

November 19, 1979

Mr. Eddie L. Shuffler
Henningson, Durham & Richardson, Inc.
6230 Fairview Road
P. O. Box 11257
Charlotte, North Carolina 28220

Re: Alexander County Landfill
SR 1620

Permit No.	Date	Document ID No.
02-01	May 21, 2010	10675

Dear Mr. Shuffler: *JWC*

The enclosed plan is approved and Permit Number 02-01 is issued with the following conditions:

1. Filing of the Permit with the Alexander County Register of Deeds.
2. Posting of the Permit Number and the words "No Hazardous or Liquid Waste Accepted without Written Permission From the Division of Health Services."
3. Final grading plan to be reflective of cross-sectional drawings.
4. Monitoring wells to be installed when construction begins in areas upgradient from the well locations.
5. The final two feet of cover shall be composed of the finest grain material on site.
6. The omission of cells 6, 15, 16 and 25.
7. Intermediate cover (1 foot) and temporary seeding will be required on areas that will not be under active construction for a period of 90 days or more.
8. Construction of sediment basin prior to land disturbance.

October 19, 1979

If this office can be of further assistance, please advise.

Respectfully,

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

JGL:sms

Enclosure

cc: Mr. Robert M. Apple

PERMIT NO. 02-01

DATE ISSUED 11-19-79

STATE OF NORTH CAROLINA
DEPARTMENT OF HUMAN RESOURCES

Division of Health Services

P.O. Box 2091 Raleigh 27602

SOLID WASTE MANAGEMENT
PERMIT

Alexander County is hereby issued a permit to
operate a Sanitary Landfill
located on SR 1620 in Alexander County, in accordance
with Article 13B of the General Statutes of North Carolina and all rules promul-
gated thereunder. The facility is located on the below described property.

BEGINNING at a point in the centerline of SR 1620 thence $S9^{\circ} 05' W$, 300.3' to
a stone thence $S85^{\circ} 20' E$ 200.0' to an iron thence $S 36^{\circ} 13' W$ 421.4' to a stone
thence $N 83^{\circ} 19' W$ 821.4' to an iron thence $S6^{\circ} 05' W$ 217.5' to an iron thence
 $N84^{\circ} 09' W$ 1020.2' to an iron thence $N29^{\circ} 39' E$ 302.1' to an iron thence $N39^{\circ}$
 $31' E$ 508.9' to an iron thence $S85^{\circ} 39' E$ 655.7' to an iron thence $S76^{\circ} 49' E$
236.63' to an point in SR 1620 thence $N78^{\circ} 45' E$ 604.9' to the point of beginning,
containing 24.76 acres more or less, are shown on map by Goven Engineering dated
May 15, 1979.



Hugh H. Filson, M.D.
Director
Division of Health Services



Head
Solid & Hazardous Waste Management
Program
Sanitary Engineering Section

HDR

Henningson, Durham & Richardson, Inc. of North Carolina

November 12, 1979



Mr. Gordon Layton
Solid and Hazardous Waste
Management Program
P. O. Box 2091
Raleigh, NC 27602

Re: Alexander County Sanitary Landfill

Dear Mr. Layton:

Per our telephone conversation of November 2, 1979, enclosed are three copies of the Alexander County Sanitary Landfill Plan for your approval.

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

Yours very truly,

HENNINGSON, DURHAM & RICHARDSON, INC.,
of North Carolina

By Eddie L. Shuffler
Eddie L. Shuffler, E.I.T.

lpw

Enclosure



Henningson, Durham & Richardson, Inc. of North Carolina

Environmental Resources
Engineering
Construction
Management
and Technology

September 17, 1979

Mr. Gordon Layton
Solid and Hazardous Waste Program
P.O. Box 2091
Raleigh, NC 27602



RE: Alexander County Sanitary Landfill

Dear Mr. Layton:

Enclosed is a copy of the lease agreement between Cresent Land and Timber Company and Alexander County. Included in this agreement is the legal description and conditions of the lease.

If you have any questions, please call.

Very truly yours,

HENNINGSON, DURHAM & RICHARDSON, INC.,
of North Carolina

By Daniel E. Dawson
Daniel E. Dawson, E.I.T.

DED/lg

STATE OF NORTH CAROLINA)
COUNTY OF ALEXANDER)

L E A S E



THIS LEASE, Made and entered into as of the 2 day of August, 1979, by and between CRESCENT LAND & TIMBER CORP., a corporation organized under the laws of the State of South Carolina, Lessor, and ALEXANDER COUNTY, North Carolina, Lessee:

W I T N E S S E T H :

That Lessor, for and in consideration of the rents to be paid and the covenants and agreements hereinafter expressed, to be kept and performed by Lessee, hereby leases to Lessee and Lessee hereby leases from Lessor upon the terms and conditions and for the purposes in this instrument set out, the property located in Millers Township, Alexander County, North Carolina, more particularly described on Exhibit A attached hereto.

1. Term: This lease shall begin on the First day of July, 1979, and shall terminate on the last day of June, 1989.

2. Rent: Lessee shall pay to Lessor for the period of July 1, 1979, through June 30, 1984, an annual rental of \$1,240.00, payable in advance on July 1 of each year.

On July 1, 1984, the annual rental to be paid for the remaining five (5) years of the lease term shall be adjusted to reflect any increase in the Consumer Price Index, Wage Earners and Clerical Workers (Revised), Southern Region, All Items, 1967 = 100, published by the United States Department of Labor, Bureau of Labor Statistics. The following formula shall be used:

$$\frac{\text{Consumer Price Index-Year of Adjustment}}{\text{Base Consumer Price Index}} \times \text{Base Rent } (\$1,240)$$

The Base Consumer Price Index shall be established as the last index published prior to July 1, 1979. The index to be used in the year of

adjustment shall be the most recent index published prior to July 1, of the adjustment year. If the Consumer Price Index hereinabove set forth is discontinued and no similar index is substituted therefor, in that event the most nearly comparable index issued by the United States Government or any agency thereof with respect to consumer prices shall be used hereunder. In no event shall the minimum annual rental payable hereunder be less than \$1,240.00 per annum after July 1, 1984.

3. Permitted Uses: The leased premises shall be used by the Lessee for a sanitary landfill and for no other purpose without the prior written consent of the Lessor.

4. Entry by Lessor: Lessor, its agents and representatives, at all reasonable times may enter said property to examine same and any such entry by or on behalf of Lessor shall not be or constitute an eviction, partial eviction, or deprivation of any right of Lessee and shall not alter the obligations of the Lessee hereunder or create any right in Lessee adverse to the interests of Lessor.

5. Transfer or Assignment: The Lessee may not transfer nor assign this lease nor let nor sublet the whole or any part of the leased premises to anyone without the prior written consent of the Lessor.

6. Power Line Easement: Lessor reserves to Duke Power Company, its successors and assigns, an easement to build, construct, maintain and operate electric power lines on, over, along and above the leased premises. Lessor also reserves to Duke Power Company, its successors and assigns, the right, privilege and easement to erect, construct, reconstruct, replace, maintain and use towers, poles, wires, lines, cables and all necessary and proper foundations, footings, crossarms, and other appliances and fixtures for the purpose of trans-

mitting electric power and for said Power Company's communication purposes, together with a right of way.

7. Fires Forbidden: The Lessee will not ignite fires nor allow any fires on the demised premises. Lessee will extinguish all fires on the demised premises regardless of where or how the fire originates.

8. Erosion: Lessee shall operate the landfill in such a manner as to avoid erosion of the leased premises onto the property of others or onto other property of Lessor. Without limiting the generality of the preceding sentence, Lessee shall take particular care to avoid water or lake siltation.

9. Condition of Premises: As the premises are used for landfill purposes, area by area, each completed area will be properly leveled and contoured together with such terracing as is necessary for erosion control and properly sowed in Kentucky Fescue 31 Grass during the appropriate sowing season(s), with the application of 2,000 pounds of lime and 500 pounds of 10-10-10 fertilizer per acre. An area will be properly seeded and reseeded until such time as a good stand of Kentucky Fescue 31 Grass is established. All grassed areas of the landfill will be annually fertilized using 500 pounds of 10-10-10 fertilizer per acre. By the end of the lease term Lessee shall have established a good stand of Kentucky Fescue 31 Grass on such portion of the entire premises as shall have been used for landfill purposes and such portion shall have been properly leveled and contoured together with such terracing as is necessary for erosion control. In addition to the foregoing, Lessee shall take all actions of restoration and/or conservation as are now or may be in the future required by any applicable law or regulation. At the end of the lease term, Lessee shall post conspicuous signs in prominent places stating "Dump is Closed."

10. Illegal Uses: Lessee will not make nor permit to be made any illegal use of the leased premises, nor any use thereof constituting a public nuisance, and shall comply with all applicable rules and regulations of any governmental or health authorities. The Lessee covenants and agrees to comply with all Federal, State, County and Municipal laws, rules and regulations as they now exist or may hereafter be enacted relating to the operation of the premises including but not limited to the rules and regulations of the Department of Solid Waste and Vector Control of the North Carolina Division of Health Services and will commit no act or acts which will render the Lessor liable therefor. All facilities shall be operated only with the approval of the applicable governmental authority.

11. Sanitation: The Lessee covenants that it will not permit the leased premises to become a hazard to health or a nuisance. The Lessee shall be solely responsible for the covering and backfilling of such garbage, waste or refuse that shall be dumped thereon and Lessee will insure that such covering and backfilling is done in a proper manner. Garbage and rubbish is to be compacted and covered as required by applicable law and/or regulation but in no event less often than twice weekly. Haul roads into the landfill and all other property of the Lessor adjacent to the landfill are to be kept free of garbage and solid waste which might accumulate as a result of hauling operations.

12. Buildings: The Lessee shall not build or construct any buildings or other improvements of any nature on the demised premises without Lessor's prior written consent. Lessor's consent is hereby given for construction of the following: Attendant booth, supply trailer, fence, road, well, equipment shed, and scales.

13. Taxes and Assessments: The rentals received herein are net of all taxes. Lessee shall pay when due all taxes or assess-

ments of any kind which could become a lien against the subject property, including but not limited to all personal property and ad valorem taxes both on the leasehold improvements and on the fee ownership of Lessor. Lessee shall list and return in its name for tax and assessment purposes any structure(s) or other improvement(s) owned by Lessee on the subject property. Lessee shall furnish Lessor copies of paid receipts for all said taxes and assessments on or before the 30th day of November of each year.

14. Indemnity: Lessee will indemnify and save harmless Lessor, its successors and assigns, from and against any and all claims arising from any conduct, management, operation, work or thing done in or about the leased premises or any building, structure or equipment thereon during the period of this lease, or arising from any act or failure to act by Lessee, his agents, contractors, employees or sub-lessees, or arising from any accident, injury or damage whatsoever, however caused to any person or persons or to the property of any person, persons, corporation or corporations during the period of this lease, on, in or about the leased premises, and from and against all costs, counsel fees, expenses, liabilities and damages incurred in or about such claim or any action or proceeding brought thereon, and in case any action or proceeding be brought against Lessor, its successors or assigns, by reason of any such claim, Lessee on notice from Lessor, shall resist and defend such action or proceeding by counsel satisfactory to Lessor. Lessee hereby waives all claims against Lessor for damages to the building and improvements that are now on or hereafter placed or built on the premises and to the property of Lessee in, on, or about the premises, and for injuries to persons or property in or about the premises, from any cause arising at any time during the term hereof. In order to assure Lessor the performance of this indemnity agreement, Lessee shall

carry and furnish evidence satisfactory to Lessor of the existence of public liability insurance, with limits on bodily injury of not less than \$100,000/\$300,000, and property damage of not less than \$50,000/\$100,000, naming Lessor as an additional insured in such insurance policy or policies.

15. Surrender of Lease: The voluntary or other surrender of this lease by Lessee, or a mutual cancellation thereof, shall not work a merger, and shall, at the option of Lessor, terminate all or any existing subleases or subtenancies or may, at the option of Lessor, operate as an assignment to it of any or all such subleases or subtenancies.

16. Termination and Waiver: It is expressly agreed and understood that the violation of any of the covenants, conditions, terms or provisions of this agreement by Lessee, including but not limited to, nonpayment of rent or noncompliance with health and sanitation laws or regulations shall terminate this lease at the option of the Lessor. This lease may also be terminated by the Lessor, if at any time during the duration of this lease (or any renewal thereof) the Lessee should be adjudged bankrupt or insolvent by any federal or state court or the Lessee shall allow a final judgment obtained against it to remain unpaid for a period of sixty (60) days. Failure of Lessor to exercise any of said rights relating to the termination of this lease or any other rights of Lessor under this agreement, shall not be construed as a waiver or abandonment of the right thereafter to exercise any or all of same. In the event that the Lessor terminates this lease under any of the above written conditions, the Lessor may enter the leased premises and expel the Lessee therefrom or the Lessor may in lieu thereof, or in conjunction therewith, pursue any other lawful right or remedy incident to the relationship created by this lease.

17. Notices: Wherever in this lease it shall be required or permitted that notice be given by either party to this lease to the other, such notice must be in writing and must be given personally or forwarded by certified mail addressed as follows:

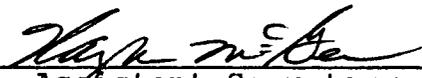
1. To Lessor: Crescent Land & Timber Corp.
P. O. Box 30817
Charlotte, North Carolina 28230
2. To Lessee: Alexander County Board of Commissioners
P. O. Box 546
Taylorsville, North Carolina

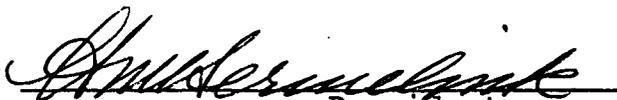
Such addresses may be changed from time to time by notice given hereunder.

