TIP: **U-3609A**

COUNTY: **Wayne**

DESCRIPTION: **Goldsboro – US 13 (Berkeley Boulevard) from Royal Avenue to South Drive**

LET DATE: **May 20, 2014**

Roadway and Structure Subsurface Investigation Information

GeoTechnologies, Inc.

Geotechnical and Construction Materials Testing Services

March 7, 2013

Mr. Jason Lawing, PE, CFM.
KIMLEY-HORN & ASSOCIATES, INC.
P.O. Box 33068
Raleigh, NC 27636-3068

Re: Culvert Borings Letter
Fallin Boulevard Realignment/Berkeley Boulevard Culvert Upgrade
Goldsboro, North Carolina
GeoTechnologies Project No. 1-10-0646-EA

Mr. Lawing:

As authorized, GeoTechnologies, Inc. is pleased to present the attached subsurface information pertaining to the above referenced project. We understand that the subsurface information will be used by the contractor for help in designing temporary shoring for the culvert upgrade on Berkley Boulevard. Our services included drilling two soil test borings on March 6, 2013 to a depth of about 30 feet at locations shown on the attached Figure 1. Standard penetration testing (ASTM D-1586) was performed at select intervals. Also attached is a generalized subsurface profile (Figure 2) and the individual test borings logs.

GeoTechnologies, Inc. appreciates the opportunity to be of service on this phase of the project. Please contact us if you have any questions concerning this letter or if we may be of additional service on this or other projects.

Sincerely,

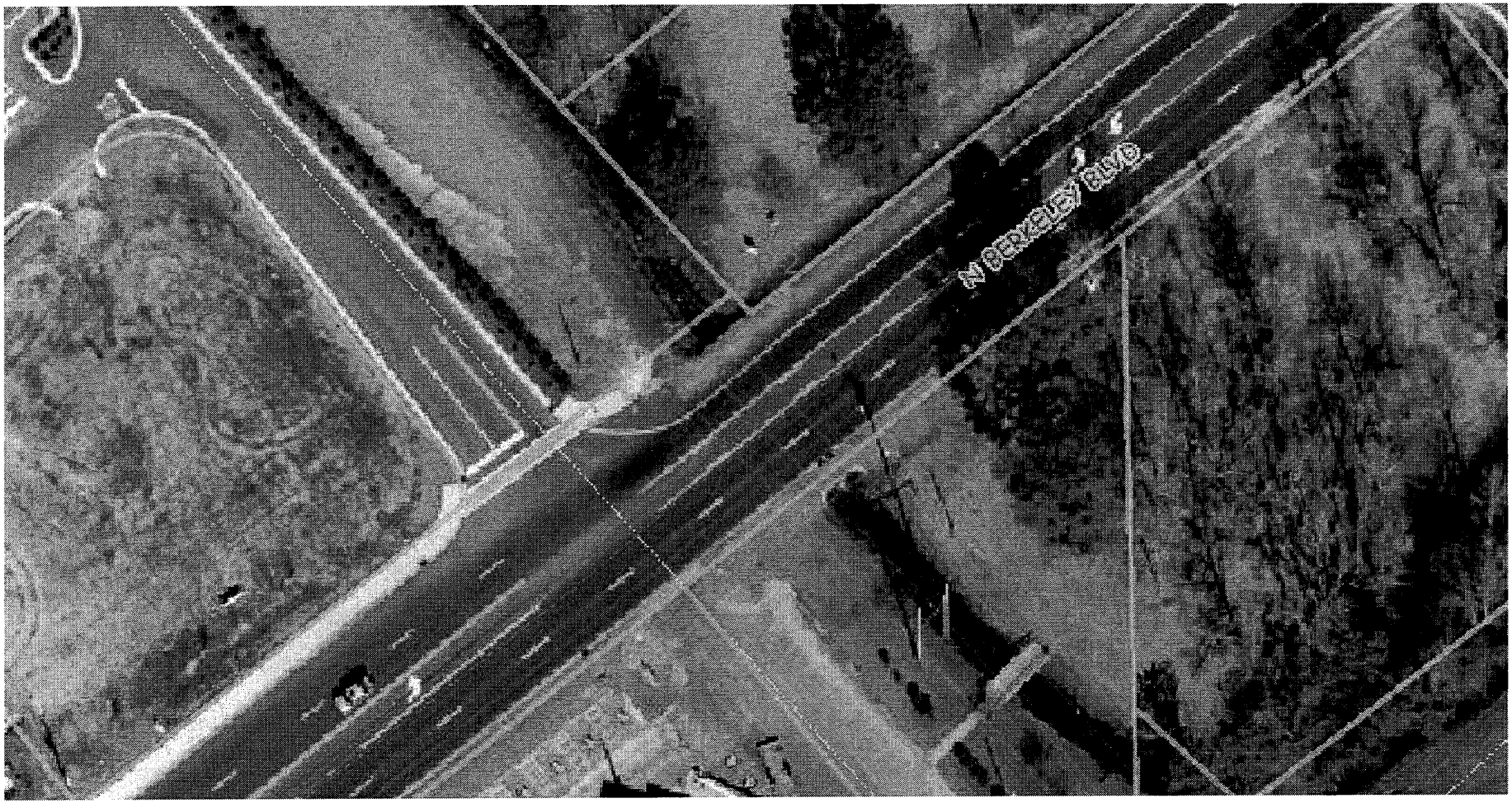
GeoTechnologies, Inc.

David L. Israel, P.E.
Principal Engineer

MRP/pr-dli

Attachments

1100646ea-culvert



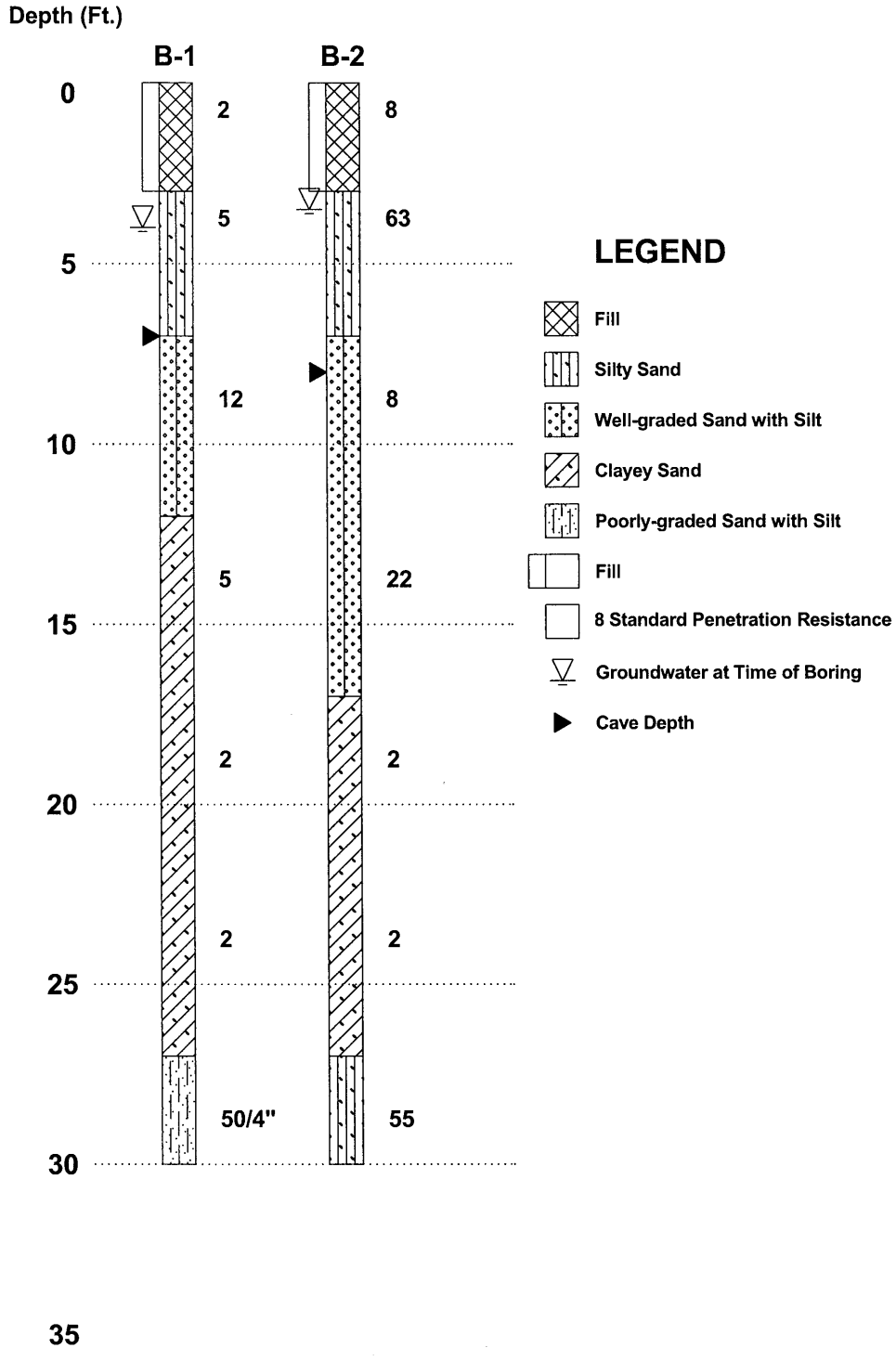
N
W E
S

Berkley Blvd. Culvert

Printed:Mar 07, 2013

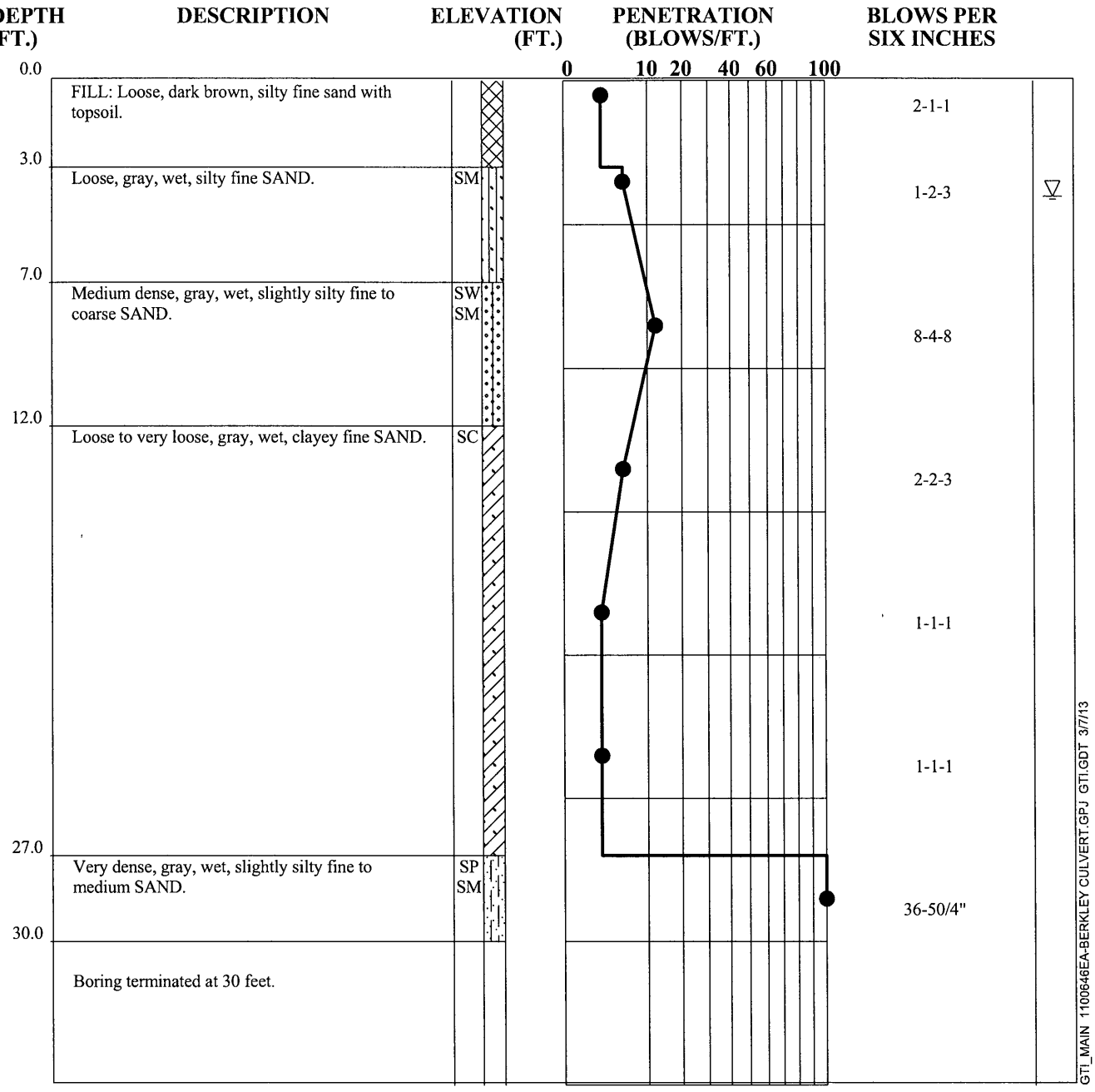
Figure 1 - Boring Location Sketch
1-10-0646-EA

GENERALIZED SUBSURFACE PROFILE



PROJECT:		SCALE:
Berkley Culvert Goldsboro, NC	GeoTechnologies, Inc.	JOB NO:1-10-0646-EA FIG NO:2

TEST BORING RECORD



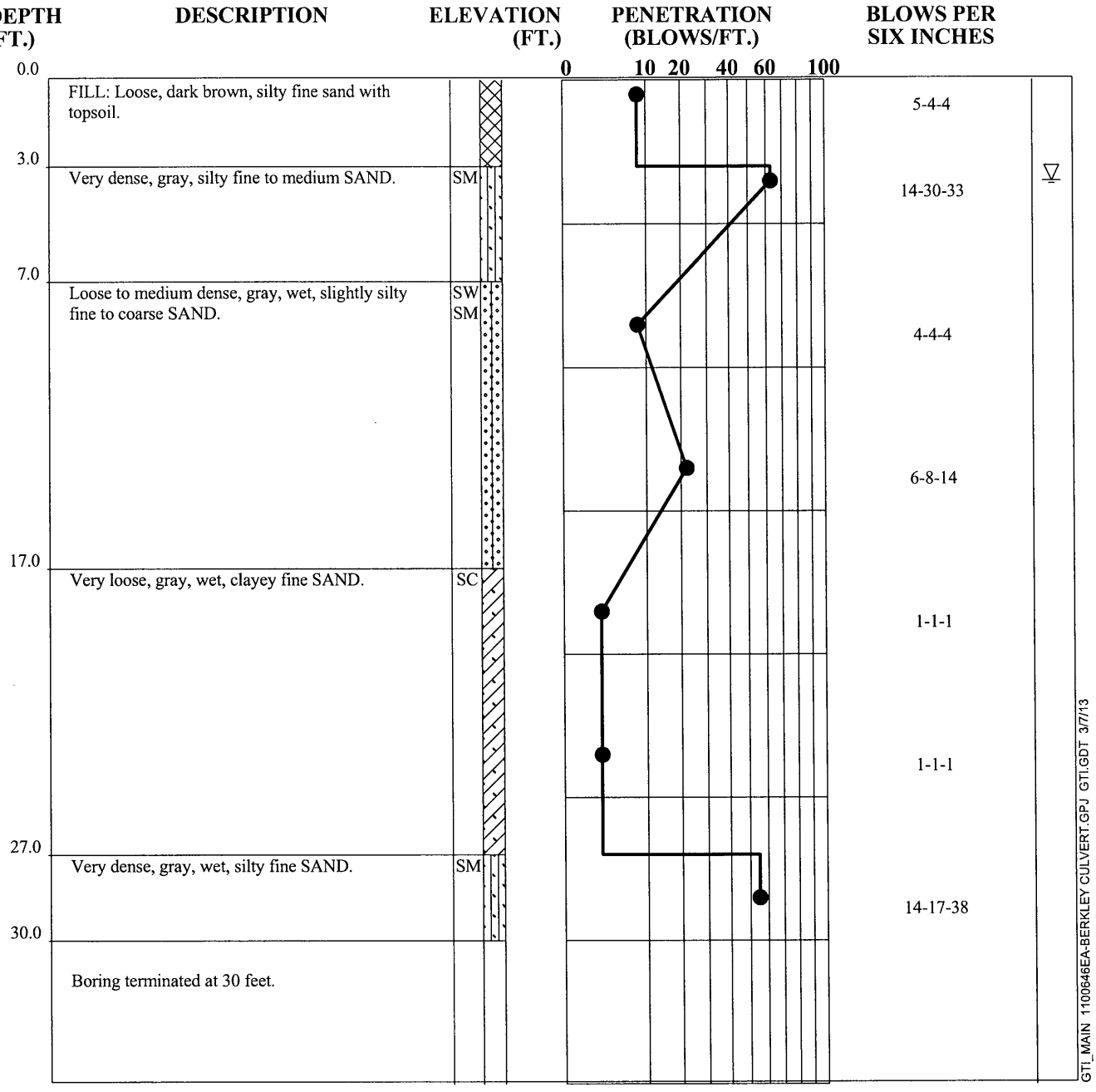
Drilled with ATV rig. Holes backfilled with hole plug.

JOB NUMBER 1-10-0646-EA
BORING NUMBER B-1
DATE 3-6-13

PAGE 1 OF 1

GeoTechnologies, Inc.
3200 Wellington Court, Suite 108
Raleigh, NC 27615

TEST BORING RECORD



Drilled with ATV rig. Holes backfilled with hole plug.

JOB NUMBER 1-10-0646-EA
BORING NUMBER B-2
DATE 3-6-13

PAGE 1 OF 1

GeoTechnologies, Inc.
3200 Wellington Court, Suite 108
Raleigh, NC 27615

TABLE 1
TEST BORING LOCATIONS

Fallin Boulevard/Berkeley Boulevard Culvert Extension

GeoTechnologies Project No. 1-10-0646-EA

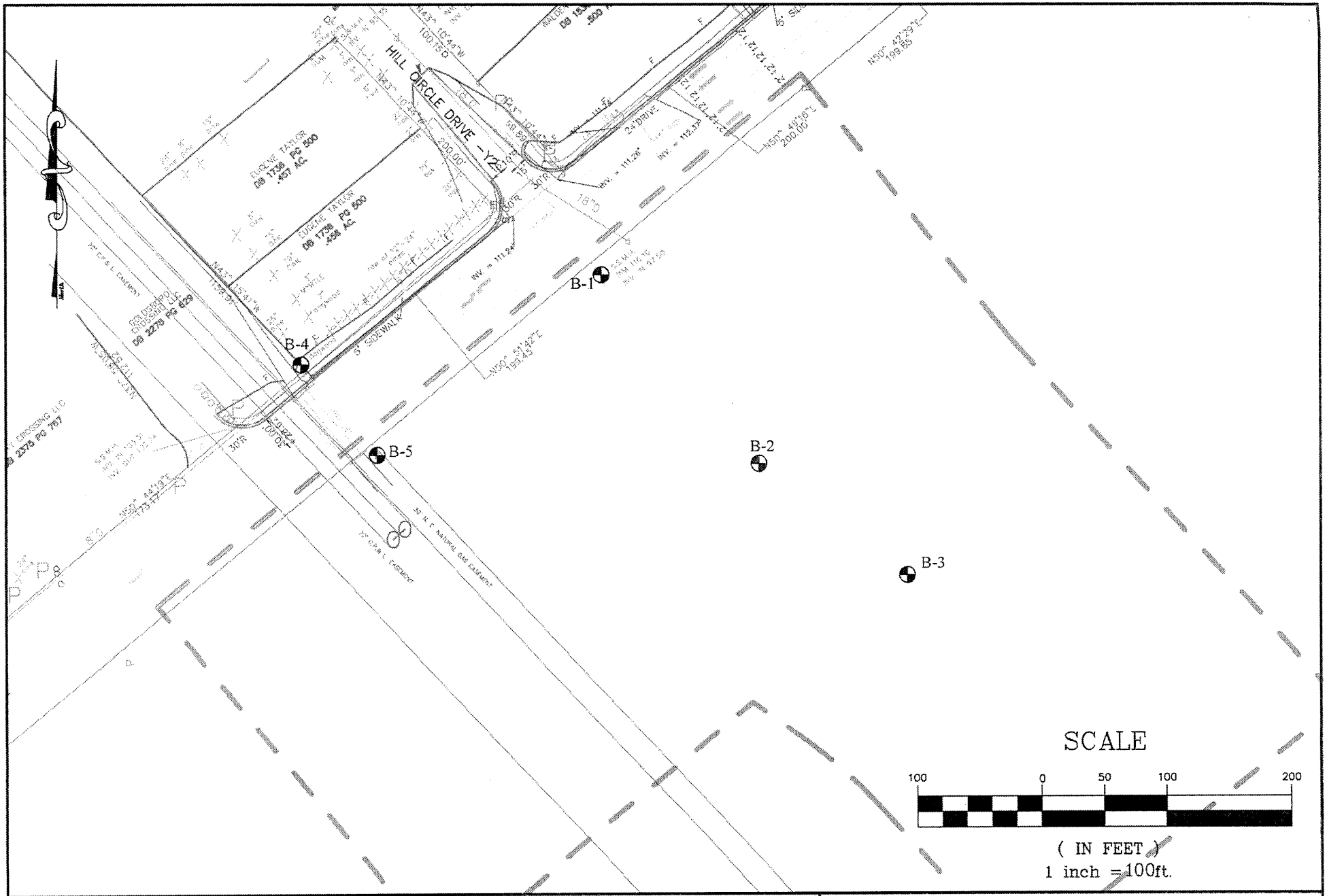
		NC Grid Coordinates	
Boring #	**Location**	**North**	**East**
B-1	Roadway	596151	2319480
B-2	Roadway	596001	2319607
B-3	Roadway	595912	2319726
B-4	Culvert	596080	2319238
B-5	Culvert	596008	2319299

TABLE 2
SUMMARY OF LABORATORY TEST DATA

Fallin Boulevard/Berkeley Boulevard Culvert Extension

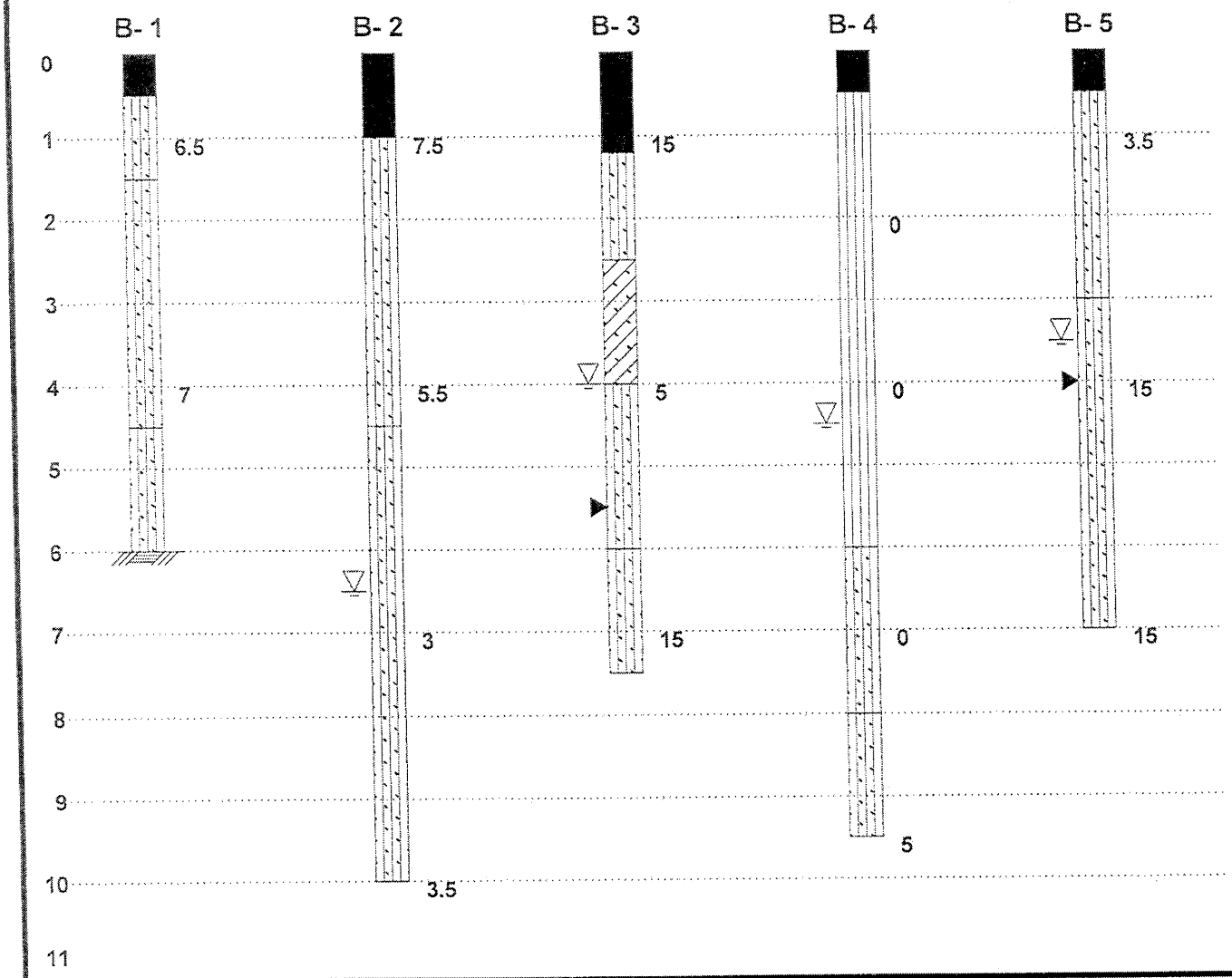
GeoTechnologies Project No. 1-10-0646-EA

			Atterberg Limits					
Boring #	**Depth (ft)**	**Unified Soil Classification**	**Liquid Limit (%)**	**Plastic Index (%)**	**% Passing #200 Sieve**	**Standard Proctor Maximum Dry Density (pcf)**	**CBR (%)**	**Natural Moisture Content (%)**
B-1	3	SM	28	2	30.6	-	-	23.3
B-2	1.0 - 3.0	SM	18	0	16.9	121.0	20.8	11.1
B-3	2	SM	-	-	10.4	-	-	8.5
B-5	1.5	SM	33	2	-	-	-	-



PROJECT: Fallin Blvd. Realignment/ Berkely Blvd. Culvert Extension Goldsboro, North Carolina	GeoTechnologies, Inc.	SCALE: As Shown JOB No: 1-10-0646-EA FIGURE No: 1

GENERALIZED SUBSURFACE PROFILE



LEGEND

- Topsoil
- Silty Sand
- Clayey Sand
- Low Plasticity Silt
- 8 Dynamic Cone Penetration
- Groundwater at Time of Boring
- Hand Auger Refusal
- Cave Depth

PROJECT:

Fallin Blvd Realignment &
Berkley Blvd Culvert Upgrades
Goldsboro, North Carolina

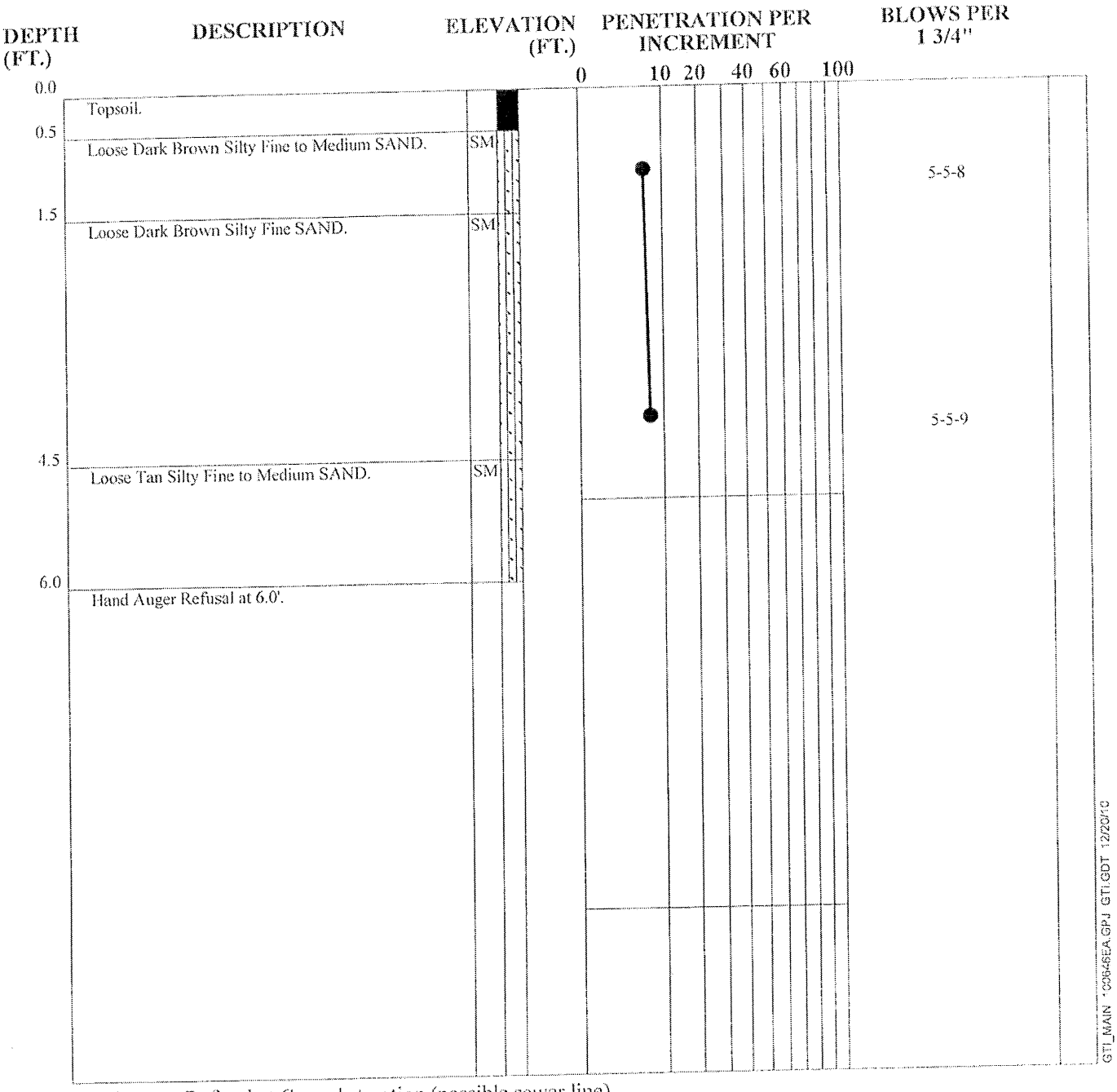
GeoTechnologies, Inc.

SCALE: As Shown

JOB No:1-10-0646-EA

FIGURE No: 2

DYNAMIC HAND CONE PENETROMETER RECORD



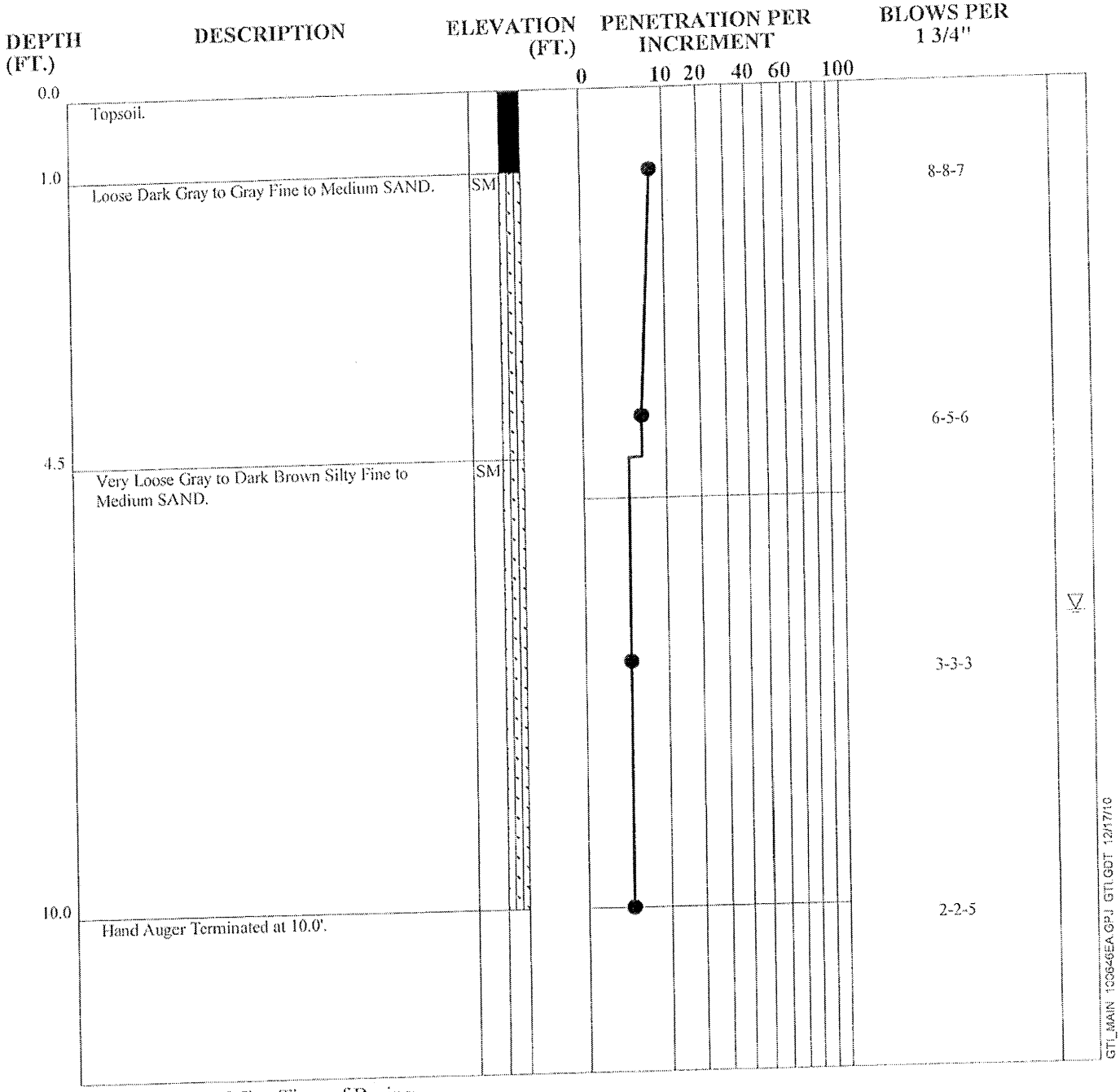
Hand Auger Refusal at 6' on obstruction (possible sewer line).

JOB NUMBER 1-10-0646-EA
BORING NUMBER B- 1
DATE

GeoTechnologies, Inc.

PAGE 1 OF 1

DYNAMIC HAND CONE PENETROMETER RECORD



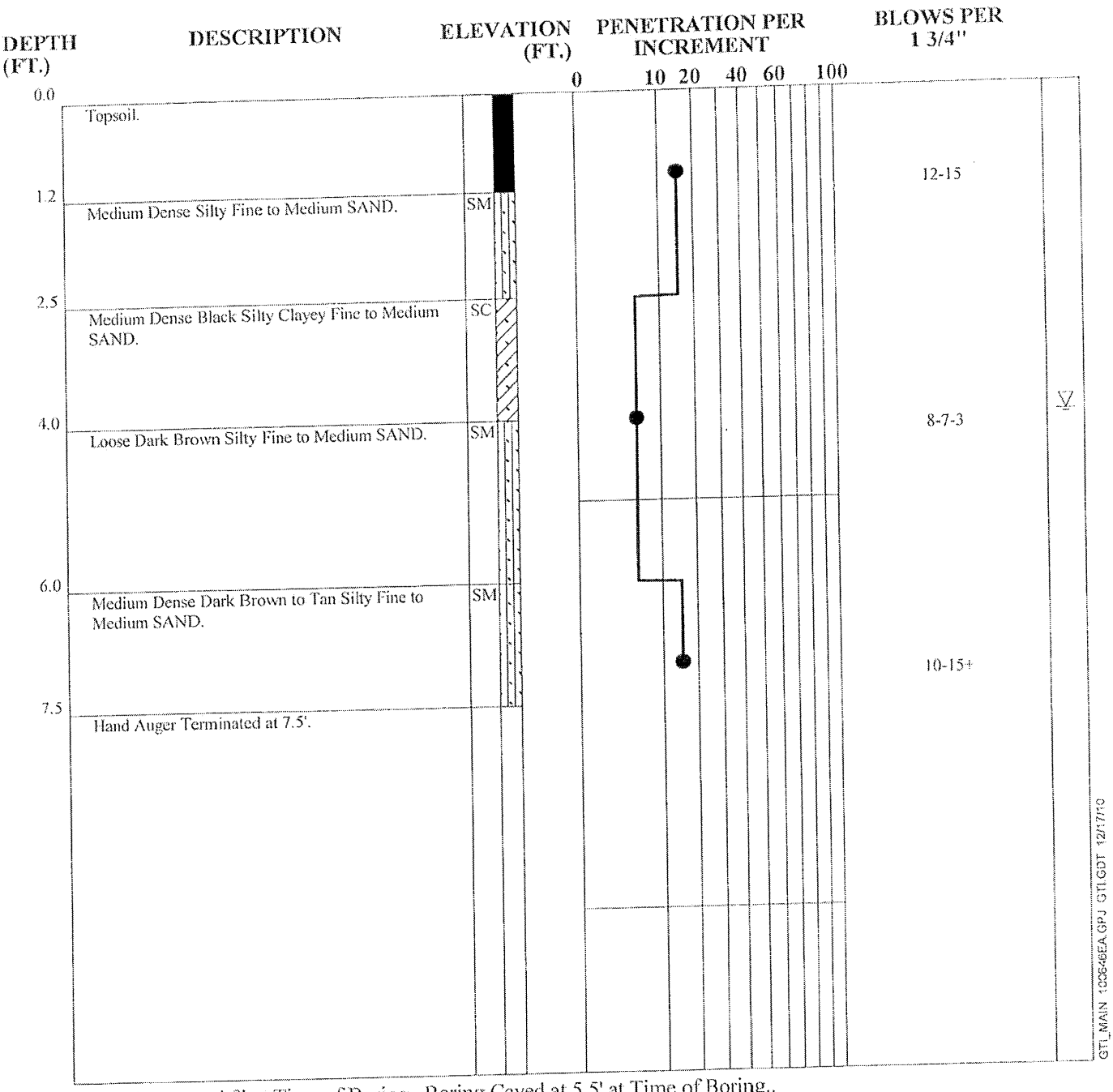
Groundwater at 6.5' at Time of Boring.

JOB NUMBER 1-10-0646-EA
BORING NUMBER B-2
DATE

GeoTechnologies, Inc.

