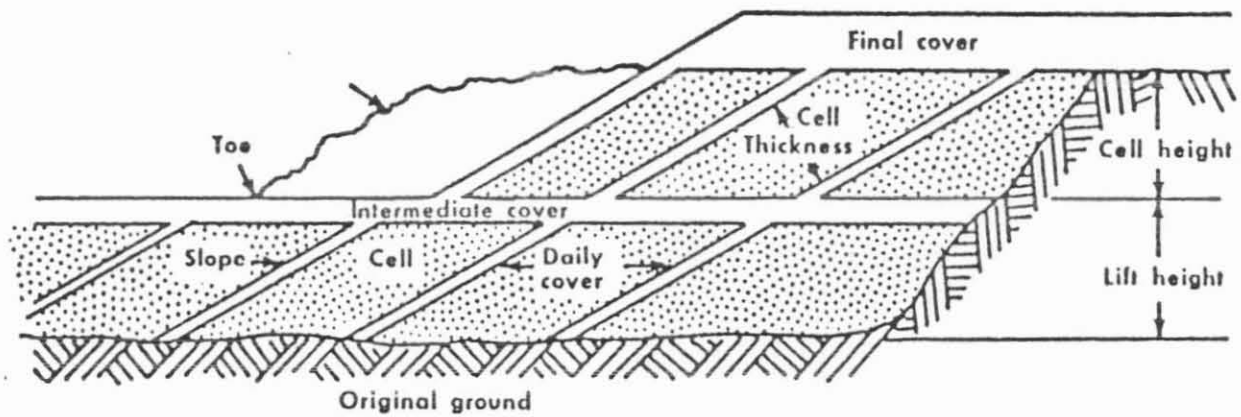
TRENCH APPROACH

APPENDIX G

CELL CONSTRUCTION AND BUILDING BLOCK CELL CONCEPT



CELL CONSTRUCTION



BUILDING BLOCK CELL CONCEPT

APPENDIX H

ZONING LETTER AND TAX MAP

ALAMANCE COUNTY
Department of Administration
COUNTY OFFICE BUILDING
124 West Elm Street
Graham, North Carolina 27253

Administrative Services

Telephone 228-1312
Area Code 919

January 5, 1988

Mr. Michael P. Herbert
Hazen and Sawyer Consulting Engineers
4300 Glenwood Avenue
Raleigh, N. C. 27622

Dear Mr. Herbert:

The proposed landfill site, identified as Tax Map Parcel 9-7-21 is within the jurisdiction of Alamance County. There is no zoning at this site and there is no County Ordinance prohibiting a landfill at this site. There is a County Ordinance requiring a fifty (50) foot buffer adjacent to Haw Creek. There is an identified flood prone area adjacent to Haw Creek that is subject to Federal Emergency Management Administration, County Flood Damage Prevention Ordinance and U.S. Army Corps of Engineers Section 401 requirements should any fill be proposed in the "A" Flood Zone.

Sincerely,

ALAMANCE COUNTY

M. M. Way
Administrative Officer II

MMW:la

APPENDIX I

STATE REVIEW COMMENT FROM:

1. DEPARTMENT OF NATURAL RESOURCES
   AND COMMUNITY DEVELOPMENT
   (ENDANGERED SPECIES AND NATURE PRESERVES)

2. DEPARTMENT OF CULTURAL RESOURCES
   (HISTORICAL AND ARCHAEOLOGICAL SITES)

State of North Carolina
Department of Natural Resources and Community Development
Division of Parks and Recreation
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
S. Thomas Rhodes, Secretary

Dr. William W. Davis
Director

February 9, 1988

Mr. Michael P. Hebert
Hazen and Sawyer, P.C.
P.O. Box 30428
Raleigh, N.C. 27622

Dear Mr. Hebert:

The site for the proposed horizontal expansion of the existing landfill near Swepsonville (Alamance County) is not currently known to support habitat for any endangered or threatened species or other special natural features. This conclusion is based on examination of our data bank and map files. Lack of data for an area can signify the absence of studies of a site and is not necessarily conclusive evidence that no such natural resources occur.

Thank you for consulting the N.C. Natural Heritage Program.

Sincerely,

Laura Mansberg

Laura Mansberg
Inventory Specialist

LM/tm

D/4

PO Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4181

North Carolina Department of Cultural Resources

James G. Martin, Governor
Patric Dorsey, Secretary

Division of Archives and History
William S. Price, Jr., Director

February 16, 1988

Mr. Michael P. Hebert, E.I.T.
Hazen and Sawyer
P.O. Box 30428
Raleigh, N.C. 27622

Re: Extension of existing landfill
Alamance County, ER 88-7767

Dear Mr. Hebert:

Thank you for your letter of January 28, 1988, concerning the above project.

The area of the proposed landfill extension was subjected to an archaeological survey in 1986 by Ms. Jane McManus of the University of North Carolina at Chapel Hill. No significant archaeological resources were identified as a result of the survey and it is our opinion that the proposed landfill extension will have no effect upon significant archaeological resources.

We have reviewed the photographs of the structures located on the site of the proposed landfill extension and are of the opinion that none of the dwellings or outbuildings appear to be of architectural or historical significance. Therefore, we have no further comment on the project as currently planned.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Ms. Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763.

Sincerely,

David Brook, Deputy State
Historic Preservation Officer

DB:slw

109 East Jones Street • Raleigh, North Carolina 27611
(919) 733-7305

APPENDIX J

LANDFILL OPERATIONAL PERSONNEL AND EQUIPMENT

LANDFILL OPERATIONAL PERSONNEL AND EQUIPMENT

Landfill Personnel:

One (1) Landfill Supervisor
Five (5) Equipment Operators
One (1) Landfill Entrance Attendant

Landfill Equipment:

Three (3) Compactors
Three (3) Crawler Tractors
Three (3) Scrapers
One (1) Loader Grader
One (1) Water Truck