IN WITNESS WHEREOF, the parties hereto have executed this agreement in duplicate as of the day and year first above written.

ATTEST:

CRESCENT LAND & TIMBER CORP.

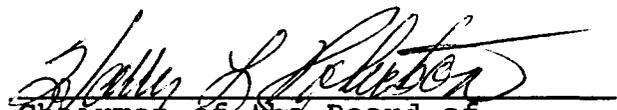

Assistant Secretary

By 
President

ATTEST:

ALEXANDER COUNTY


Clerk of the Board of Alexander
County Commissioners

By 
Chairman of the Board of
Alexander County Commissioners

STATE OF NORTH CAROLINA

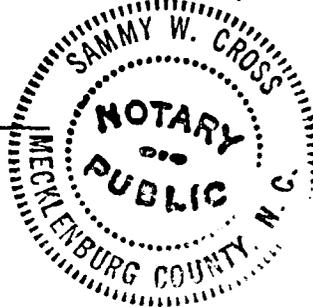
COUNTY OF MECKLENBURG

I, SAMMY W. CROSS, a Notary Public for the above State and County, hereby certify that WAYNE MCGEE personally came before me this day and acknowledged that he is ASST. Secretary of CRESCENT LAND & TIMBER CORP., a corporation, and that by authority duly given and as the act of said corporation, the foregoing and annexed instrument was signed in its name by H.M. HERMELINK, its _____ President, sealed with its corporate seal and attested by himself as its ASST. Secretary.

WITNESS my hand and official seal, this the 7TH day of AUGUST, 1979.

Sammy W. Cross
Notary Public

My Commission Expires 8-6-81



STATE OF NORTH CAROLINA

COUNTY OF ALEXANDER

I, Betty Jo Keller, Deputy, a Notary Public for the above State and County, do hereby certify that Martha Caldwell, Clerk of the Board of Alexander County Commissioners, this day personally came before me, and being by me duly sworn, says that he knows the Common Seal of the Board of Alexander County Commissioners and is acquainted with Harry L. Robertson who is Chairman of the Board of Alexander County Commissioners, and that he, the said Clerk of said Board, is the Clerk of the said Board of Alexander County Commissioners and that he saw the said Chairman sign the foregoing instrument and that he, the said Clerk of the Board of Alexander County Commissioners, affixed said seal to said instrument, and that he, the said Clerk of said Board, signed his name in attestation of the execution of said instrument in the presence of the said Chairman of the Board of Alexander County Commissioners.

WITNESS my hand and official seal, this the 29 day of

August, 1979.

Betty Jo Keller, Deputy
Notary Public
Clerk of Superior Court

My Commission Expires _____

August 28, 1979

Mr. Daniel E. Dawson
Henningson, Durham & Richardson,
Inc. of N.C.
6230 Fairview Road
Post Office Box 11257
Charlotte, North Carolina 28220

Dear Mr. Dawson:

For our telephone conversation of August 24, 1979, enclosed is a copy of the proposed Alexander County landfill plan. Please find comments on Page 16. Also needed is a legal description of the property (See Section .0110(12)). *JWVC*

Call me when you have reviewed the comments.

Yours truly,

J. Gordon Layton, Environmental Engineer
Solid & Hazardous Waste Management Program
Sanitary Engineering Section

JGL:bm
cc: Mr. Robert M. Apple

August 21, 1979

CLL F

Mr. Daniel E. Dawson
Henningson, Durham & Richardson, Inc. of N.C.
6230 Fairview Road
Post Office Box 11257
Charlotte, North Carolina 28220

Dear Mr. Dawson:

A preliminary review of the operational plan for the Alexander County Landfill has been completed and the following comments are made:

1. The plan cannot be approved as submitted. *DW & DC*
2. Design is not continuous in regard to operation.
3. Side slopes are too long - 70 feet plus.
4. Volume of potential fill is not utilized to best advantage (3:1 side slopes are used instead of 2:1, and voids are left where fill could go.) Peaks are too extreme.
5. Slope drains and bench terraces with 10-foot set back or equivalent measure to be utilized.
6. Also, a legal description should be submitted with the plans.

In summary, the final design of the plan has been tried in the past and shown not to work. Running water down slopes for long distances may work in theory but it is not practical on the fill area.

I will be available to discuss this at your convenience.

Yours truly,

J. Gordon Layton
Environmental Engineer
Solid & Hazardous Waste Management Program
Sanitary Engineering Section

JGL:ns

cc: Mr. Robert M. Apple

HDR

6230 Fairview Road
Box 11257
Raleigh, NC 27620
(704) 364-1800

Henningson, Durham & Richardson, Inc. of North Carolina

5

August 2, 1979

Mr. Bill Meier
Division of Health Services
Department of Human Resources
P.O. Box 2091
Raleigh, NC 27602

Dear Mr. Meier:

I am submitting in person four copies of the Alexander County Sanitary Landfill Plan and Narrative for operational plan approval. On behalf of Alexander County, we request that this site be given your approval for use as a sanitary landfill.

If you have any questions please do not hesitate to call.

Very truly yours,

HENNINGSON, DURHAM & RICHARDSON, INC.,
of North Carolina

By *Daniel E. Dawson*
Daniel E. Dawson, E.I.T.

lg

Enclosure

CC: Jim Varner
Alexander County Administrator



STATE OF NORTH CAROLINA
DEPARTMENT OF HUMAN RESOURCES

JAMES B. HUNT, JR.
GOVERNOR

HUGH H. TILSON, M.D.
DIRECTOR

SARAH T. MORROW, M.D., M.P.H.
SECRETARY

Division of Health Services

WESTERN REGIONAL OFFICE
WESTERN NORTH CAROLINA SANITORIUM
BUILDING 3
BLACK MOUNTAIN, N.C. 28711

July 30, 1979



Mr. Jim Varner
Alexander County Manager
Old Jail Building
Taylorsville, N.C. 28681

Re: Solid Waste Collection and Disposal
Alexander County

Dear Jim:

This letter is written in reference to the Solid Waste Collection and Disposal Program of Alexander County.

Mr. Ned Herman is to be commended for his efforts to provide a comprehensive program for solid waste collection within Alexander County. I am sure that the residents of the County appreciate the efforts of Mr. Herman to maintain sanitary container sites throughout Alexander County. I believe that in the past few months Alexander County has made much progress towards collection and disposal of solid waste and I look forward to the continued improvement of the program as development of a new county landfill progresses.

It is important that, during the period of time between today and the ultimate closure date of the present landfill, we must emphasize operating the landfill according to State Solid Waste Regulations. As you know from our conversations of July 12 and July 27, 1979, at the present time the Alexander County Landfill is operating in violation of several solid waste standards. I have enclosed a copy of the inspection of July 27 for your review. Please note the absence of six inches of daily cover and control of surface drainage. In my opinion, proper compaction and daily covering of solid waste along with confining of the working face

of the Landfill, would satisfy the six-inch depth requirement and would also improve surface drainage. This control of surface drainage would also reduce leachate production. It is important that confining, compacting and daily covering of solid waste begin immediately.

I would also suggest that the County begin discussing closure of the present Landfill. Based upon observations of the landfill, potential problems encountered during closure might include:

1. Providing a minimum of two feet of soil over all landfilled areas.
2. Establishment of vegetative covers on the Landfill surface and side slopes (I would suggest that you contact the local Solid Conservation Service Representative for appropriate recommendations regarding vegetation and erosion control.
3. Control of surface water runoff (this can be accomplished through a series of berms, terraces and piping of rain-water runoff down side slopes.

Once again, I would like to compliment the County on the improvements which have been and are continuing to be made in the solid waste program. I look forward with you to the future operation of the new county landfill and to the continued success of the county-wide collection program.

If I can be of any assistance or should you have any questions regarding this letter, please notify me.

Sincerely,

Robert M. Apple
District Sanitarian
Solid Waste and Vector Control

RMA/mr

July 5, 1979

Mr. Jimmy M. Varner
P. O. Box 546
Taylorsville, NC 28681

Dear Mr. Varner:

The report of the subsurface investigation for the proposed Alexander County Landfill has been reviewed and approved with the following comments:

JWT
Additional soil borings may be required if measured conditions i.e. rock outcrops, static water levels, and volume and quality of earth materials deviate significantly from construction and operational conditions.

If we can be of further assistance, please contact this office.

Respectfully,

William L. Mayer, Environmental Engineer
Solid & Hazardous Waste Management Program
Sanitary Engineering Section

WLM:nts
Attachment

cc: Mr. Bob Apple

HDR

Henningson, Durham & Richardson, Inc. of North Carolina

6230 Fairview Road
Box 11257
Raleigh, NC 28220
(704) 364-1800

June 14, 1979

Mr. Bill Meier
Division of Health Services
Department of Human Resources
P. O. Box 2091
Raleigh, North Carolina 27602

Dear Mr. Meier:

Per our conversation today, I am enclosing four copies of the "Information for Solid Waste Disposal Site Approval - Alexander County." On behalf of Alexander County, we request that this site be given your approval for use as a sanitary landfill.

If you have any question, please do not hesitate to call.

Very truly yours,

HENNINGSON, DURHAM & RICHARDSON, INC.,
of North Carolina

By Daniel E. Dawson
Daniel E. Dawson, E. I. T.

lpw

Enclosure



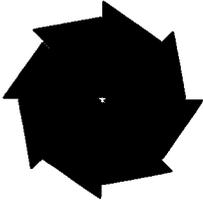
INFORMATION FOR SOLID
WASTE DISPOSAL SITE
APPROVAL - ALEXANDER COUNTY



- (1) A topographic map or survey of the site is enclosed.
 - (a) The entire property is to be leased by Alexander County from Crescent Timber Company. *AWTC*
 - (b) All land use within one-fourth mile of the disposal site is agricultural.
 - (c) The location of all homes, industrial buildings, public or private utilities, and roads, are shown on the vicinity map.
 - (d) The location of wells, watercourses, dry runs, rock outcroppings and other applicable details regarding the general topography are shown on the vicinity map.

- (2) The soils report sent to you on 5/29/79 should provide sufficient information for an evaluation of subsurface conditions that exist at the site. The data includes:
 - (a) The results of sufficient soil borings to provide geological data of the area planned for the proposed sanitary landfill. The soil borings are accurately plotted relative to the boundaries of the proposed operational area.
 - (b) A stone on one of the eastern corners has been established as a bench mark that will not be destroyed during landfill development. From this bench mark, the ground elevation of each individual boring has been determined and plotted.
 - (c) The soil borings extend ten feet below the lowest proposed excavation with at least one boring near the lowest elevation of the planned operational area. The number of borings were dictated by soil conditions.
 - (d) A log of the soil borings describing the soil types and classifications is included in the soils report. Boring profiles were plotted which coincide with operational cross-sectional drawings as much as possible. A copy of this was sent to you on 5/21/79.
 - (e) Groundwater elevations at the time of boring and 24 hours later are included in the soils report, along with other pertinent geological information.

- (f) A geologic report concerning solution features, landslides, creep, other slope instability, or other geologic hazards which may be associated with the site when needed is included in the soils report.
 - (g) Analysis of the ground water to depict the natural quality of the groundwater of the proposed disposal site area is to be conducted at the later date.
- (3) There will be no borrowed materials brought onto the site.



North Carolina Department of Natural Resources & Community Development

James B. Hunt, Jr., Governor

Howard N. Lee, Secretary

DIVISION OF ENVIRONMENTAL MANAGEMENT

June 1, 1979



Mr. Bill Meyer
Solid & Hazardous Waste Management
N. C. Department of Human Resources
Post Office Box 2091
Raleigh, North Carolina 27602

Subject: Proposed Landfill Site
S. R. 1620
Alexander County

Dear Bill:

I have visited the above proposed landfill site with Mr. Bob Apple of your Department and I have reviewed the Report of Subsurface Exploration submitted by Law Engineering and Testing Company. The following are my preliminary comments on the proposal.

When considering the depth to the water table as an excavation depth limit, the fact that no groundwater was encountered in several of the boreholes should not be used as a basis for planning excavation to the total depth of the borehole. The present water table elevation may be near the elevation of the bottom of the borehole. For example, borehole B-1 was taken to a depth of 30 feet and the groundwater-table was not encountered. It is my opinion that excavation in this case should probably not be allowed to a depth of 30 feet at this point. If the depth to the water table is not determined at a point, I believe we will have to assume the water table is within one or two feet of the bottom of the borehole, and the excavation depth should be designed from that water table elevation.

As part of our Department's water level monitoring program we have been measuring the depth to water in a nearby water table well in Alexander County. During our period of record (1974 to present), the water level in this well has fluctuated approximately 5.5 feet. The measured high was 36.3 feet below land surface in July, 1975 and the low was 42.3 in November, 1976. The water levels measured in March, 1979 was 41.3 feet below land surface. The water levels measured in March at the landfill site were probably also at a water table low. I believe it would be reasonable to expect future water table elevations approximately 4 feet higher than those measured.

Mr. Bill Meyer
Page Two
June 1, 1979

If this Office can be of any further assistance, please contact us.