PAGE 1 OF 1

DYNAMIC HAND CONE PENETROMETER RECORD



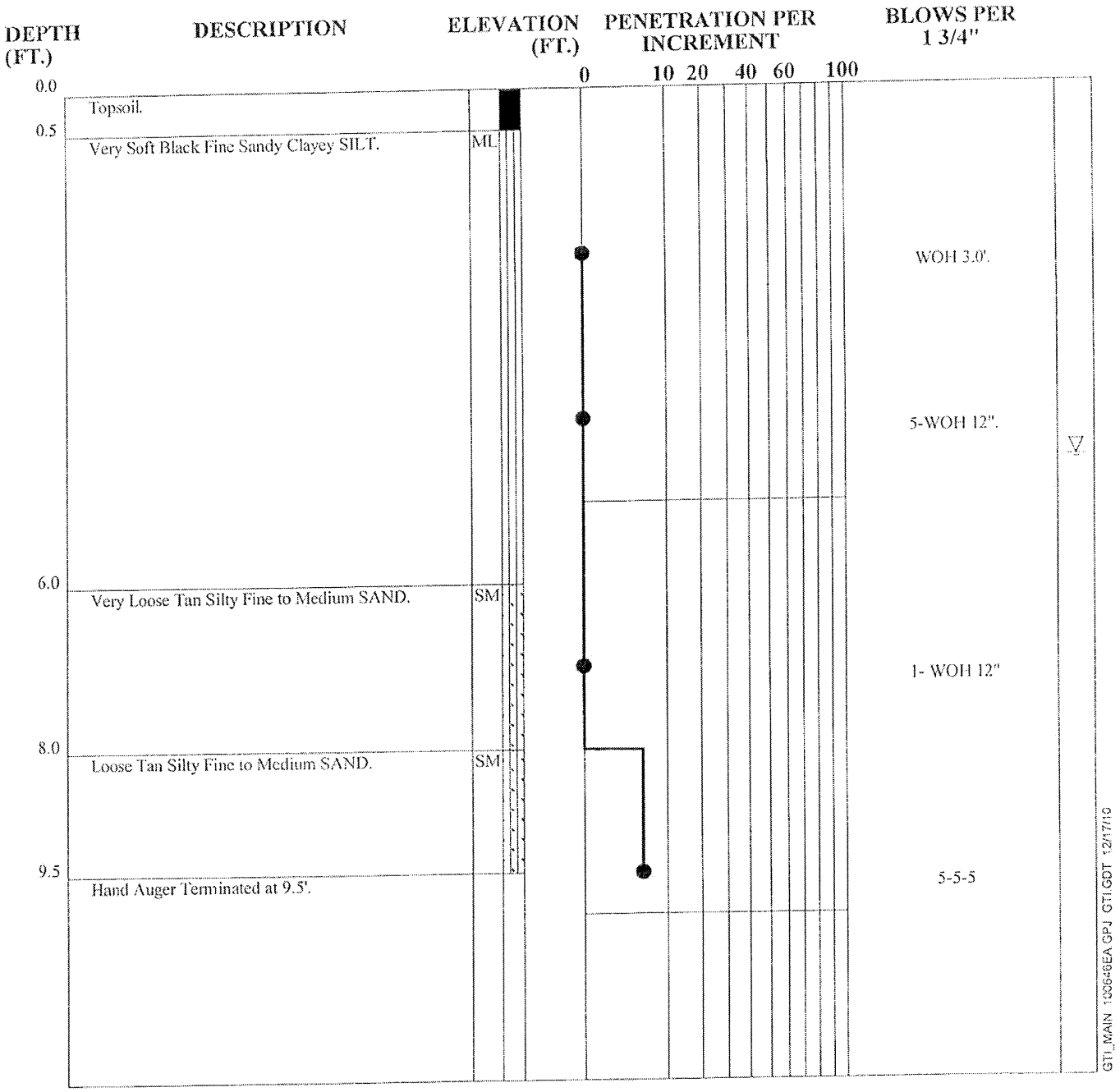
Groundwater at 4.0' at Time of Boring. Boring Caved at 5.5' at Time of Boring..

JOB NUMBER 1-10-0646-EA
BORING NUMBER B- 3
DATE

GeoTechnologies, Inc.

PAGE 1 OF 1

DYNAMIC HAND CONE PENETROMETER RECORD



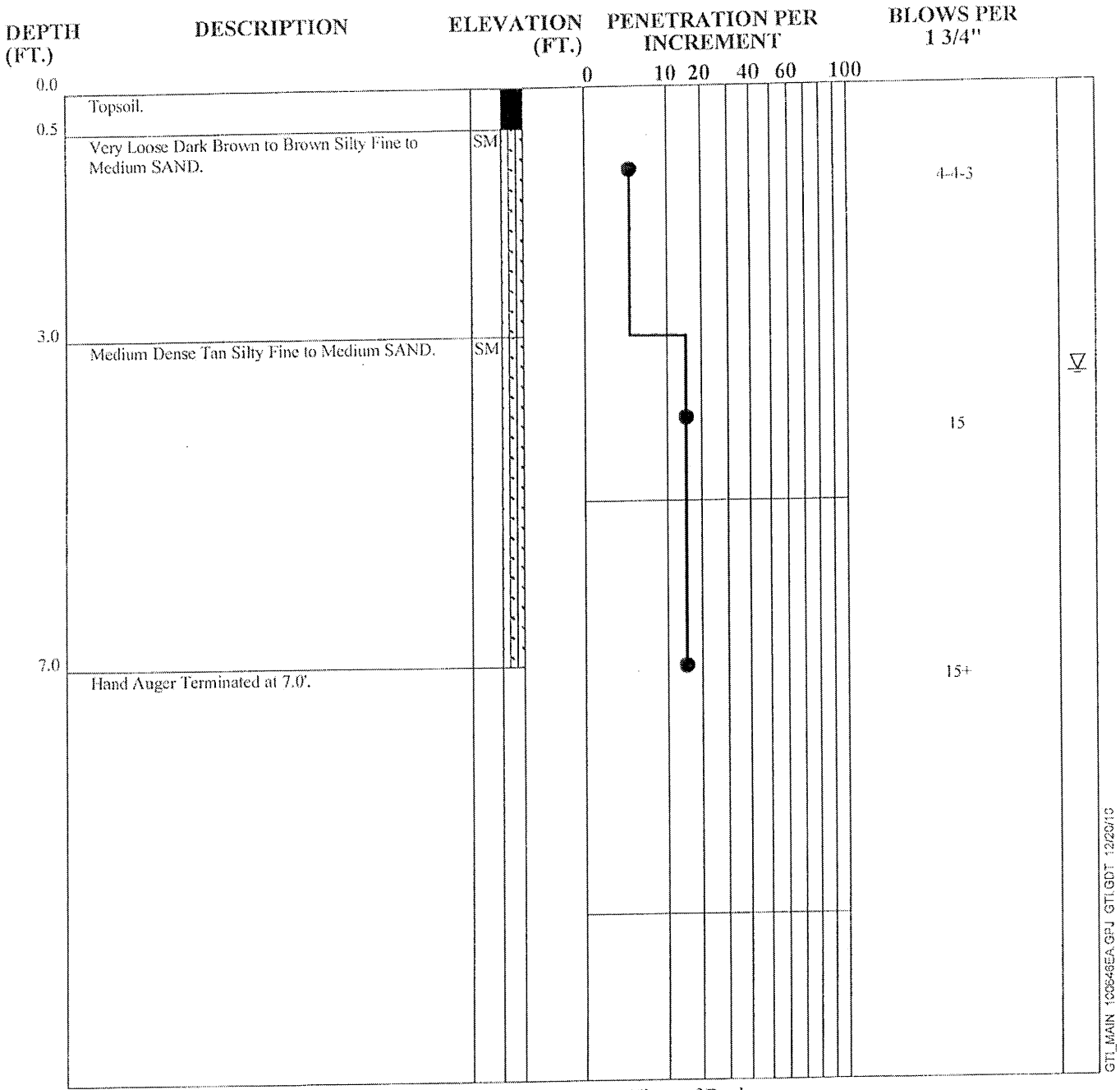
Groundwater at 4.5' at Time of Boring.

JOB NUMBER 1-10-0646-EA
BORING NUMBER B- 4
DATE

PAGE 1 OF 1

GeoTechnologies, Inc.

DYNAMIC HAND CONE PENETROMETER RECORD

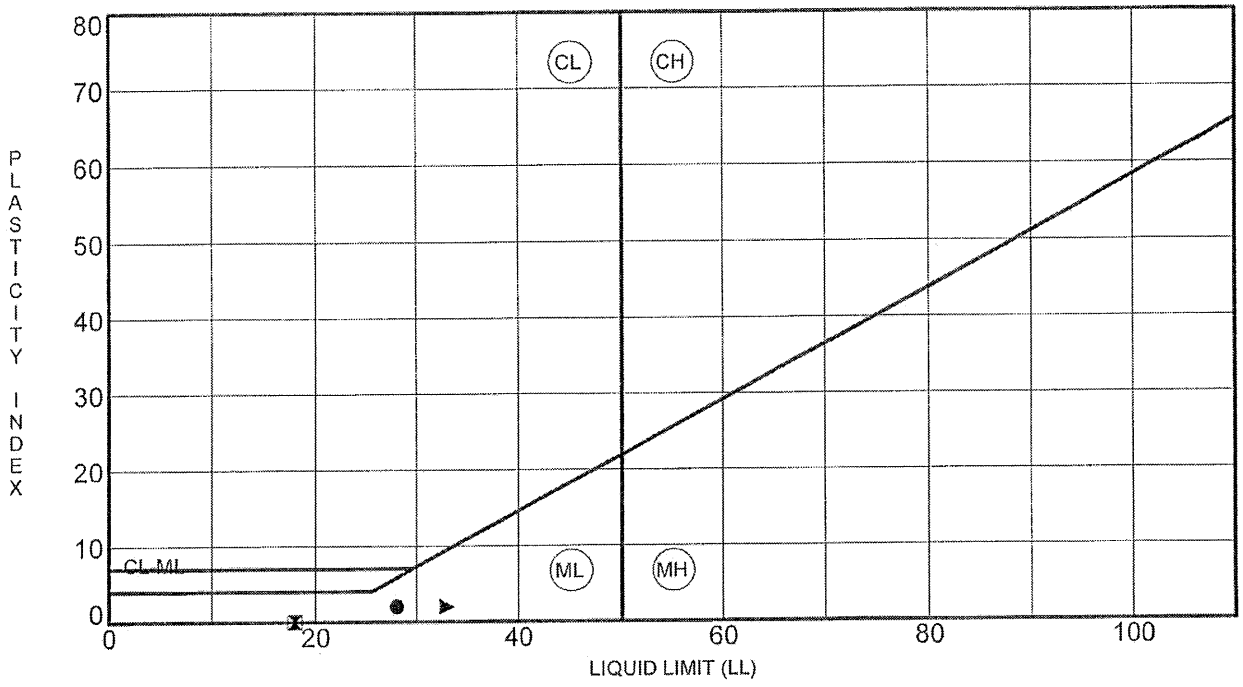


Groundwater at 3.5' at Time of Boring. Boring Caved at 4.0' at Time of Boring..

JOB NUMBER 1-10-0646-EA
BORING NUMBER B- 5
DATE

GeoTechnologies, Inc.

PAGE 1 OF 1



Specimen Identification		LL	PL	PI	Fines	Classification
● B-1	3'	28	26	2	30.6	Gray Silty Medium to Fine Sand
⧓ B-2	1-3'	18	18	NP	16.9	Gray Silty Fine to Medium Sand
▶ B-5	1.5'	33	31	2		Black Silty Sand

PROJECT Berkley Blvd Culvert Upgrades - Goldsboro, North Carolina

JOB NO. 1-10-0646-EA

DATE 12/20/10

ATTERBERG LIMITS' RESULTS

GeoTechnologies, Inc.

Raleigh, NC 27615

GeoTechnologies, Inc.

Job No: 1-10-0646-EA Date: 12/20/10

Job Name: Fallin Blvd Realignment & Berkley Blvd Culvert Upgrad

Job Location: Goldsboro, North Carolina

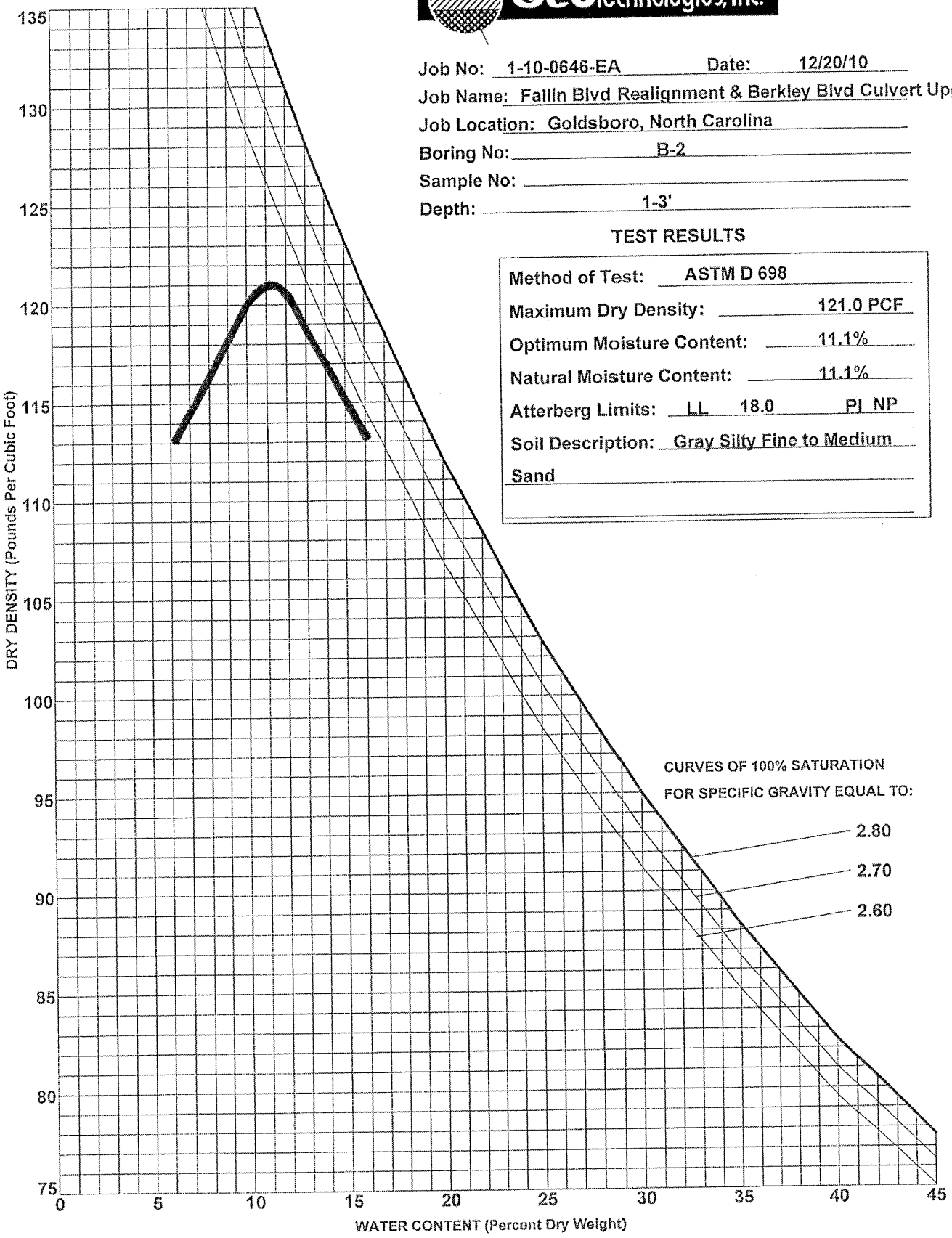
Boring No: B-2

Sample No:

Depth: 1-3'

TEST RESULTS

Method of Test:	ASTM D 698
Maximum Dry Density:	121.0 PCF
Optimum Moisture Content:	11.1%
Natural Moisture Content:	11.1%
Atterberg Limits:	LL 18.0 PI NP
Soil Description:	Gray Silty Fine to Medium Sand



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc.
Raleigh, NC 27615

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-10-0646-EA **JOB NAME:** Fallin Boulevard

DATE: 11/22/2010 **SAMPLE I.D.** B-2 **DEPTH:**

NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

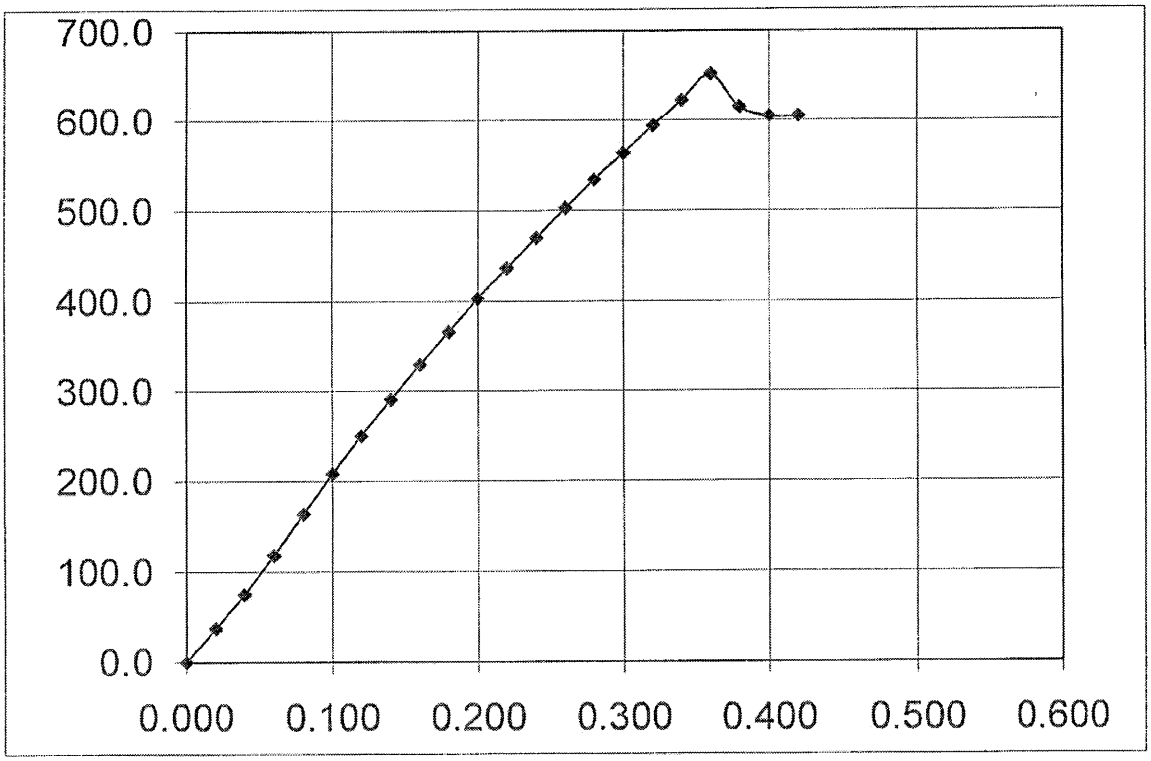
Opt. Moisture = 11.1% Max. Dry Density = 121.0 PCF

SOIL DESCRIPTION: Gray Silty Fine to Medium to Sand (SM)

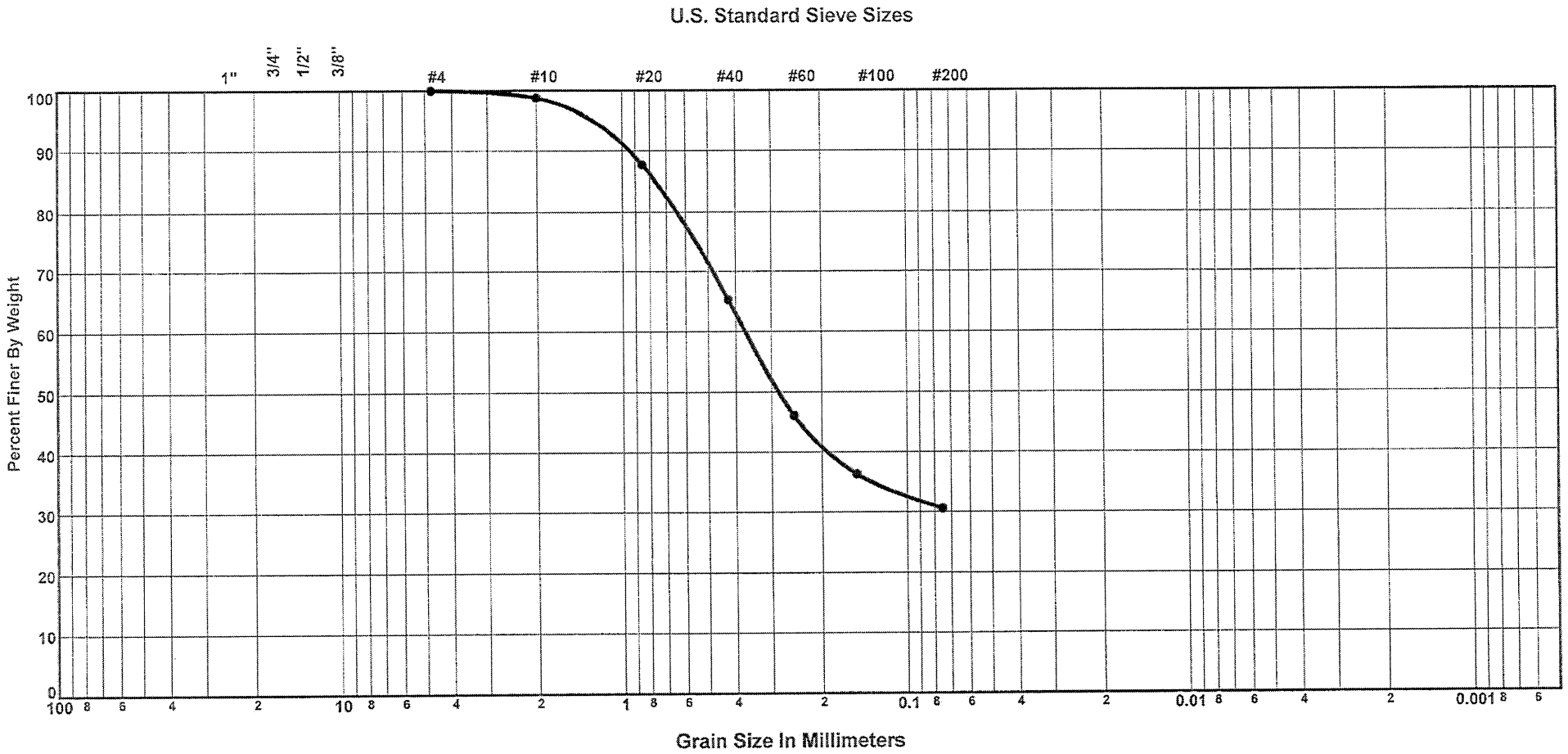
CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	10.3%	Initial Reading	0.151
WET DENSITY	131.7 lbs./cu.ft.	Final Reading	0.151
DRY DENSITY	119.4 lbs./cu.ft.	Mold Height	4.594
% COMPACTION	98.7 %	% Swell	0.00

LOAD CELL 2000 LB. RATE OF DEFORMATION .05 in./min.

SURCHARGE USED 10 lbs.



CBR @ 0.1"	20.8
CBR @ 0.2"	26.8
% SWELL	0.0



GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
B-1	3'	23.3	28.0	26.0	2.0	Gray Silty Medium to Fine Sand

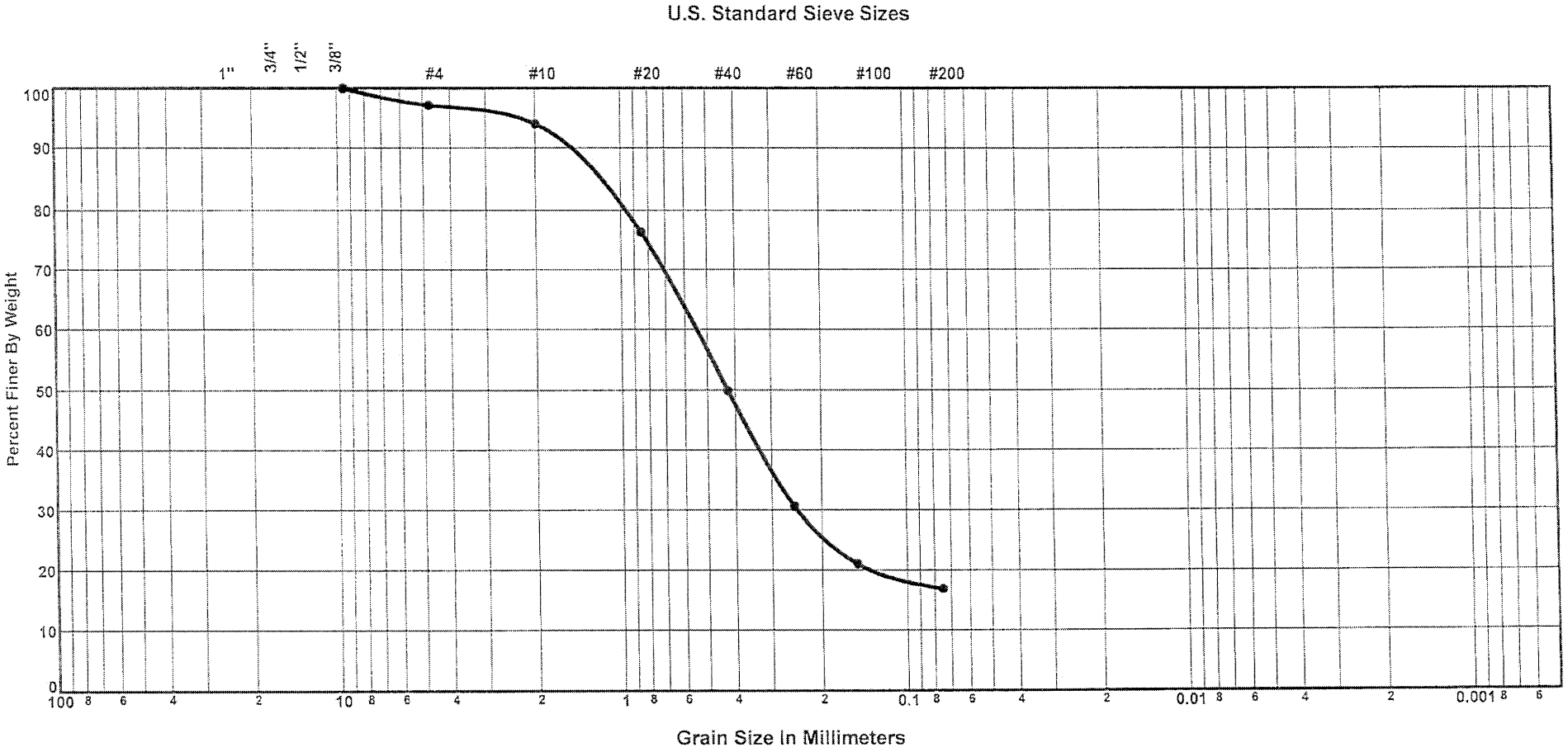
Project:
Fallin Blvd Realignment &
Berkley Blvd Culvert Upgrades
Goldsboro, North Carolina

Job No.: 1-10-0646-EA

Date: 12/20/10

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.



GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
B-2 Bulk	1-3'		18.0	18.0	NP	Gray Silty Fine to Medium SAND

Project:

Fallin Blvd. Reallingment
Goldsboro, North Carolina

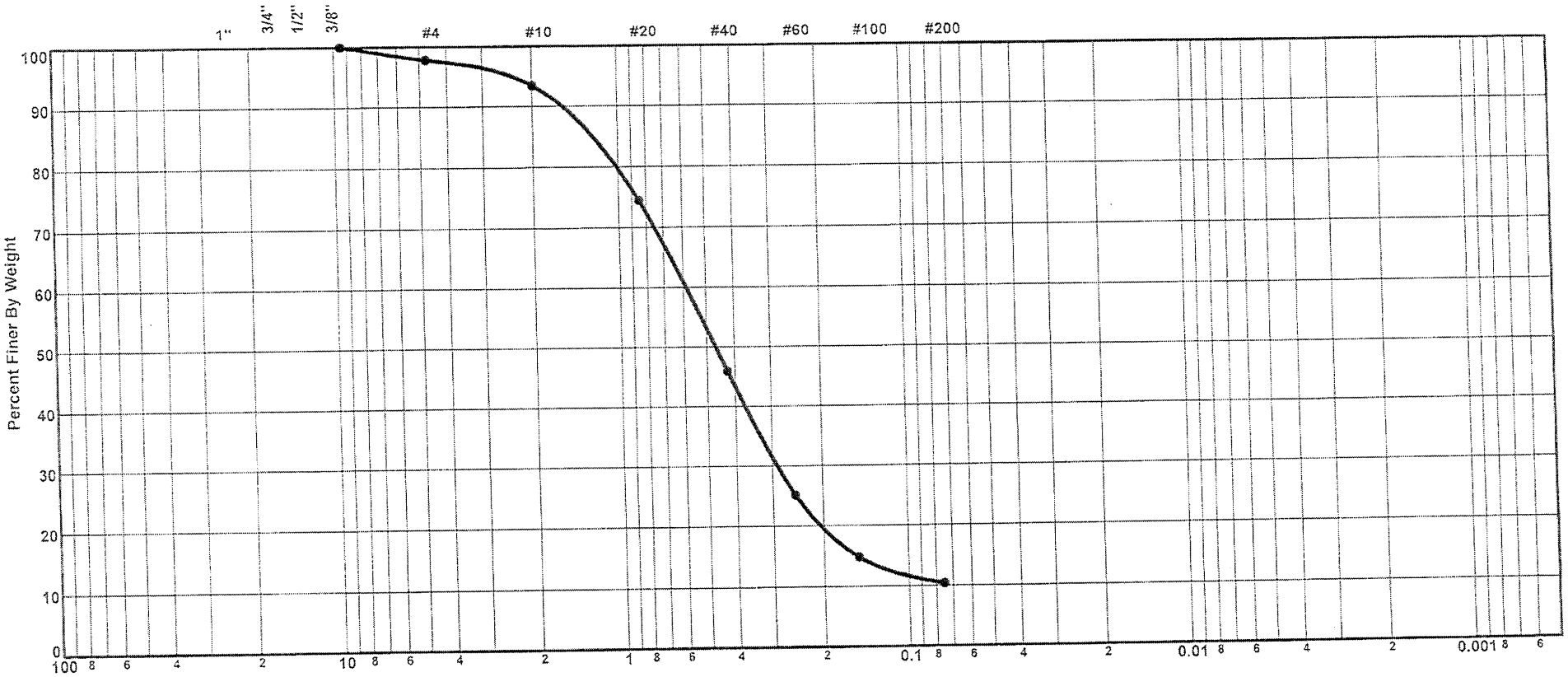
Job No.: 1-10-0646-EA

Date: 11/23/10

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
B-3	2'					Gray Silty Fine to Medium SAND

Project:

Fallin Blvd. Reallingment
Goldsboro, North Carolina

Job No.: 1-10-0646-EA

Date: 11/23/10

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

Report of Subsurface Investigation
Goldsboro Roadway Projects
Goldsboro, North Carolina
GeoTechnologies Project No. 1-02-0071-EA

Prepared For:

Kimley-Horn & Associates
P.O. Box 33068
Raleigh, NC 27636

Prepared By:

GeoTechnologies, Inc., P.A.
3200 Wellington Court, Suite G
Raleigh, North Carolina 27615

March 2002

GeoTechnologies, Inc.

GeoTechnologies, Inc.

3200 Wellington Court, Suite G
Raleigh, North Carolina 27615
919-954-1514
Fax 919-954-1428

March 15, 2002

Kimley-Horn & Associates
P.O. Box 33068
Raleigh, NC 27636

Attn: Mr. Chuck Nuckols

Re: Report of Subsurface Investigation
Goldsboro Roadway Projects – Berkley Boulevard, Royal Avenue
And Oak Forest Road
Goldsboro, North Carolina
GeoTechnologies Project No. 1-02-0071-EA

Gentlemen:

GeoTechnologies, Inc. has completed the authorized subsurface investigation, field testing, laboratory testing, and geotechnical engineering evaluation for the proposed roadway projects in Goldsboro, North Carolina. This report presents the findings of the investigation and recommendations for design and construction of the widening areas.

Subsurface conditions at the site were investigated by completing forty soil test borings. Originally, the borings were to be placed on approximately 200 foot intervals and adjacent to the roadway; however, due to the presence of numerous underground utilities existing immediately adjacent to the roadways, the borings could only be advanced in the 40 locations indicated on the attached Figures 1 through 4. The borings were drilled utilizing a drill rig mounted on an all-terrain carrier utilizing 2-1/4 inch diameter hollow stem augers to advance the borings to a termination depth of 10 feet below existing site grade. In these areas, standard penetration testing was completed in accordance with ASTM D-1586 and was utilized to sample the subsurface soils at selected intervals in the borings. Penetration resistances from the soils encountered by the test borings were utilized to evaluate consistency and density of the subsurface materials. Several of the test borings were also probed or advanced by hand augering techniques due to the presence of overhead power lines or inaccessibility due to existing establishments. Standard penetration resistances for the subsurface materials were estimated as the augers were advanced into the subsurface profile and the indicated resistances should therefore also be considered approximate at 7 locations.

Additionally, laboratory Atterberg limits, grain size distribution, standard Proctor compaction, and one-point soaked CBR tests were performed on 10 representative samples.

PROJECT INFORMATION

It is our understanding that the project will involve widening of the existing Berkley Boulevard from Royal Avenue to New Hope Road (Station 10+00 to Station 70+00). Additionally, we understand that widening and construction of new sections of Royal Avenue (Station 10+00 to Station 62+00) and North Oak Forest Road will be conducted.

SUBSURFACE CONDITIONS

Generalized subsurface profiles prepared from the test boring data are attached to this report as Figures 2 through 5 to graphically illustrate subsurface conditions encountered at this site. More detailed descriptions of the conditions encountered at the individual test boring locations are then presented on the attached test boring records.

The subsurface profile consisted of a near surface veneer of topsoil extending to depths of 8 to 12 inches. Topsoil depths in areas adjacent to the existing Central Heights Road, particularly in the agricultural fields, extended up to 18 inches below the site grade. Topsoil materials were underlain by silty and clayey sands extending to the boring termination depth of 10 feet below site grade. Penetration resistances in the sands varied from 2 to 26 blows per foot (bpf). The borings were terminated at 10 feet below existing site grade.

All of the test borings were terminated prior to encountering partially weathered rock. Groundwater was encountered between 2 and 7 feet below the site grade. It should be noted that the subsurface conditions on this site are conducive to the development of perched water and groundwater levels are likely to fluctuate during different times of the year.

LABORATORY INVESTIGATION

The laboratory testing program was directed primarily towards evaluating the subgrade support characteristics of the subsurface soils. Soil samples recovered from the field were visually classified by a geotechnical engineer prior to laboratory testing. The laboratory testing program included the following items which were completed in general accordance with the specified ASTM guidelines:

1. Standard Proctor Compaction Tests (ASTM D-698),
2. California Bearing Ratio Tests (ASTM D-1883), and
3. Grain Size Distribution (ASTM D-1140).

The results of all laboratory tests are attached to this report.

In summary, the results of the standard Proctor compaction tests indicate that the near surface soils at the site have standard Proctor maximum dry densities ranging from approximately 114.0 to 123.9 pounds per cubic foot(pcf) with optimum moisture contents of

approximately 10.2 to 14.0%. The California Bearing Ratio tests completed on samples recovered from the site have design CBR values of between 6.2 to in excess of 20% with negligible swell values. Typically, the soils which exist in this area will exhibit CBR values on the order of about 6% to 10% when properly recompacted to not less than 98% of the standard Proctor maximum dry density. The majority of the soils encountered on this site consist of nonplastic sandy materials and it is our opinion that design CBR values on the order of 6 to 10% are commonly found in the area.

RECOMMENDATIONS

The following recommendations are made based upon a review of the attached test boring data, laboratory testing, our understanding of the proposed construction, and past experience with similar projects and subsurface conditions. Should site grading or roadway alignment change significantly from those now under consideration, we would appreciate being provided with that information so that these recommendations may be confirmed, extended, or modified as necessary.

General Site Conditions. Test borings performed along the route of the proposed roadways indicate the soils to consist predominately of nonplastic silty and clayey sands. The sandy materials were loose in some areas and contained excess moisture content. Some repair work consisting of moisture conditioning and recompacting the surface soils should be anticipated. It should be noted that numerous underground utilities exist immediately adjacent to the existing roadways and that those utility trenches probably have not been backfilled with properly compacted fill in all cases. Our experience has been that utility backfill over lines which are installed as closely spaced as those which exist along this roadway alignment generally are moderately to poorly compacted and will take on significant quantities of moisture during the wetter winter months of the year making those areas unstable.

Based on these findings, we do not anticipate that difficult excavation will be encountered anywhere along the proposed widening project, but the marginal subgrade conditions will exist due to loose, wet sands and over underground utilities. We suggest that the design be based on CBR values of 6 to 10% and that consideration be given to design alternatives for strengthening the roadway section over portions of the utility corridors. Typically, the utility corridors are repaired by excavating slightly deeper and utilizing a geogrid reinforcement such as BX-1100 grid with additional stone replacement. If the depth of the line is such that the appropriate over-excavation and stone replacement cannot be performed, another practice which has been successfully used is to increase the support value of the finished base course by adding approximately 4% cement by weight using a rotor tiller to provide for uniform distribution of this cement in the section. The most appropriate method of repair will need to be determined in the field at the time of construction. Due to very significant potential for having marginal conditions in the utility corridors, we suggest that roadway sections include alternatives for stabilizing the roadway subgrade over the utility corridors. Additionally, the subgrade soils should be scarified and recompacted prior to placement of CABC base course stone or fill. The

specific method and location of repairs will need to be evaluated in the field during grading activities.

Site Grading Considerations. The initial grading process should begin with the removal of all vegetation and topsoil from those areas designed for construction of the proposed widening areas. We anticipate that stripping thickness will generally be on the order of 6 to 12 inches; however, these measurements may be thicker in agricultural areas. At these locations, stripping thickness on the order of 8 to 18 inches may be required to adequately remove all roots and organics. Once stripping is completed, we recommend that all areas to receive fill be proofrolled with a partially loaded dump truck or similar piece of rubber tired equipment in order to identify any areas exhibiting subgrade deflection. Any area which ruts or pumps excessively under the action of rubber tired equipment should be properly cut to firm material and replaced with properly compacted structural fill or reworked and recompacted in place. Once the proposed widening areas or new roadways have been stripped, we recommend that a geotechnical engineer visit with the contractor on the site to provide additional recommendations regarding horizontal and vertical limits of repair and the necessity of utilizing a geogrid reinforcement or additional stone. Any off-site borrow fill used should consist of silty or clayey sands or low plasticity silts or clays having AASHTO soil classifications of A-1, A-2, A-3, A-4, or A-6. These materials should not be compacted to less than 95% of the standard Proctor maximum dry density except for the final foot beneath pavement subgrades where this requirement should be increased to 100% of the standard Proctor maximum. It is recommended that quality control testing be performed to verify that proper soil density specifications are being met, and to insure the placement of fill is being performed in a controlled manner.

Since the on-site soils are moisture sensitive, the contractor should be prepared to moisture condition the near surface soils as needed to achieve proper compaction. Fill materials should be compacted within 2% of the optimum moisture content. High near surface moisture conditions could result in rutting or pumping of the near surface soils which will require repair in the form of undercut and structural fill replacement or discing, drying, and recompacting; however, the exact limits of these repairs cannot be determined until the area has been proofrolled.

Pavement Design Recommendations. Laboratory standard Proctor compaction and 96 hour soaked CBR tests were performed on samples obtained from various locations which appear to be at or near finished grade. GeoTechnologies has utilized design CBR values ranging from 6 to 10 percent from averages for each section, based on the results of the CBR testing and our past experience with similar soil conditions.

Specific pavement designs are provided for Berkley Road, Royal Avenue West, and Royal Avenue extension (Central Heights and Oak Forest). Additionally, designs have been provided utilizing CABC base coarse stone as well as an alternate design utilizing full depth asphalt. The most important factors affecting pavement life in the area of the site are the condition of the subgrade immediately prior to base course stone placement or paving and post construction drainage. It is important that subgrades be reworked and compacted to not less than 100% of the standard Proctor maximum dry density immediately prior to base course stone

placement or paving. We recommend that all pavement areas be detailed to promote positive drainage away from paved areas. Pavement designs for these conditions, based on the traffic volumes estimated for 2,015 as provided by Kimley Horn & Associates, are as follows:

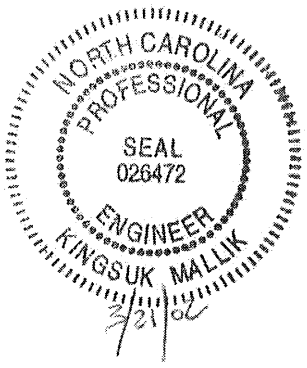
Section	S12.5B (in)	I19.0B (in)	B25.0B (in)	ABC (in)
Berkley Road	3	3	4.5	
	3	3		10
Royal Avenue West	3	3	4.0	
	3	3		10
Royal Avenue Extension	3	3	4.5	
	3	3		10

CABC base course stone should be compacted to 100% of the standard Proctor maximum dry density and all materials should comply with guidelines established by NCDOT for Roads and Structures. Surface asphalt(S12.5B and I19.0B) should be placed in lifts not less than 1.0 inch in thickness and should not to exceed 2.5 inches in thickness. H binder(B25.0B) should be placed in lifts not less than 2.0 inches in thickness and should not to exceed 4.0 inches in thickness.

GeoTechnologies, Inc. appreciates the opportunity to have provided you with our services on this phase of the project. Please contact us if you should have questions regarding this report or if we may be of further assistance.

Very truly yours,

GeoTechnologies, Inc.

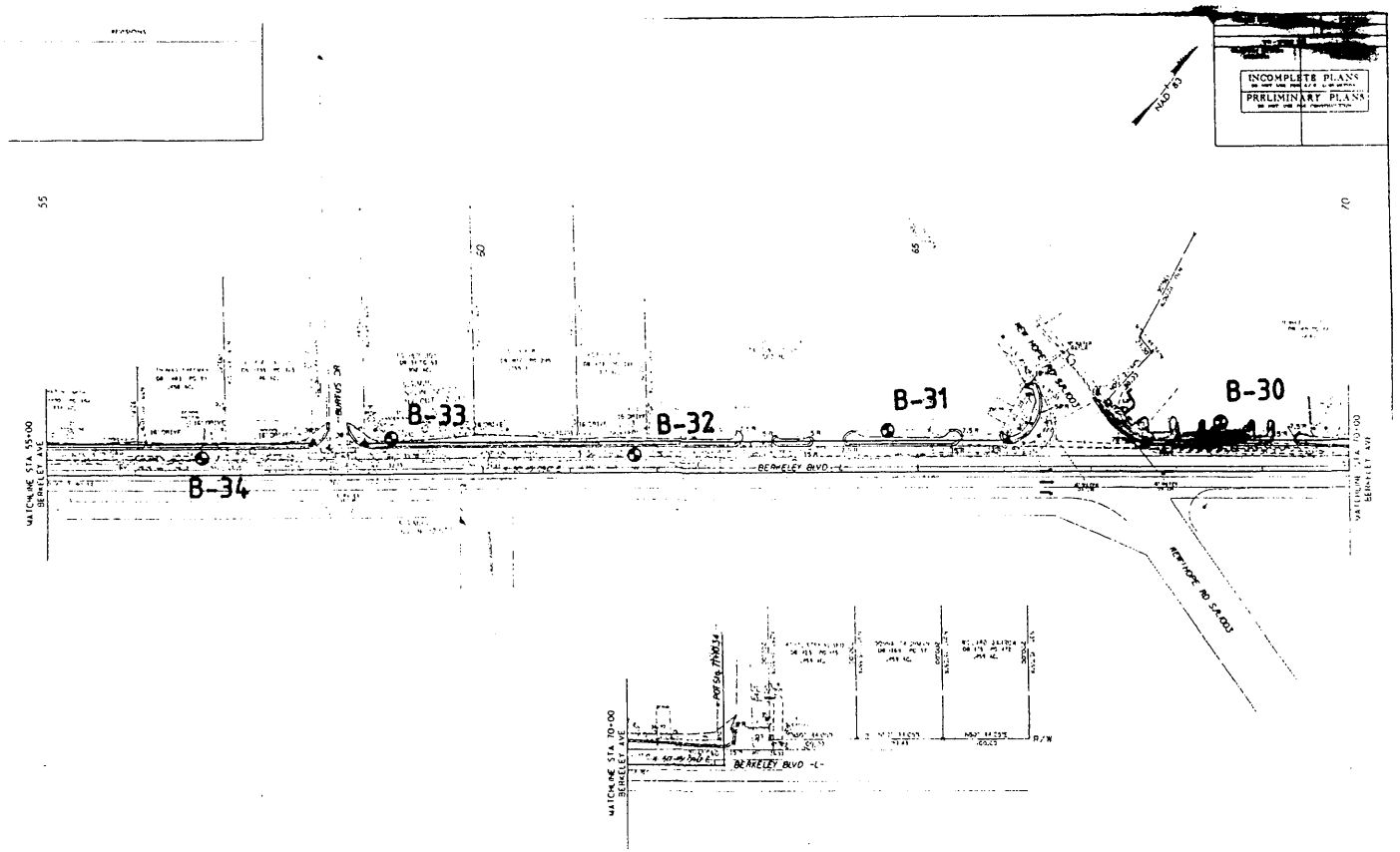


Toby Mallik, P.E.
NC Registration No. 26472

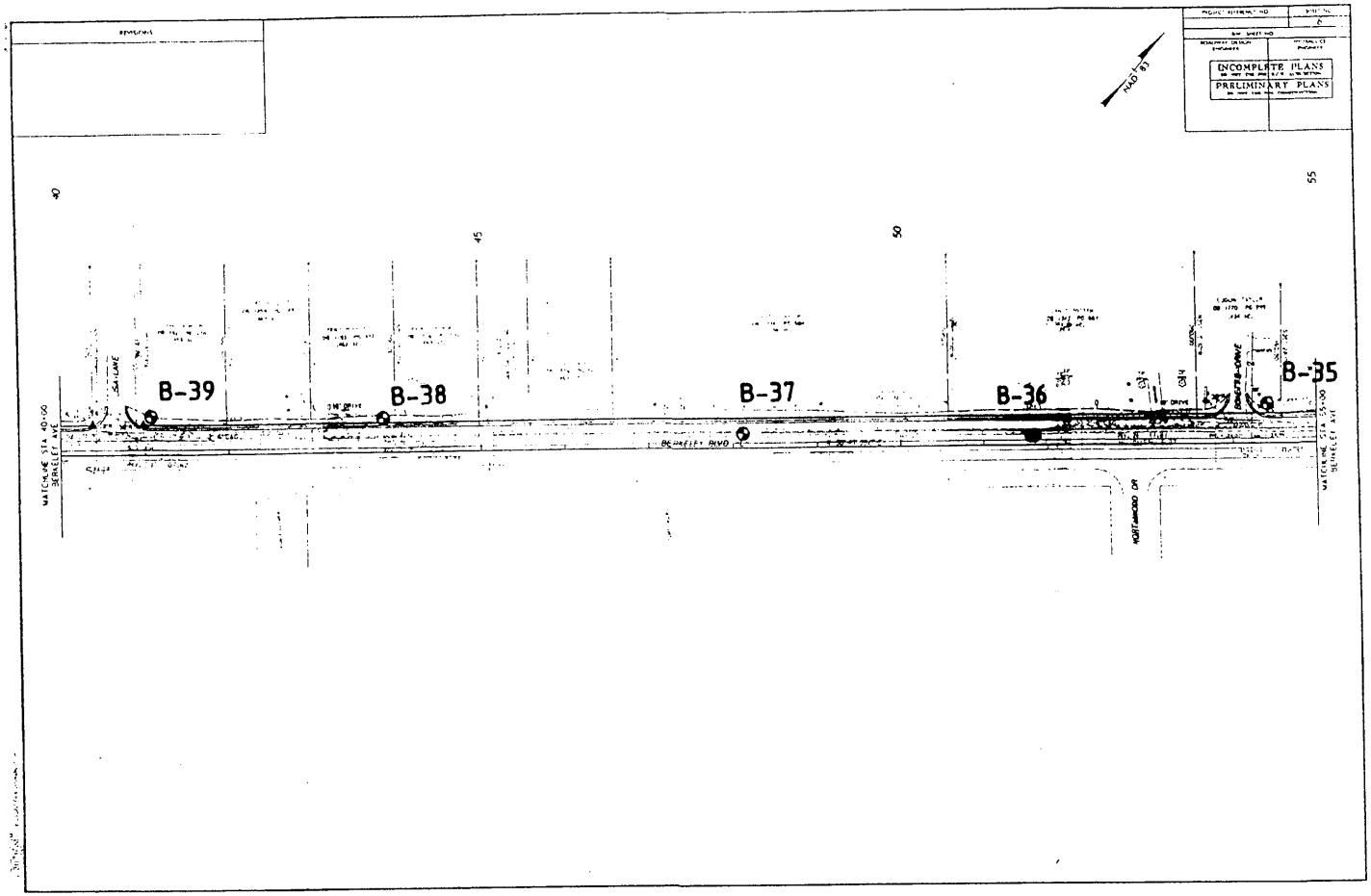
David L. Israel, P.E.
NC Registration No. 14319

TM/las
Attachments

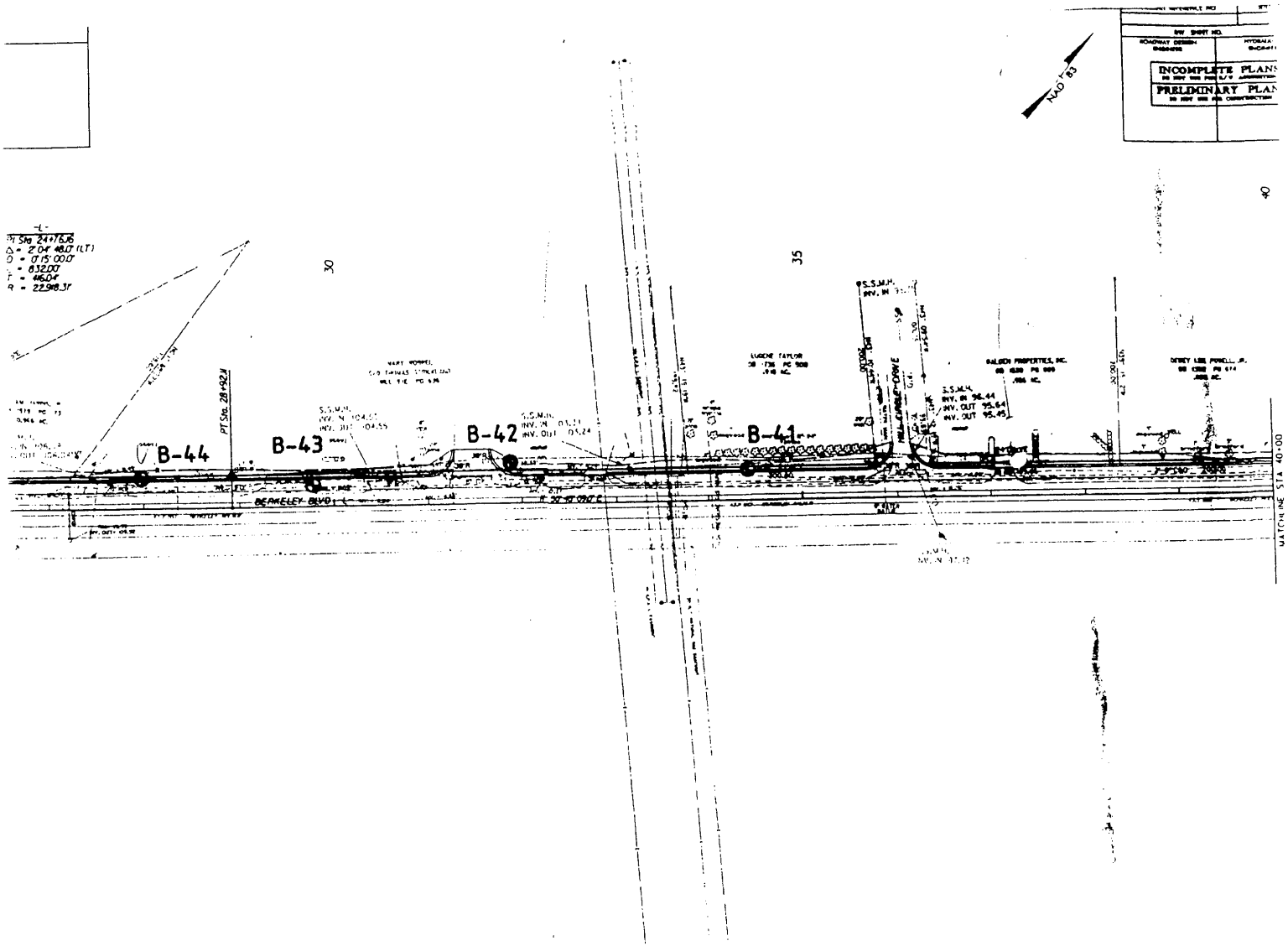
020071ea.doc



PROJECT: Goldsboro Road Widening Goldsboro, North Carolina	GeoTechnologies, Inc.	SCALE: Not to Scale JOB No: 1-02-0071-EA FIGURE No: 1A



PROJECT: Goldsboro Road Widening Goldsboro, North Carolina	GeoTechnologies, Inc.	SCALE: Not to Scale JOB No: 1-02-0071-EA FIGURE No: 1/3



PROJECT:

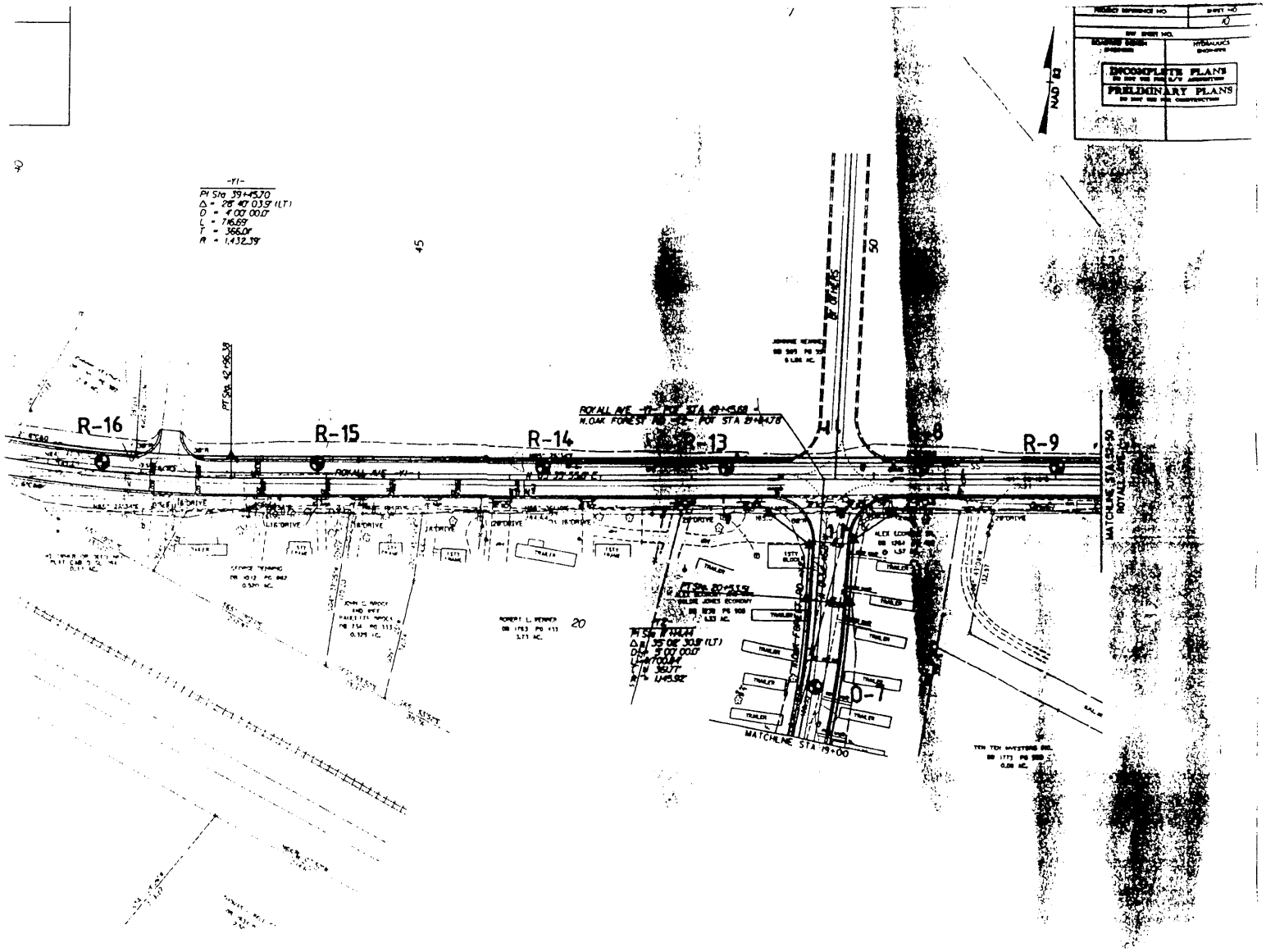
Goldsboro Road Widening
Goldsboro, North Carolina

GeoTechnologies, Inc.

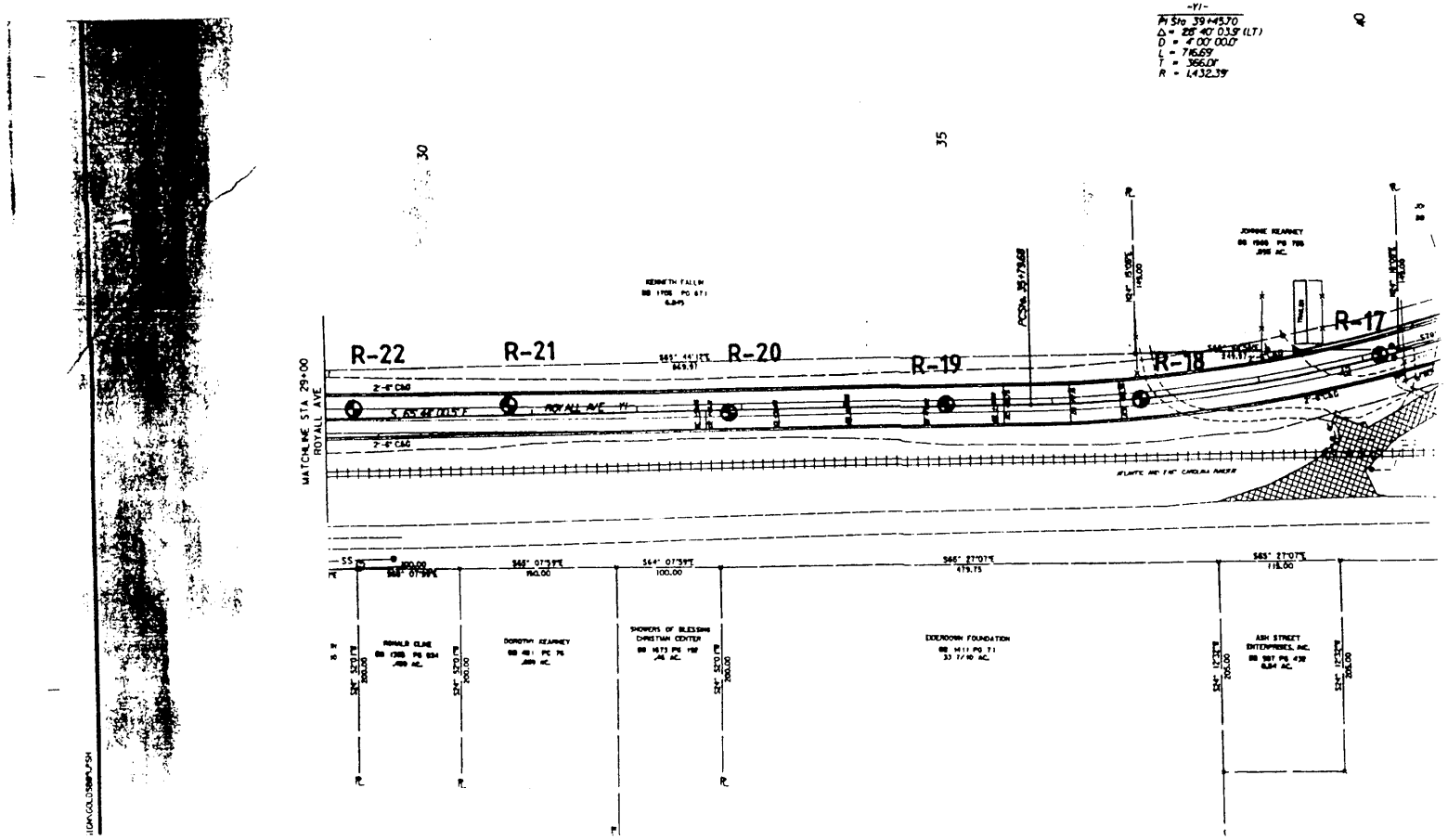
SCALE: Not to Scale

JOB No: 1-02-0071-EA

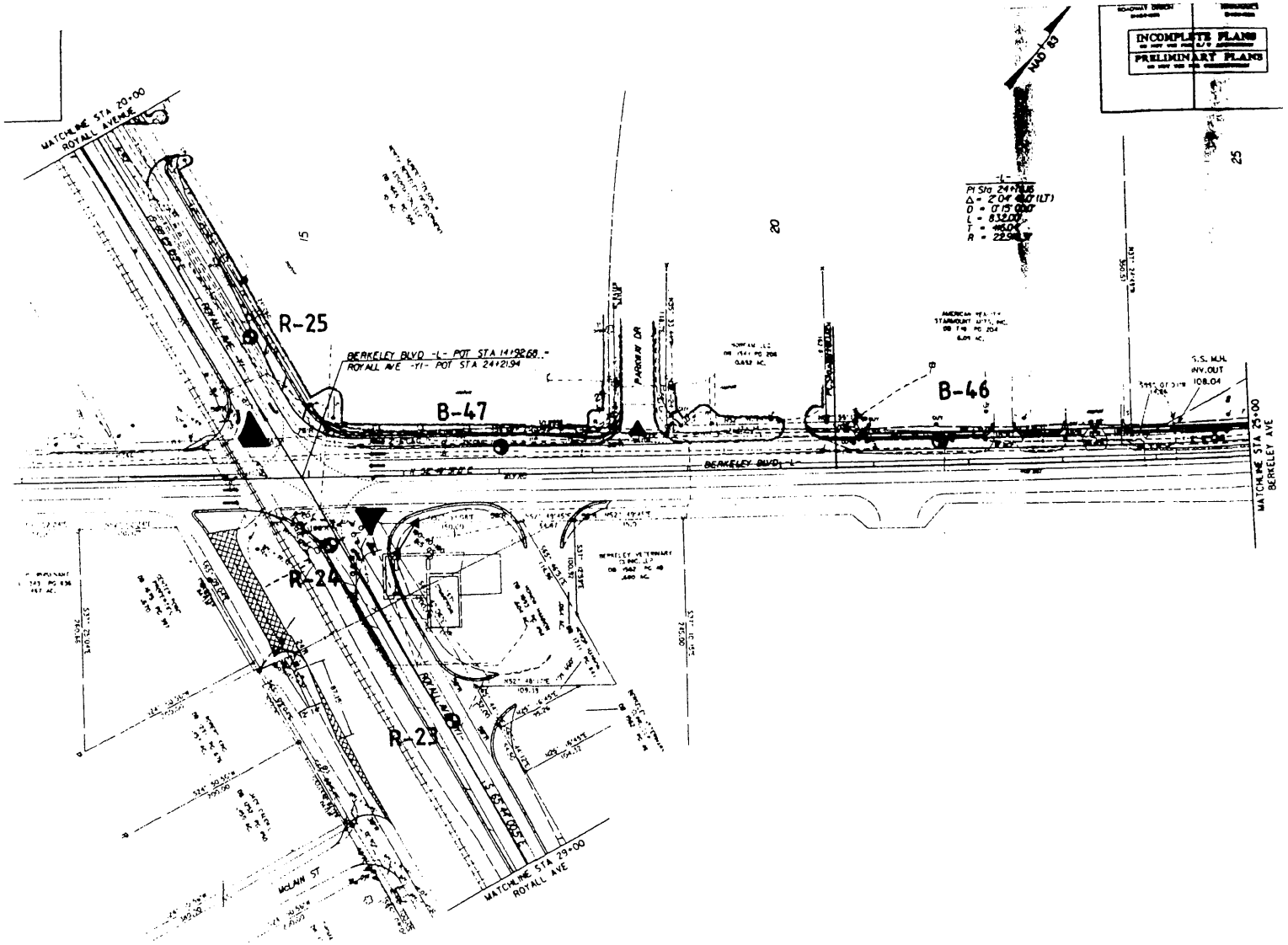
FIGURE No: 1C



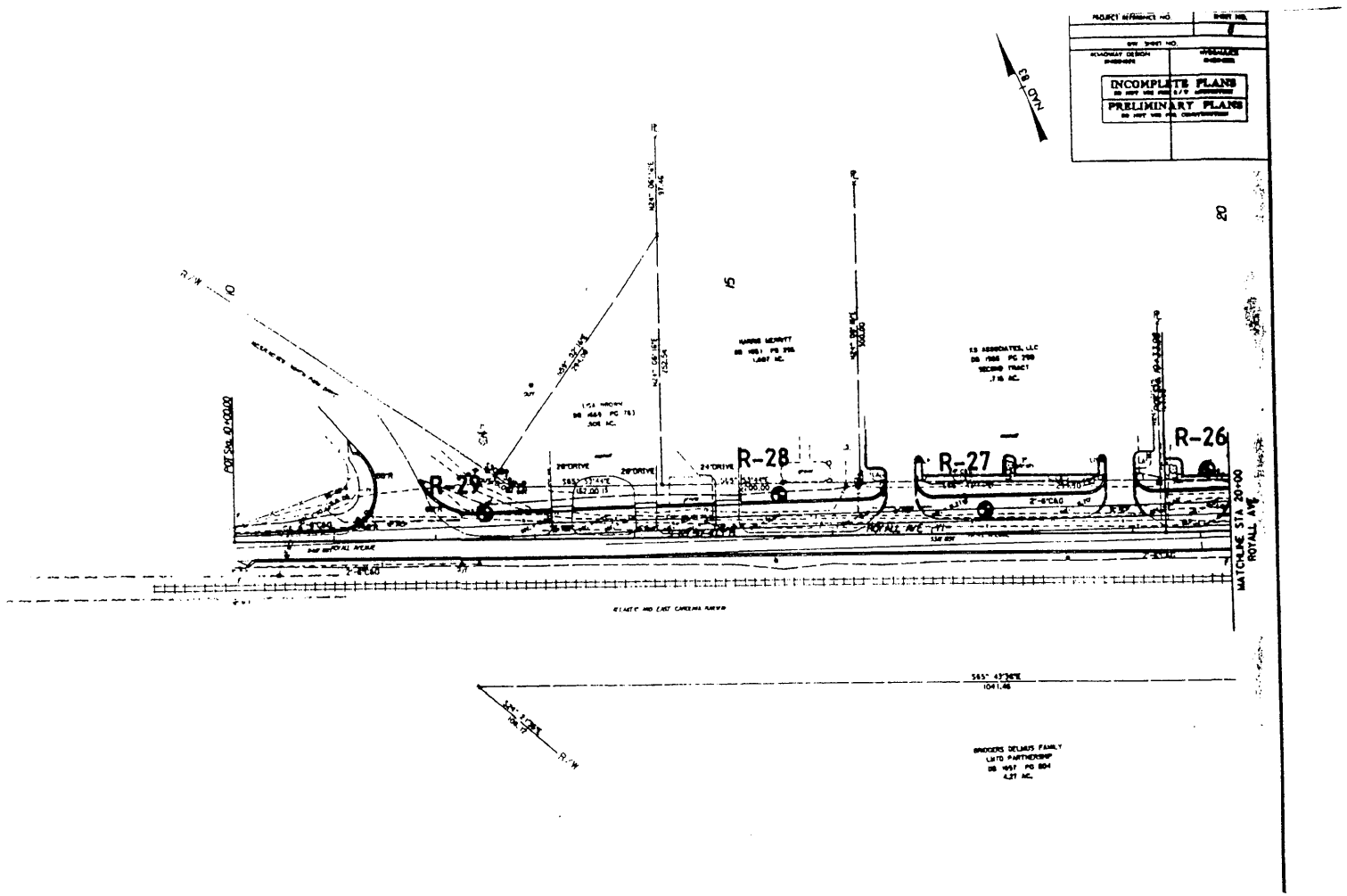
PROJECT: Goldsboro Road Widening Goldsboro, North Carolina	GeoTechnologies, Inc.	SCALE: Not to Scale JOB No: 1-02-0071-EA FIGURE No: 1D



PROJECT: Goldsboro Road Widening Goldsboro, North Carolina	GeoTechnologies, Inc.	SCALE: Not to Scale JOB No: 1-02-0071-EA FIGURE No: 1E



PROJECT: Goldsboro Road Widening Goldsboro, North Carolina	GeoTechnologies, Inc.	SCALE: Not to Scale JOB No: 1-02-0071-EA FIGURE No: 1F



PROJECT:

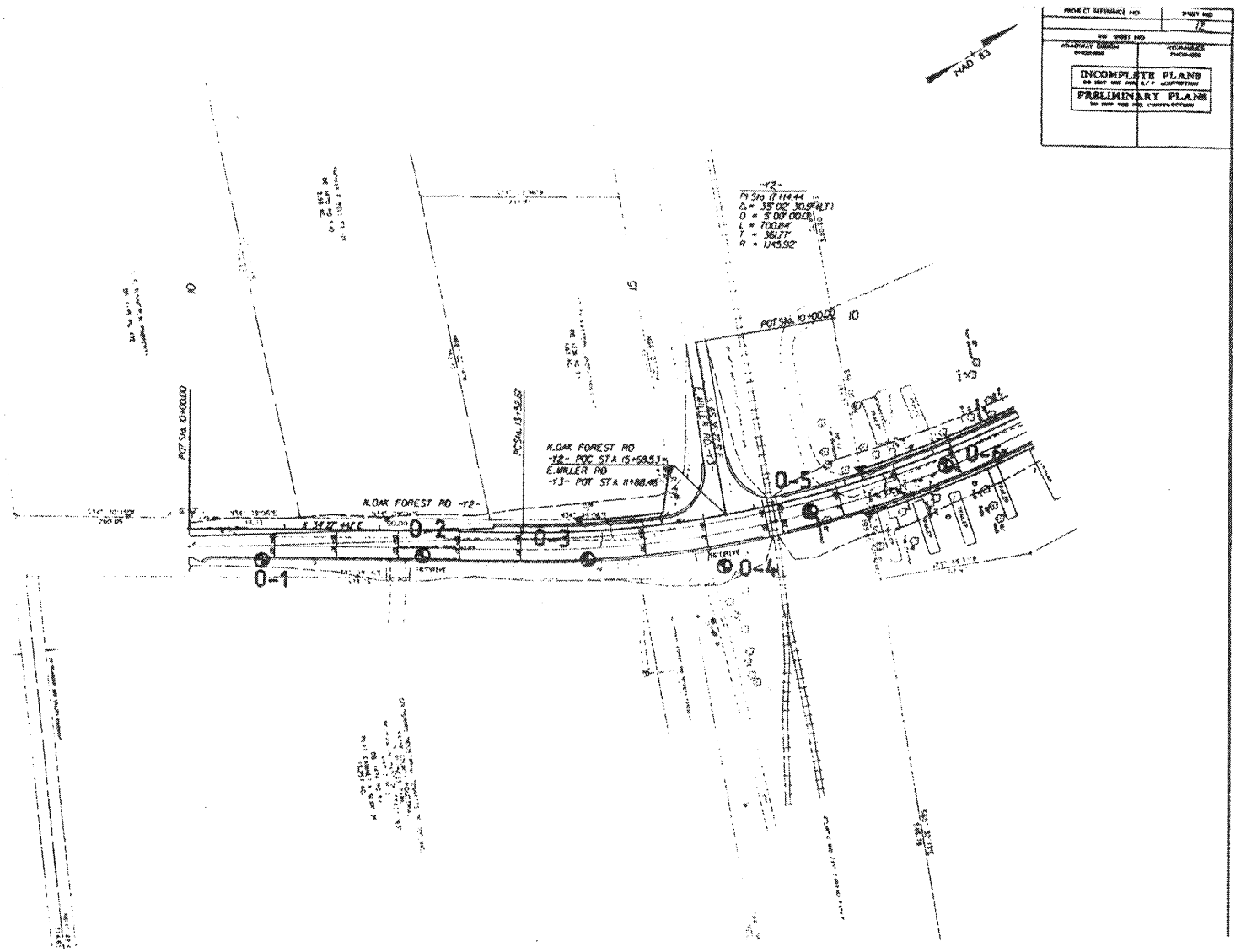
Goldsboro Road Widening
Goldsboro, North Carolina

GeoTechnologies, Inc.

SCALE: Not to Scale

JOB No: 1-02-0071-EA

FIGURE No: 16



PROJECT:

Goldsboro Road Widening
Goldsboro, North Carolina

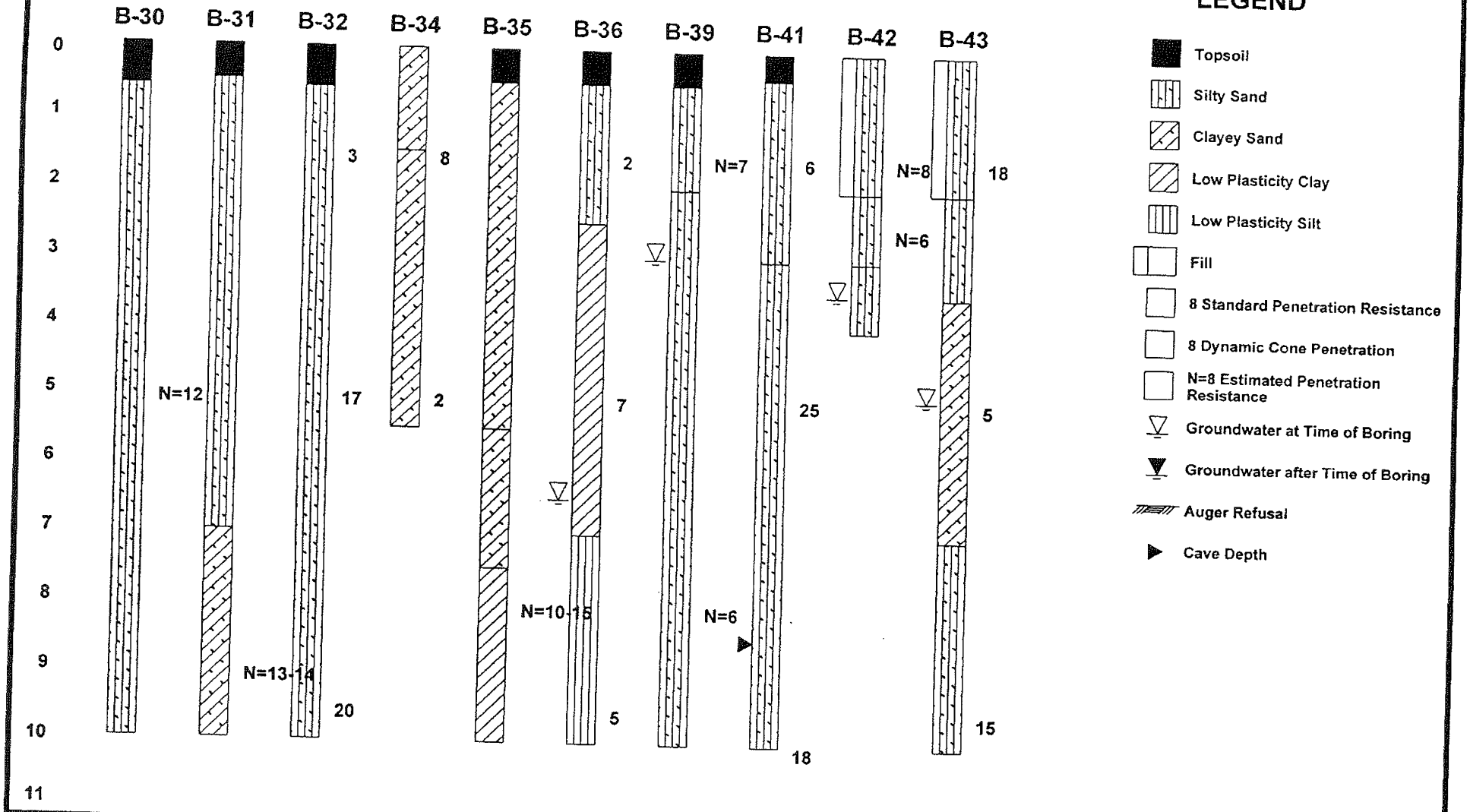
GeoTechnologies, Inc.

SCALE: Not to Scale

JOB No: 1-02-0071-EA

FIGURE No: 14

GENERALIZED SUBSURFACE PROFILE



PROJECT:

Goldsboro Road Widening
Goldsboro, North Carolina

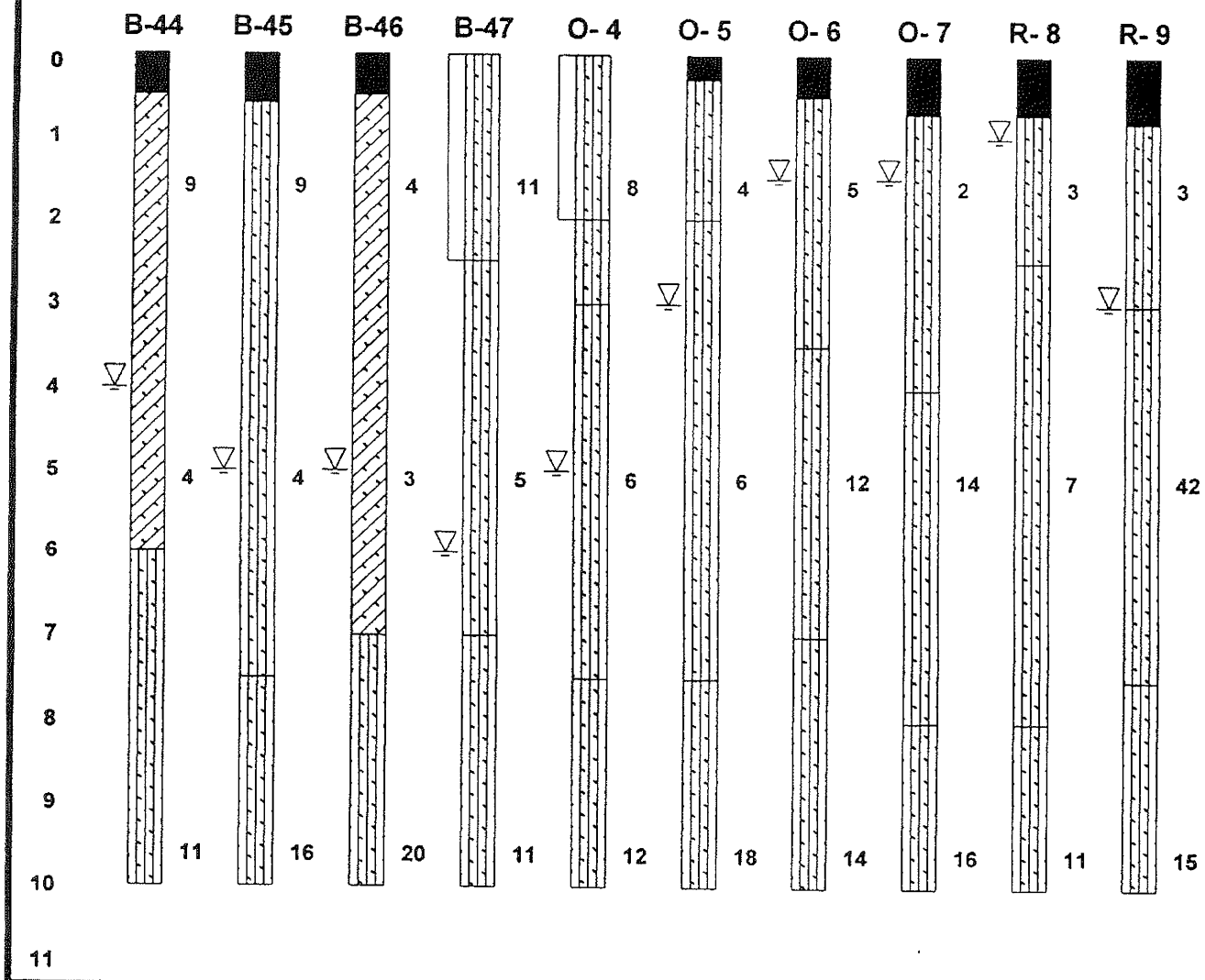
GeoTechnologies, Inc.

SCALE: As Shown

JOB No:1-02-0071-EA

FIGURE No:2

GENERALIZED SUBSURFACE PROFILE



LEGEND

- Topsoil
- Clayey Sand
- Silty Sand
- Fill
- 8 Standard Penetration Resistance
- 8 Dynamic Cone Penetration
- N=8 Estimated Penetration Resistance
- Groundwater at Time of Boring
- Groundwater after Time of Boring
- Auger Refusal
- Cave Depth

PROJECT:

Goldsboro Road Widening
Goldsboro, North Carolina

GeoTechnologies, Inc.