Sincerely,



Michael R. Groves
Hydrologist

MRG:sju

cc: Mr. Bob Apple
Mr. Daniel Danson



PRELIMINARY

JUN 18 1979

HDR Henningson, Durham & Richardson
 Engineers • Architects • Planners
 Charlotte, North Carolina

VICINITY MAP

ALEXANDER COUNTY SANITARY LANDFILL
 ALEXANDER COUNTY, NORTH CAROLINA

DESIGNED BY :

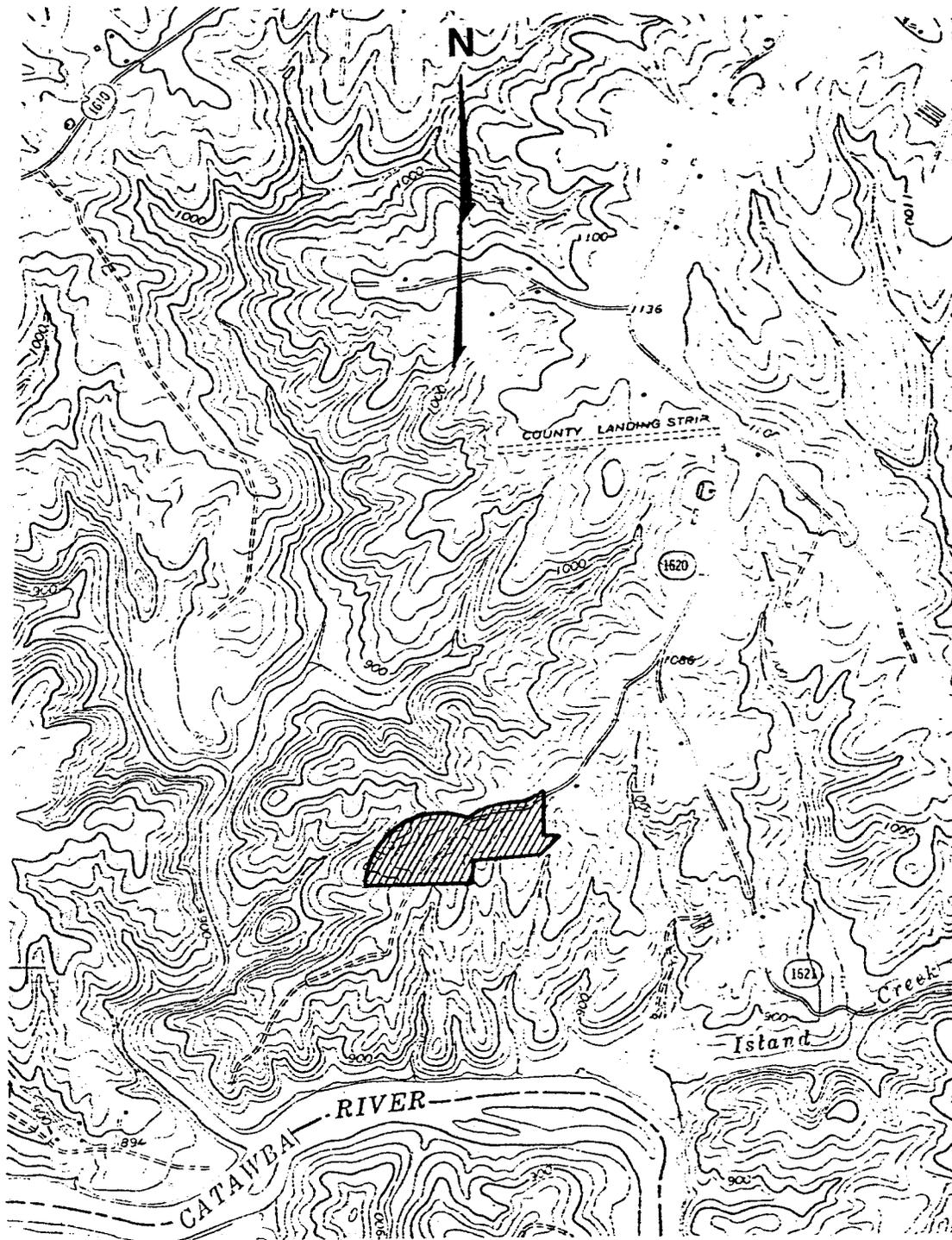
DATE : JUNE , 1979

DRAWN BY : R.C.H.

SCALE : 1" = 2000'

JOB NO : 173-01-18

DWG. NO :



PRELIMINARY
 JUN 18 1979

HDR Henningson, Durham & Richardson
 Engineers • Architects • Planners
 Charlotte, North Carolina

VICINITY MAP

ALEXANDER COUNTY SANITARY LANDFILL
 ALEXANDER COUNTY, NORTH CAROLINA

DESIGNED BY:
 DRAWN BY: R.C.H.

DATE: JUNE, 1979
 SCALE: 1" = 2000'

JOB NO: 173-01-18

DWG. NO:



PRELIMINARY

JUN 18 1979

HDR

Herrington, Durham & Richardson
 Engineers • Architects • Planners
 Charlotte, North Carolina

VICINITY MAP

ALEXANDER COUNTY SANITARY LANDFILL
 ALEXANDER COUNTY, NORTH CAROLINA

DESIGNED BY :

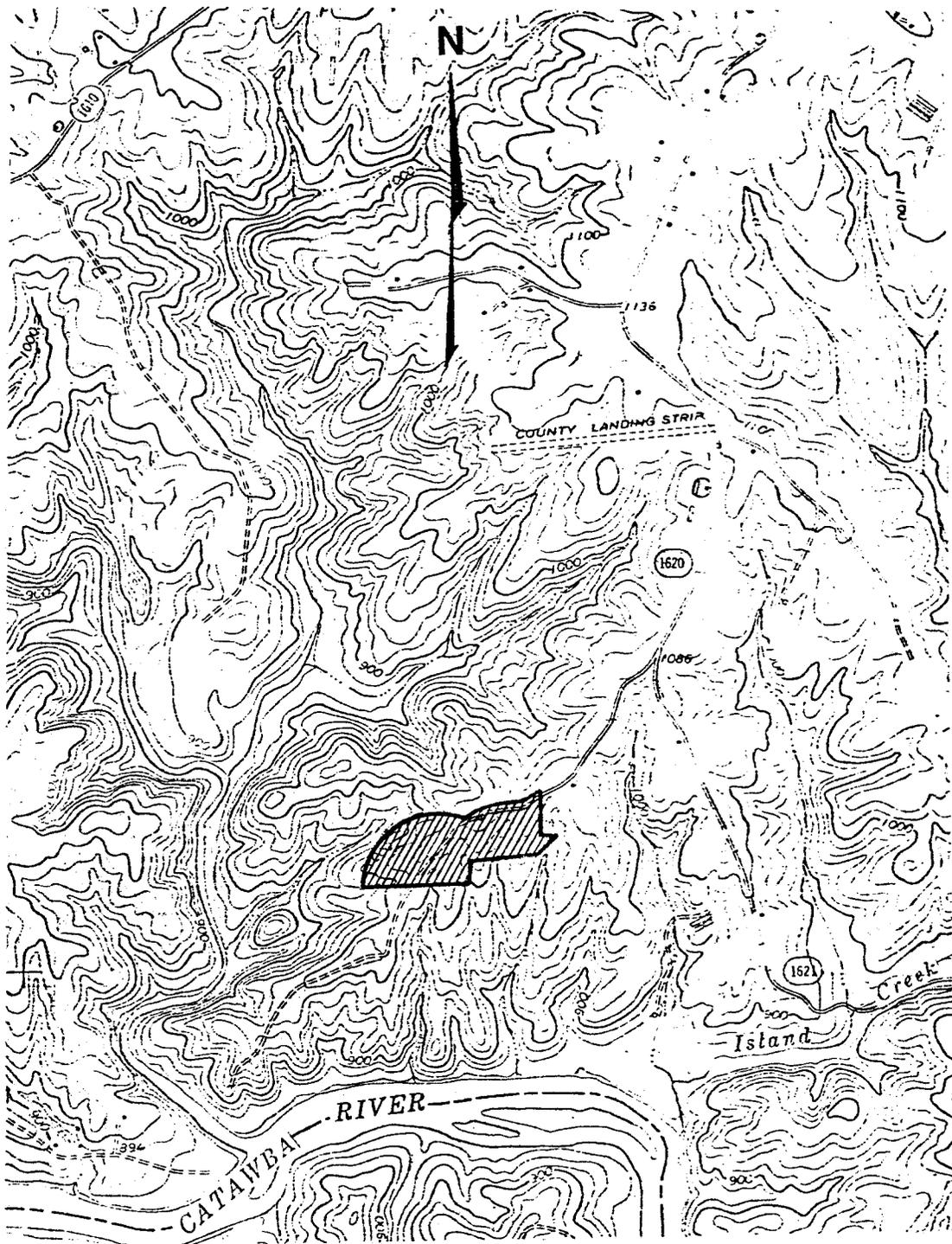
DATE : JUNE , 1979

DRAWN BY : R.C.H.

SCALE : 1" = 2000'

JOB NO : 173-01-18

DWG. NO :



PRELIMINARY
JUN 18 1979

HDR Henningson, Durham & Richardson
Engineers • Architects • Planners
Charlotte, North Carolina

VICINITY MAP

ALEXANDER COUNTY SANITARY LANDFILL
ALEXANDER COUNTY, NORTH CAROLINA

DESIGNED BY :

DATE : JUNE , 1979

DRAWN BY : R.C.H.

SCALE : 1" = 2000'

JOB NO : 173-01-18

DWG. NO :

Alexander County Sanitary Landfill

Alexander County is in urgent need of this sanitary landfill. All available cover material at the existing landfill has been exhausted and a new landfill has to be opened immediately.

Located in Western North Carolina, Alexander County's present population is estimated to be 23,800 people. The population for the County has been projected to reach 29,000 by 1990. At present the County is generating 380-400 tons of solid waste per year. The classifications of the solid waste materials are as follows:

Residential	- 52%
Commercial	- 10%
Industrial	- 28%
Miscellaneous	- 10%
	<u>100%</u>

The sanitary landfill site consists of 25 acres leased from Crescent Timber Company to the County. Recently the majority of the timber on the site has been harvested, and except for 2-3 acres which has not been harvested, the site is covered only by vines and small trees.

By use of diversion ditches, see sheet 15 and attachment #1, the twenty-five acre site can be divided into distinct watersheds - a 15 acre watershed and a 10-acre watershed. To control the volume of sedimentation leaving the site, two sedimentation basins are to be simultaneously constructed on the site. The two basins each have different watershed characteristics. The first basin requires a 60-inch diameter pipe or two 42-inch diameter pipes while the second basin requires a 48-inch or two 36-inch diameter pipes. To reduce the costs of these sedimentation control measures, only one watershed will be operated at a time. The larger pipe assembly will be used in both basins. The design calculation for the basins are included in attachments #2 and 3. All side slopes will have slopes of 3 lengths horizontal to length vertical or flatter. Lateral dikes and swales were considered for use on the side slopes but were determined to be unnecessary. Within 30 days of final grading, the surfaces will be fertilized, seeded and mulched as described on sheets numbered 5, 10 and 14. Upon completion of the sanitary landfill, in approximately 10-11 years, all erosion control facilities will be removed.

The sanitary landfill operations will begin in basin number one's watershed with the trench excavation of cell #1. The material from this cell will be used to construct sedimentation basin #1. Once cell #1 is excavated, soil from cell #2 will be excavated and utilized as 6-inch daily and 2-foot final cover material in cell #1. When cell #1 is filled, it and part of cell #2 will be covered and used as a stockpile area for soil excavated from cells 2-6. The cells will be filled by the area method beginning near SR 1620. As the stockpile is exhausted, the southern portion of cells 2-6 will be filled, Cell #7 will be area filled by excavating and filling with the same material. Once filled, cell #7 will be covered by a stockpile of cover material from the excavation of cells 8-16. When all stockpile material has been used

as daily and final cover material in the area-filled cells, the sedimentation basin will be excavated and the pipe and riser relocated to construct the second sedimentation basin. Material excavated from cell #17 will be used to construct the second basin. Once trench filled, cell #17 and part of cell #18 will be covered by a stockpile of cover materials from the excavations of cells 18-25. These cells will be filled from north to south by the area-filled method. A minimum of 2-feet of final cover, over the solid waste is planned.

The landfill will have a fence along S.R. 1620 with two locking gates so that illegal and after hours dumping will be prevented. A maintenance building is planned at the end of the road. Three monitoring wells are to be constructed as the area around them are filled. As different areas are opened for sanitary landfilling, necessary site roads will be constructed as shown on sheet #15.

The sanitary landfill will be equipped with a 9 cubic yard Wabco 101-F elevating scraper, a Fiat Allis 14B tractor with a 3.5 cubic yard bucket and a ripper and a Trashmaster 350 compactor. Mr. Ned Herman is the supervisor and will be in charge of the operation and maintenance of the site.