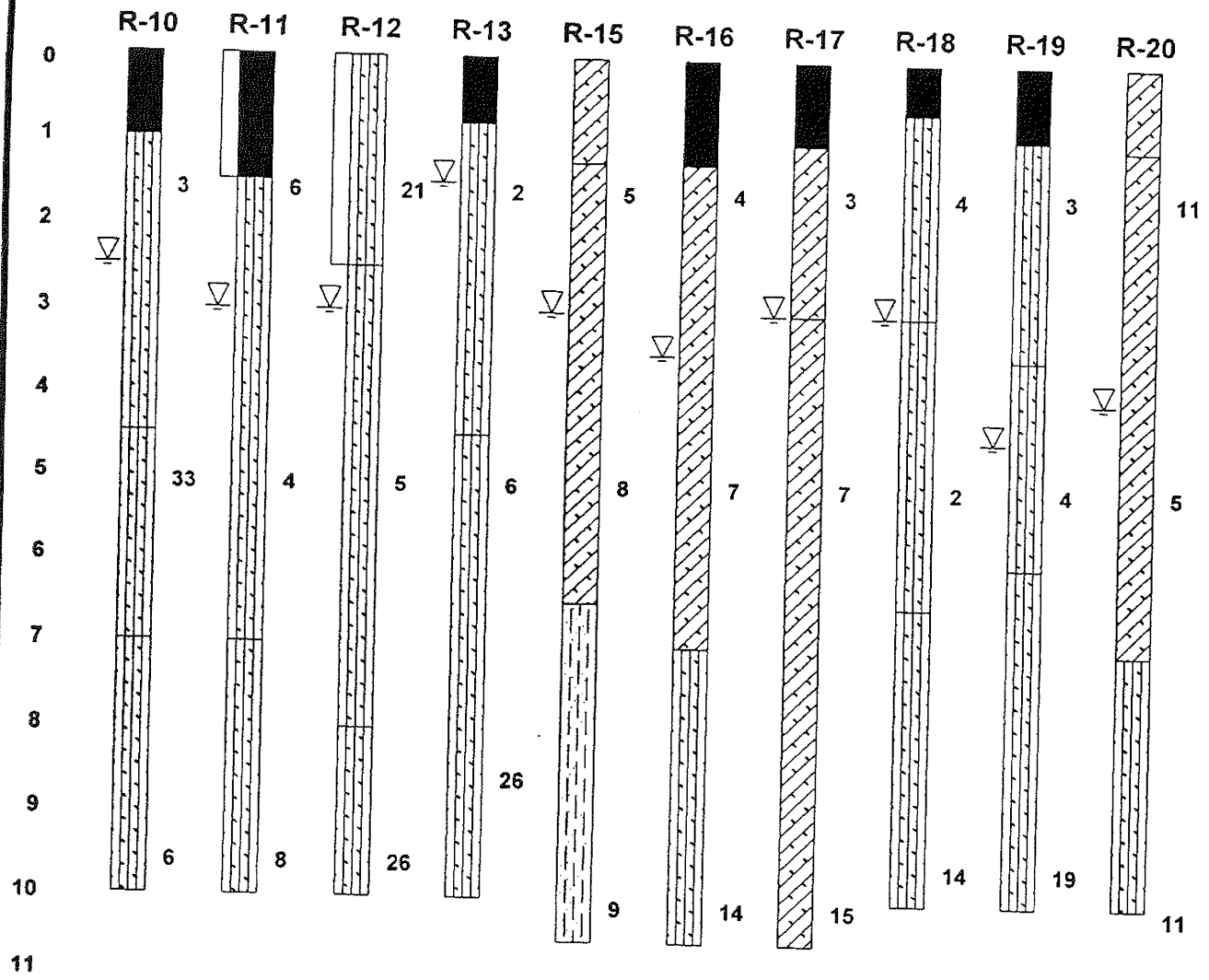
SCALE: As Shown

JOB No:1-02-0071-EA

FIGURE No:3

Depth (Feet)

GENERALIZED SUBSURFACE PROFILE



LEGEND

- Topsoil
- Silty Sand
- Clayey Sand
- Poorly-graded Sand with Silt
- Fill
- 8 Standard Penetration Resistance
- 8 Dynamic Cone Penetration
- N=8 Estimated Penetration Resistance
- Groundwater at Time of Boring
- Groundwater after Time of Boring
- Auger Refusal
- Cave Depth

PROJECT:

Goldsboro Road Widening
Goldsboro, North Carolina

GeoTechnologies, Inc.

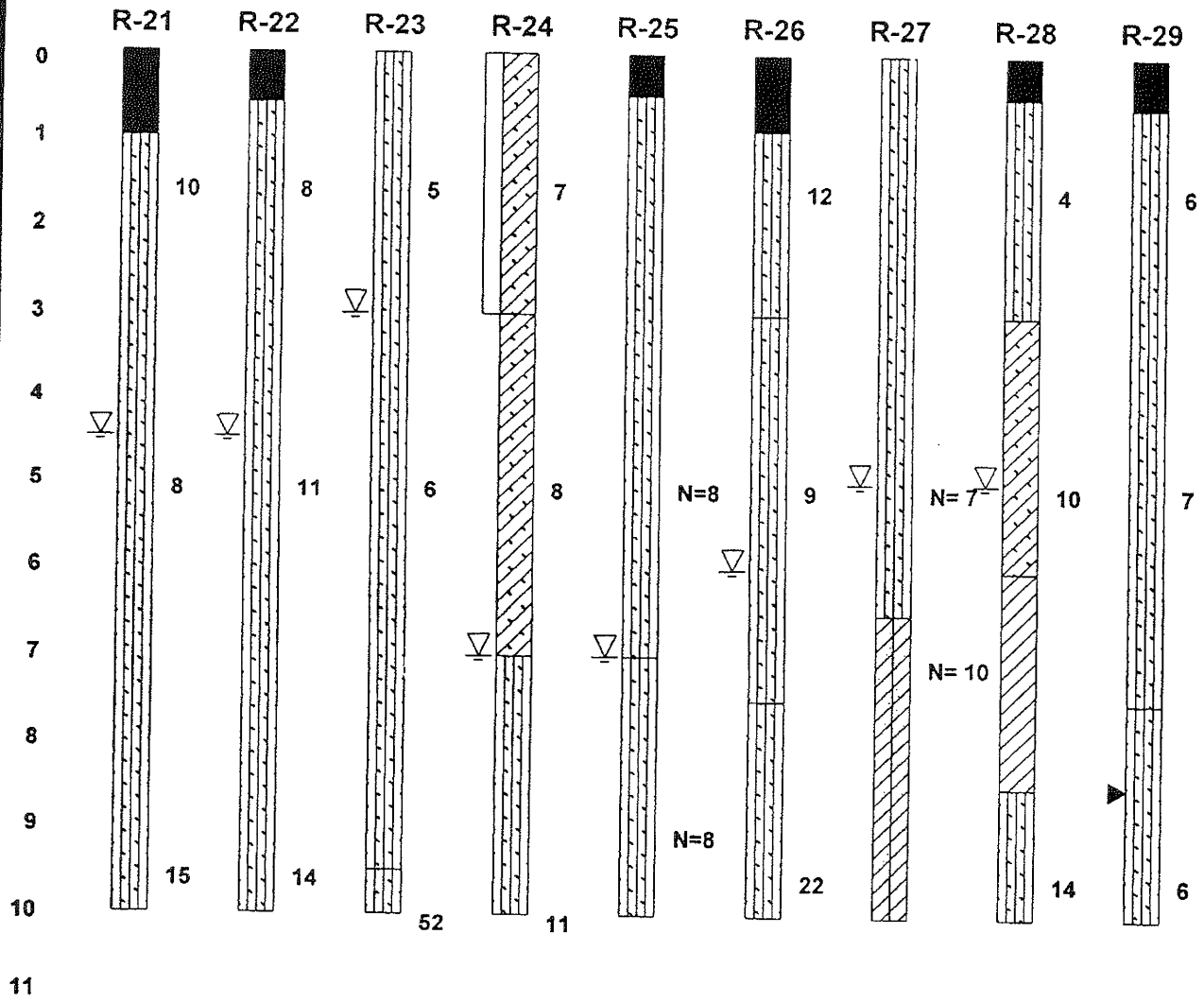
SCALE: As Shown

JOB No:1-02-0071-EA

FIGURE No:4

Depth (Feet)

GENERALIZED SUBSURFACE PROFILE



LEGEND

- Topsoil
- Silty Sand
- Clayey Sand
- Slightly Clayey Fine to Medium SAND
- Low Plasticity Clay
- Fill
- 8 Standard Penetration Resistance
- 8 Dynamic Cone Penetration
- N=8 Estimated Penetration Resistance
- Groundwater at Time of Boring
- Groundwater after Time of Boring
- Auger Refusal
- Cave Depth

PROJECT:

Goldsboro Road Widening
Goldsboro, North Carolina

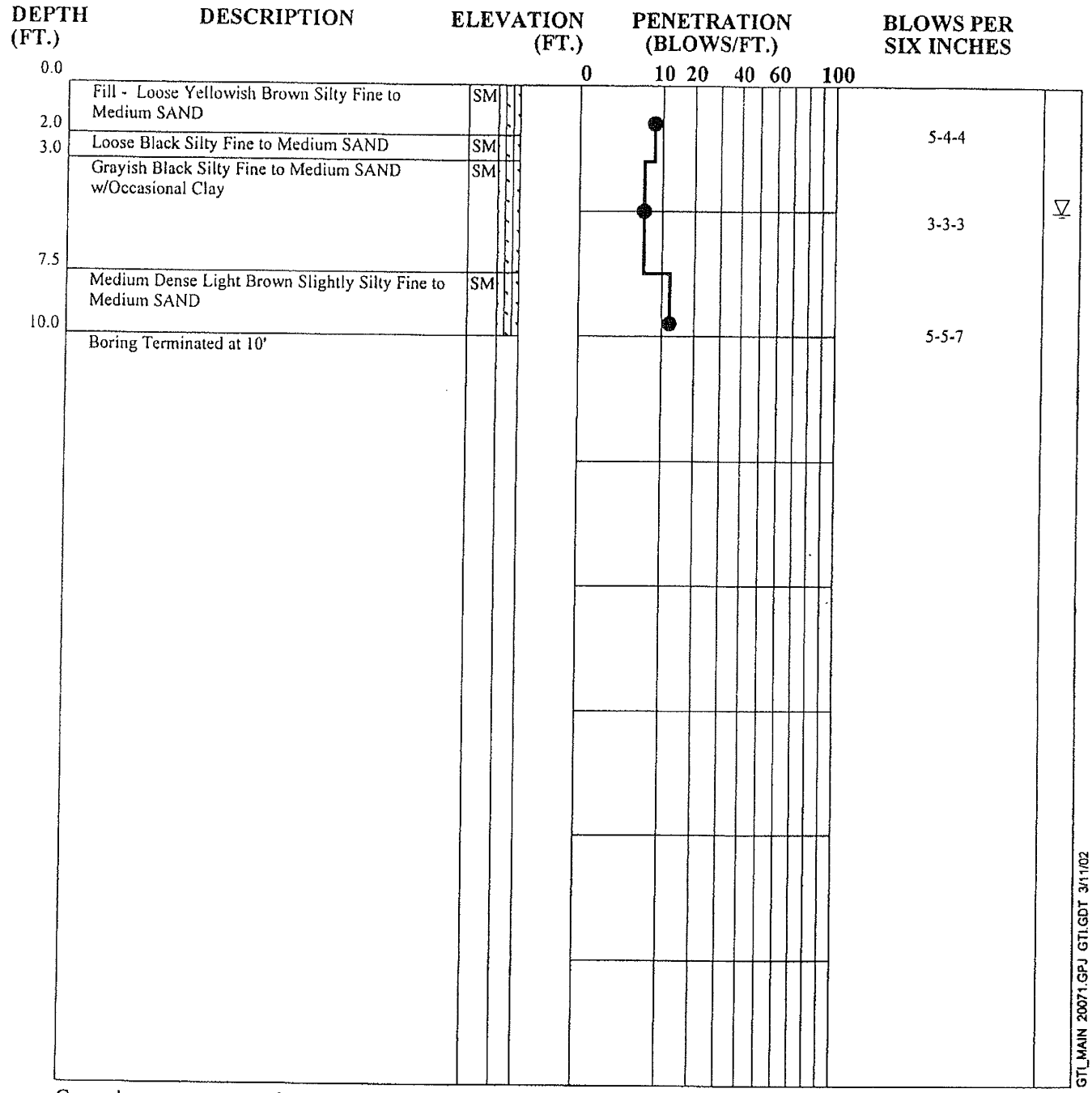
GeoTechnologies, Inc.

SCALE: As Shown

JOB No:1-02-0071-EA

FIGURE No:5

TEST BORING RECORD



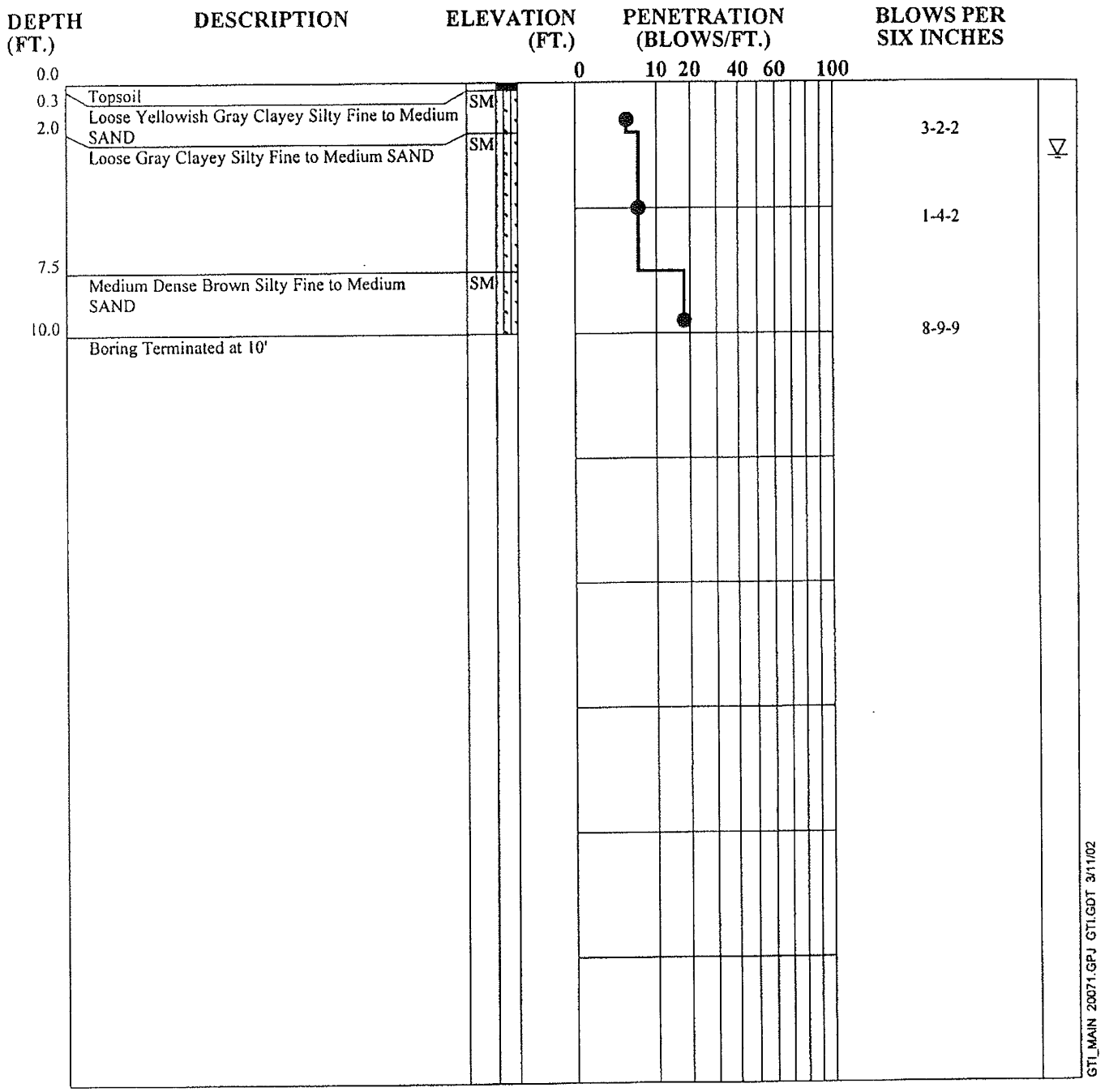
Groundwater encountered at 5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER O- 4
DATE 2-8-02

PAGE 1 OF 1

GeoTechnologies, Inc.

TEST BORING RECORD

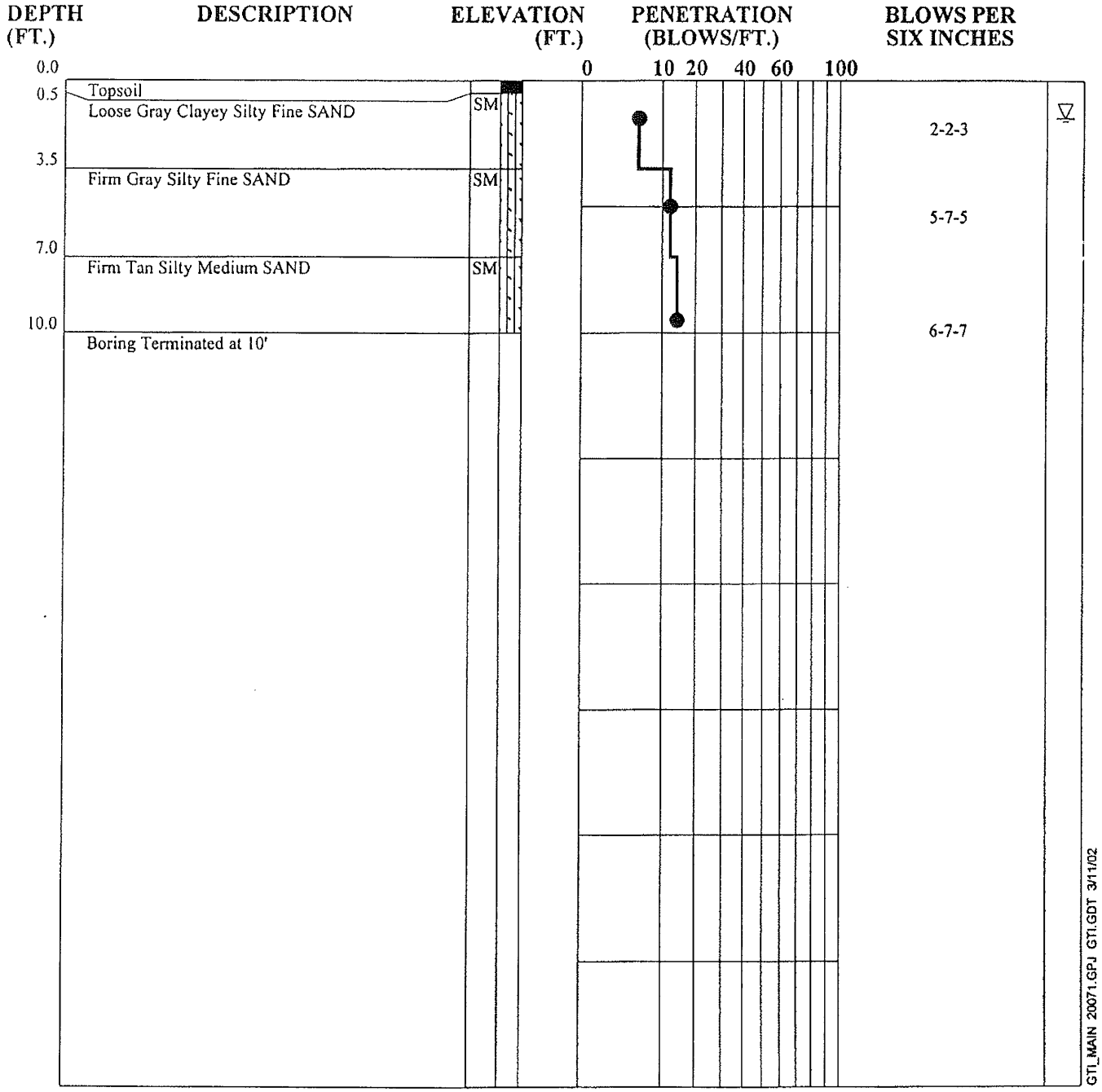


Groundwater encountered at 3' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER O- 5
DATE 2-8-02

GeoTechnologies, Inc.

TEST BORING RECORD



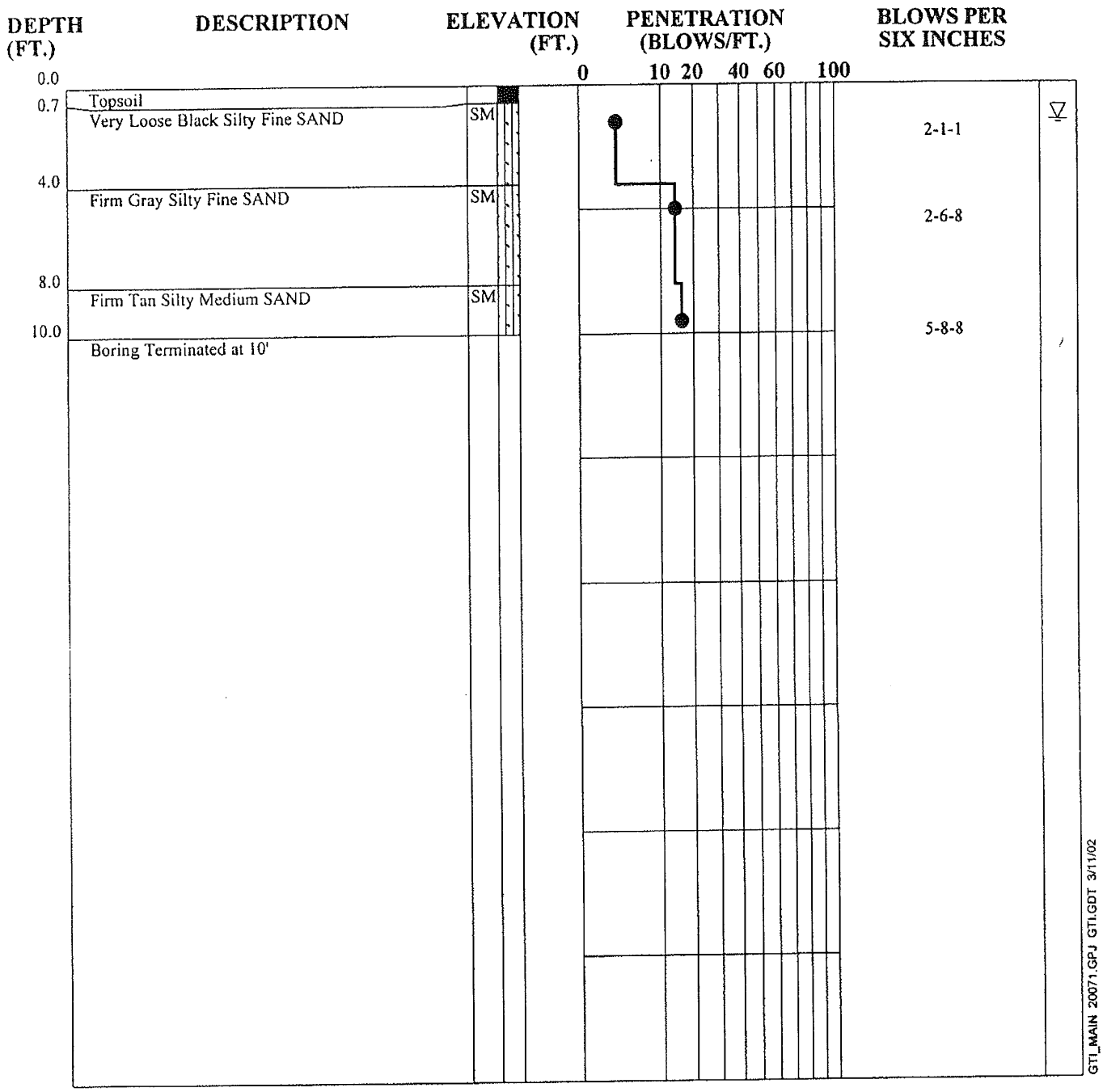
Groundwater encountered at 1.5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER O- 6
DATE 2-11-02

GeoTechnologies, Inc.

PAGE 1 OF 1

TEST BORING RECORD

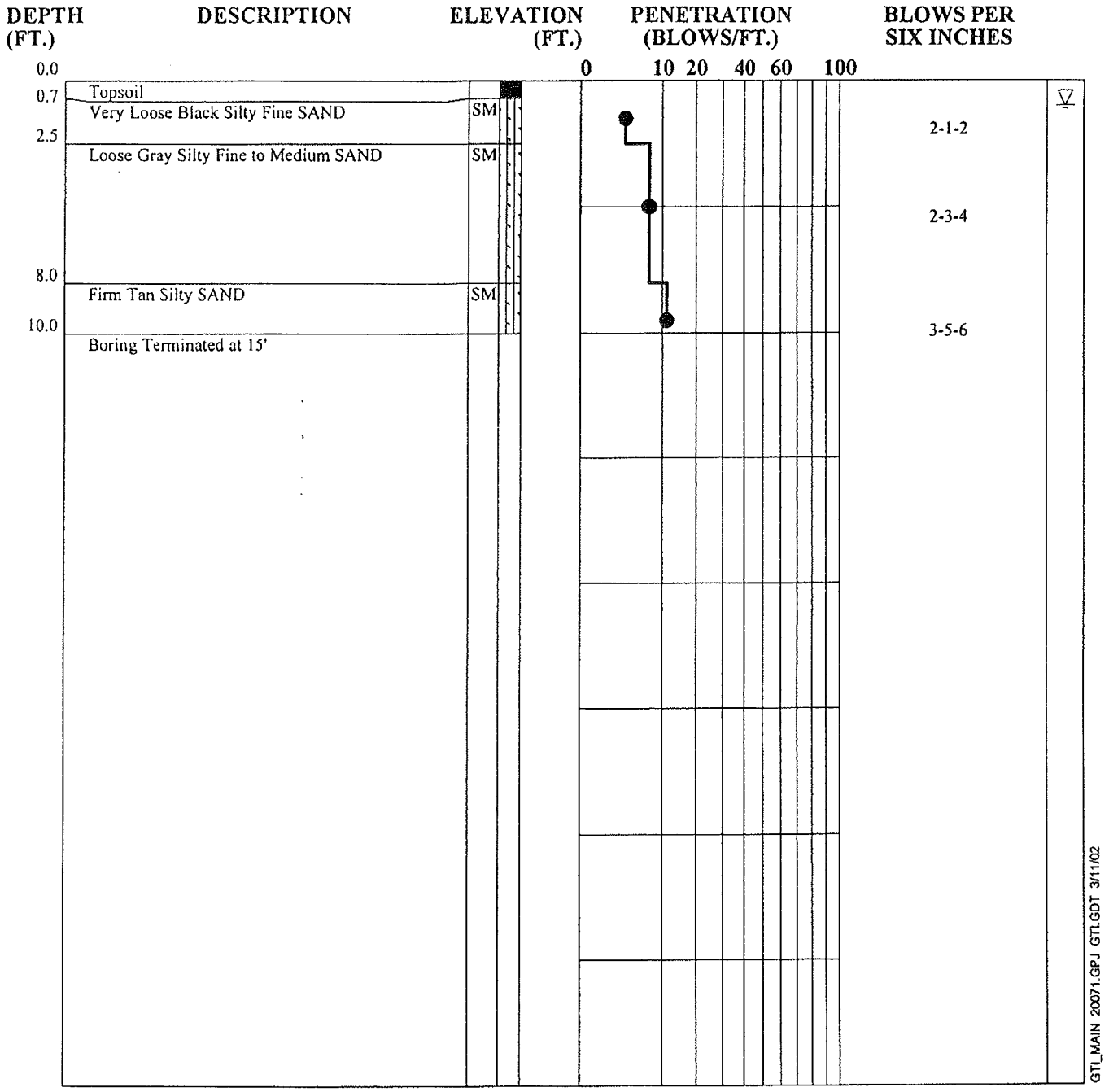


Groundwater encountered at 1.5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER O- 7
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD

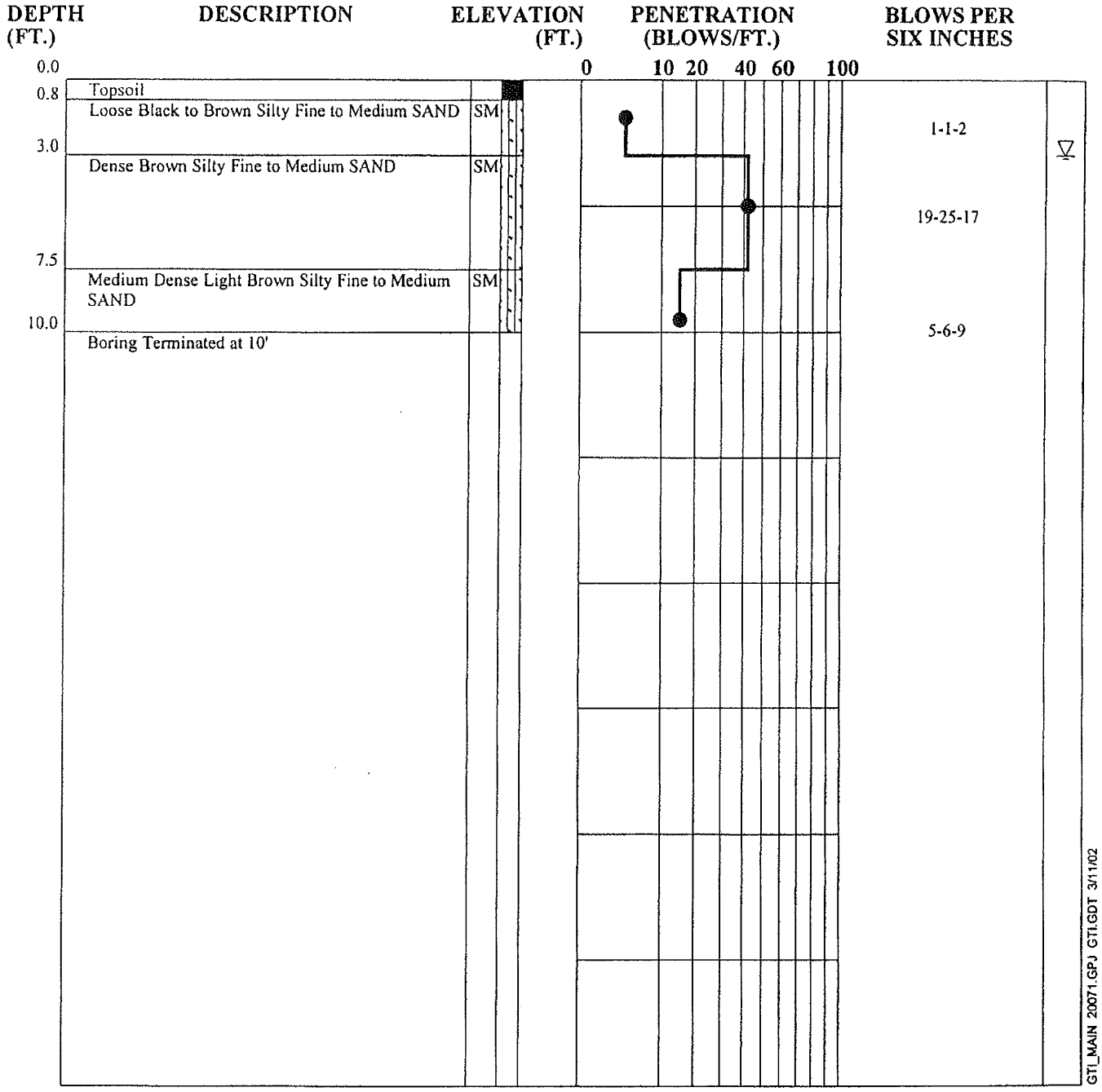


Groundwater encountered at 1' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER R- 8
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD



Groundwater encountered at 3' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-9
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.) 0 10 20 40 60 100	BLOWS PER SIX INCHES
0.0				
1.0	Topsoil			
	Loose Light Brown Silty Fine to Medium SAND	SM		2-1-2
4.5				
	Dark Gray Slightly Clayey Silty Fine to Medium SAND	SM		4-15-18
7.0				
	Loose Brown Silty Fine to Medium SAND	SM		1-3-3
10.0				
	Boring Terminated at 10'			

Groundwater encountered at 2.5' at time of boring

GTI_MAIN 20071.GPJ GTI.GDT 3/11/02

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-10
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.) 0 10 20 40 60 100	BLOWS PER SIX INCHES
0.0				
1.5	Fill - Topsoil Mixed w/Black Silty Fine to Medium SAND			
	Loose Gray & Black Silty Fine to Medium SAND	SM		4-4-2
7.0				2-2-2
	Loose Tan & Gray Silty Fine to Medium SAND	SM		
10.0				5-4-4
	Boring Terminated at 10'			

Groundwater encountered at 3' at time of boring.

GTL_MAIN 20071.GPJ GTI.GDT 3/11/02

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-11
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.) 0 10 20 40 60 100	BLOWS PER SIX INCHES
0.0	Fill - Firm Black Silty Fine to Medium SAND w/Topsoil	SM		2-13-8
2.5	Loose Gray & Black Fine to Medium SAND	SM		2-2-3
8.0	Firm Gray Silty Fine to Medium SAND	SM		10-11-15
10.0	Boring Terminated at 10'			

Groundwater encountered at 3' at time of boring.

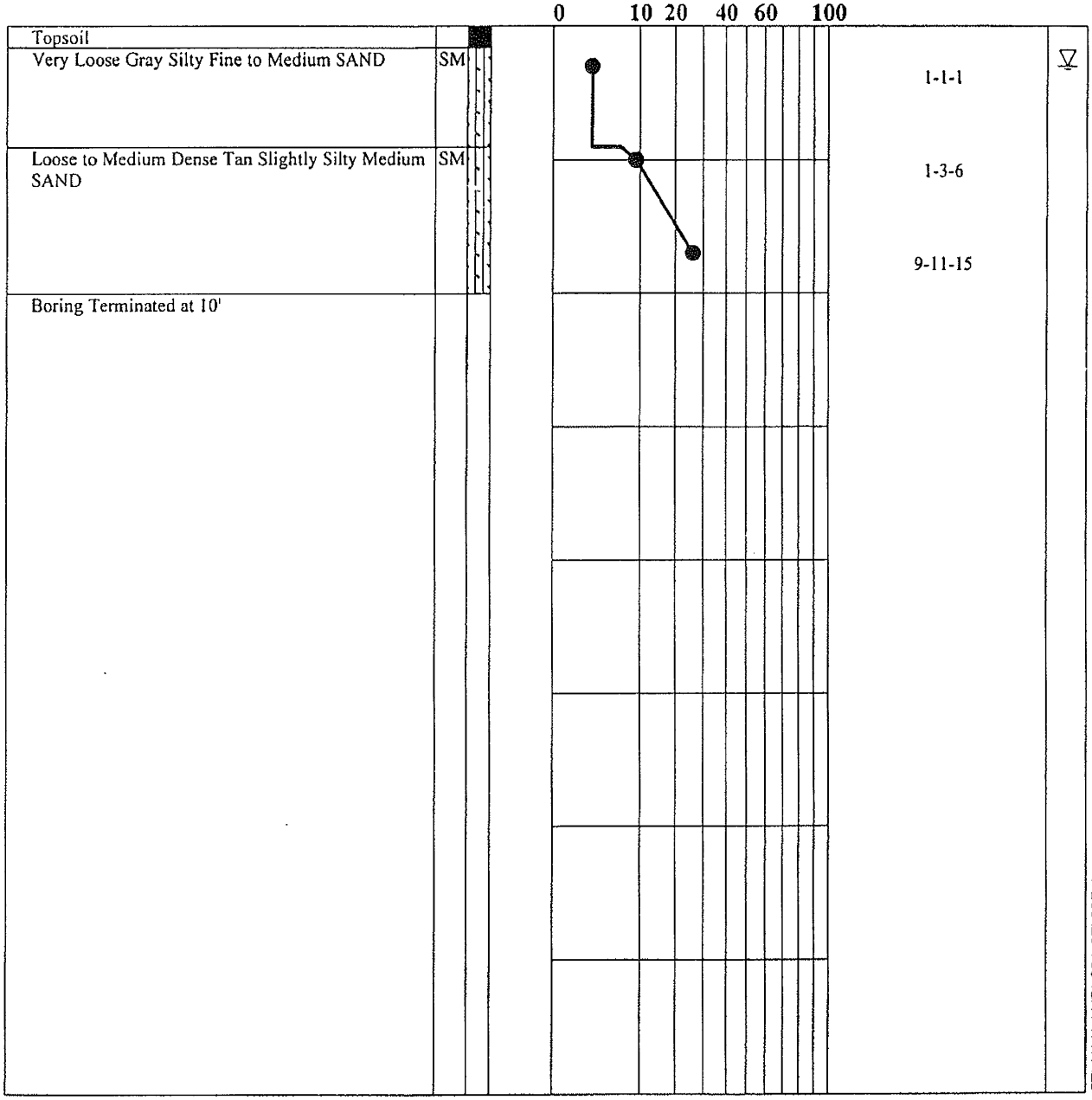
GTI_MAIN 20071.GPJ GTI.GDT 3/11/02

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-12
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.)	BLOWS PER SIX INCHES
0.0			0 10 20 40 60 100	
0.8	Topsoil			
	Very Loose Gray Silty Fine to Medium SAND	SM		1-1-1
4.5	Loose to Medium Dense Tan Slightly Silty Medium SAND	SM		1-3-6
				9-11-15
10.0	Boring Terminated at 10'			



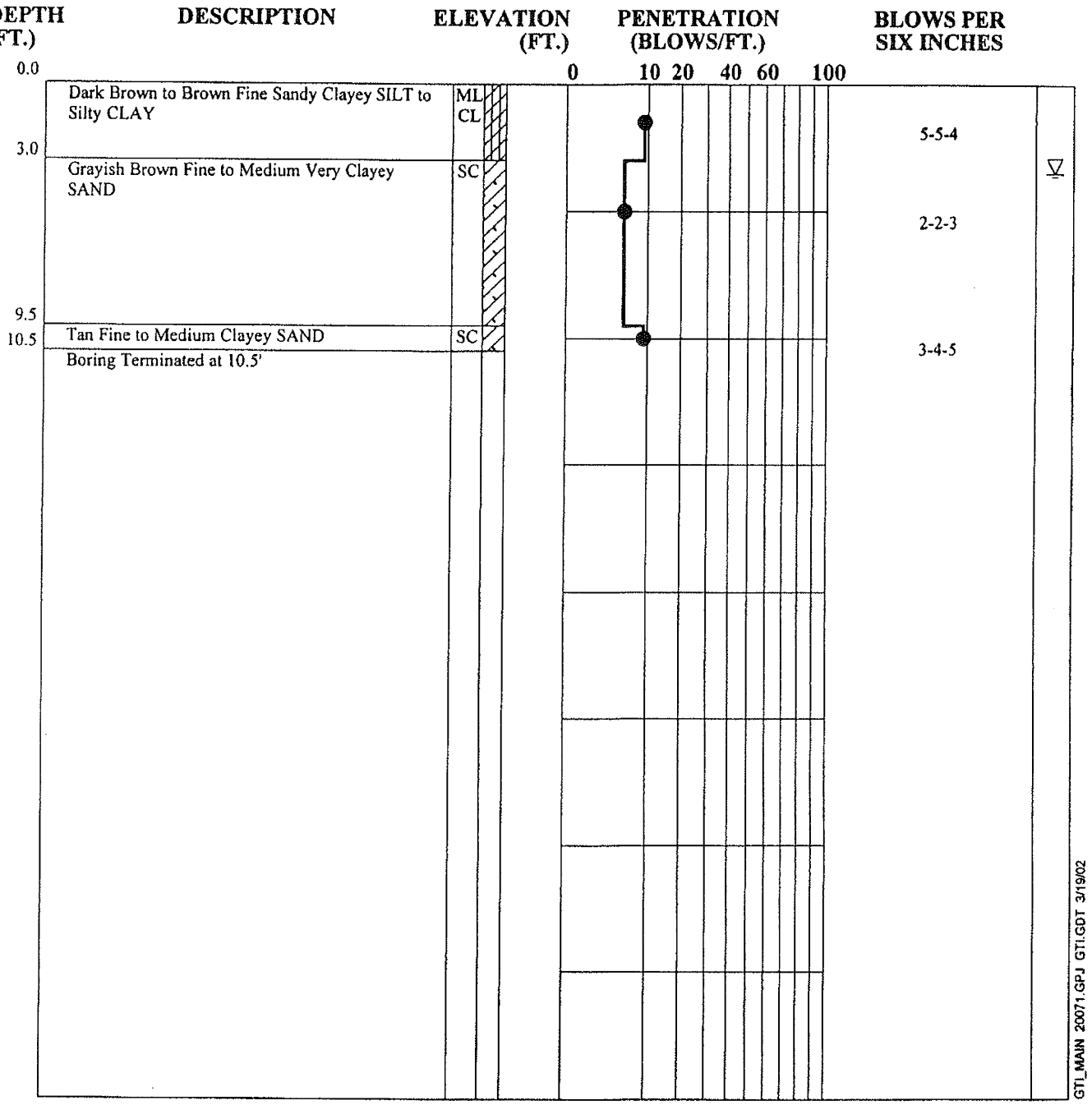
Groundwater encountered at 1.5' at time of boring

GTI_MAIN 20071.GPJ GTI.GDT 3/11/02

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-13
DATE 2-11-02

GeoTechnologies, Inc.

TEST BORING RECORD

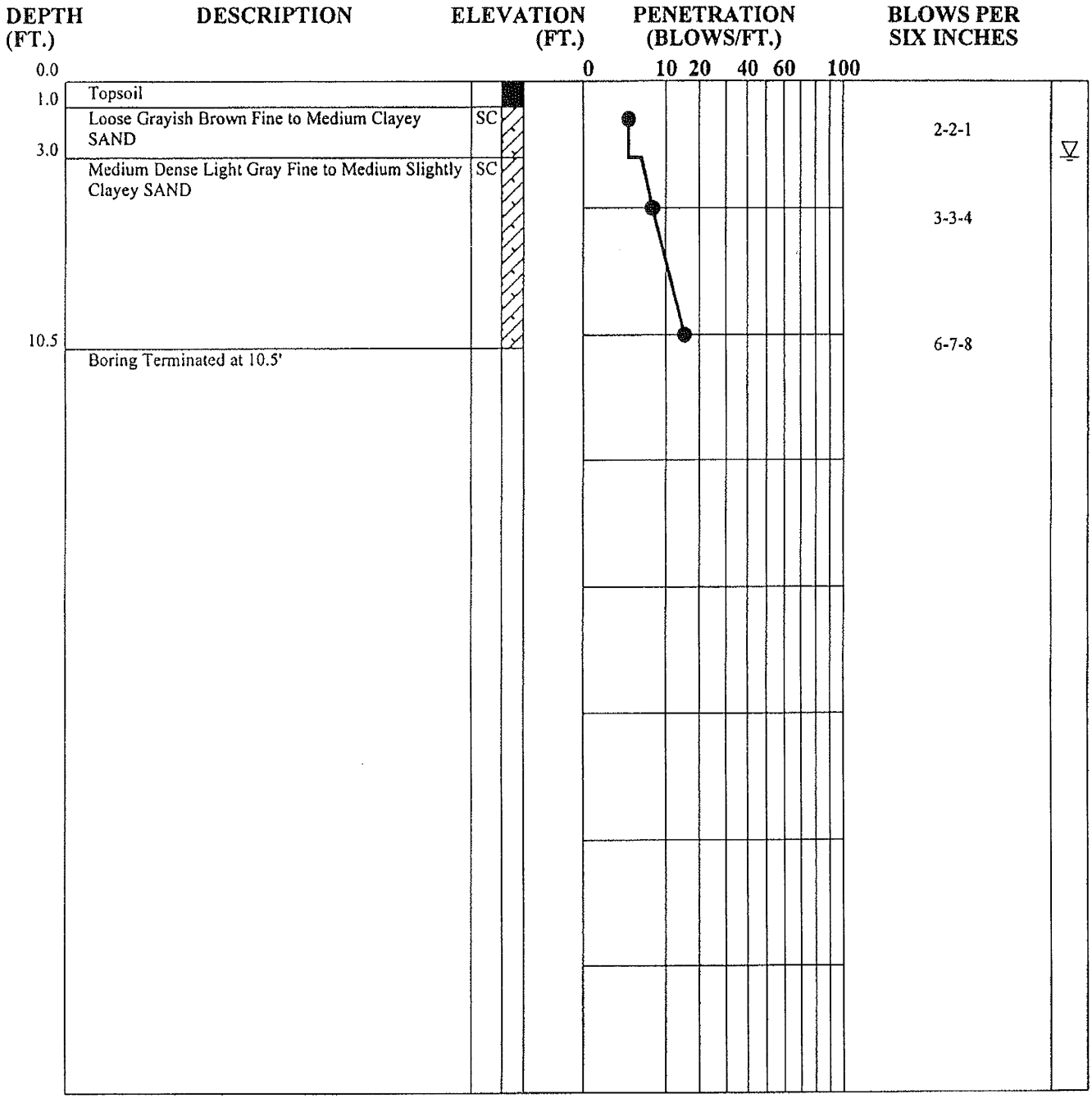


Groundwater encountered at 3.5' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-14
DATE 2-8-02

GeoTechnologies, Inc.

TEST BORING RECORD

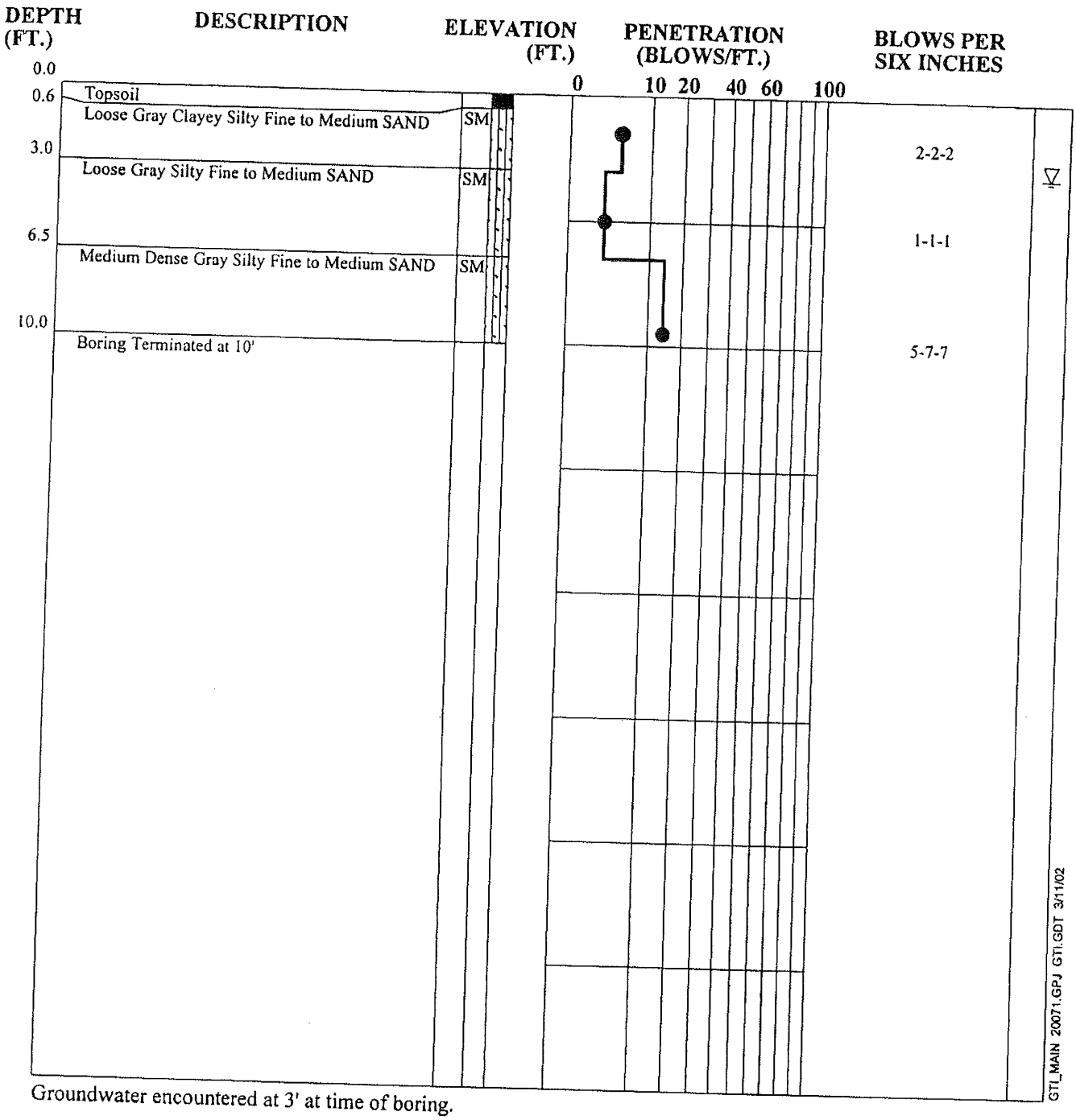


Groundwater encountered at 3' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-17
DATE 2-8-02

GeoTechnologies, Inc.

TEST BORING RECORD



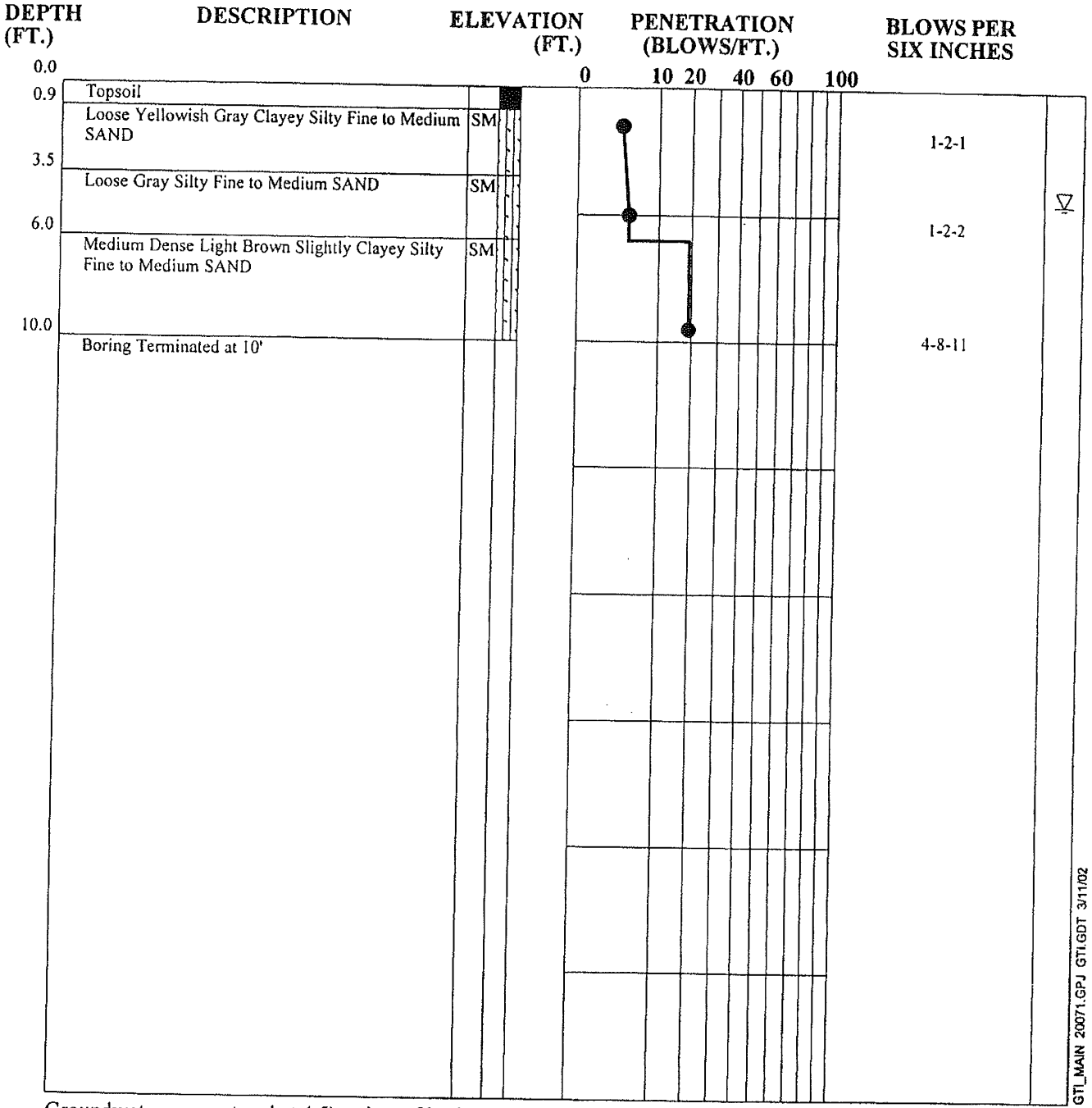
Groundwater encountered at 3' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-18
DATE 2-8-02

PAGE 1 OF 1

GeoTechnologies, Inc.

TEST BORING RECORD



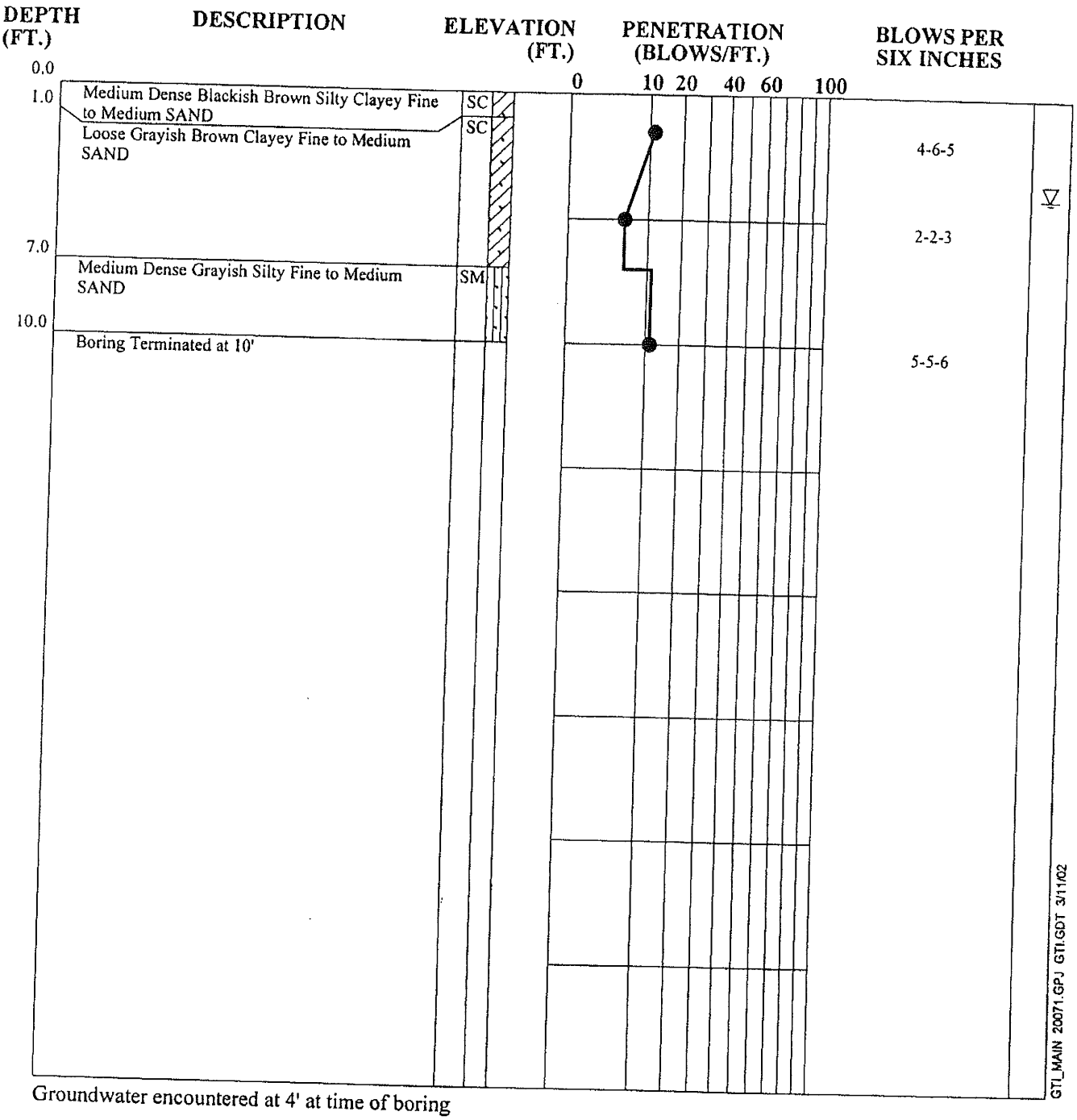
Groundwater encountered at 4.5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-19
DATE 2-8-02

PAGE 1 OF 1

GeoTechnologies, Inc.

TEST BORING RECORD



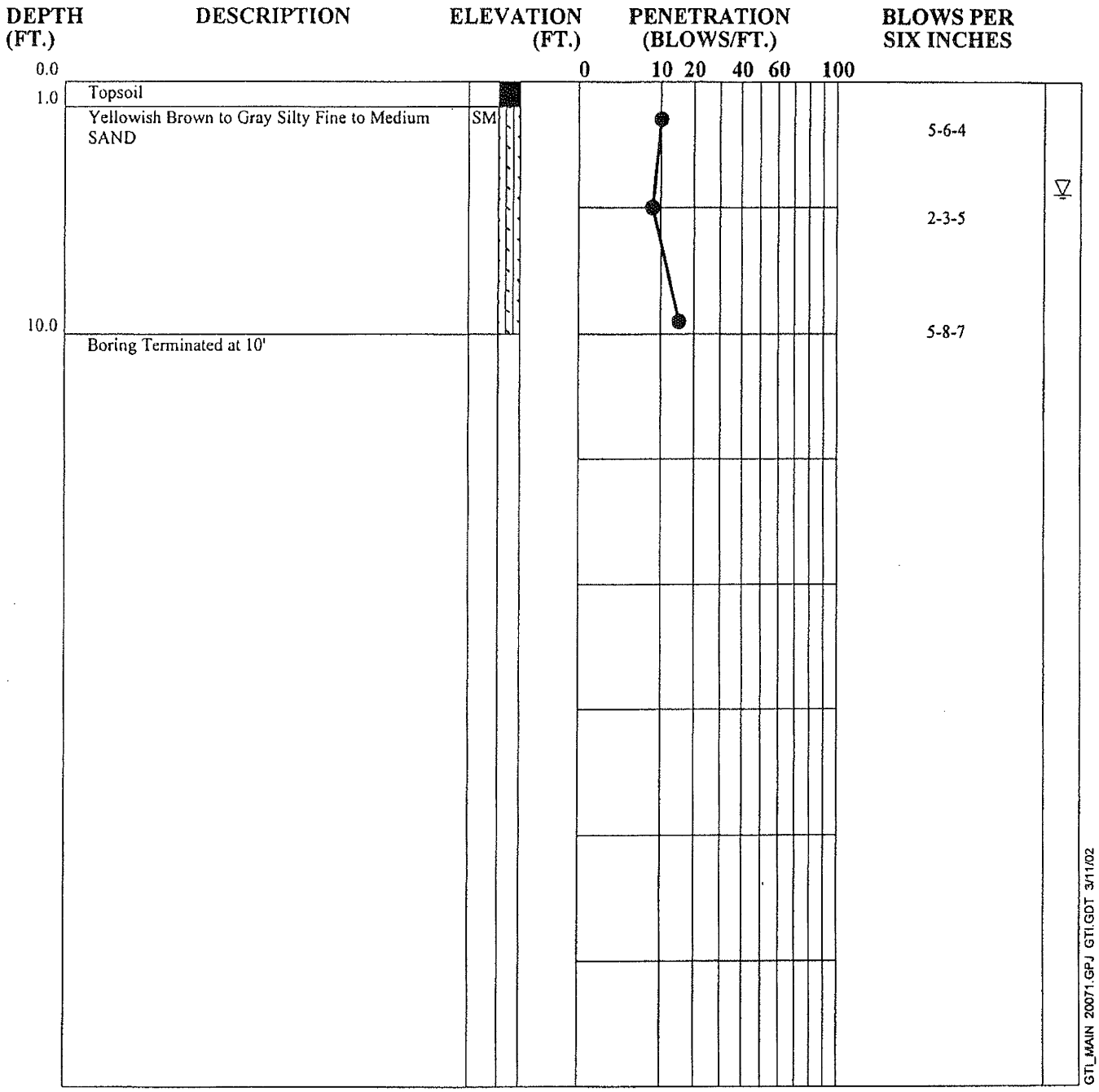
Groundwater encountered at 4' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-20
DATE 1-8-02

PAGE 1 OF 1

GeoTechnologies, Inc.

TEST BORING RECORD

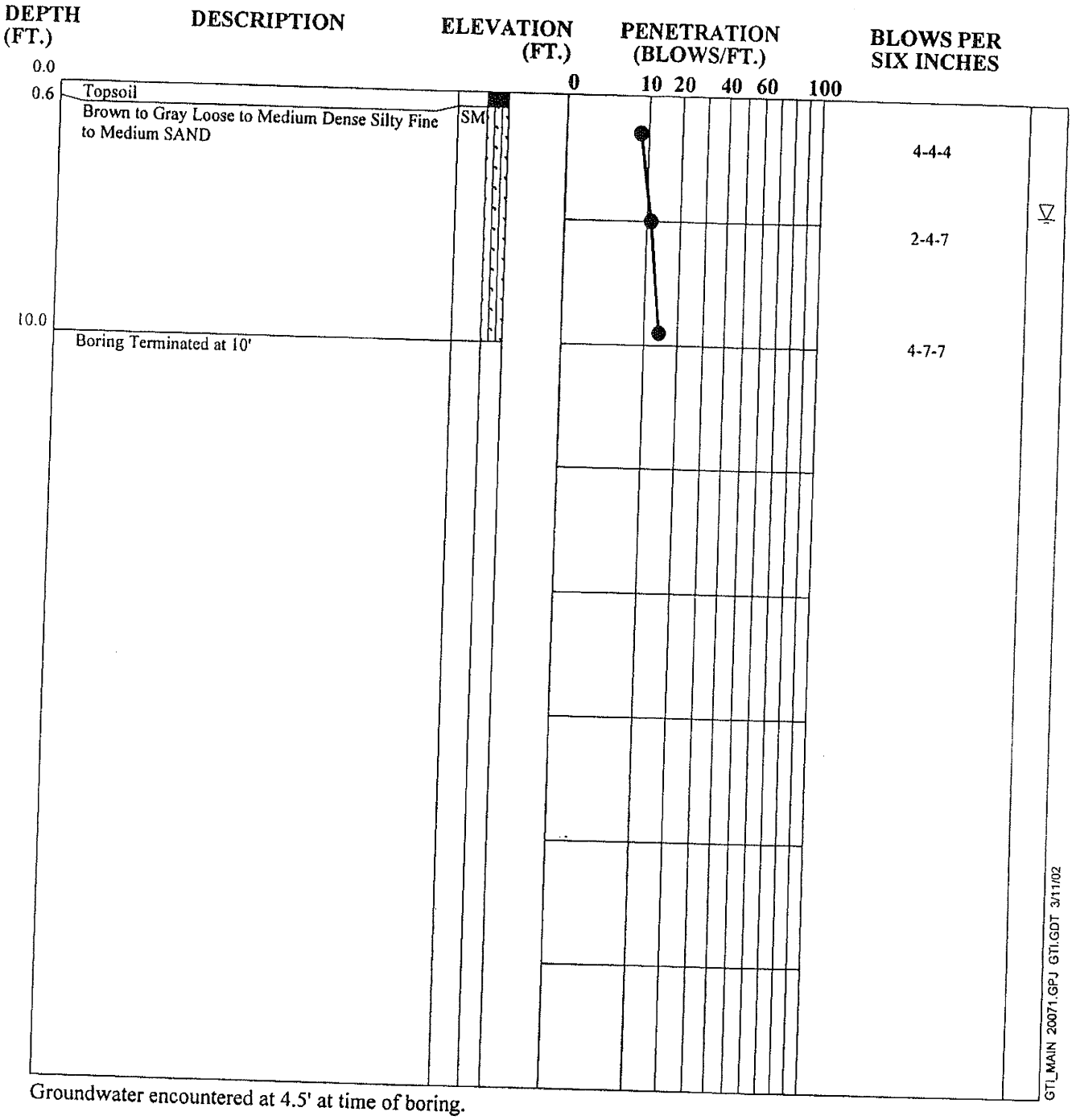


Groundwater encountered at 4.5' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-21
DATE 2-8-02

GeoTechnologies, Inc.

TEST BORING RECORD

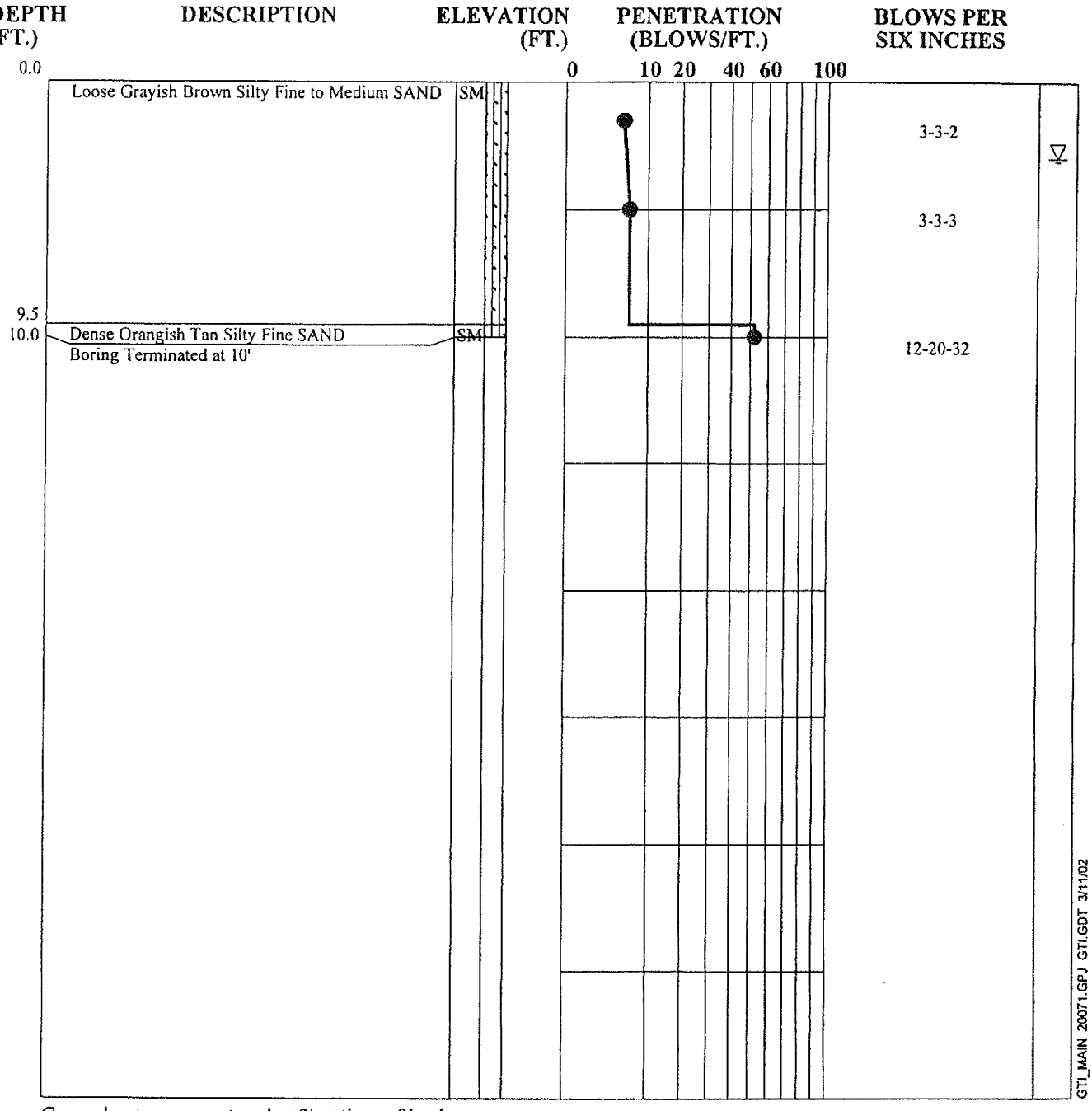


Groundwater encountered at 4.5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-22
DATE 2-8-02

GeoTechnologies, Inc.

TEST BORING RECORD

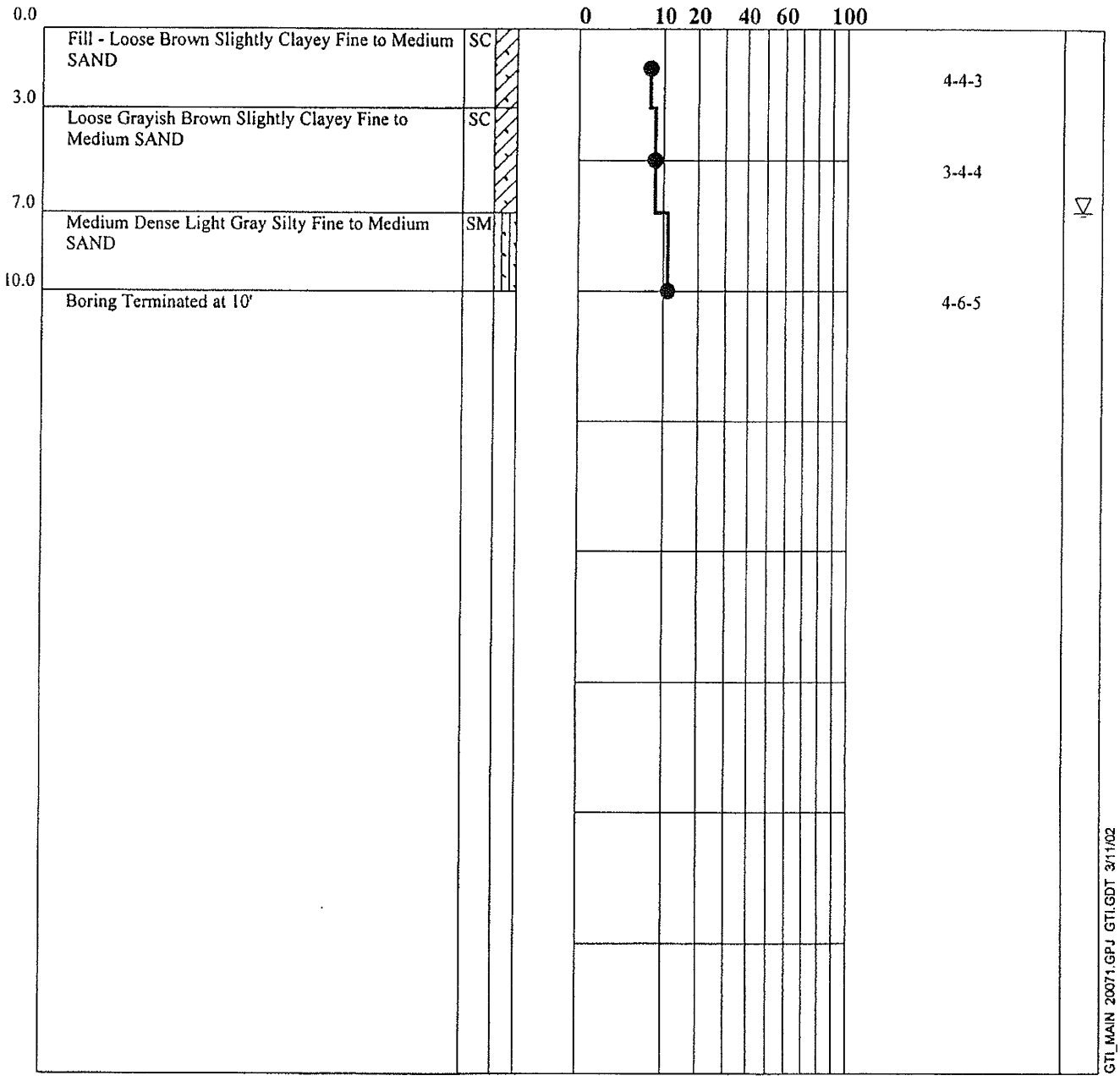


Groundwater encountered at 3' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-23
DATE 1-8-02

GeoTechnologies, Inc.

TEST BORING RECORD

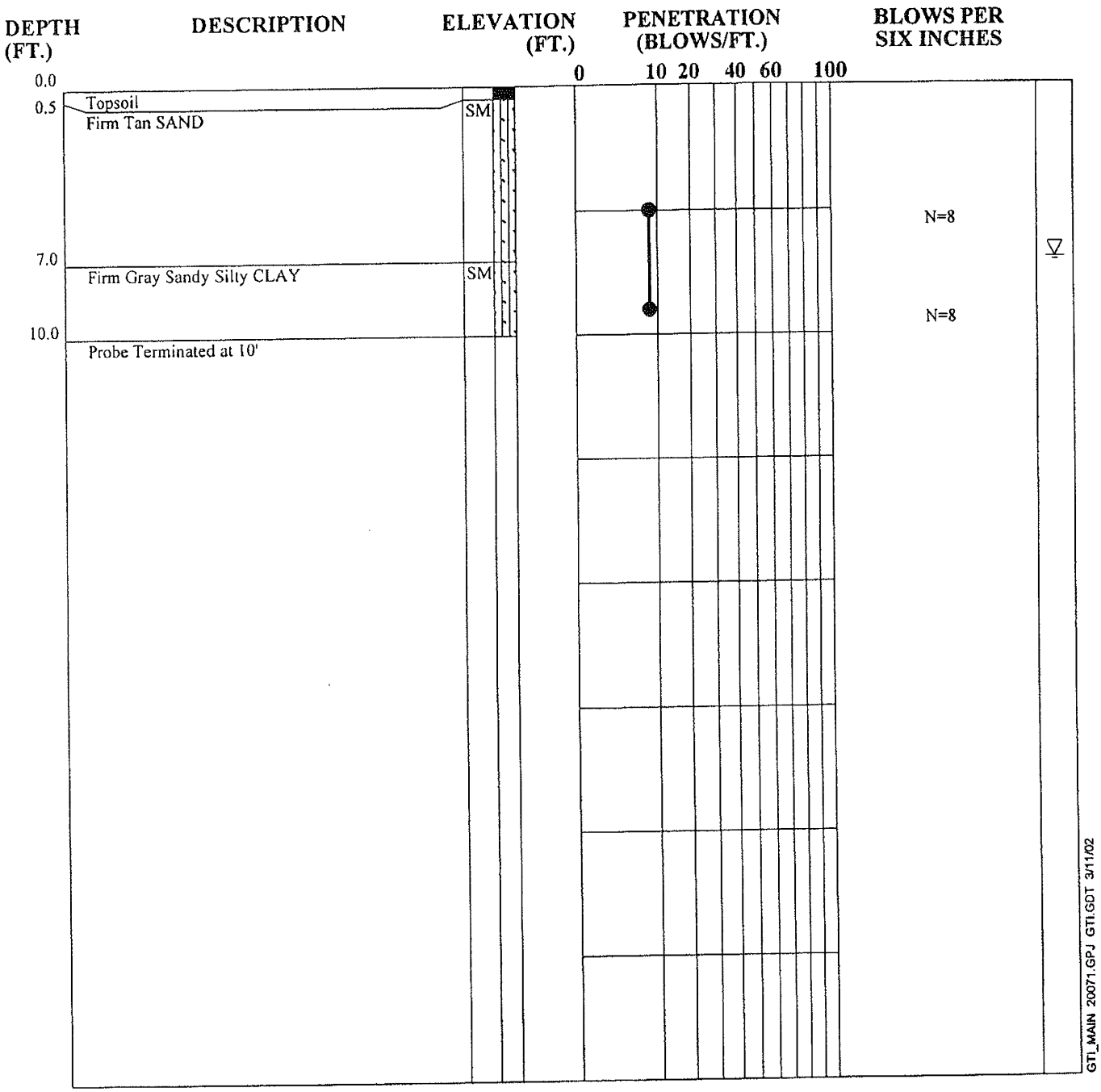


Groundwater encountered at 7' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-24
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

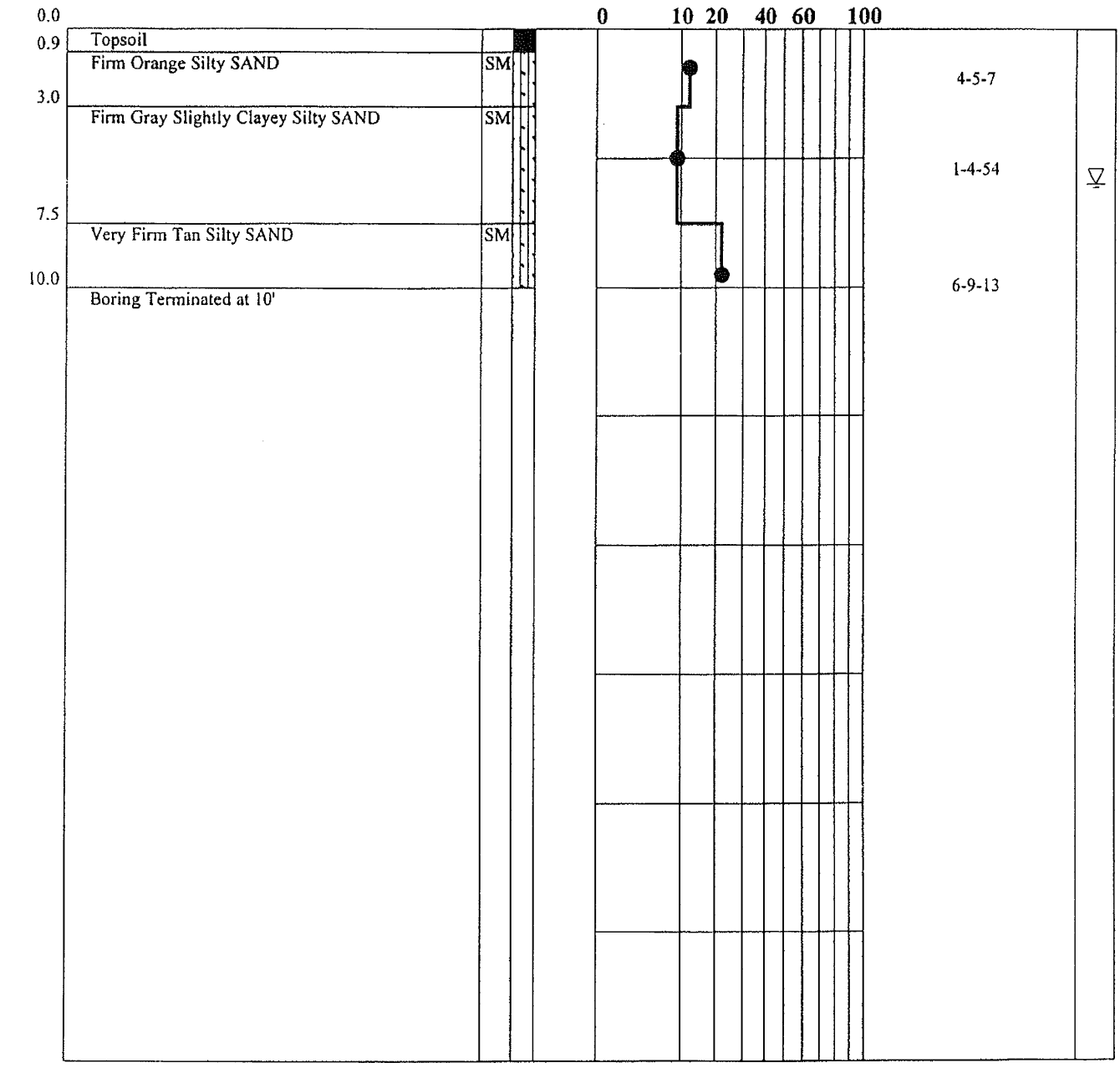


Groundwater encountered at 7' at time of boring

JOB NUMBER	1-02-0071-EA
BORING NUMBER	R-25
DATE	2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