ATTACHMENT # 1



PROJECTS ALEXANDER COUNTY SANITARY LANDFILL

SUBJECT EROSION CONTROL

COMPUTED DED CHECKED _____ DATE 7/25/79 PAGE _____ OF _____

MAXIMUM DRAINAGE AREA (A) = 10 ACRES

RUNOFF COEFFICIENT (C) = 0.6

RAINFALL INTENSITY (i) = 7.0 INCHES / HR

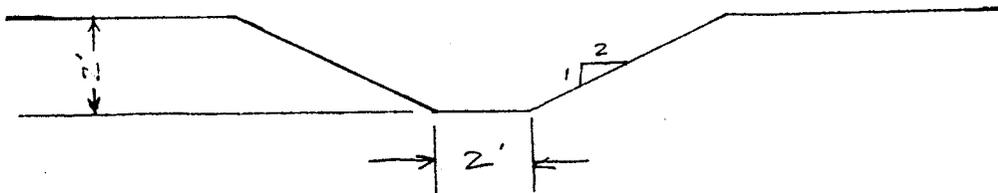
DISCHARGE (Q) = C i A = 42 CFS

MAXIMUM VELOCITY (V) = 7.75

MINIMUM CHANNEL CROSS-SECTIONAL AREA = $Q \div V = 105 \text{ SQ FT}$

SIDE SLOPE = 2:1

n = .022



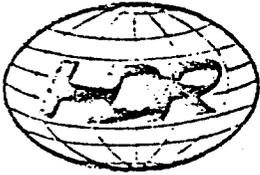
$$A = B(y) + M(y^2) = 12 \text{ SQ. FT.}$$

$$\frac{D}{b} = \frac{2}{2} = 1$$

K = 2.99 PAGE 7-35 KING + BRATTON TABLE 7-10

$$S = \left(\frac{Q(n)}{D^{5/3} K} \right)^2 = \left(\frac{(42)(.022)}{(2)^{5/3} (2.99)} \right)^2 = .002' / 1'$$

ATTACHMENT #2



PROJECTS ALEXANDER COUNTY SANITARY LANDFILL
 SUBJECT EROSION CONTROL
 COMPUTED DED CHECKED _____ DATE 7/25/79 PAGE _____ OF _____

SEDIMENTATION BASIN #1

RETURN PERIOD = 10 YRS

DRAINAGE AREA (A) = 18 ACRES

RUNOFF COEFFICIENT (C) = 0.6

RAINFALL INTENSITY (i) = 70 INCHES / HR

DISCHARGE (Q) = C i A = 76 CFS

STORAGE = 0.5 INCHES X 18 ACRES X $\frac{1 \text{ FT}}{12 \text{ INCHES}}$ = 1.2 AC-FT

BASE ELEVATION = 1015'

TOP OF DAM = 1030'

SEDIMENTATION BASIN VOLUME = 31,750 CU-FT, \approx 1.2 AC-FT

STAGE	STORAGE
1015'	0 CU-FT
1020	9000
1025	31,750
1030	74,500

PIPE(S) LENGTH = 75'

MAXIMUM DISCHARGE VELOCITY (V) = 4 FT/S

MINIMUM CROSS-SECTIONAL AREA (A) = $Q \div V = \frac{76}{4} = \underline{19.0}$ SQ FT

1 - PIPE : DIAMETER = 60 INCHES

2 - PIPES : DIAMETER = 42 INCHES

SLOPE = .003 FT/FT, n = 0.024

INLET INVERT = 1017.23'

OUTLET INVERT = 1017.00'

NOTE: $S = \left[\frac{Q_n}{\left[\frac{D}{16} \right]^{8/3}} \right]^2$

ATTACHMENT #3



PROJECTS ALEXANDER COUNTY SANITARY LANDFILL
 SUBJECT EROSION CONTROL
 COMPUTED DED CHECKED _____ DATE 7/25/79 PAGE _____ OF _____

SEDIMENTATION BASIN #2

RETURN PERIOD = 10 YRS

DRAINAGE AREA (A) = 10 ACRES

RUNOFF COEFFICIENT (C) = 0.6

RAINFALL INTENSITY (i) = 70 INCHES / HR

DISCHARGE (Q) = C i A = 42 CFS

STORAGE = 0.5 INCHES X 10 ACRES X $\frac{1 \text{ FT}}{12 \text{ INCHES}}$ = 0.42 AC-FT

BASE ELEVATION = 965 ',

TOP OF DAM = 980

SEDIMENTATION BASIN VOLUME = 27,500 CU-FT, \approx 0.63 AC-FT

STAGE	STORAGE
965'	0 CU-FT
970	4,250
975	12,250
980	27,500
985	51,500
990	77,250

PIPE(S) LENGTH = 75 '

MAXIMUM DISCHARGE VELOCITY (V) = 4 F/S

MINIMUM CROSS-SECTIONAL AREA (A) = $Q \div V =$ 10.5 SQ FT

1 - PIPE : DIAMETER = 48 - INCHES

2 - PIPES : DIAMETER = 36 - INCHES

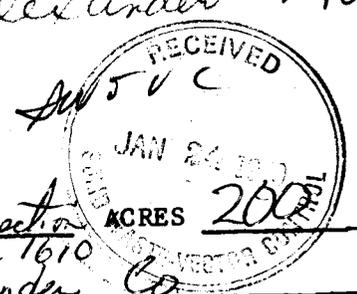
SLOPE = .003 FT/FT, n = 0.024

INLET INVERT = 965.00 '

OUTLET INVERT = 964.78 '

N. C. DEPARTMENT OF HUMAN RESOURCES
 DIVISION OF HEALTH SERVICES
 CHECK-OFF SHEET FOR PROPOSED SANITARY LANDFILL SITES

Alexander 10



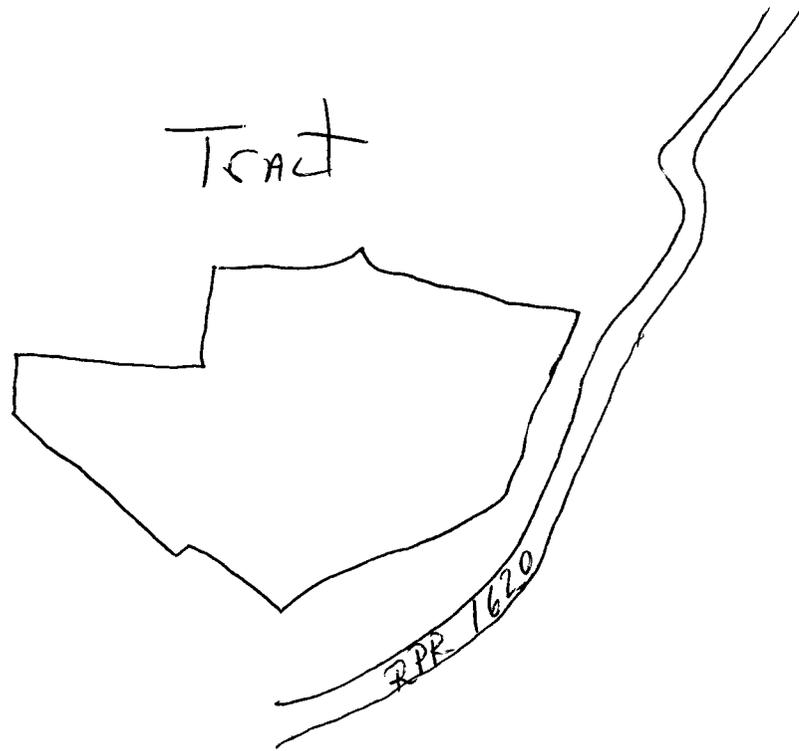
COUNTY Alexander LOCATION RR 1620, 1.8 miles S. of intersection with 1610
 PROPERTY OWNER Bowater Corp. PROPOSED OPERATOR Alexander Co.

1. Is this site within the boundaries of a public water supply watershed? Watershed _____ YES _____ NO
2. Does any portion of this site contain floodplain areas? YES _____ NO
3. Are there public or private wells nearby that could be affected? YES _____ NO
 Nearest well in feet _____ (Elaborate in Comments Section)
4. Are there springs present on the site? Number 2 on tract YES NO _____
none on possible site YES NO _____
5. Will this site require dyking? YES _____ NO _____
6. Will this site require piping of surface drainage? YES _____ NO _____
7. Not precluding required boring information, does this site have adequate cover material for the sanitary landfill development? YES _____ NO _____
8. Will this site require diversion of surface water? YES NO _____
 Receiving stream for surface drainage from site _____
9. Will this site require extensive preparation, such as clearing? YES _____ NO _____
 (Elaborate in Comments Section) some clearing
10. Will this site require a new all-weather access road? YES _____ NO
 (Elaborate in Comments Section) approx. 1/2 mile
11. Evaluate the following:

	POOR	GOOD	EXCELLENT
A. Surface soil conditions as related to cover requirements	_____	<input checked="" type="checkbox"/>	_____
B. Location as related to population density	_____	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
C. Accessibility to users	_____	<input checked="" type="checkbox"/>	_____
12. Based on the observations made above and otherwise, do you recommend that the requestor proceed with the requirements of .0111 and .0112 of the Division of Health Services "Solid Waste Management Rules"? will request additional
OPINION OF SITE AT LATER DATE. YES _____ NO _____
13. COMMENTS: (Include any requirements noted by you for the sanitary landfill development and operation) This site is located immediately adjacent to property owned by Duke Power Co. (possibility of use of Duke Power property) Site has rolling terrain, NO impact on private water supplies
14. Number of borings recommended for a representative sampling of the site _____
15. Percent of usable land _____. Include sketch of site on back of this form.

1/15/77
 (DATE)

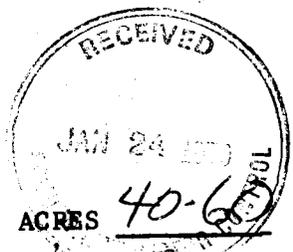
Robert J. Spivey
 Division of Health Services
 District Sanitarian for Solid Waste
 or
 Environmental Engineer



I will request that Bill Meyer visit all of the more favorable sites after Jim Varner (county mgr. of Alexander Co.) obtains permission on Duke Power Property for possible site location.

I walked over this site and noted property similar to the Wilkes Co. landfill site. The property consists of a depressed area between two ridges, no notable on site water, cover material present, no homes in the area, adjacent (approx. 1 mile) to Little River.

N. C. DEPARTMENT OF HUMAN RESOURCES
 DIVISION OF HEALTH SERVICES
 CHECK-OFF SHEET FOR PROPOSED SANITARY LANDFILL SITES



COUNTY Alexander LOCATION RPR 1415, 2 miles N. of 1411 ACRES 40.6
 PROPERTY OWNER Johnson PROPOSED OPERATOR Alexander Co.

1. Is this site within the boundaries of a public water supply watershed? Watershed _____ YES _____ NO
2. Does any portion of this site contain floodplain areas? YES _____ NO
3. Are there public or private wells nearby that could be affected? YES _____ NO
 Nearest well in feet _____ (Elaborate in Comments Section)
4. Are there springs present on the site? Number _____ YES _____ NO
5. Will this site require dyking? YES _____ NO _____
6. Will this site require piping of surface drainage? YES _____ NO _____
7. Not precluding required boring information, does this site have adequate cover material for the sanitary landfill development? YES _____ NO
8. Will this site require diversion of surface water? YES _____ NO _____
 Receiving stream for surface drainage from site _____
9. Will this site require extensive preparation, such as clearing? YES _____ NO
 (Elaborate in Comments Section)
10. Will this site require a new all-weather access road? YES NO _____
 (Elaborate in Comments Section)
11. Evaluate the following:

	POOR	GOOD	EXCELLENT
A. Surface soil conditions as related to cover requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Location as related to population density	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C. Accessibility to users	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Based on the observations made above and otherwise, do you recommend that the requestor proceed with the requirements of .0111 and .0112 of the Division of Health Services "Solid Waste Management Rules"? YES _____ NO

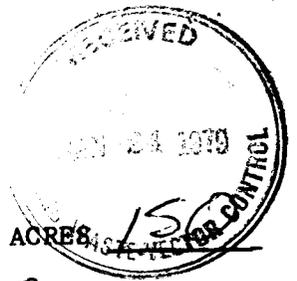
13. COMMENTS: (Include any requirements noted by you for the sanitary landfill development and operation) Site appears to be extremely Rocky. Stream at base of property. Terrain unfavorable for landfill; Heavy power lines cross middle of property.

14. Number of borings recommended for a representative sampling of the site _____
15. Percent of usable land _____. Include sketch of site on back of this form.

1/15/79
 (DATE)

Robert J. Apple
 Division of Health Services
 District Sanitarian for Solid Waste
 or
 Environmental Engineer

N. C. DEPARTMENT OF HUMAN RESOURCES
 DIVISION OF HEALTH SERVICES
 CHECK-OFF SHEET FOR PROPOSED SANITARY LANDFILL SITES



COUNTY Alexander LOCATION RPR 1711, approx. 1 mile N. of Taylorville ACRES 150
 PROPERTY OWNER Ferrings PROPOSED OPERATOR Alexander Co.

1. Is this site within the boundaries of a public water supply watershed? Watershed _____ YES _____ NO
2. Does any portion of this site contain floodplain areas? YES _____ NO
3. Are there public or private wells nearby that could be affected? YES NO _____
 Nearest well in feet on site (Elaborate in Comments Section)
4. Are there springs present on the site? Number 1 found YES NO _____
5. Will this site require dyking? YES NO _____
6. Will this site require piping of surface drainage? YES _____ NO _____
7. Not precluding required boring information, does this site have adequate cover material for the sanitary landfill development? YES _____ NO _____
8. Will this site require diversion of surface water? YES _____ NO _____
 Receiving stream for surface drainage from site _____
9. Will this site require extensive preparation, such as clearing? YES NO _____
 (Elaborate in Comments Section)
10. Will this site require a new all-weather access road? YES _____ NO _____
 (Elaborate in Comments Section)
11. Evaluate the following:

	POOR	GOOD	EXCELLENT
A. Surface soil conditions as related to cover requirements	<input checked="" type="checkbox"/>	_____	_____
B. Location as related to population density	_____	_____	<input checked="" type="checkbox"/>
C. Accessibility to users	_____	<input checked="" type="checkbox"/>	_____
12. Based on the observations made above and otherwise, do you recommend that the requestor proceed with the requirements of .0111 and .0112 of the Division of Health Services "Solid Waste Management Rules"?
Will Request additional opinions of site at later date. YES _____ NO _____
13. COMMENTS: (Include any requirements noted by you for the sanitary landfill development and operation) I would hesitate to answer all questions noted on form due to lack of experience evaluating proposed sites. Will Request Review From Raleigh Office.
14. Number of borings recommended for a representative sampling of the site _____
15. Percent of usable land _____ . Include sketch of site on back of this form.