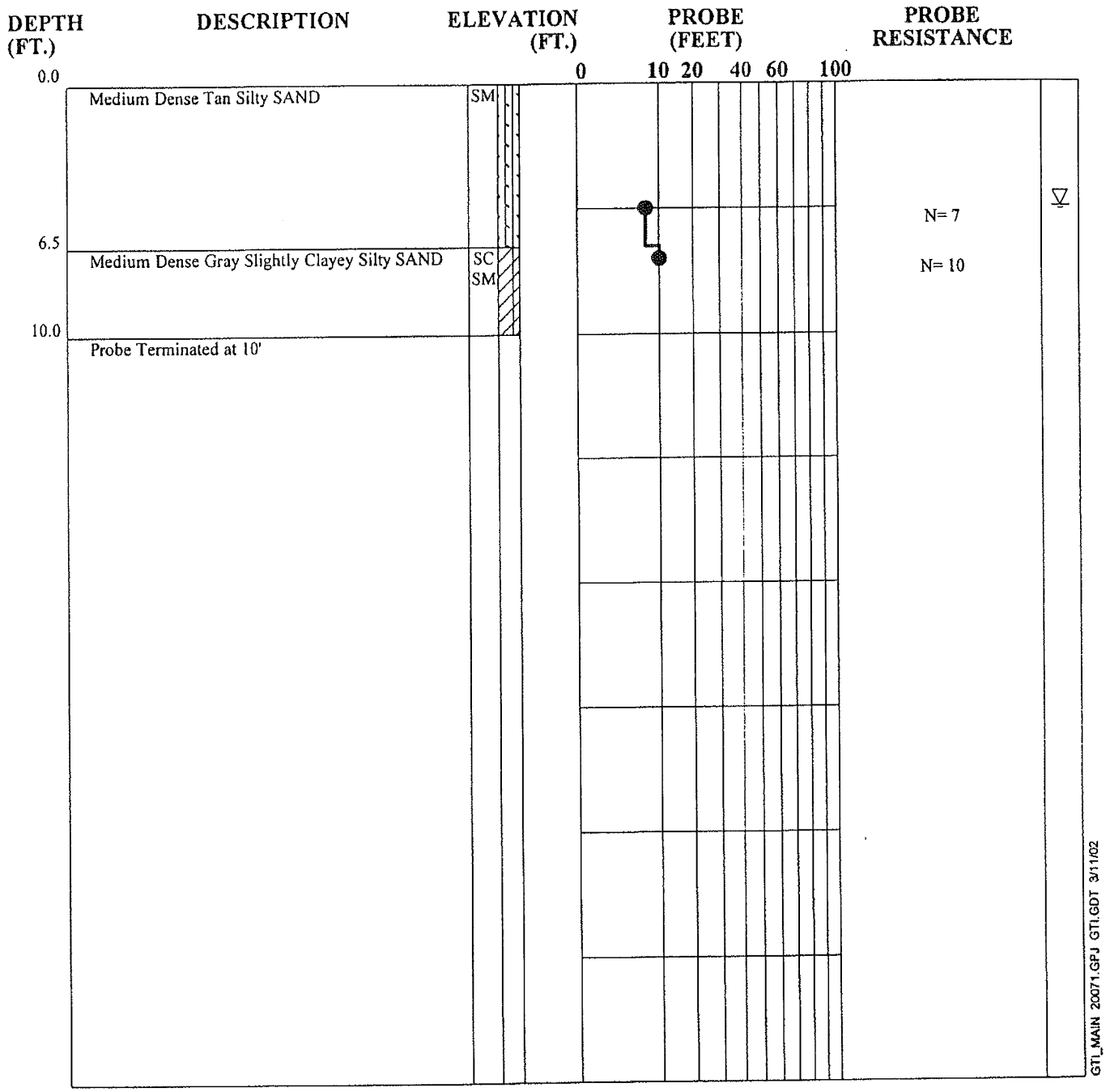


Groundwater encountered at 6' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-26
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

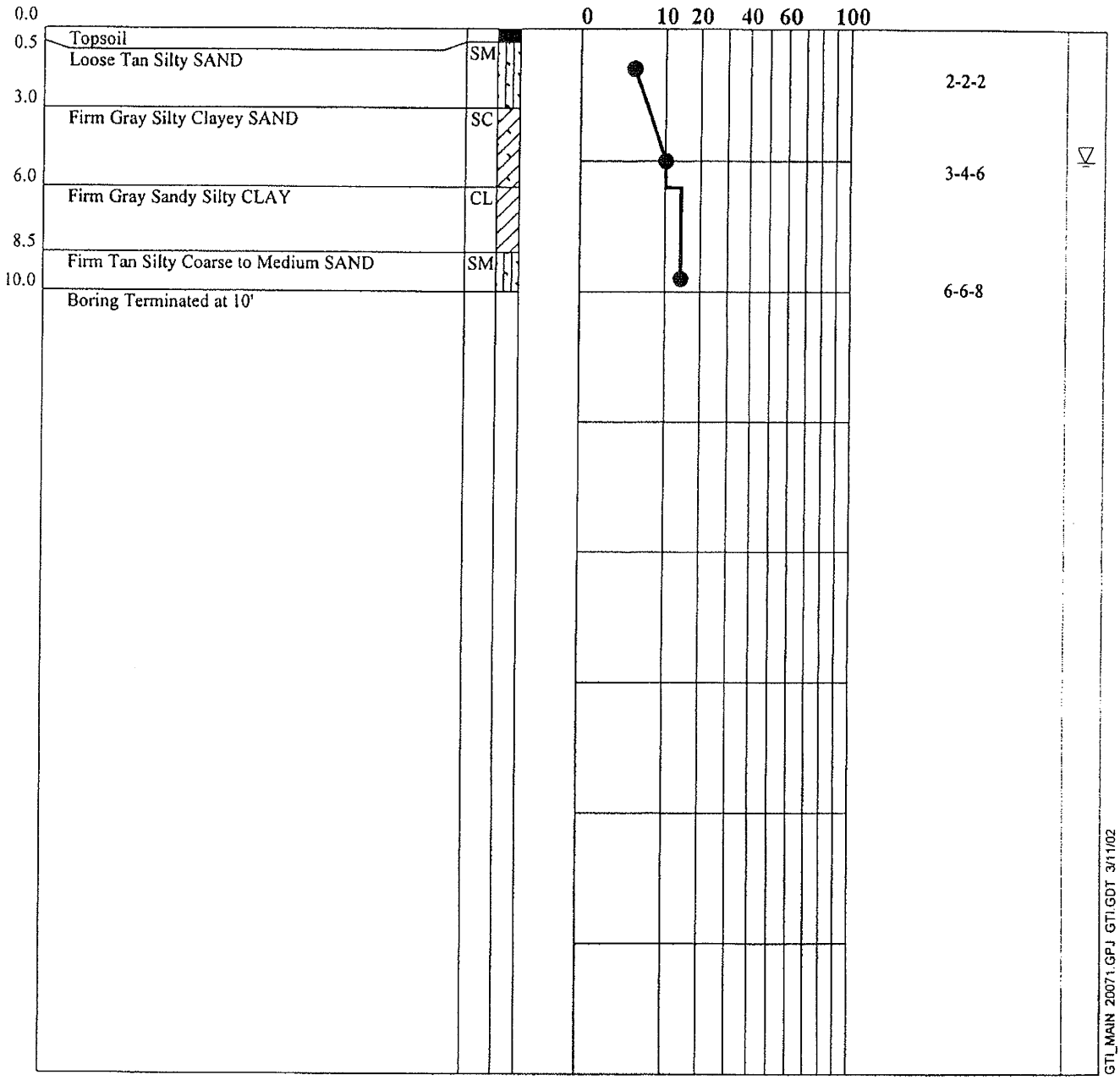


Groundwater encountered at 5' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-27
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD



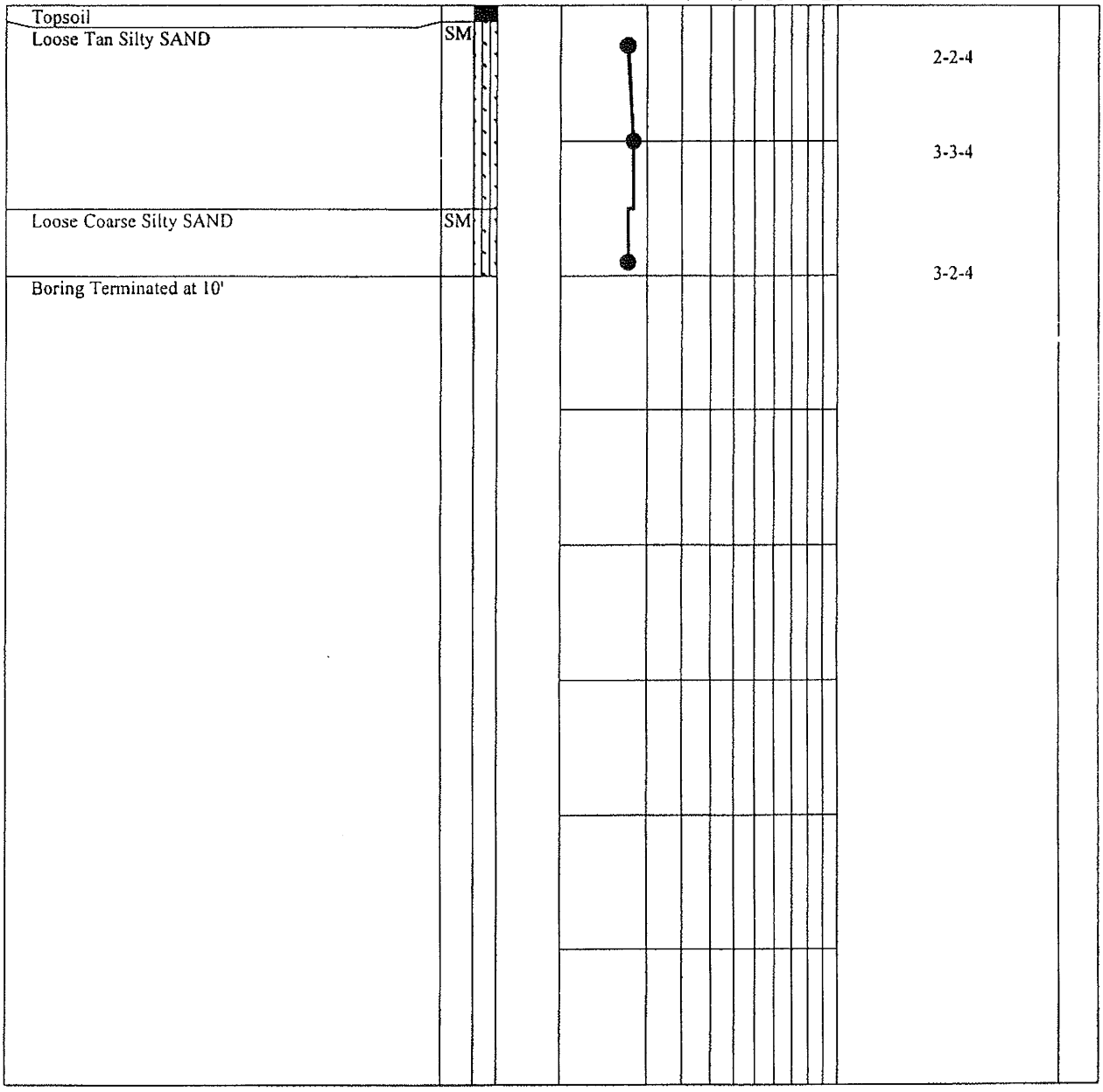
Groundwater encountered at 5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-28
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.)	BLOWS PER SIX INCHES
0.0			0 10 20 40 60 100	
0.6	Topsoil Loose Tan Silty SAND	SM		2-2-4
				3-3-4
7.5	Loose Coarse Silty SAND	SM		
10.0				3-2-4
	Boring Terminated at 10'			



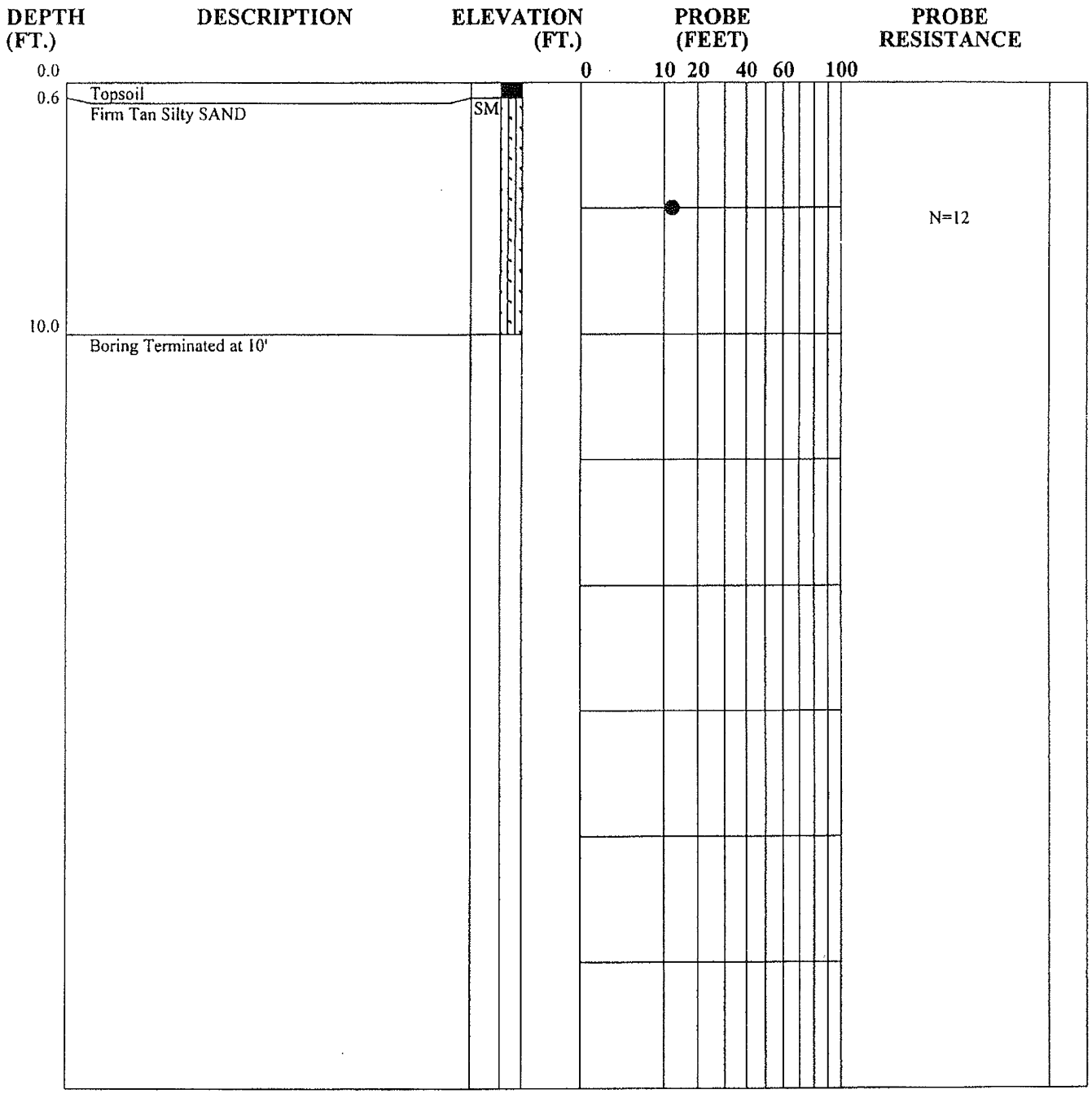
GTI_MAIN 20071.GPJ GTI.GDT 3/11/02

Boring Caved at 8.5' and Dry at at Time of Boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER R-29
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD



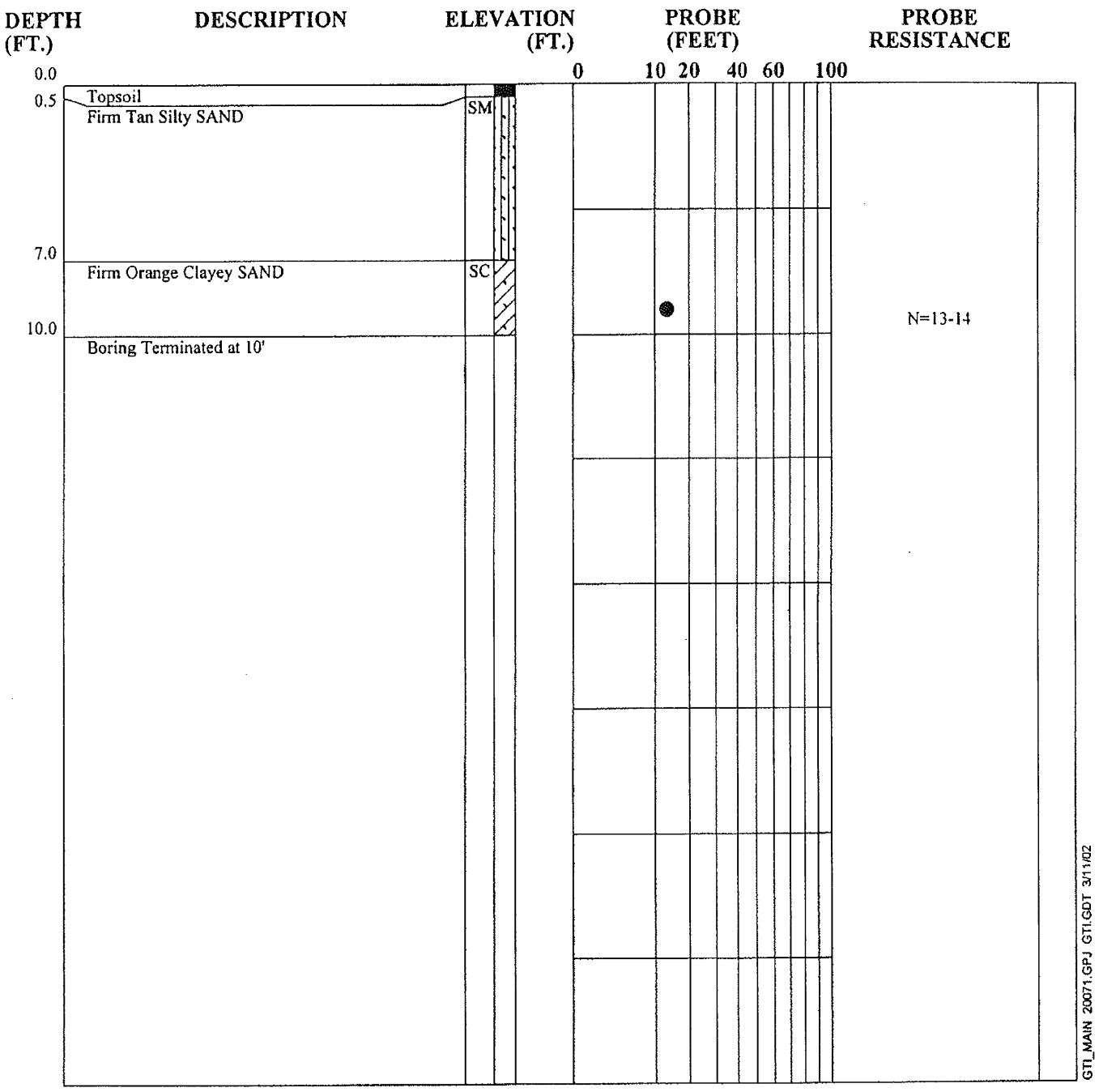
Groundwater not encountered at time of boring.

GTI_MAIN 20071.GPJ GTI.GDT 3/11/02

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-30
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

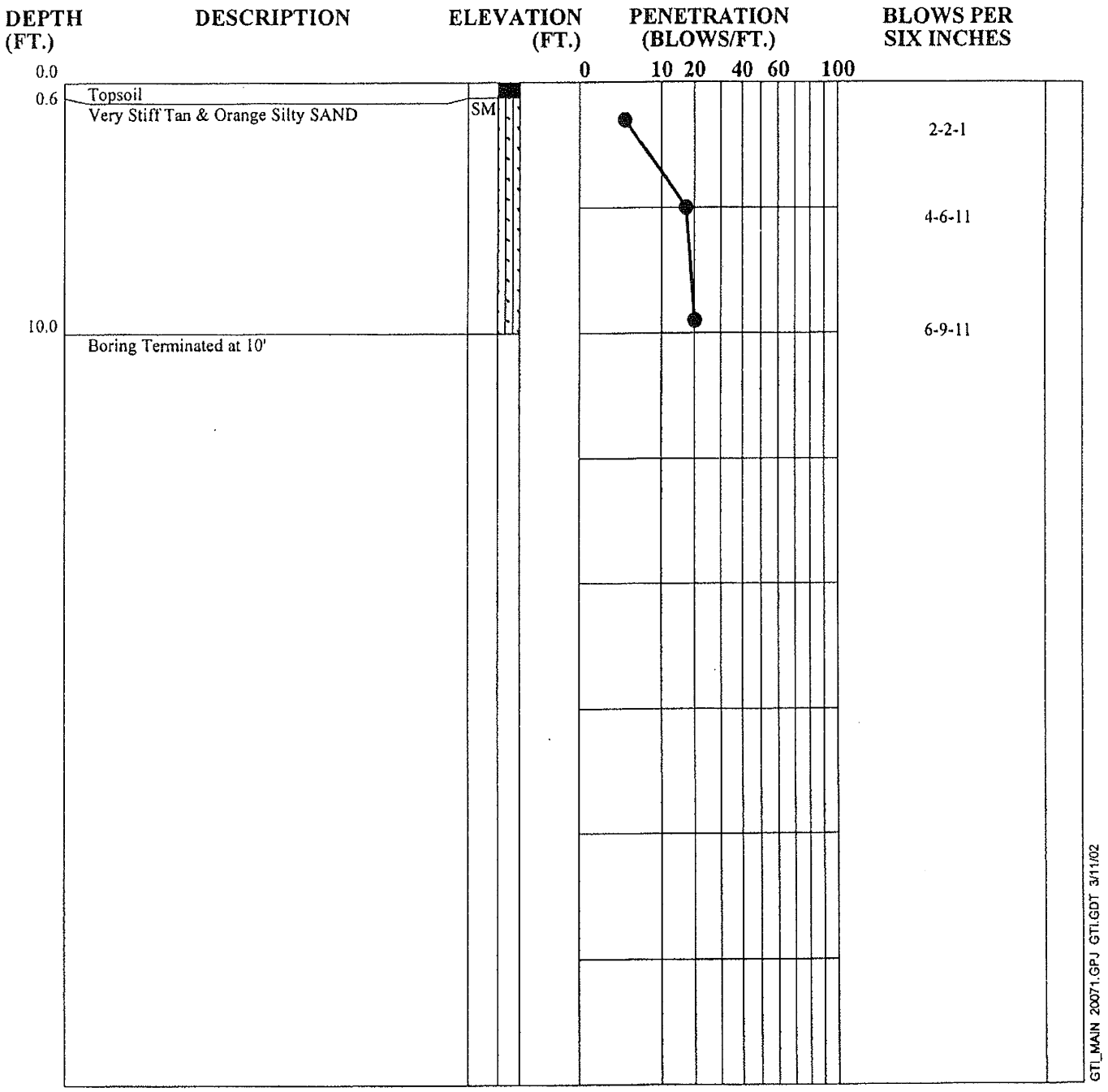


Groundwater not encountered at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-31
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD



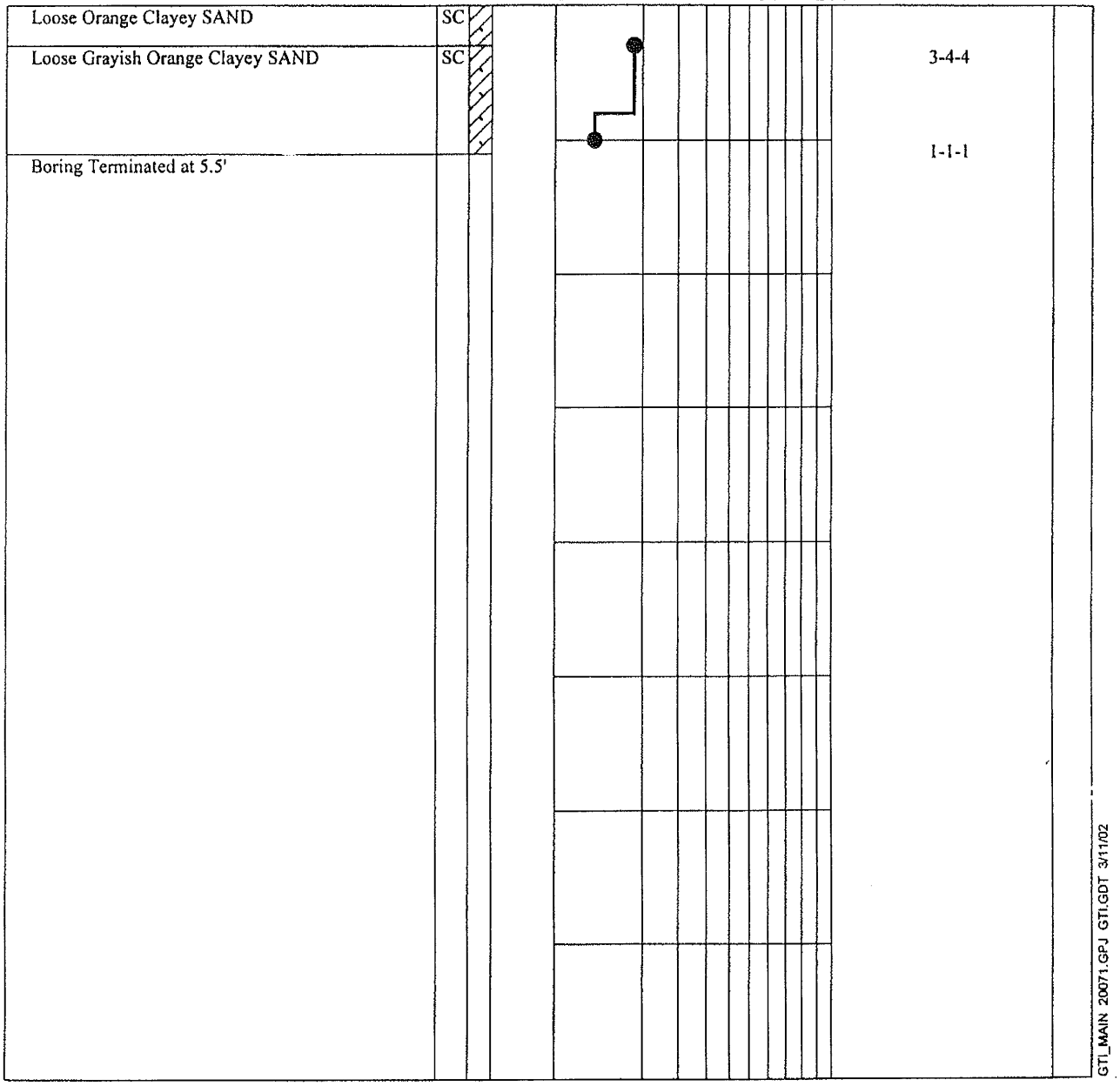
Groundwater not encountered at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-32
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

DEPTH (FT.)	DESCRIPTION	ELEVATION (FT.)	PENETRATION (BLOWS/FT.) 0 10 20 40 60 100	BLOWS PER SIX INCHES
0.0	Loose Orange Clayey SAND	SC		
1.5	Loose Grayish Orange Clayey SAND	SC		3-4-4
5.5	Boring Terminated at 5.5'			1-1-1



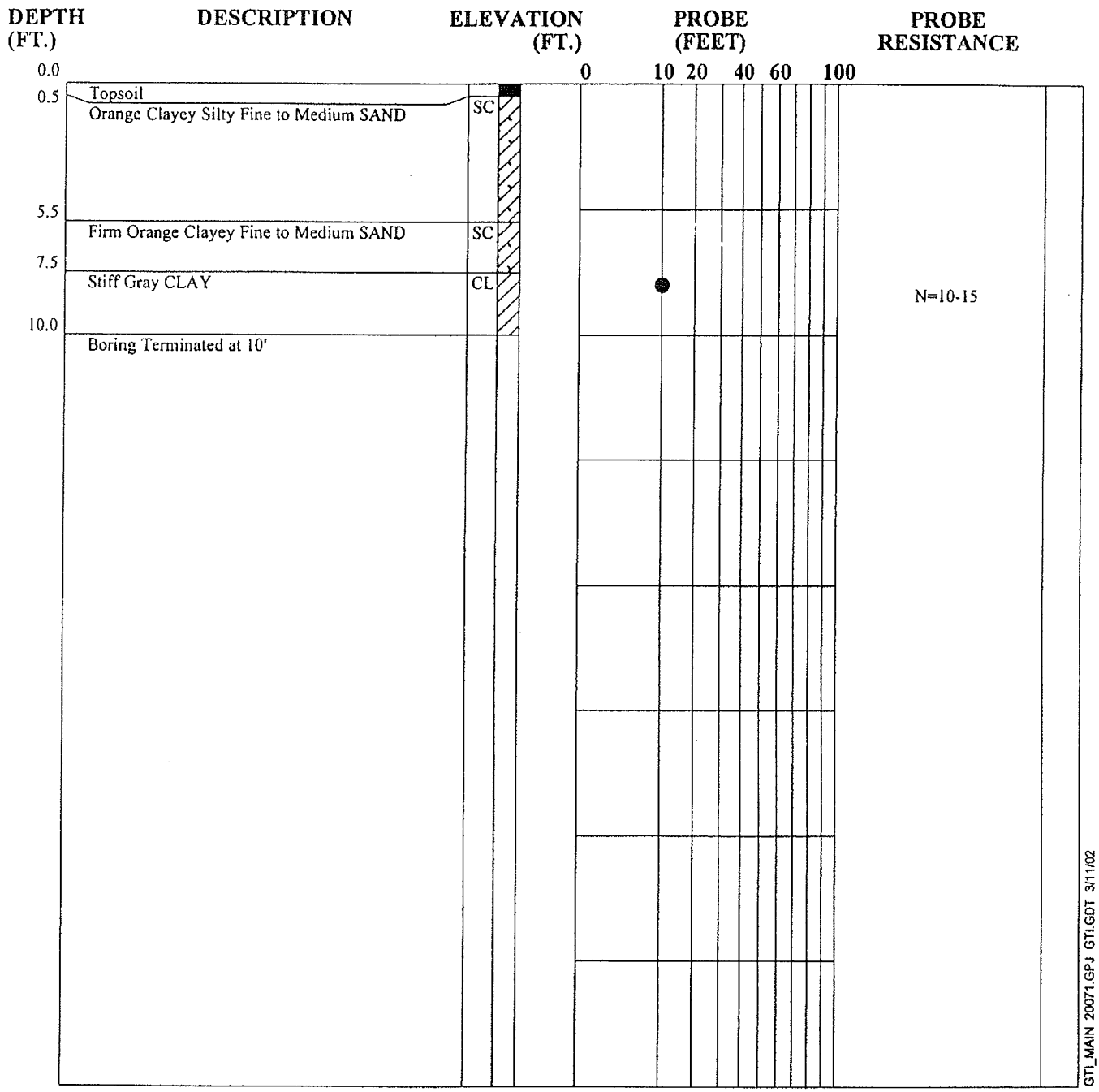
GTI_MAIN 20071.GPJ GTI.GDT 3/11/02

Groundwater not encountered at time of boring. Possible sewer line at 5.5'.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-34
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

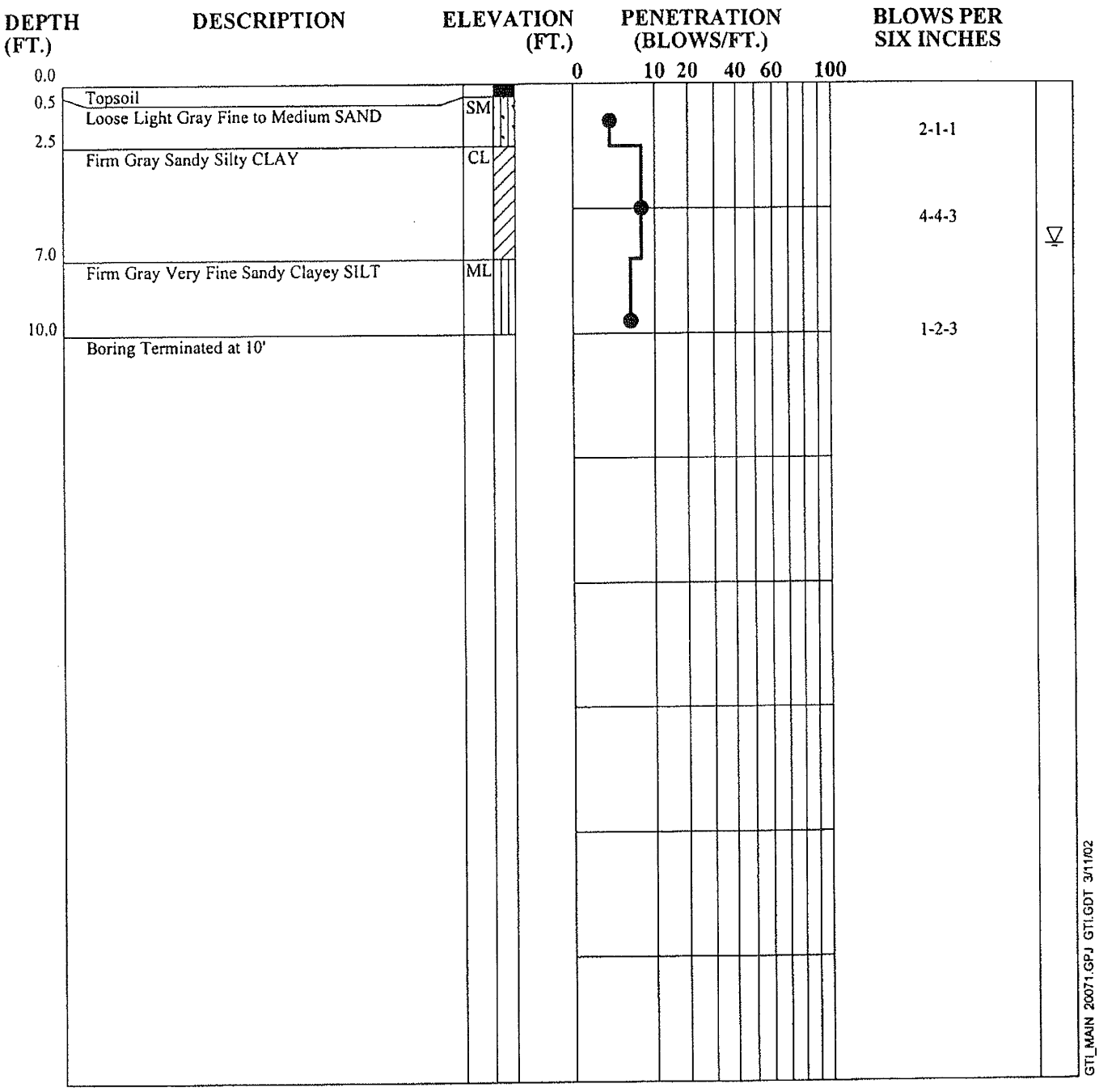


Groundwater not encountered at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-35
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

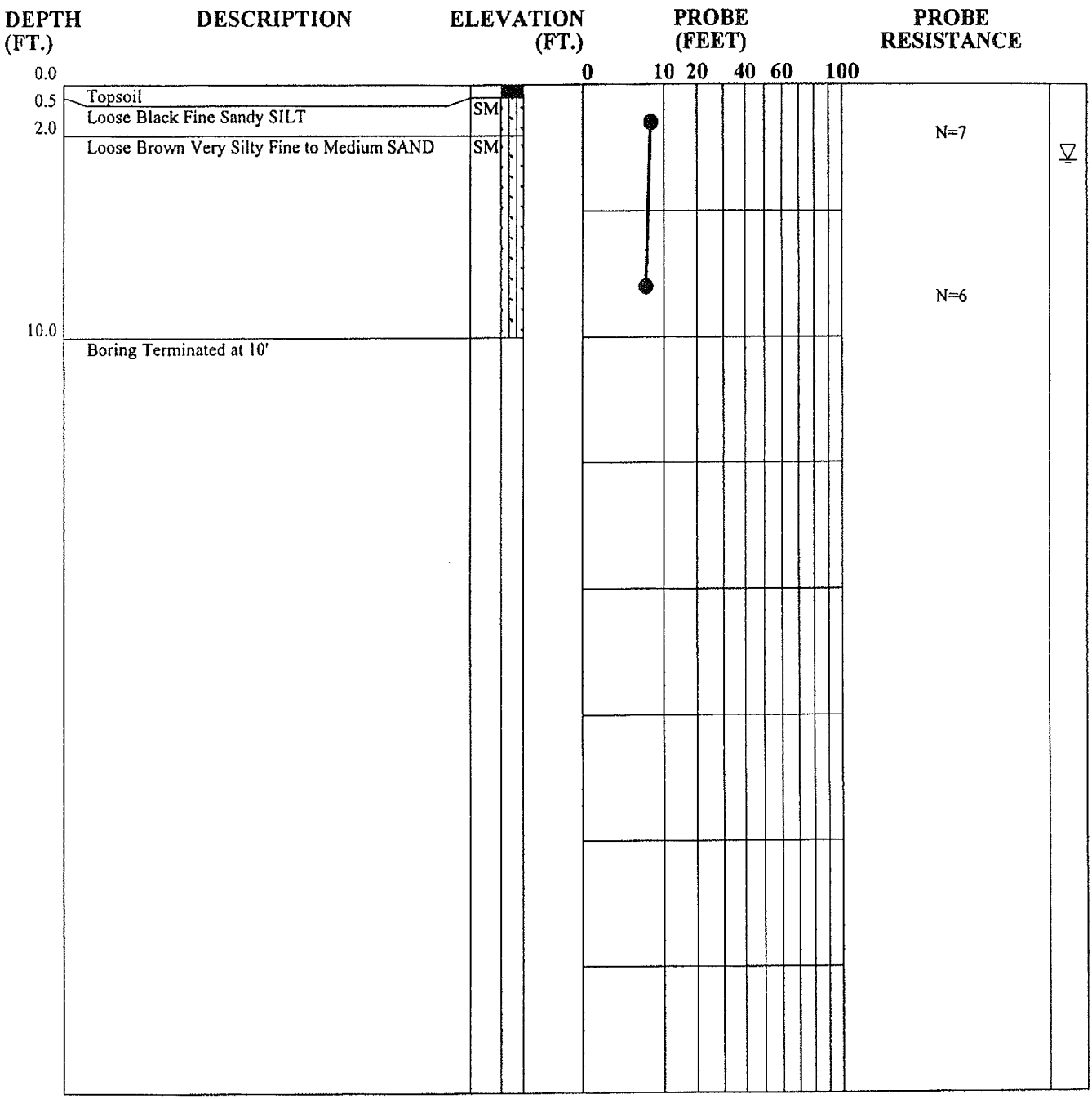


Groundwater encountered at 6.5'

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-36
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

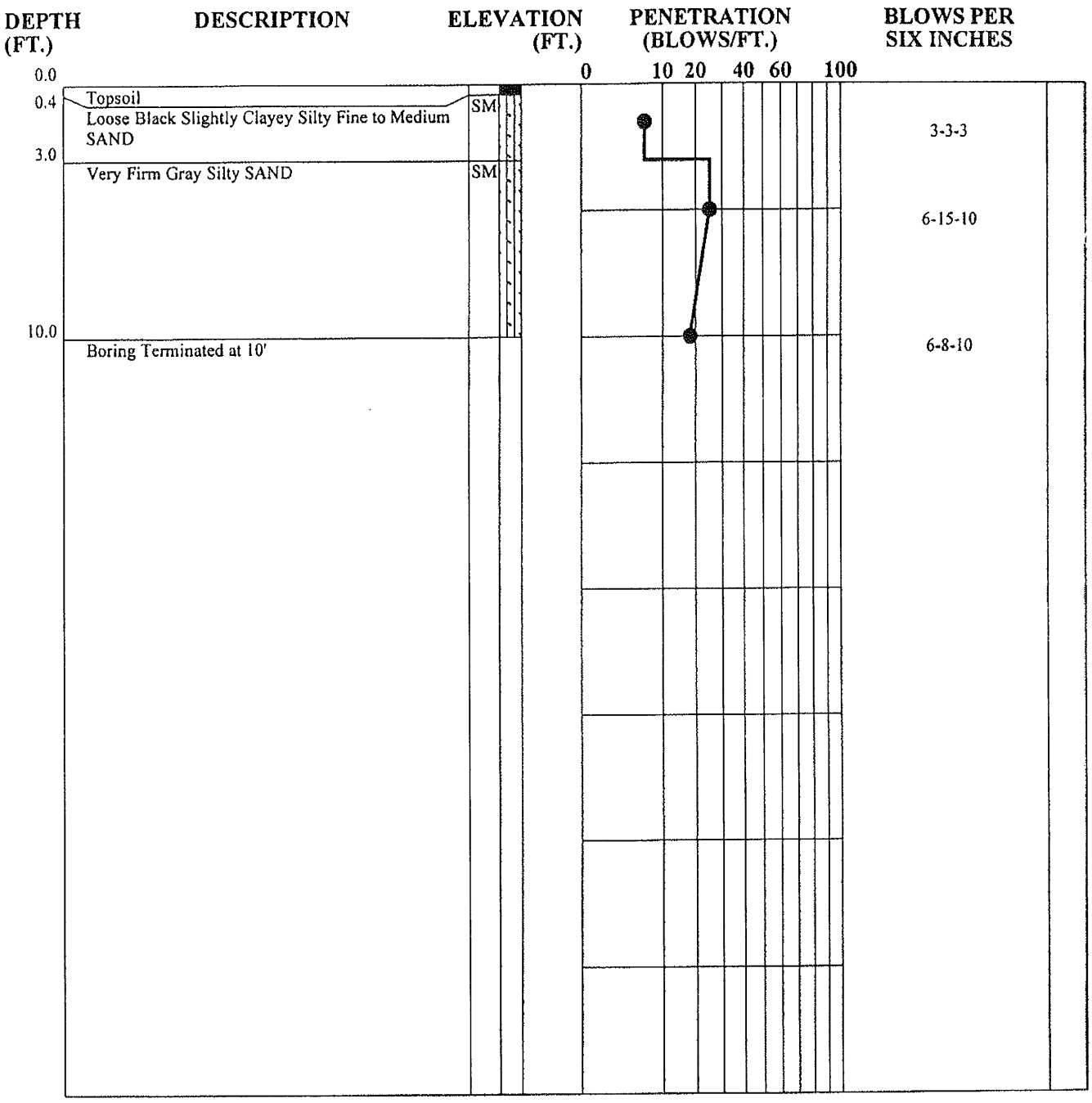


Groundwater encountered at 3' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-39
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

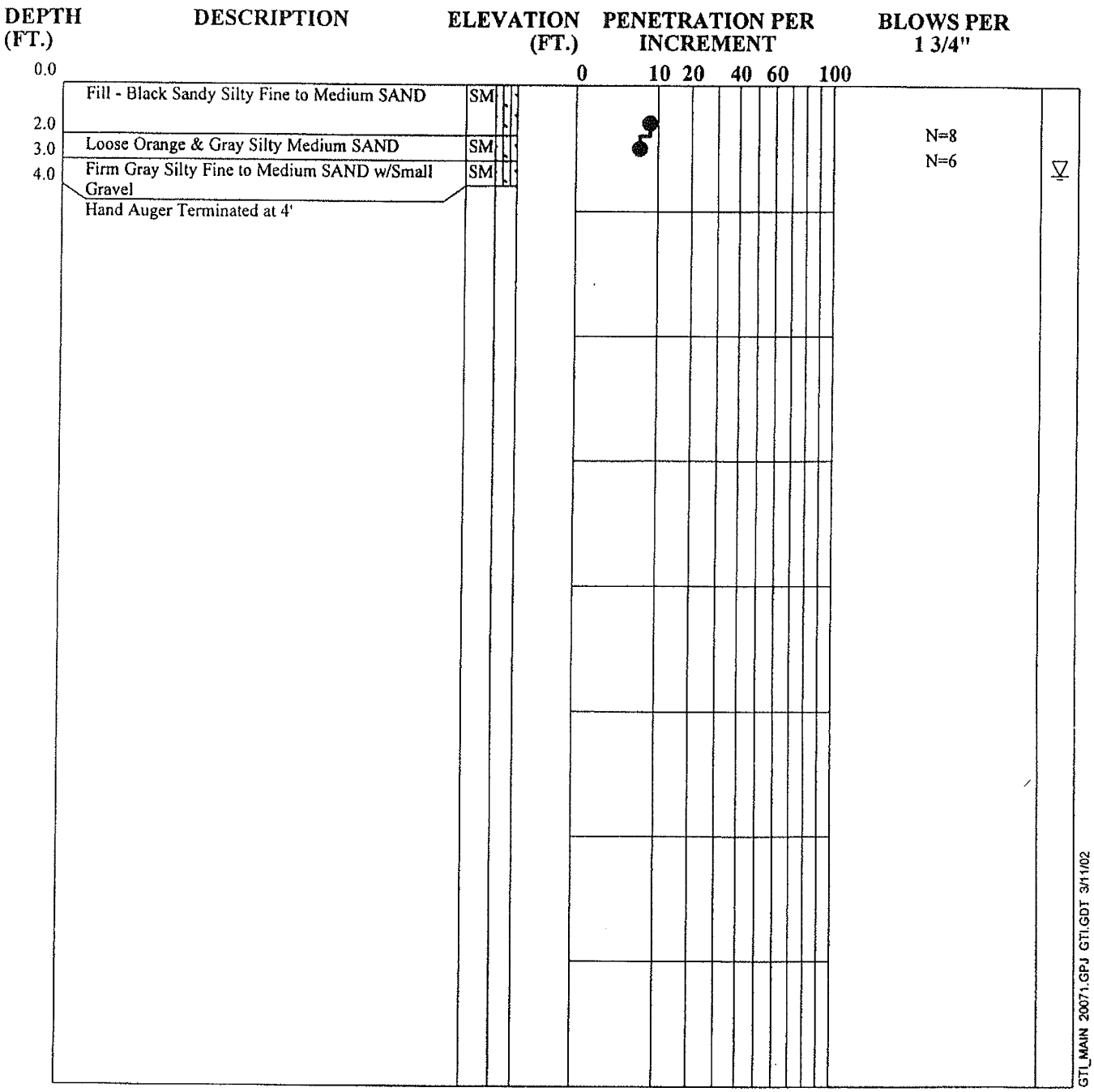


Boring Caved at 3.5' and Dry at at Time of Boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-41
DATE 2-12-02

GeoTechnologies, Inc.

DYNAMIC HAND CONE PENETROMETER RECORD

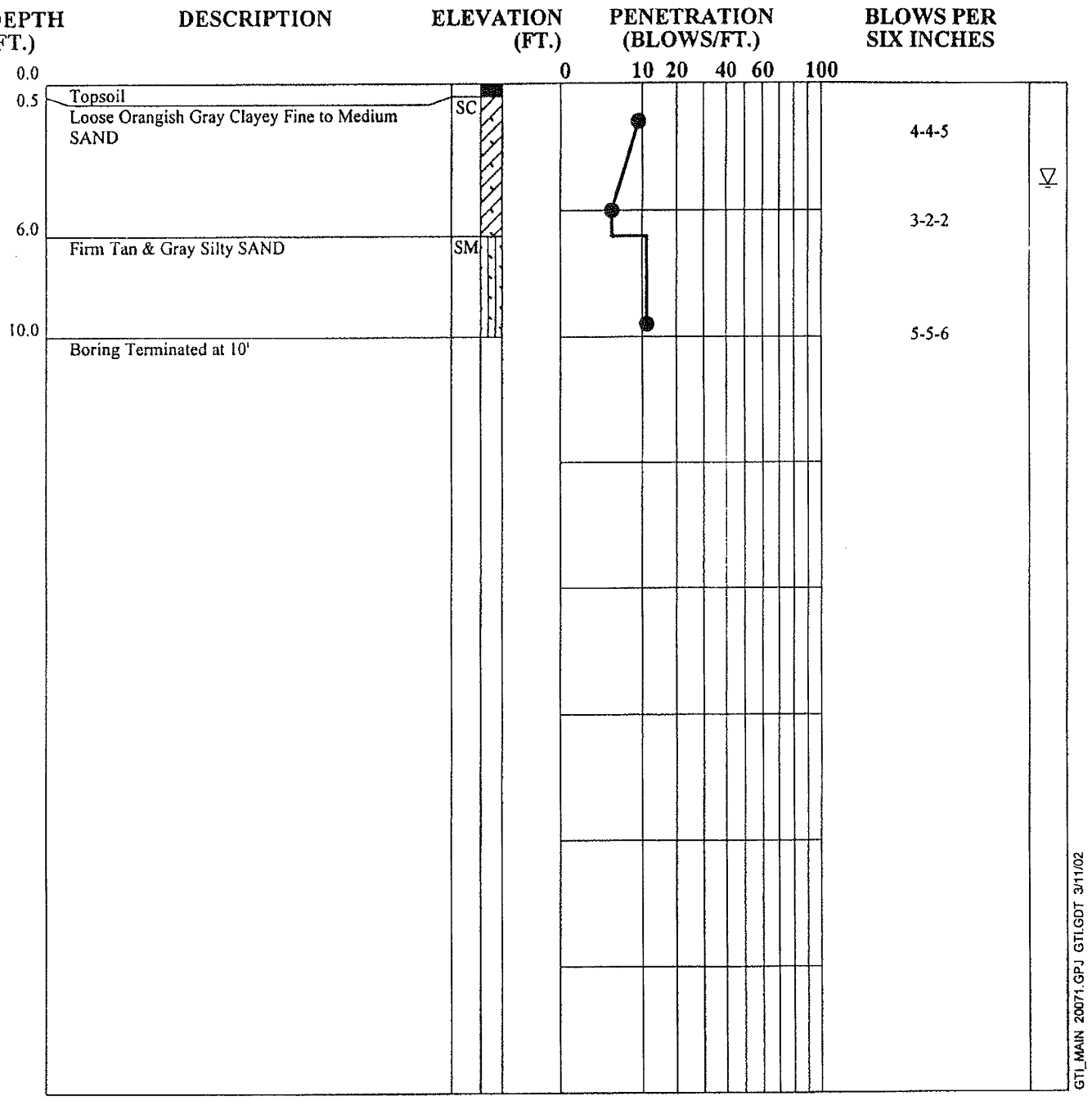


Groundwater encountered at 3.5' at time of boring.

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-42
DATE 2-12-02

GeoTechnologies, Inc.

TEST BORING RECORD

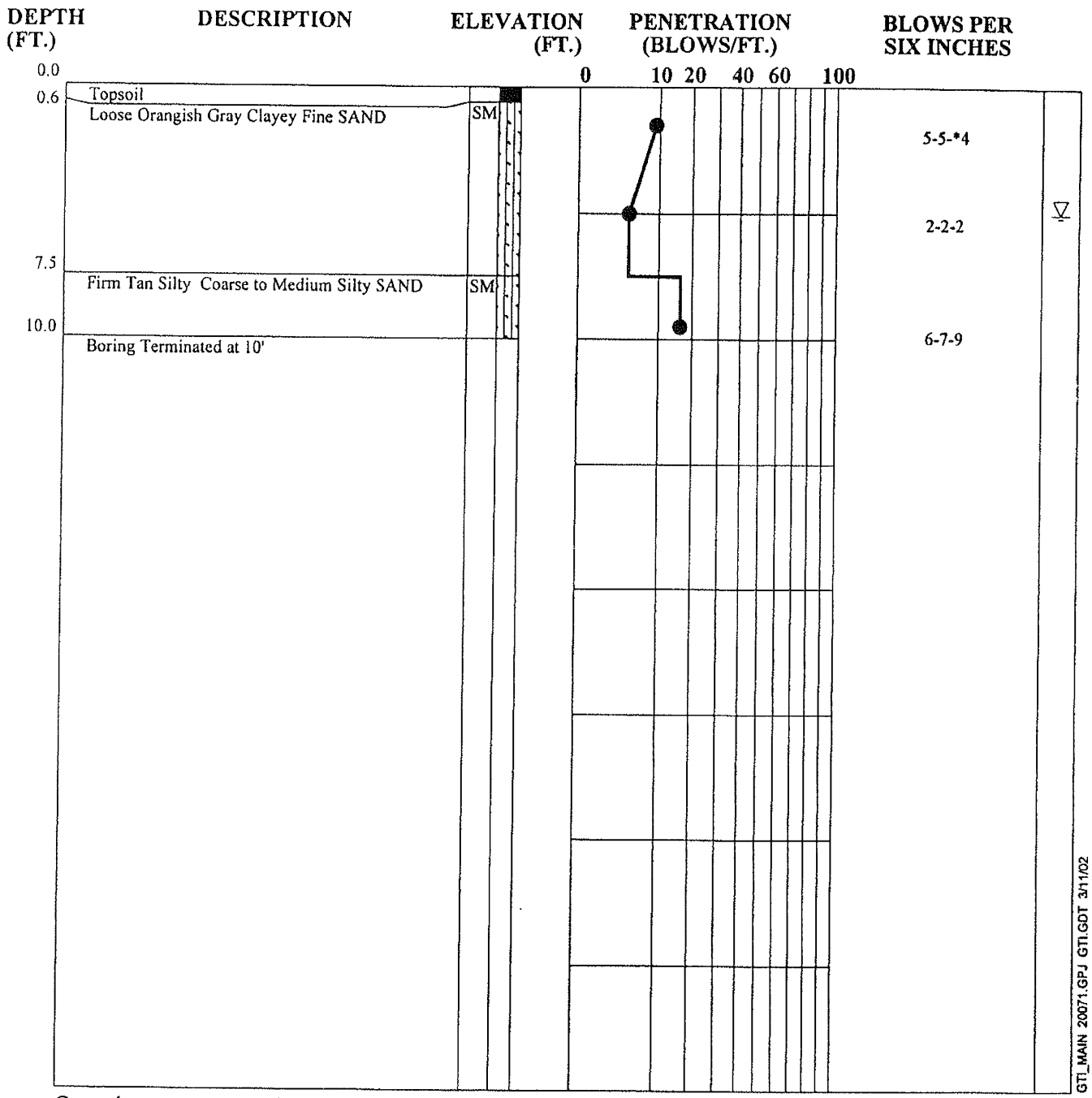


Groundwater encountered at 4' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-44
DATE 2-13-02

GeoTechnologies, Inc

TEST BORING RECORD

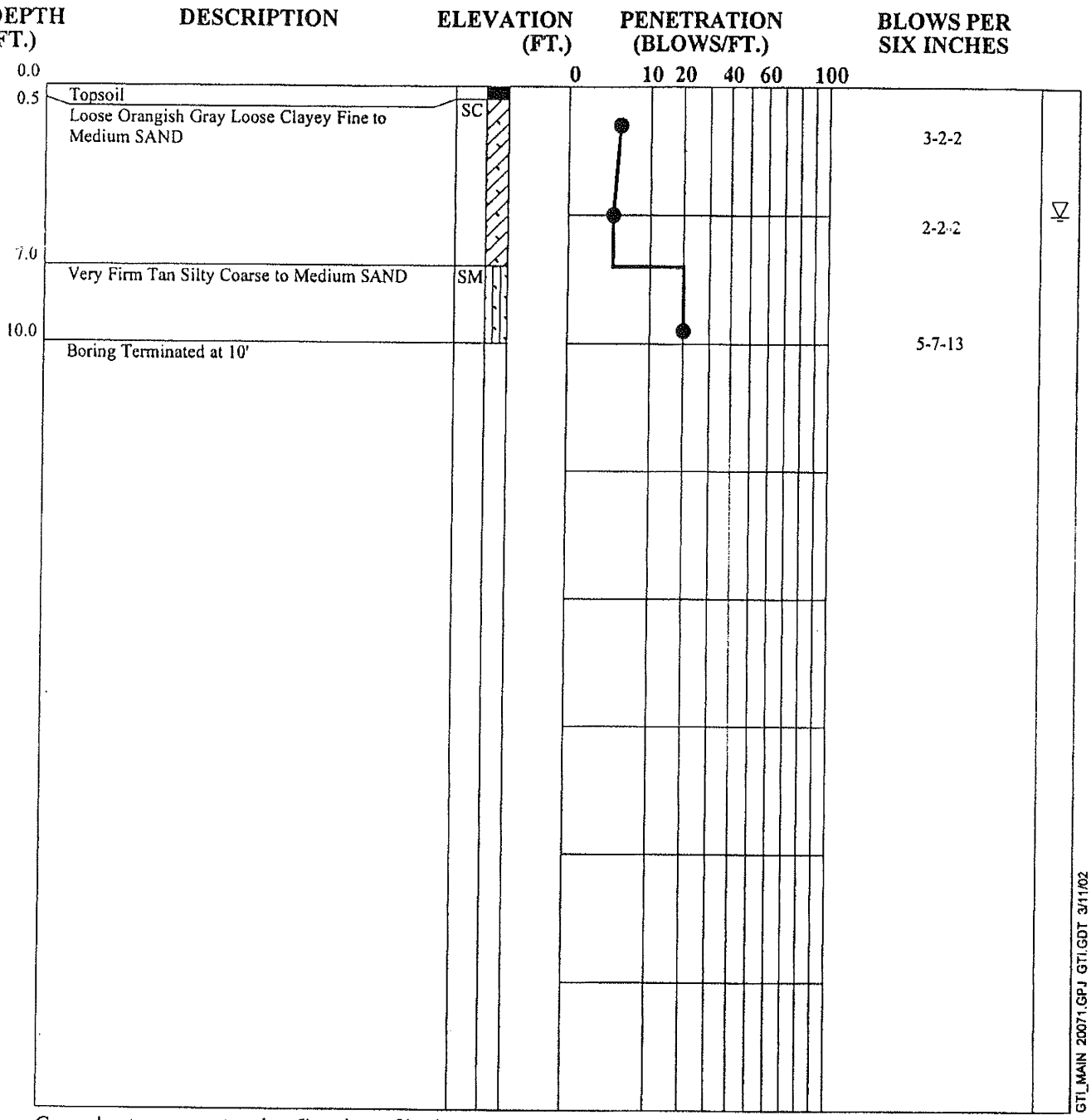


Groundwater encountered at 5' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-45
DATE 2-13-02

GeoTechnologies, Inc.

TEST BORING RECORD



Groundwater encountered at 5' at time of boring

JOB NUMBER 1-02-0071-EA
BORING NUMBER B-46
DATE 2-13-02

GeoTechnologies, Inc

GeoTechnologies, Inc

Job No: 1-02-0071-EA Date: 3/19/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

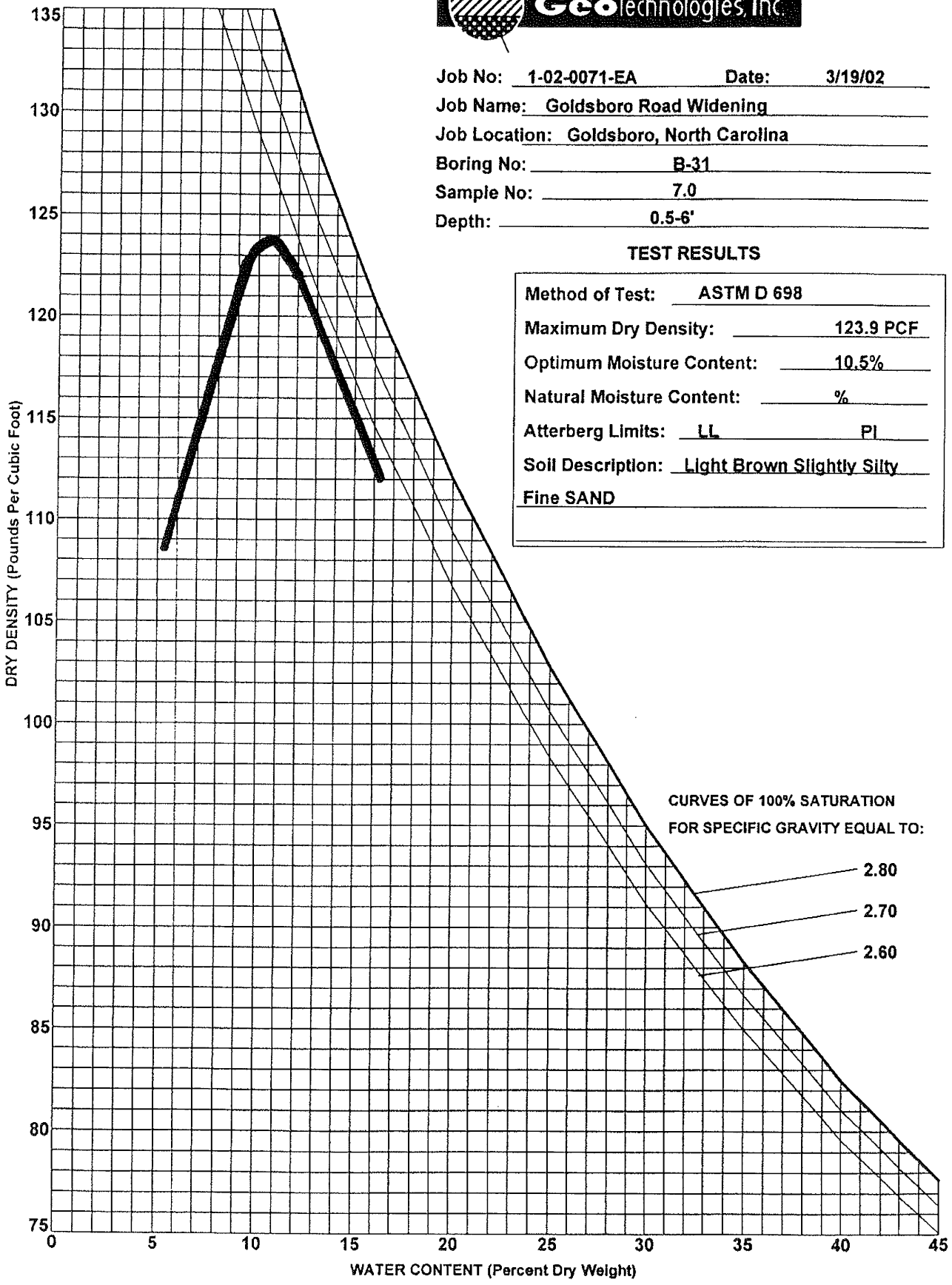
Boring No: B-31

Sample No: 7.0

Depth: 0.5-6'

TEST RESULTS

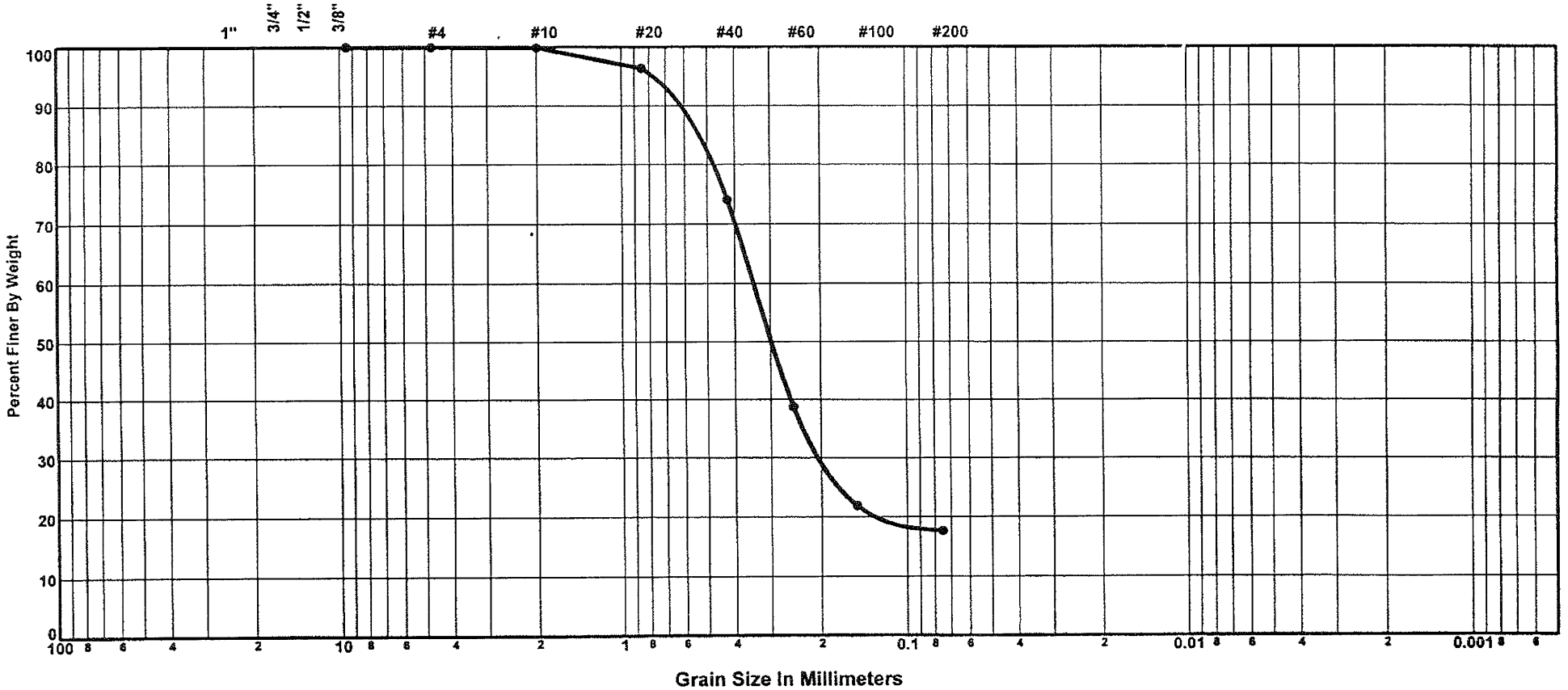
Method of Test:	ASTM D 698
Maximum Dry Density:	123.9 PCF
Optimum Moisture Content:	10.5%
Natural Moisture Content:	%
Atterberg Limits:	LL PI
Soil Description:	Light Brown Slightly Silty Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
B-31 7	0.5-6'					Light Brown Slightly Silty Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/19/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** B-31 **DEPTH:** 0.5-6.0'

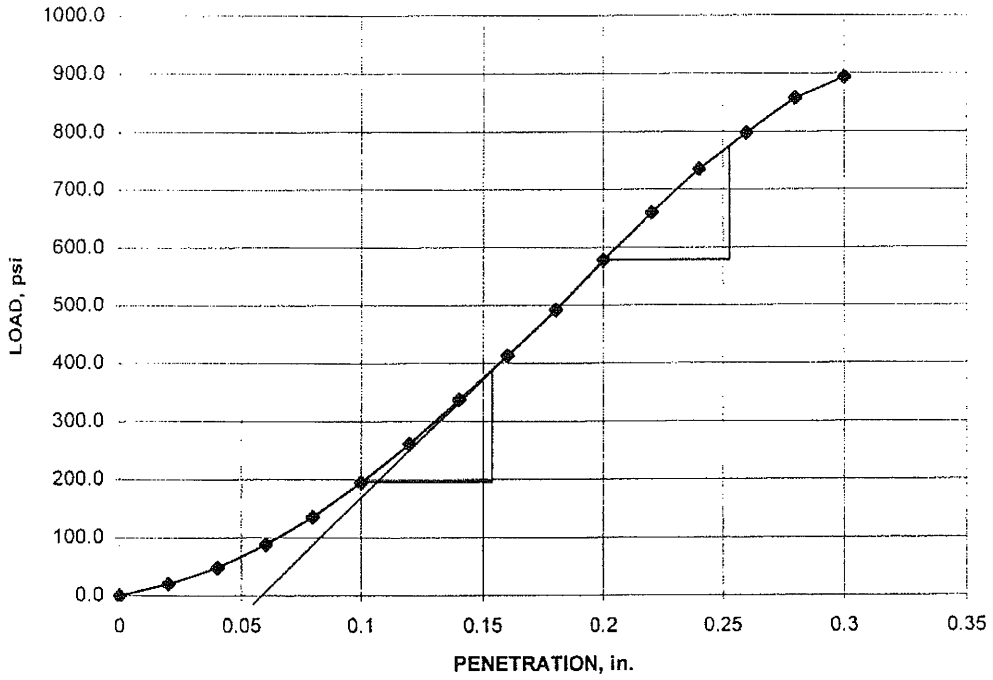
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 10.5% Max. Dry Density = 123.9 PCF

SOIL DESCRIPTION: Light Brown Silty Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	10.5%	Initial Reading	0.147
WET DENSITY	134.9 lbs./cu.ft.	Final Reading	0.152
DRY DENSITY	122.1 lbs./cu.ft.	Mold Height	4.585
% COMPACTION	98.5 %	% Swell	0.1

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	Corrected	38.0
CBR @ 0.2"	Corrected	51.0
% SWELL		0.1

GeoTechnologies, Inc.

Job No: 1-02-0071-EA Date: 3/14/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: B-41

Sample No: 4.0

Depth: 0.5-5.5'

TEST RESULTS

Method of Test: ASTM D 698

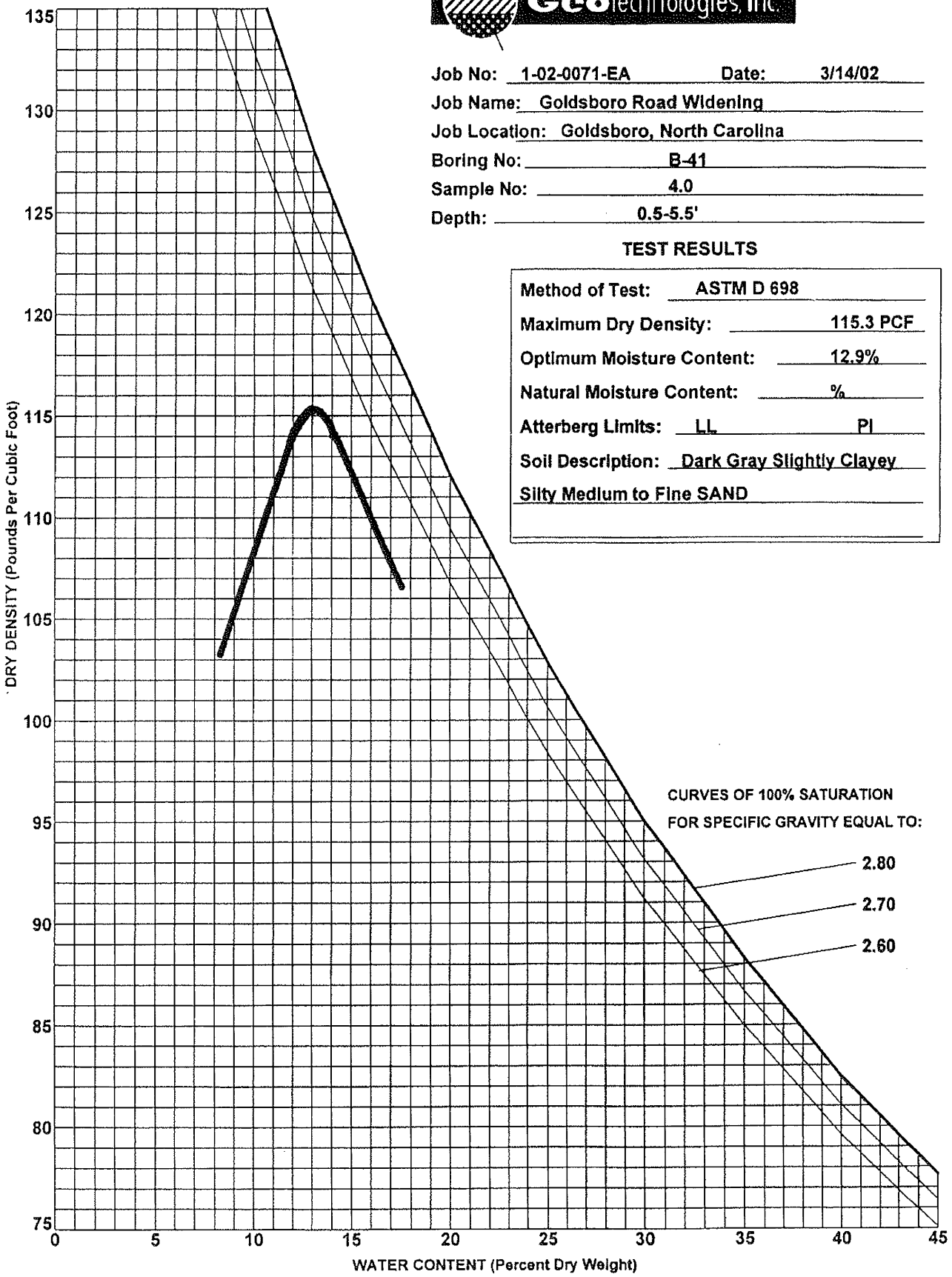
Maximum Dry Density: 115.3 PCF

Optimum Moisture Content: 12.9%

Natural Moisture Content: %

Atterberg Limits: LL PI

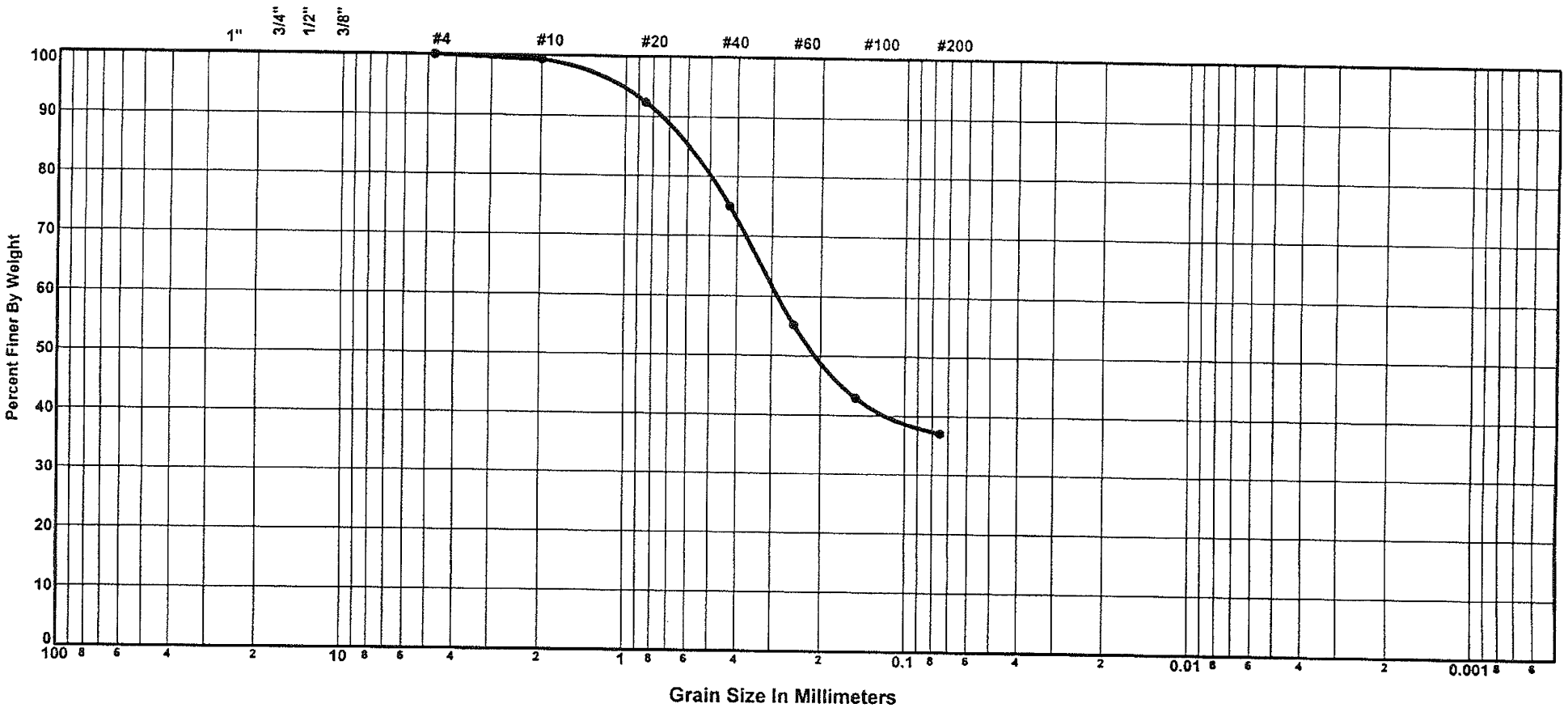
Soil Description: Dark Gray Slightly Clayey Silty Medium to Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
B-41 4	0.5-5.5'					Dark Gray Slightly Clayey Silty Medium to Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/14/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies Inc.

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** B-41 **DEPTH:** 0.5-5.5'

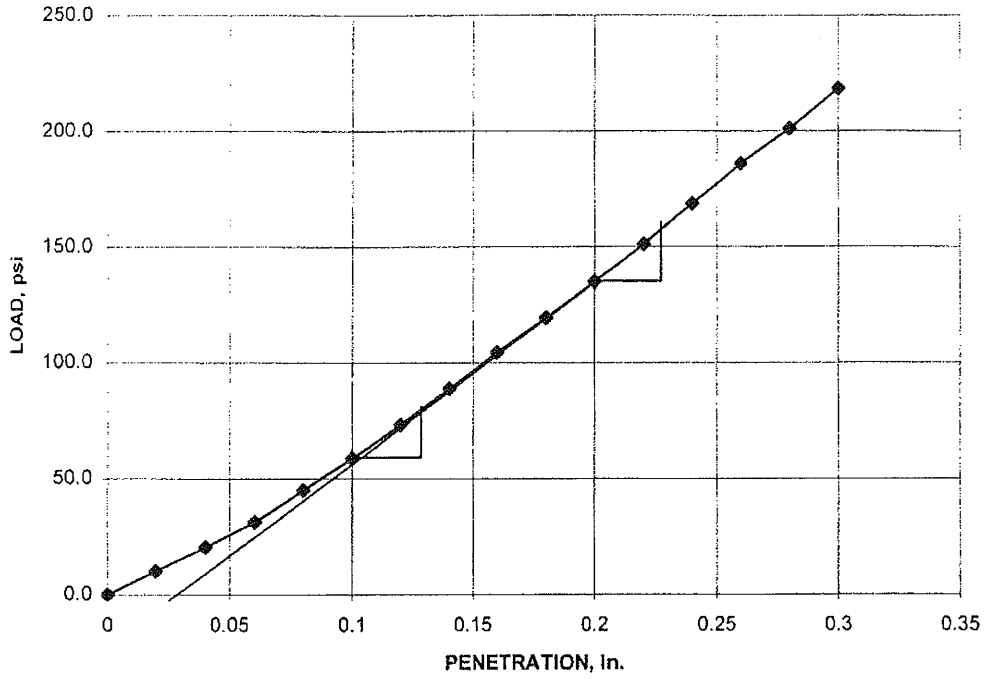
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 12.9% Max. Dry Density = 115.3 PCF

SOIL DESCRIPTION: Dark Gray Slightly Clayey Silty Medium-Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	12.9%	Initial Reading	0.062
WET DENSITY	130.3 lbs./cu.ft.	Final Reading	0.076
DRY DENSITY	115.4 lbs./cu.ft.	Mold Height	4.593
% COMPACTION	100.1 %	% Swell	0.3

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	Corrected	7.7
CBR @ 0.2"	Corrected	10.7
% SWELL		0.3

GeoTechnologies, Inc.