1/15/79
 (DATE)

Robert J. [Signature]
 Division of Health Services
 District Sanitarian for Solid Waste
 or
 Environmental Engineer

N. C. DEPARTMENT OF HUMAN RESOURCES
 DIVISION OF HEALTH SERVICES
 CHECK-OFF SHEET FOR PROPOSED SANITARY LANDFILL SITES



COUNTY Alexander LOCATION RR 1165, 1 mile S intersection ACRES 25
 PROPERTY OWNER Charles Caldwell PROPOSED OPERATOR Alexander Co.

1. Is this site within the boundaries of a public water supply watershed? Watershed _____ YES _____ NO
2. Does any portion of this site contain floodplain areas? YES _____ NO
3. Are there public or private wells nearby that could be affected? YES _____ NO
 Nearest well in feet _____ (Elaborate in Comments Section)
4. Are there springs present on the site? Number _____ YES _____ NO _____
5. Will this site require dyking? YES _____ NO _____
6. Will this site require piping of surface drainage? YES _____ NO _____
7. Not precluding required boring information, does this site have adequate cover material for the sanitary landfill development? YES _____ NO
8. Will this site require diversion of surface water? YES NO _____
 Receiving stream for surface drainage from site _____
9. Will this site require extensive preparation, such as clearing? YES _____ NO _____
 (Elaborate in Comments Section)
10. Will this site require a new all-weather access road? YES NO _____
 (Elaborate in Comments Section)
11. Evaluate the following:

	POOR	GOOD	EXCELLENT
A. Surface soil conditions as related to cover requirements	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Location as related to population density	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
C. Accessibility to users	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Based on the observations made above and otherwise, do you recommend that the requestor proceed with the requirements of .0111 and .0112 of the Division of Health Services "Solid Waste Management Rules"? YES _____ NO

13. COMMENTS: (Include any requirements noted by you for the sanitary landfill development and operation) Terrain of site extremely unfavorable for site development. Property basically a depressed area between adjacent landowners. No cover material

14. Number of borings recommended for a representative sampling of the site _____
15. Percent of usable land _____. Include sketch of site on back of this form.

1/15/79
 (DATE)

Robert J. Apple
 Division of Health Services
 District Sanitarian for Solid Waste
 or
 Environmental Engineer

HENNINGSON, DURHAM & RICHARDSON

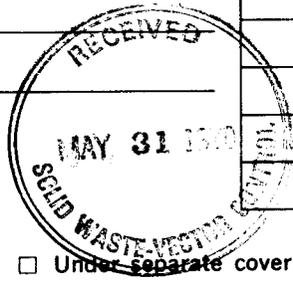
P.O. Box 11257
6230 Fairview Road
Charlotte, North Carolina 28209

LETTER OF TRANSMITTAL

11

DATE 5-29-79	JOB NO. 173-01-18
ATTENTION BILL MEIER	
RE: ALEXANDER CO L.F. DESIGN	

TO Mr. Bill MEIER
DIVISION OF HEALTH SERVICES
DEPT. OF HUMAN RESOURCES
P.O. Box 2091
RALEIGH, N.C. 27602



GENTLEMEN:

- WE ARE SENDING YOU Attached Under separate cover via _____ the following items:
- Shop drawings Prints Plans Samples Specifications
- Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
1			LAST TEN PAGES OF SOILS REPORT BY LET CO.

THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
- For your use Approved as noted Submit _____ copies for distribution
- As requested Returned for corrections Return _____ corrected prints
- For review and comment _____
- FOR BIDS DUE _____ 19 _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Daniel E. Dawson

If enclosures are not as noted, kindly notify us at once.

HENNINGSON, DURHAM & RICHARDSON

P.O. Box 11257
6230 Fairview Road
Charlotte, North Carolina 28209

LETTER OF TRANSMITTAL

DATE	5-21-79	JOB NO.	173-01-18
ATTENTION	MR. BILL MEIER		
RE:	ALEXANDER COUNTY		
	SANITARY LANDFILL		

TO DIVISION OF HEALTH SERVICES
P.O. Box 2091
RALEIGH, N.C. 27602

GENTLEMEN:

- WE ARE SENDING YOU Attached Under separate cover via _____ the following items:
- Shop drawings Prints Plans Samples Specifications
- Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
1			ZEROX OF U.S.G.S WITH APPROX SITE LOCATION
1			" " BOUNDARY SURVEY
1			PRINT " TOPOGRAPHIC "
1			PRINT " " " WITH CROSS-SECTIONS
1			PRINT CROSS-SECTIONS

THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
- For your use Approved as noted Submit _____ copies for distribution
- As requested Returned for corrections Return _____ corrected prints
- For review and comment PRELIMINARY SITE APPROVAL
- FOR BIDS DUE _____ 19 _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Don Dawson



LAW ENGINEERING TESTING COMPANY

Geotechnical and Materials Engineers

P.O. BOX 11297 / 501 MINUET LANE / CHARLOTTE, NORTH CAROLINA 28220 / (704) 523-2022

April 17, 1979



Alexander County
c/o Henningson, Durham and Richardson, Inc.
6230 Fairview Road, Suite 101
Charlotte, North Carolina 28210

Attention: Mr. Dan Dawson

Subject: Report of Subsurface Exploration
Alexander County Landfill Site (Proposed)
N.C. S.R. 1620
Alexander County, North Carolina
LETCo. Job No. CH 4257

Gentlemen:

As authorized by Mr. Dan Dawson of Henningson, Durham and Richardson, Inc., Law Engineering Testing Company has completed a subsurface exploration at the proposed sanitary landfill site. The purpose of our investigation was to generally determine the soil types, groundwater conditions and presence of any rock or very hard soils at selected locations in the area proposed for landfill. In addition, laboratory testing was performed to aid in classifying and evaluating the soils encountered at the site. This report describes the work performed and presents the results obtained, along with our general evaluation and comments.

FIELD INVESTIGATION

Soil Test Borings

Seven soil test borings and one additional offset boring were drilled at the site at the approximate locations shown on the attached Boring Location Plan which we prepared from the preliminary site plan furnished by Henningson, Durham and

Alexander County
LETCo. Job No. CH 4257
April 17, 1979

Richardson, Inc. The boring locations were selected and staked in the field by Mr. Dan Dawson of Henningson, Durham and Richardson, Inc. and representatives of Alexander County. These locations were shown on the furnished preliminary site plan. Ground surface elevations at the individual boring locations are not known at this time. We understand that a topographic survey of the site is presently being performed.

LABORATORY TESTING

Percent Fines

The percentage of fine-grained particles present in selected samples was determined by passing the samples through a number 200 mesh sieve. The percent by weight passing the sieve is the percentage of fines or portion of the sample in the silt and clay size range. This test was conducted in accordance with ASTM D-1140. The results are given on the attached Summary of Laboratory Test Data sheet.

Natural Moisture Content

Moisture content tests were performed on representative soil samples. These tests were performed in accordance with ASTM Specification D-2216. Results are presented on the Summary of Laboratory Test Data sheet.

Alexander County
LETCo. Job No. CH 4257
April 17, 1979

Soil Plasticity Tests

Representative samples of the upper fine-grained site soils were selected for Atterberg Limits testing to determine the soil plasticity characteristics. The soil's Plastic Index (PI) is representative of this characteristic and is bracketed by the Liquid Limit (LL) and the Plastic Limit (PL). The LL is the moisture content at which the soil will flow as a heavy viscous fluid and is determined in accordance with ASTM D-423. The PL is the moisture content at which the soil begins to lose its plasticity and is determined in accordance with ASTM D-424. The data obtained are presented on the attached Summary of Laboratory Test Data sheet.

SITE AND PROJECT INFORMATION

The proposed landfill site is located on N.C. S.R. 1620 in the southeastern portion of Alexander County, North Carolina, approximately 3,000 feet north of the Catawba River. Originally, the site was completely wooded. However, recent logging operations have removed trees over portions of the site. A dirt logging road, which is an extension of the gravel surfaced N.C. S.R. 1620, runs in a northeasterly direction through the central portion of the property. Initial development of the site will be east of this logging road in the area where our soil test borings were drilled. The ground surface over the site ranges from moderately steeply sloping over the majority of the site to steeply sloping in the vicinity of drainage features. Based on available approximate topographic information, it appears that the maximum elevation difference over the site is on the order of 60 to 70 feet.

Alexander County
LETCo. Job No. CH 4257
April 17, 1979

At the present time, no bottom elevation has been set for the proposed landfill. We understand that earth dikes will likely be required along the drainage features of the site prior to landfill operation.

The above project information was obtained from conversations with Mr. Dan Dawson of Henningson, Durham and Richardson, Inc., furnished preliminary drawings and a site inspection performed by our Mr. Jon Gould in the company of Mr. Dawson.

SUBSURFACE CONDITIONS

Alexander County is located in the Piedmont Physiographic Province of North Carolina, an area characterized by ancient igneous and metamorphic rocks. The virgin soils encountered in this area are the residual product of in-place chemical weathering of the underlying parent bedrock. The typical residual soil profile generally consists of clayey soils near the surface where soil weathering is more advanced, underlain by sandy silts and silty sands that generally becomes harder with depth to the top of parent bedrock. The boundary between soil and rock is not clearly defined; therefore, the transitional zone termed, "partially weathered rock" is defined, for engineering purposes as residual material with standard penetration resistances in excess of 100 blows per foot, but too soft for typical rock coring techniques. Weathering is facilitated by fractures, joints and by the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and hard

Alexander County
LETCo. Job No. CH 4257
April 17, 1979

rock is quite irregular and erratic, even over short horizontal distances. Also, it is not unusual to find lenses and boulders of hard rock and zones of partially weathered rock within the soil structure, well above the general bedrock level.

Quite often, the upper soils along drainage features are water-deposited (alluvial) materials that have eroded and washed down from adjacent higher ground. Where encountered, these soils are usually soft and compressible, having never been consolidated by pressures in excess of their present overburden.

From 1 to 2-1/2 ft of cut was required to provide a sufficiently level surface for drilling borings B-1 through B-4 and B-6. Thus, no topsoil was encountered in these borings or in boring B-7 which was located in the logging road roughly bisecting the property. Boring B-5 encountered approximately 4 inches of topsoil. Below the topsoil in boring B-5 and the ground surface at the other boring locations, residual soils resulting from the in-place chemical weathering of parent rock were encountered. The residual soils encountered by borings B-2 through B-7 to depths ranging from 3 to 9 ft typically consist of stiff to hard clayey silts and clayey sandy silts. The Unified Soil Classification of these soils based on limited laboratory testing and visual classification is MH or MH-CH. The upper residual soil encountered in boring B-1 to a depth of 3 ft was less clayey than the upper soils encountered elsewhere over the site and consists of very stiff sandy silt, which would classify as ML.

Alexander County
LETCo. Job No. CH 4257
April 17, 1979

Beneath the upper zone of typically clayey soils, the borings encountered firm to very dense silty sands containing scattered weathered rock fragments, which classify as SM according to the Unified Soil Classification System. The residual soils encountered by the soil test borings are typically micaceous with the mica content variable with both depth and location over the site.

Material hard enough to be termed "partially weathered rock" was encountered in all borings except B-1 at depths ranging from 4 ft in B-5 to 28 ft in B-7. The partially weathered rock encountered by the borings ranges in thickness from 1 ft thick lenses as found in boring B-6 to at least 27 ft as found in boring B-5. Refusal to the soil drilling equipment was encountered in boring B-3 at a depth of 23.5 feet. Offset boring B-3A was drilled approximately 25 ft from B-3 to help determine the lateral extent of such refusal material. Refusal was encountered in B-3A at a depth of 25 feet. Refusal may result from hard rock lenses or boulders or may represent the upper surface of sound continuous rock. Diamond core drilling is required to penetrate and retrieve samples in order to determine the nature and continuity of the refusal material. Diamond core drilling was not performed in these borings.

Groundwater levels were checked in all the borings at the time of drilling and again in most borings after 24 hours. In order to permit monitoring of the groundwater level until site grading work begins, an observation well consisting of PVC pipe (capped on the bottom and slotted over a portion of its lower length) was installed in boring B-4. After 24 hours, groundwater was at 12.5 ft in B-3, 12.7 ft in B-3A and 19.5 ft in B-4; borings B-1 and B-2

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were dry to the termination depth at this time. Borings B-5 and B-6 were dry to the termination depth at the time of drilling. Since these borings were completed on the last day we were present at the site, we were unable to check these borings for groundwater after 24 hours.

Groundwater levels may fluctuate several feet with seasonal rainfall variations. Generally, the highest groundwater levels occur in late winter and spring and the lowest levels occur in the late summer and fall.

EVALUATION AND COMMENTS

Excavation Conditions

A majority of the soils encountered by the borings can be removed with conventional earth moving equipment. However, the borings indicate that difficult excavation conditions exist over portions of the site. The partially weathered rock and possibly the harder residual soil (blow counts greater than 50 to 60 blows/ft) will require ripping for efficient removal. Excavation in partially weathered rock may also require some light blasting, along with ripping. Due to the typically erratic surface of partially weathered rock, it is likely that such material will be encountered between the widely spaced borings and possibly at higher elevations than encountered in the borings themselves.

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Cover Materials

Based on visual examination of soil samples obtained in the borings and limited laboratory testing, the on-site upper sandy clayey silt and sandy silt and deeper silty sand appear to be suitable for use as cover materials. Once a tentative landfill excavation bottom elevation has been determined, additional laboratory classification tests should be performed on the deeper proposed cover soil. In the field, landfill waste materials and cover soils should be compacted as densely as practical with available construction equipment.

Permeability

A primary concern for landfills is to provide an adequate zone of separation between the landfill bottom and the groundwater table. The permeability of this zone of separation must be adequate to prevent leakage from contaminating the groundwater table. Depending upon the nature and permeability of the residual soil or partially weathered rock exposed at the bottom of the landfill excavation, a relatively impermeable liner may be required on top of these materials. In some areas, the bottom of the landfill will likely be in partially weathered rock. Our past experience indicates that after being relieved of soil overburden by excavation, partially weathered rock is generally more permeable than before its exposure. There is potential for extreme variability in permeability of the residual soils and partially weathered rock, especially if relic features such as cracks or fissures are present which soil test borings cannot detect. Thus, the need for a blanket

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liner should be determined by field inspection of the bottom of the completed landfill excavation by an experienced soils engineer.

Limited laboratory classification testing was performed on representative upper fine-grained residual soil to evaluate its potential for use as blanket material. The classification test results indicate that the majority of the upper fine-grained soils encountered by the soil test borings could be used to provide a relatively good moisture barrier. If properly compacted, the permeability of such clayey upper soils should be on the order of 1×10^{-7} cm/sec. The selection of such material intended for use as blanket material should be monitored by a qualified soils technician working under the direct supervision of a soils engineer. Compaction and permeability tests should be conducted on representative samples of each different material to evaluate their compaction characteristics and permeability in a compacted state.

In the field, the clayey blanket soils should be compacted to at least 93 percent of the standard Proctor maximum dry density. The clayey soil should be placed slightly wet (+1 to 3 percent) of the optimum moisture content and should not be allowed to dry out and shrink due to exposure to rain, wind and sun. The blanket material should be free of all topsoil, roots and organics, which should be initially stripped from the ground surface and wasted.

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Dike Construction and Foundation Preparation

No information is currently available regarding the location and configuration of proposed dikes. Thus, only general comments regarding embankment slopes, structural fill and foundation preparation can be given.

Initially, all vegetation, roots and surface soil containing organic material should be stripped from within the foundation area of the proposed dikes. After stripping, the resulting surface should be proofrolled with a 25 to 35-ton, four-wheeled, rubber-tired roller or similar approved equipment. The proofroller should make at least four passes over each location, with the last two passes perpendicular to the first two. Any areas which wave, rut or deflect excessively and continue to do so after several passes of the proofroller should be undercut to firmer soils. The undercut areas should be backfilled in thin lifts with suitable compacted fill materials. The proofrolling operations should be monitored by a qualified soils technician working under the direct supervision of a soils engineer.

Both the upper fine-grained soils and the deeper sandy soils appear to be suitable for use as compacted structural fill for dike construction. Selection of materials to satisfy permeability requirements of the dikes should be based on laboratory permeability testing performed on representative compacted samples of these materials. Desired permeability requirements could probably be achieved either by mixing of the upper fine-grained soils and deeper more granular soils or possibly by limited use of the upper fine-grained soils to construct an upstream blanket liner.

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We recommend that all embankment fill be compacted to at least 95 percent of the standard Proctor maximum dry density (ASTM D-698). No triaxial shear testing of proposed embankment materials has been done, as would be necessary for stability analyses of embankment slopes. However, based on our experience with similar soils, we recommend that permanent dike slopes be no steeper than 2:1 (horizontal to vertical). Permanently exposed embankment slopes should be grassed soon after construction to prevent erosion of these surfaces.

QUALIFICATION OF REPORT

The general subsurface conditions utilized in our evaluation of the landfill site are based on interpolation of subsurface conditions between the widely spaced borings. The upper surface of partially weathered rock is characteristically knobby and uneven in this geologic area. Therefore, the possibility of rock boulders, ridges or pinnacles of hard materials being encountered near the surface between boring locations cannot be discounted.

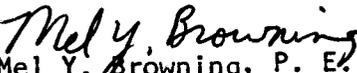
Alexander County
LETCo. Job No. CH 4257
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The discovery of any site or subsurface conditions during grading operations which deviate significantly from the data obtained in this investigation should be reported to us for our evaluation and comments.

We appreciate the opportunity to participate in this phase of your project. Please contact us if you have any questions concerning this report or if we can be of further assistance.

Very truly yours,

LAW ENGINEERING TESTING COMPANY

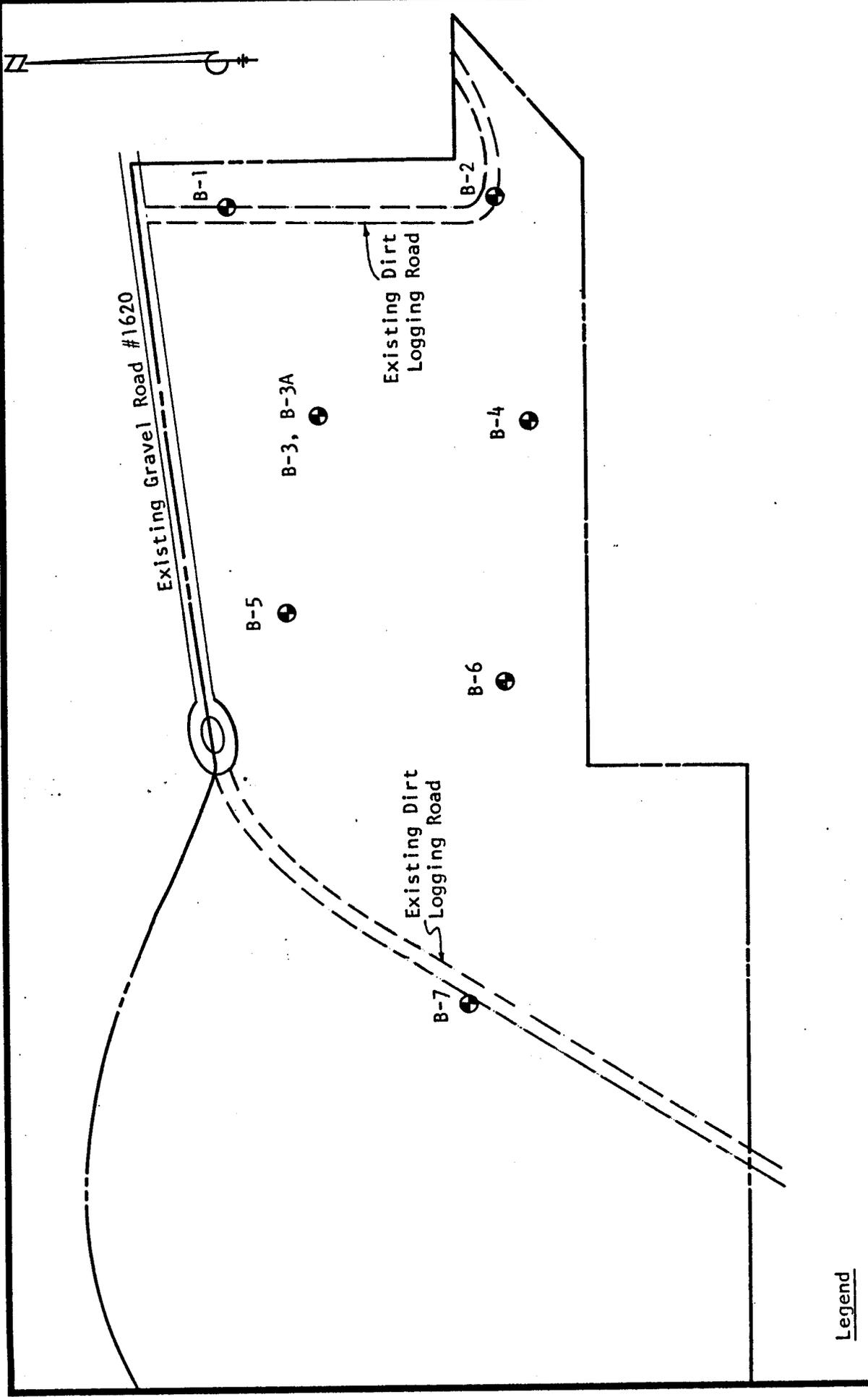

Mel Y. Browning, P. E.
Soils Engineer
Registered, N. C. 8696


Robert E. Smith, Jr., P. E.
Senior Soils Engineer
Registered, N. C. 7258

MYB/RES/etw

SUMMARY OF LABORATORY TEST DATA
LETCo. JOB NO. CH 4257

<u>Boring Number</u>	<u>Sample Depth (Ft)</u>	<u>Percent Passing No. 200 Sieve</u>	<u>Moisture Content (%)</u>	<u>Atterbert Limits</u>		
				<u>LL</u>	<u>PL</u>	<u>PI</u>
B-1	13.5 - 15.0	33.6	--	--	--	
B-2	1.0 - 2.5	64.5	25.6	51	20	
B-4	13.5 - 15.0	18.0	--	--	--	
B-5	1.0 - 2.5	74.9	28.5	55	26	
B-6	18.5 - 20.0	26.0	--	--	--	



Legend

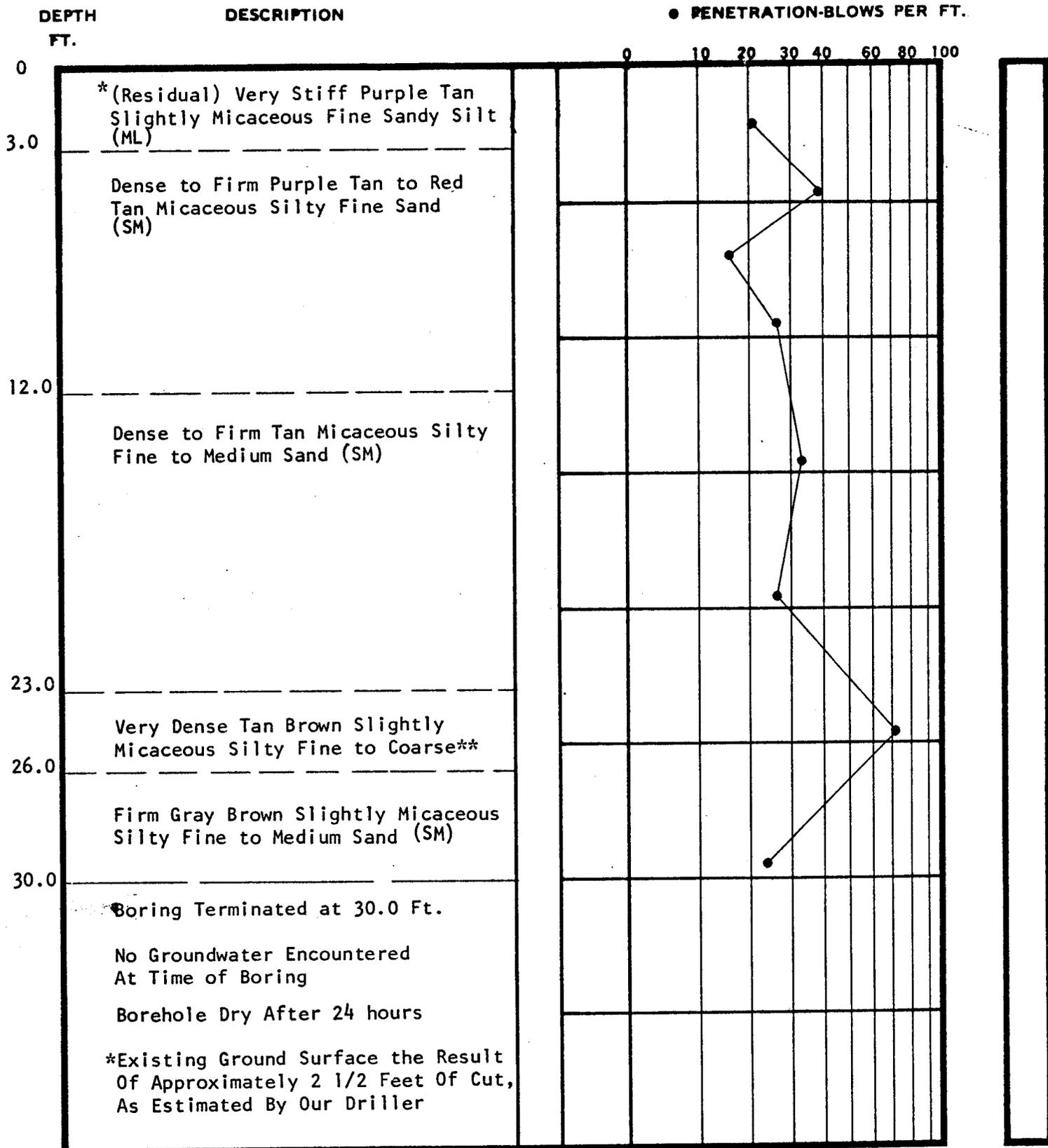
- ⊕ Approximate Soil Test Boring Location

LAW ENGINEERING TESTING CO.
CHARLOTTE, NORTH CAROLINA

Alexander County
 c/o Henningson, Durham and Richardson, Inc.
 Charlotte, North Carolina

BORING LOCATION PLAN
 Alexander County Landfill Site (Proposed)
 N.C.S.R. 1620
 Alexander County, North Carolina

DWN. BY	RST	SCALE: 1" = 200'
CKD. BY	MYB	DRAWING NO.
APPR'D.		CH 4257



**Sand With Weathered Rock Fragments (SM)
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.

TEST BORING RECORD

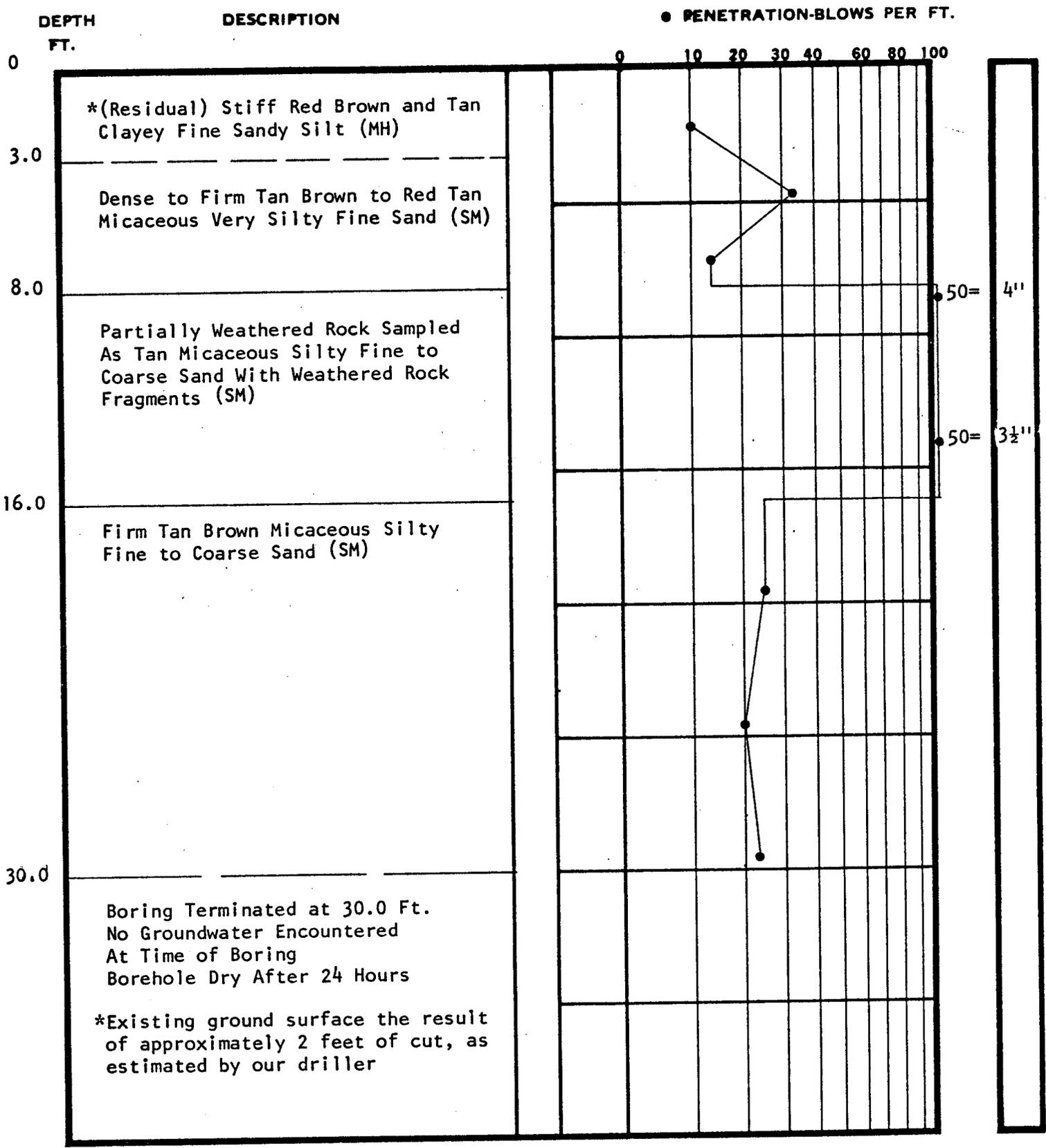
BORING NO. B-1
DATE DRILLED 3-27-79
JOB NO. CH 4257

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LAW ENGINEERING TESTING COMPANY

 UNDISTURBED SAMPLE
 50 % ROCK CORE RECOVERY

 WATER TABLE, 24 HR.
 WATER TABLE, 1 HR.
 LOSS OF DRILLING WATER



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.

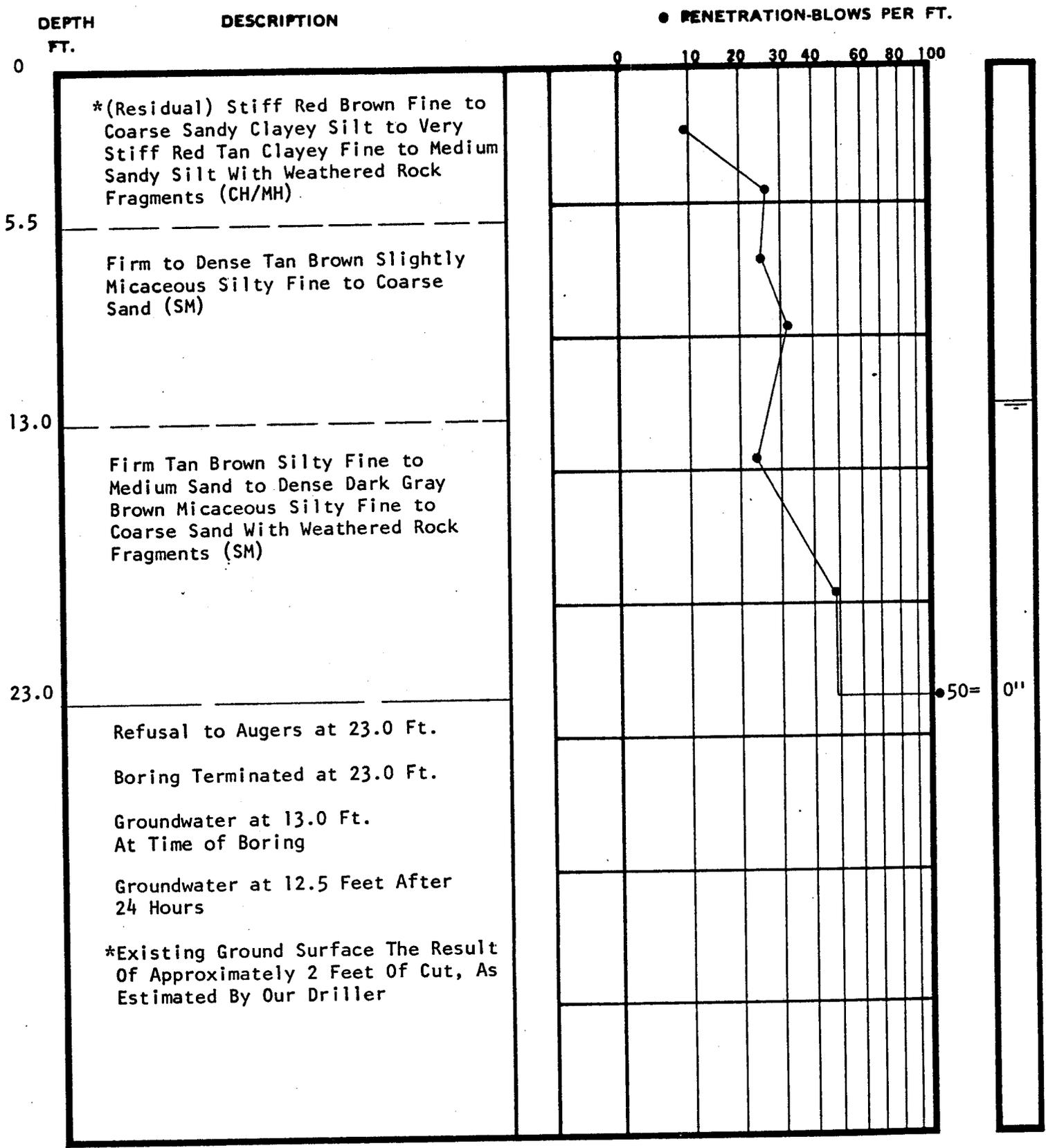
TEST BORING RECORD

BORING NO. B-2
 DATE DRILLED 3-27-79
 JOB NO. CH 4257

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LAW ENGINEERING TESTING COMPANY

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



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.

TEST BORING RECORD

BORING NO. B-3
DATE DRILLED 3-26-79
JOB NO. CH 4257

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LAW ENGINEERING TESTING COMPANY

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

50 % ROCK CORE RECOVERY

LOSS OF DRILLING WATER

DEPTH FT.	DESCRIPTION	● PENETRATION-BLOWS PER FT.													
		0	10	20	30	40	60	80	100						
0	Augered From 0 to 23.5 Ft. Without Soil Sampling														
23.5	Standard Penetration Test Taken at*														
25.0	Refusal to Augers at 25.0 Ft. Boring Terminated at 25.0 Ft. Groundwater Encountered At 13.5 Ft. At Time of Boring Groundwater Encountered At 12.7 Ft. After 24 Hours														

50 = 1/2"

*23.5 Ft.-No Sample Recovered In Spoon
 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.

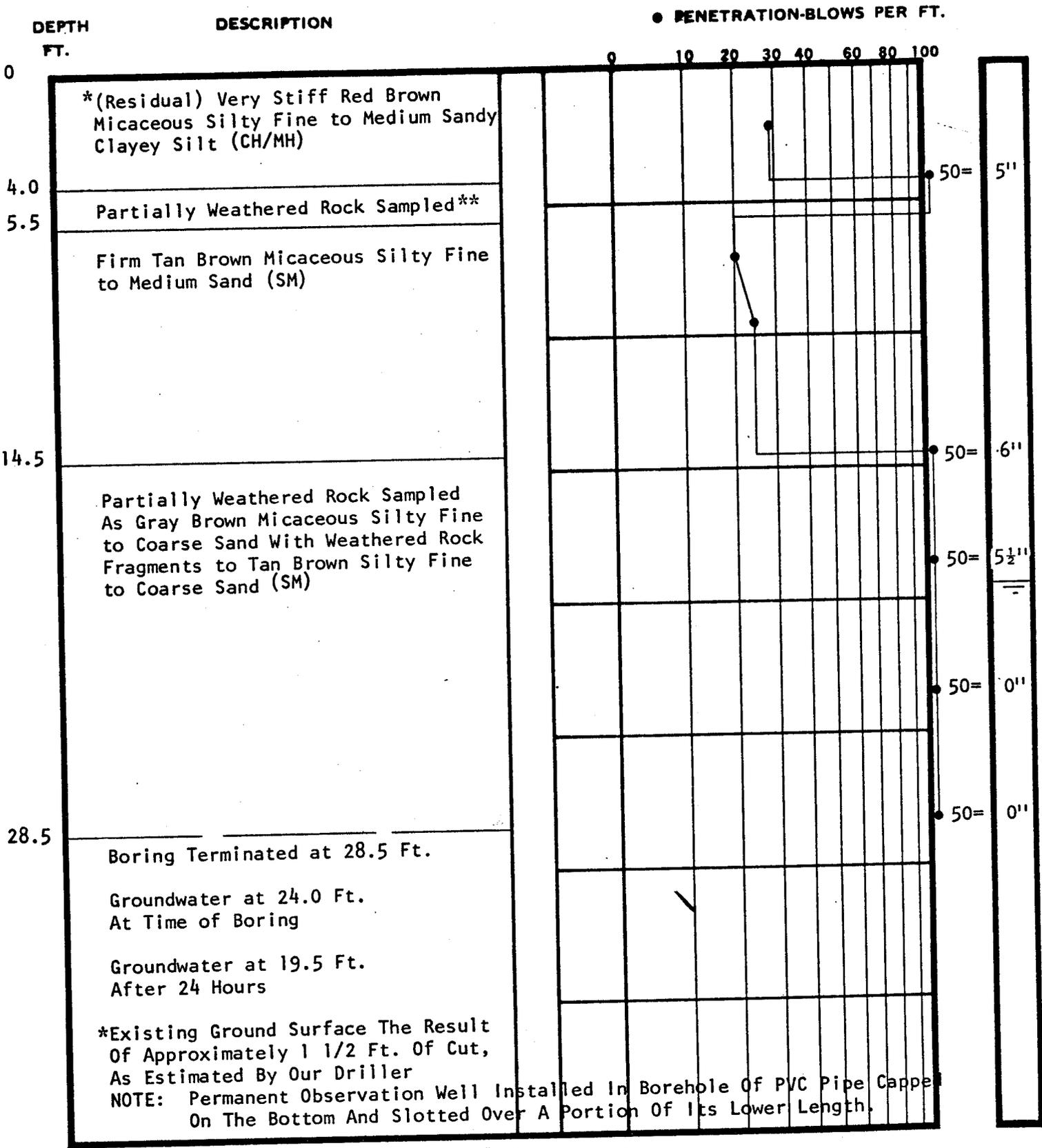
TEST BORING RECORD

BORING NO. B-3A
 DATE DRILLED 3-27-79
 JOB NO. CH 4257

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LAW ENGINEERING TESTING COMPANY

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



**As Tan Brown Micaceous Silty Fine to Medium Sand
 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.

TEST BORING RECORD

BORING NO. B-4
 DATE DRILLED 3-26-79
 JOB NO. CH 4257

PAGE 1 OF 1

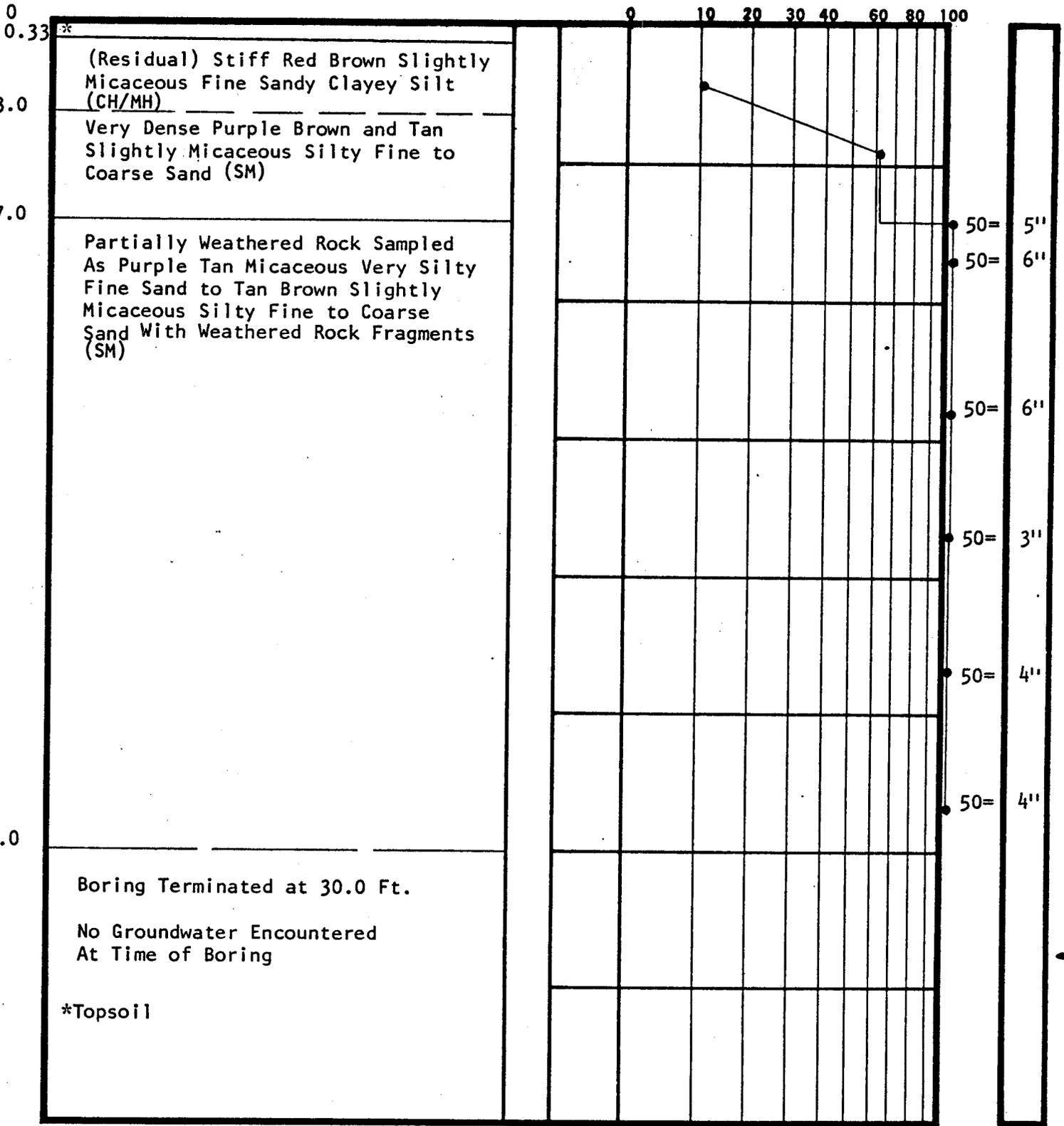
LAW ENGINEERING TESTING COMPANY

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

DEPTH
FT.

DESCRIPTION

● PENETRATION-BLOWS PER FT.



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.

TEST BORING RECORD

BORING NO. B-5

DATE DRILLED 3-28-79

JOB NO. CH 4257

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LAW ENGINEERING TESTING COMPANY



UNDISTURBED SAMPLE



WATER TABLE, 24 HR.



WATER TABLE, 1 HR.

50

% ROCK CORE RECOVERY

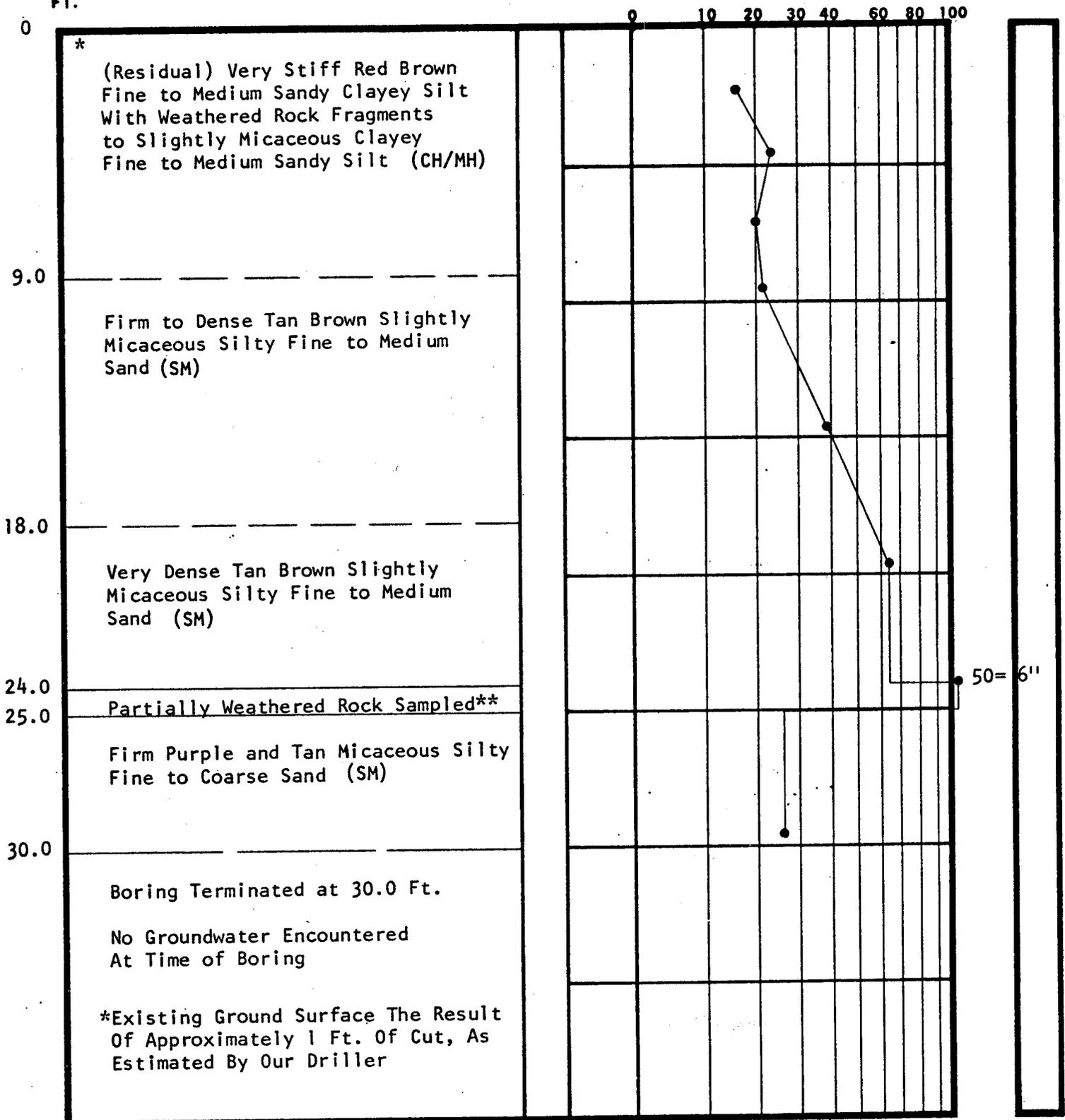


LOSS OF DRILLING WATER

DEPTH
FT.

DESCRIPTION

● PENETRATION-BLOWS PER FT.



**As Tan Brown Slightly Micaceous Silty Fine to Medium Sand (SM)

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.

TEST BORING RECORD

BORING NO. B-6
DATE DRILLED 3-28-79
JOB NO. CH 4257

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UNDISTURBED SAMPLE
 50 % ROCK CORE RECOVERY

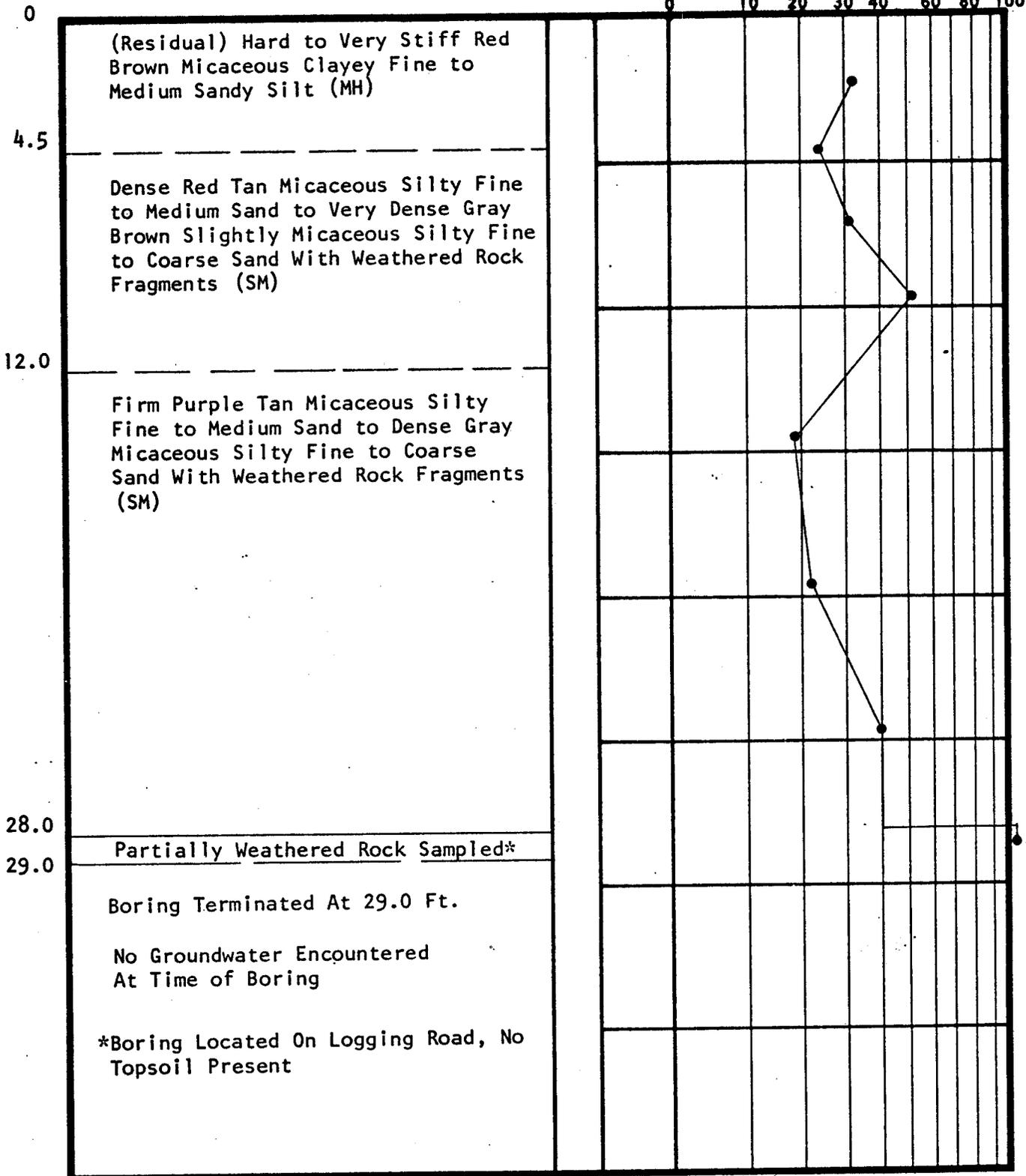
WATER TABLE, 24 HR.
 WATER TABLE, 1 HR.
 LOSS OF DRILLING WATER

LAW ENGINEERING TESTING COMPANY

DEPTH
FT.

DESCRIPTION

● PENETRATION-BLOWS PER FT.



*As Tan Brown Micaceous Silty Fine to Coarse Sand (SM)

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.

TEST BORING RECORD

BORING NO. B-7
DATE DRILLED 3-27-79
JOB NO. CH 4257

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LAW ENGINEERING TESTING COMPANY

UNDISTURBED SAMPLE

WATER TABLE, 24 HR.

WATER TABLE, 1 HR.

50 % ROCK CORE RECOVERY

LOSS OF DRILLING WATER