Job No: 1-02-0071-EA Date: 3/19/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: B-45

Sample No: 9.0

Depth: 1-5.5'

TEST RESULTS

Method of Test: ASTM D 698

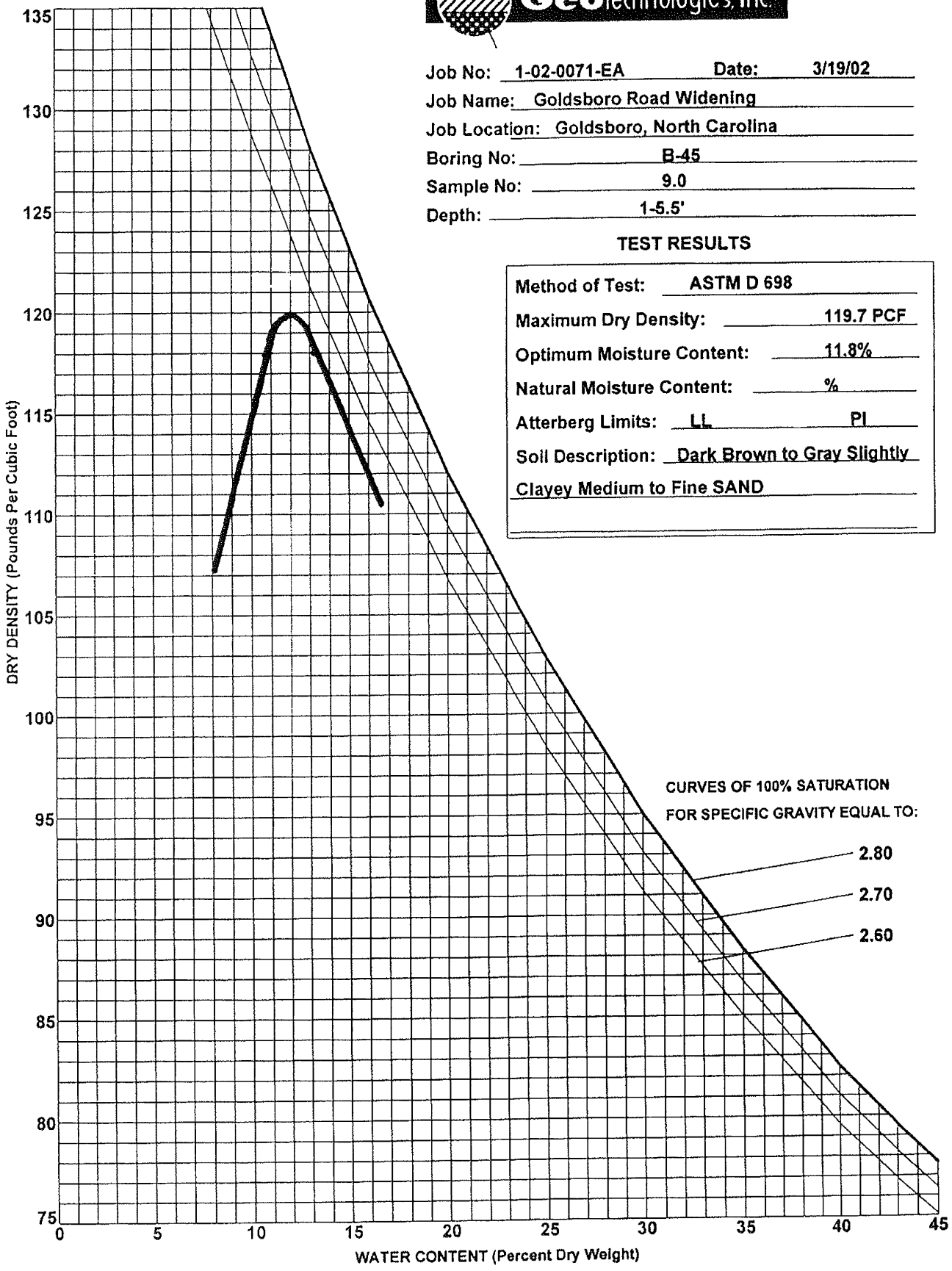
Maximum Dry Density: 119.7 PCF

Optimum Moisture Content: 11.8%

Natural Moisture Content: %

Atterberg Limits: LL PI

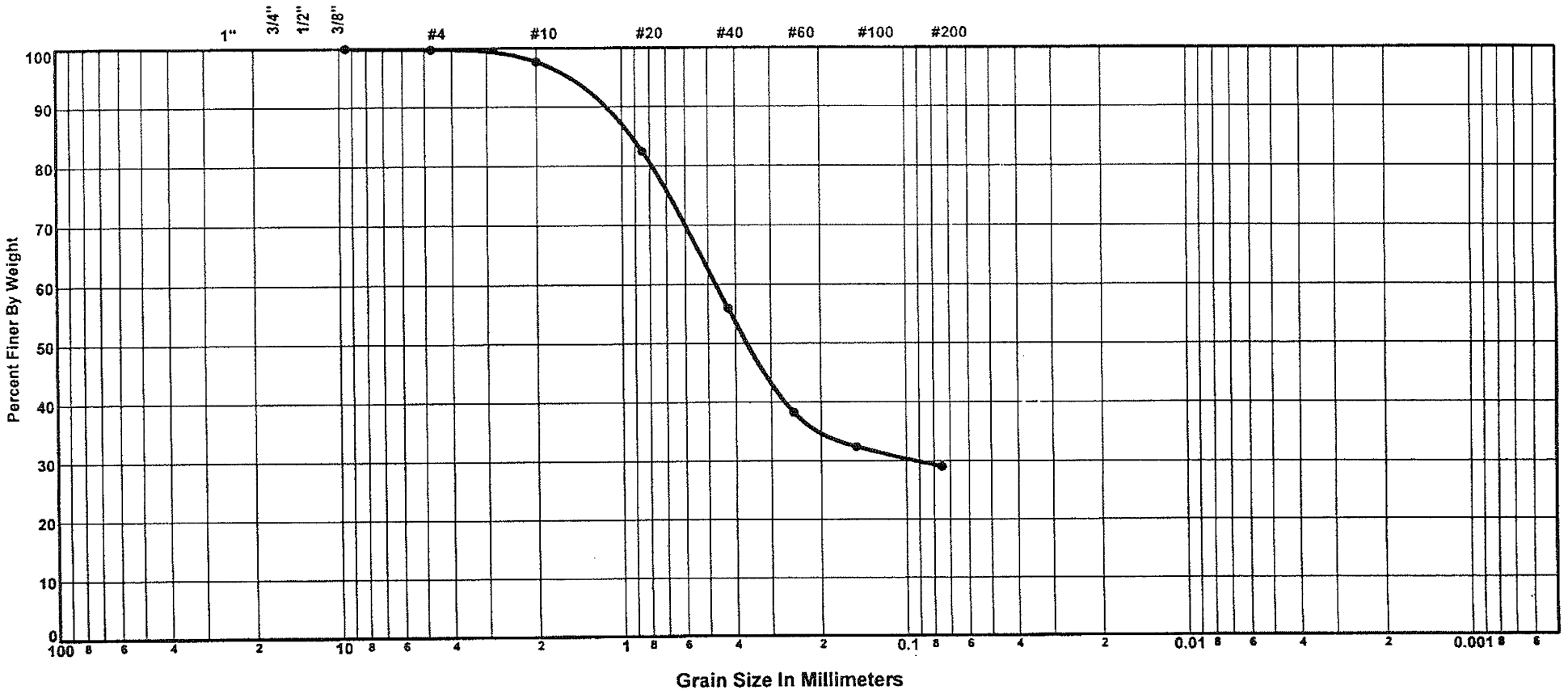
Soil Description: Dark Brown to Gray Slightly Clayey Medium to Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
B-45 9	1-5.5'					Dark Brown to Gray Slightly Clayey Medium to Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/19/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** B-45 **DEPTH:** 1.0-5.5'

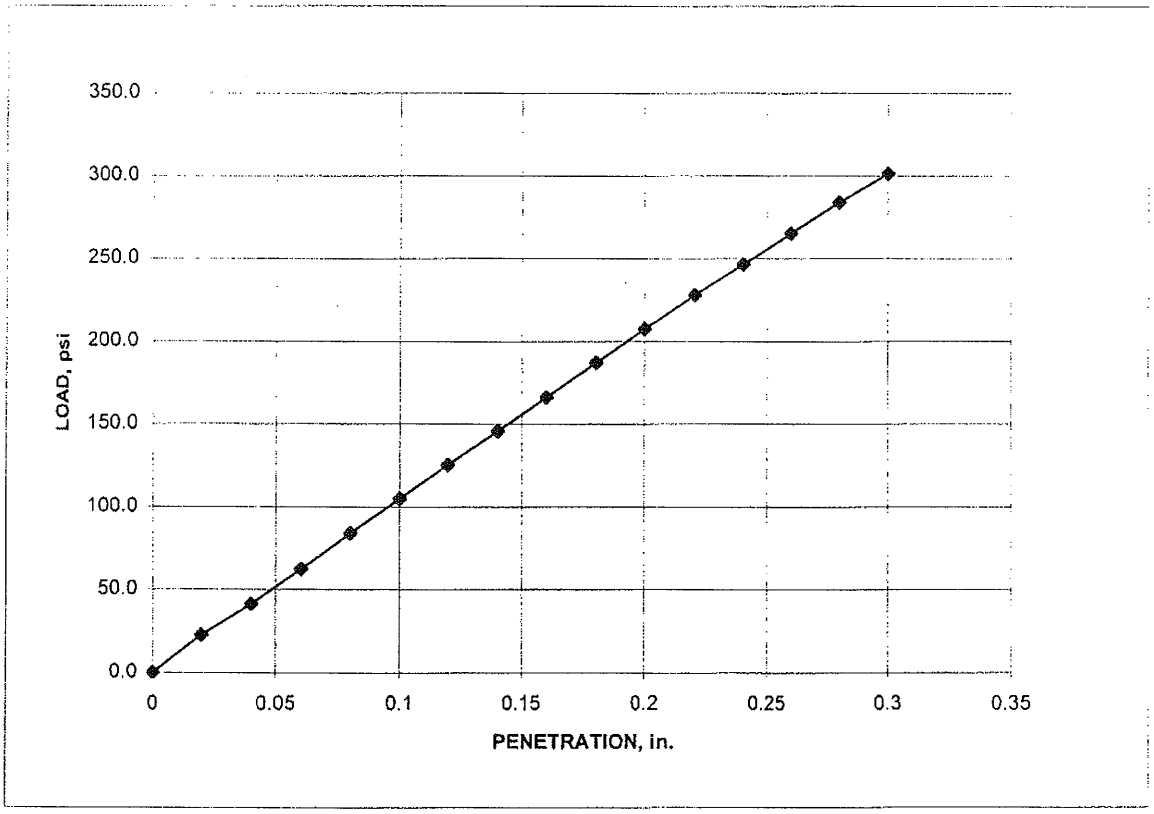
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 11.8% Max. Dry Density = 119.7 PCF

SOIL DESCRIPTION: Dark Brown Grey Clayey Medium-Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	11.8%	Initial Reading	0.145
WET DENSITY	133.6 lbs./cu.ft.	Final Reading	0.150
DRY DENSITY	119.5 lbs./cu.ft.	Mold Height	4.589
% COMPACTION	99.8 %	% Swell	0.1

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	10.5
CBR @ 0.2"	13.8
% SWELL	0.1

GeoTechnologies, Inc

Job No: 1-02-0071-EA Date: 3/14/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: O-6

Sample No: 1.0

Depth: 0-6'

TEST RESULTS

Method of Test: ASTM D 698

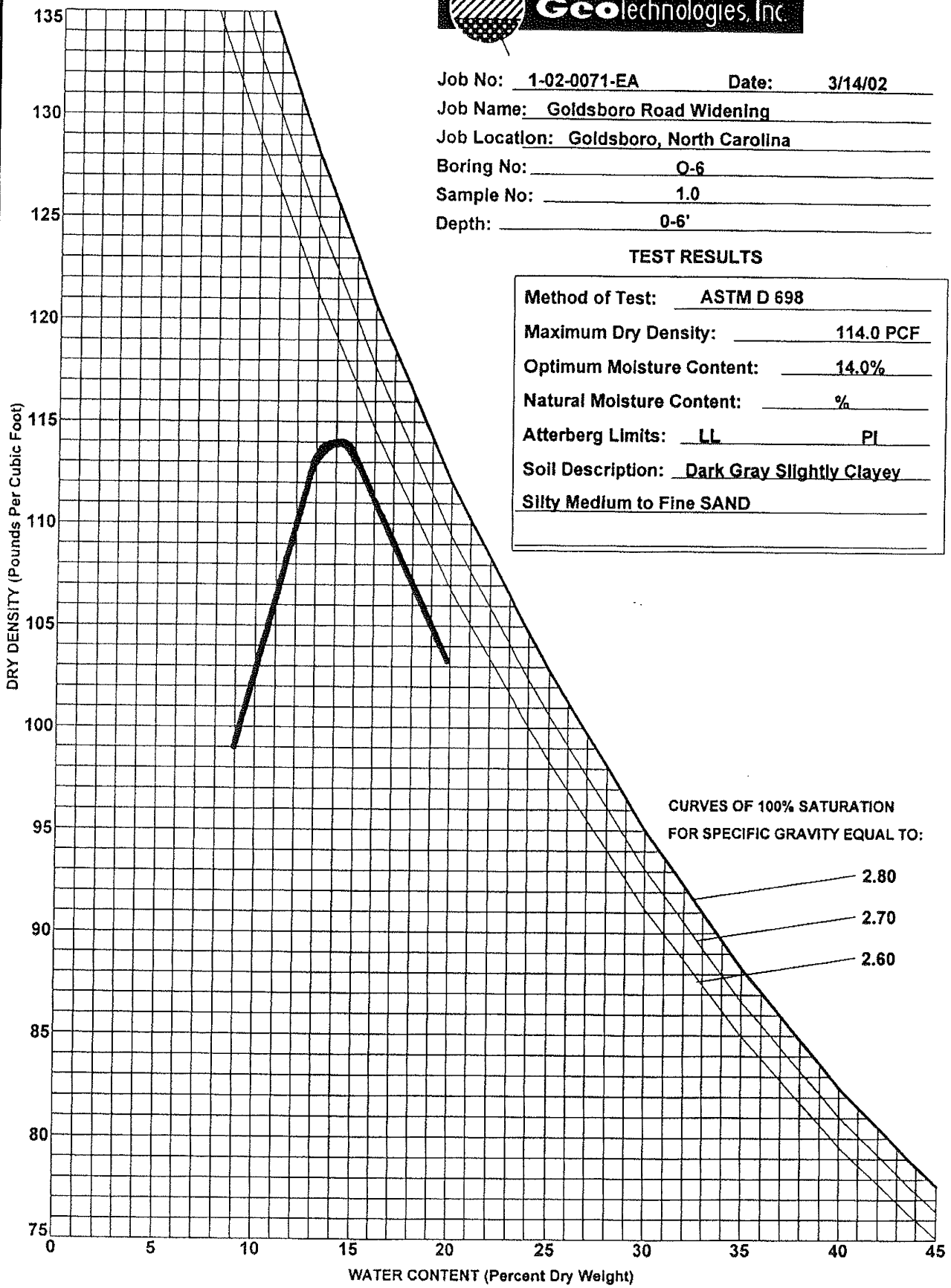
Maximum Dry Density: 114.0 PCF

Optimum Moisture Content: 14.0%

Natural Moisture Content: %

Atterberg Limits: LL PI

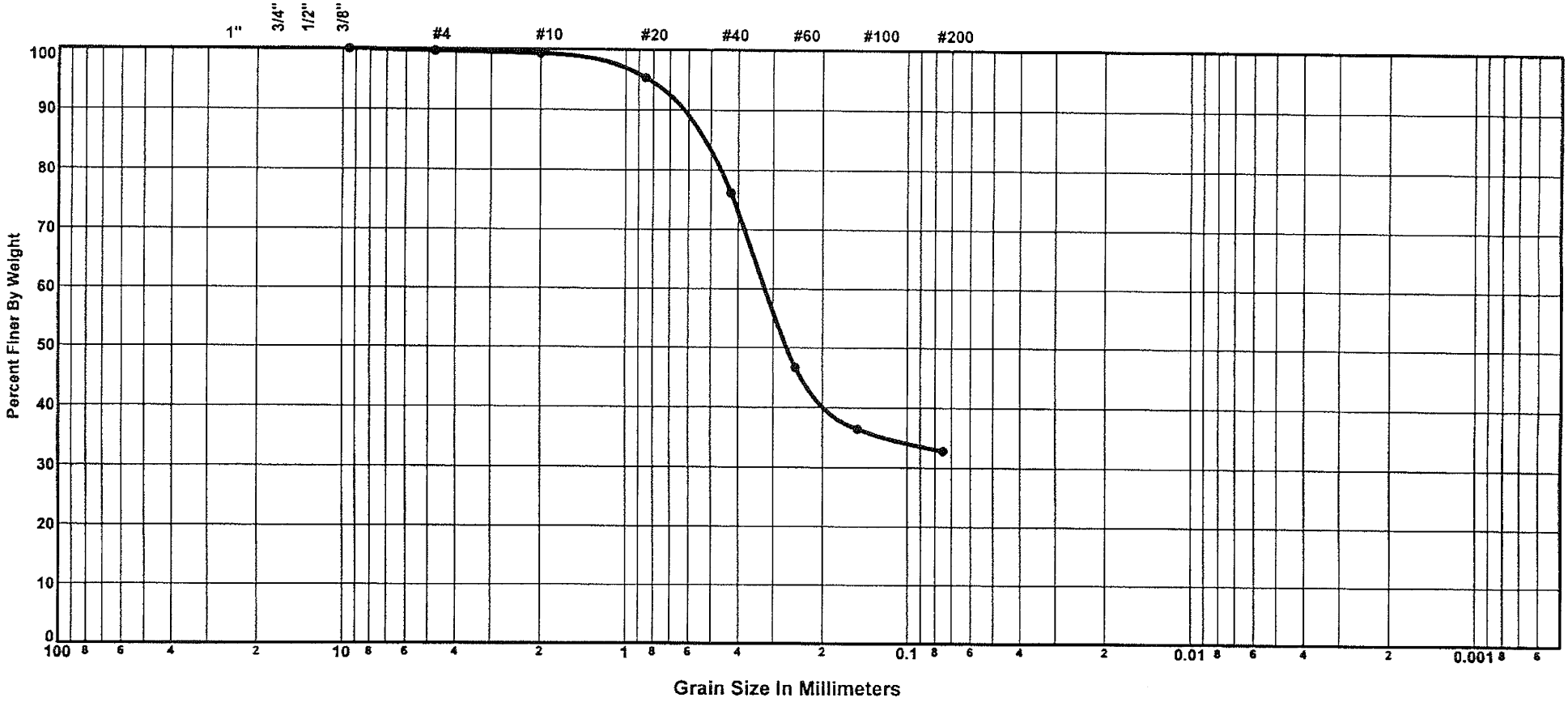
Soil Description: Dark Gray Slightly Clayey Silty Medium to Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
O-6 1	0-5'					Dark Gray Slightly Clayey Silty Medium to Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/14/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc.

CBR DATA SHEET

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** O-6 **DEPTH:**

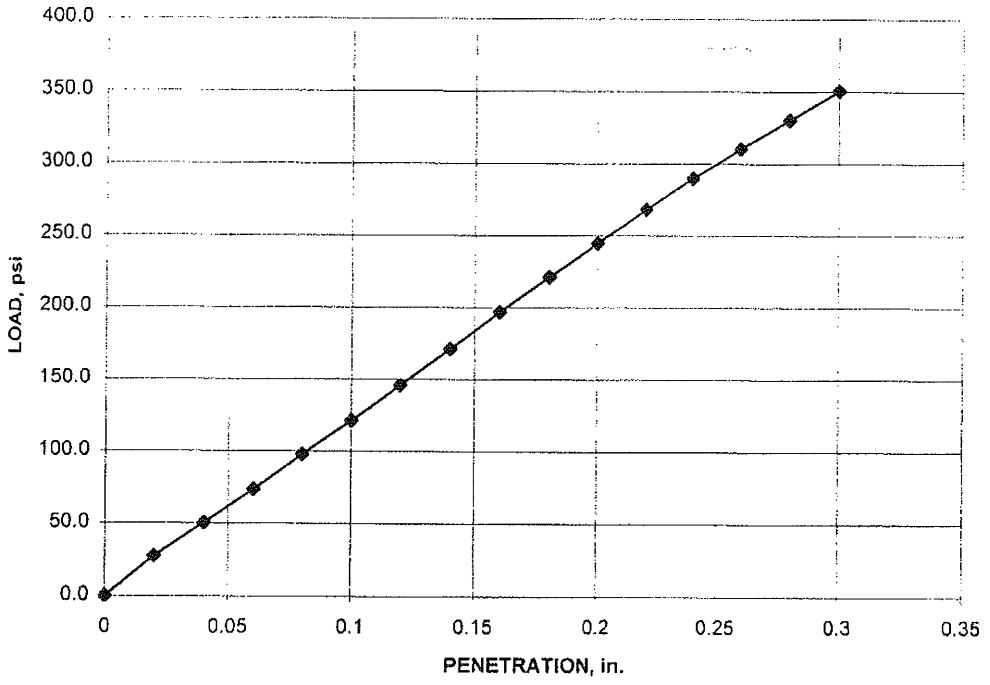
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 14.0% Max. Dry Density = 114.0 PCF

SOIL DESCRIPTION: Dark Gray Slightly Clayey Silty Medium-Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	14.0%	Initial Reading	0.178
WET DENSITY	129.0 lbs./cu.ft.	Final Reading	0.183
DRY DENSITY	113.2 lbs./cu.ft.	Mold Height	4.587
% COMPACTION	99.3 %	% Swell	0.1

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	12.1
CBR @ 0.2"	16.3
% SWELL	0.1

GeoTechnologies, Inc

Job No: 1-02-0071-EA Date: 3/14/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: R-13

Sample No: 2.0

Depth:

TEST RESULTS

Method of Test: ASTM D 698

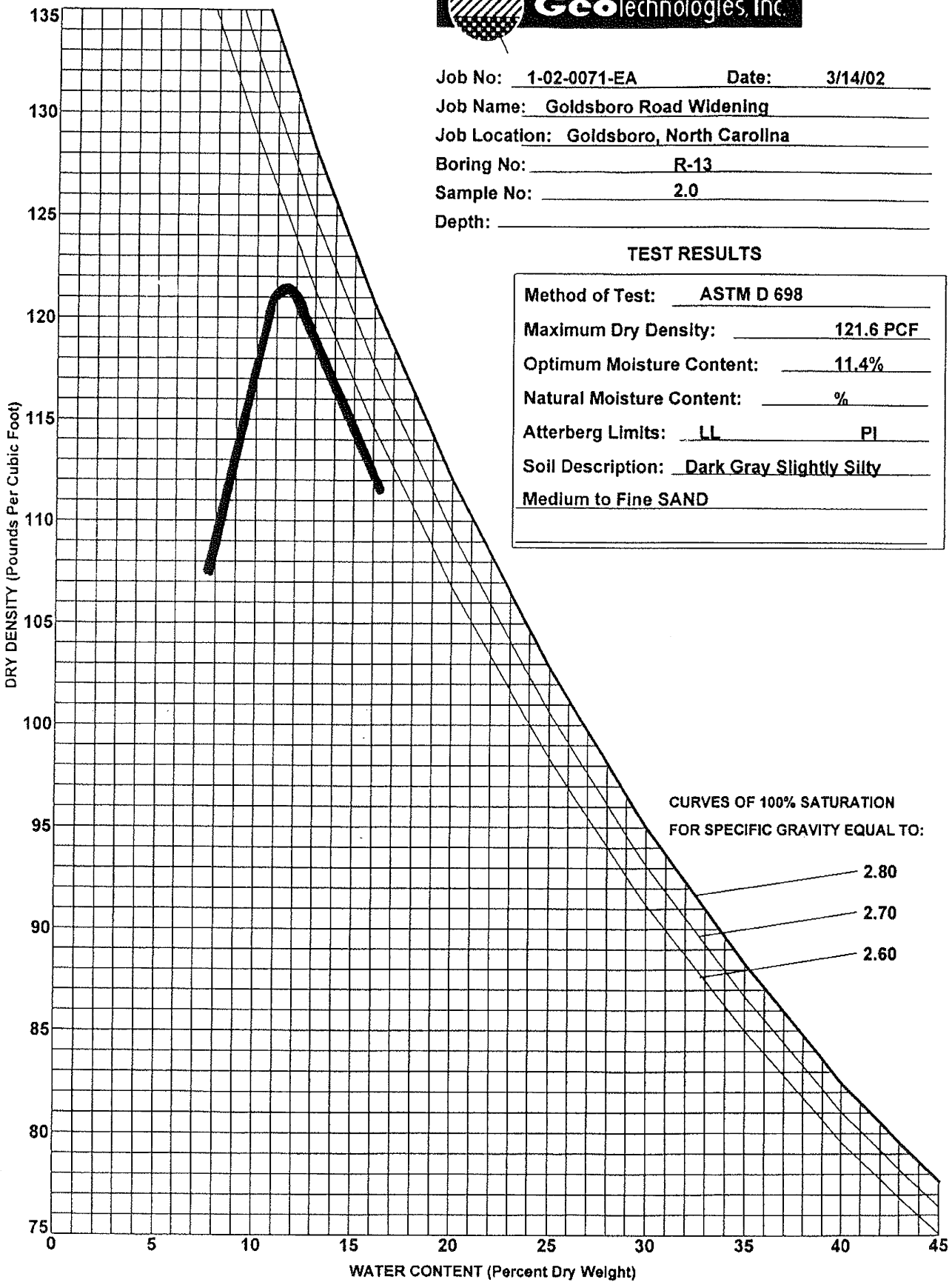
Maximum Dry Density: 121.6 PCF

Optimum Moisture Content: 11.4%

Natural Moisture Content: %

Atterberg Limits: LL PI

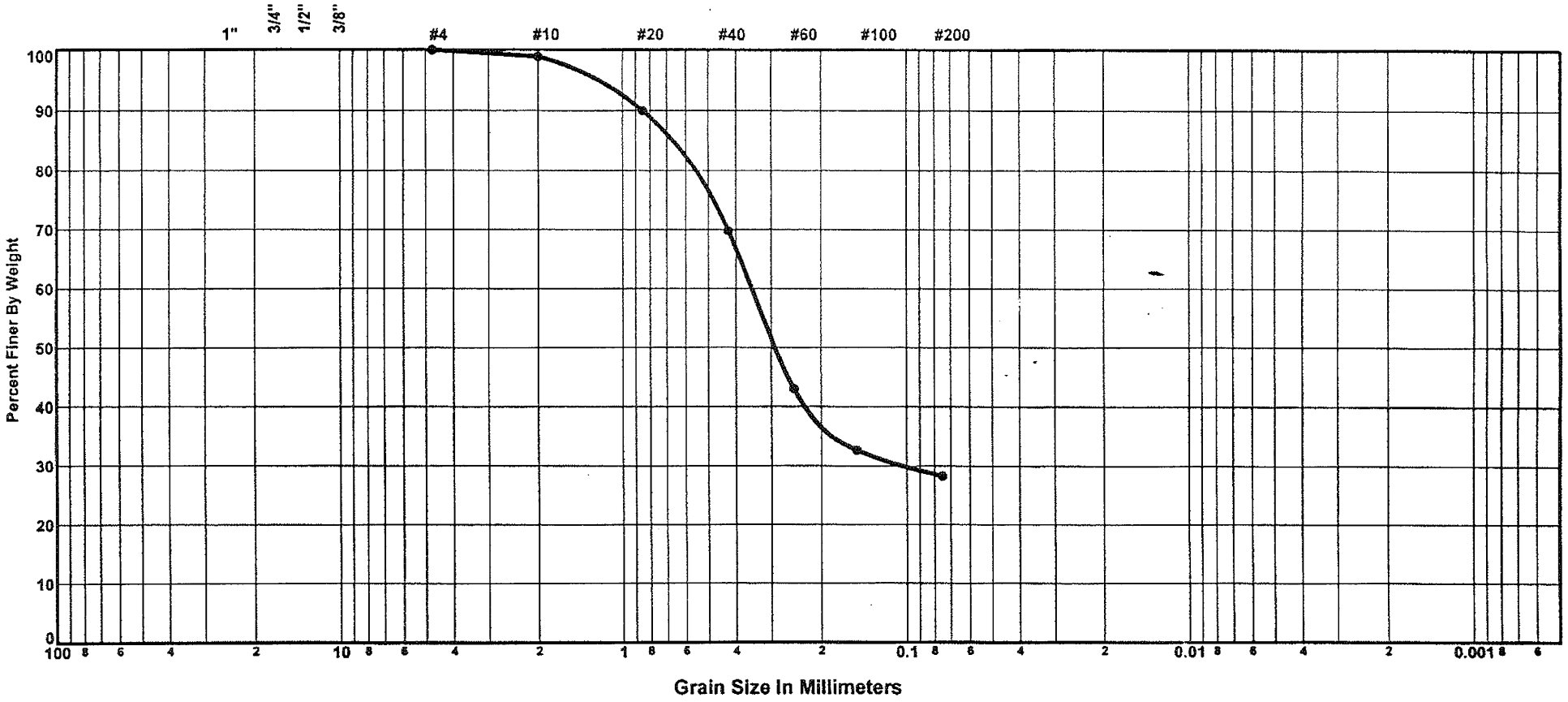
Soil Description: Dark Gray Slightly Silty Medium to Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
R-13 2						Dark Gray Slightly Silty Medium to Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/14/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc.

CBR DATA SHEET

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** R-13 **DEPTH:**

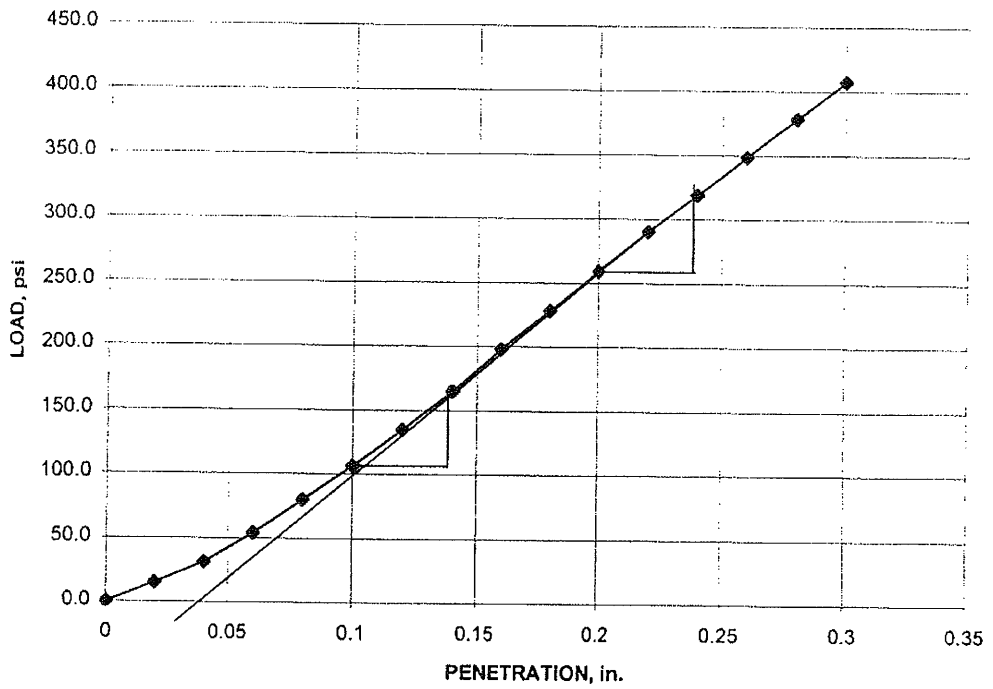
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 11.4% Max. Dry Density = 121.6 PCF

SOIL DESCRIPTION: Dark Gray Silty Medium-Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	11.4%	Initial Reading	0.205
WET DENSITY	136.1 lbs./cu.ft.	Final Reading	0.206
DRY DENSITY	122.2 lbs./cu.ft.	Mold Height	4.587
% COMPACTION	100.5 %	% Swell	0.0

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	16.5
CBR @ 0.2"	21.3
% SWELL	0.0

GeoTechnologies, Inc

Job No: 1-02-0071-EA Date: 3/19/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: R-15+R-16

Sample No: 10.0

Depth: 0-3'

TEST RESULTS

Method of Test: ASTM D 698

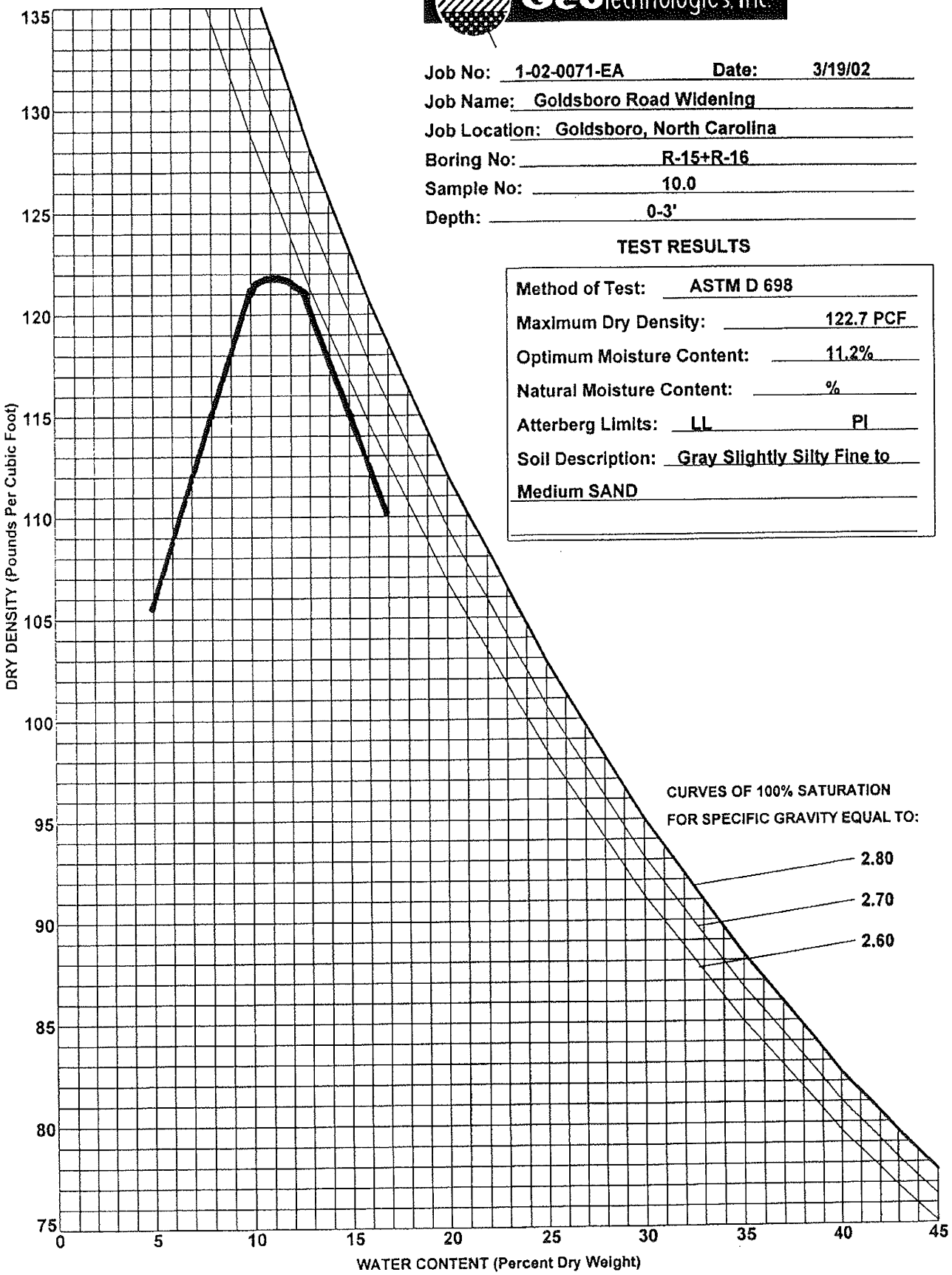
Maximum Dry Density: 122.7 PCF

Optimum Moisture Content: 11.2%

Natural Moisture Content: %

Atterberg Limits: LL PI

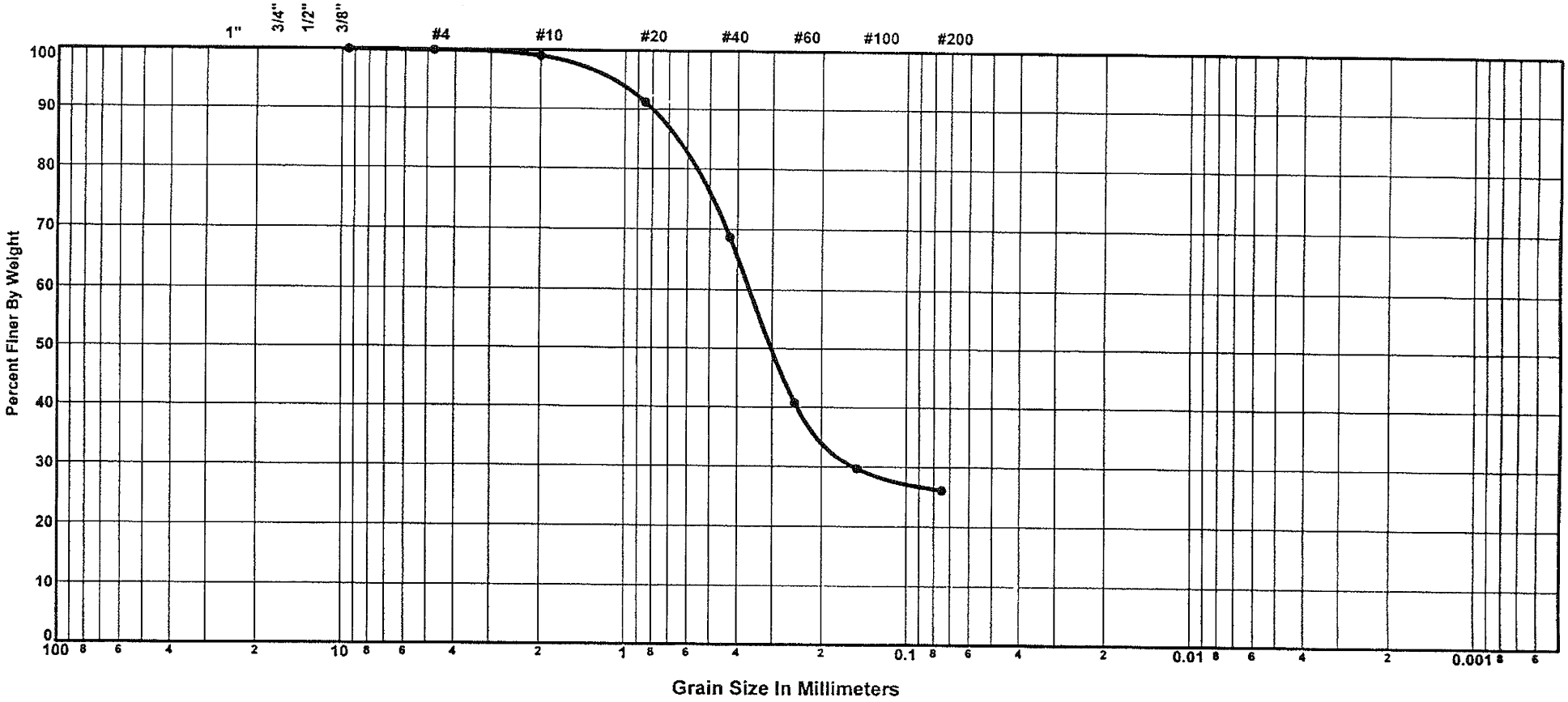
Soil Description: Gray Slightly Silty Fine to Medium SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
R-15+R-16 10	0-3'					Gray Slightly Silty Fine to Medium SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/19/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc.

CBR DATA SHEET

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** R-15+R16 **DEPTH:** 0.0-3.0'

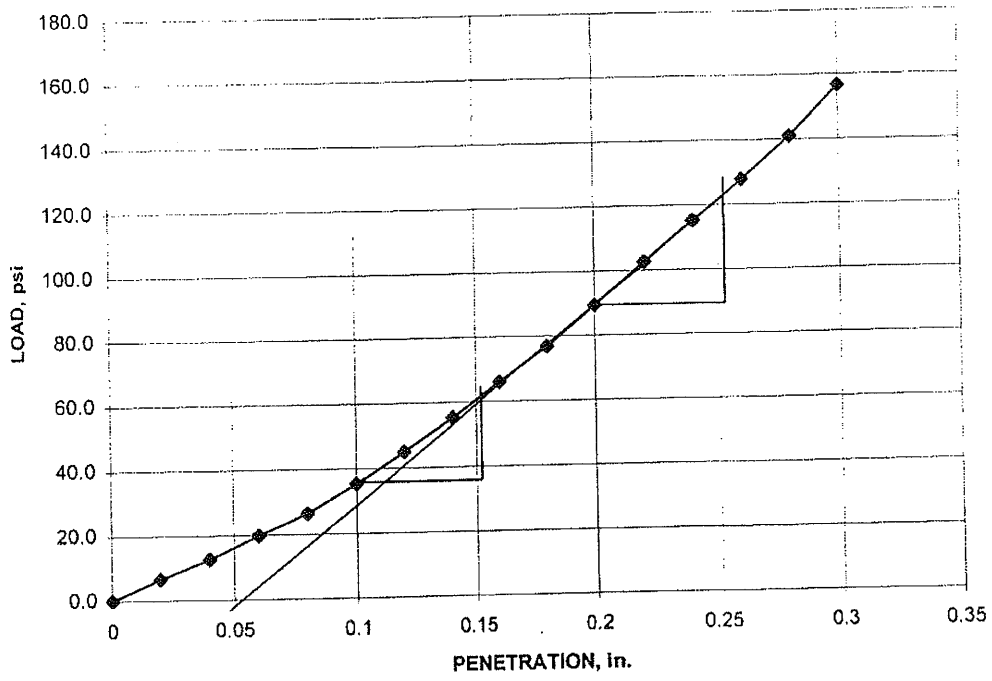
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 11.2% Max. Dry Density = 122.7 PCF

SOIL DESCRIPTION: Grey Silty Medium-Fine Sand

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	11.2%	Initial Reading	0.212
WET DENSITY	136.0 lbs./cu.ft.	Final Reading	0.214
DRY DENSITY	122.3 lbs./cu.ft.	Mold Height	4.586
% COMPACTION	99.7 %	% Swell	0.0

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	Corrected	6.2
CBR @ 0.2"	Corrected	8.1
% SWELL		0.0

GeoTechnologies, Inc.

Job No: 1-02-0071-EA Date: 3/19/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

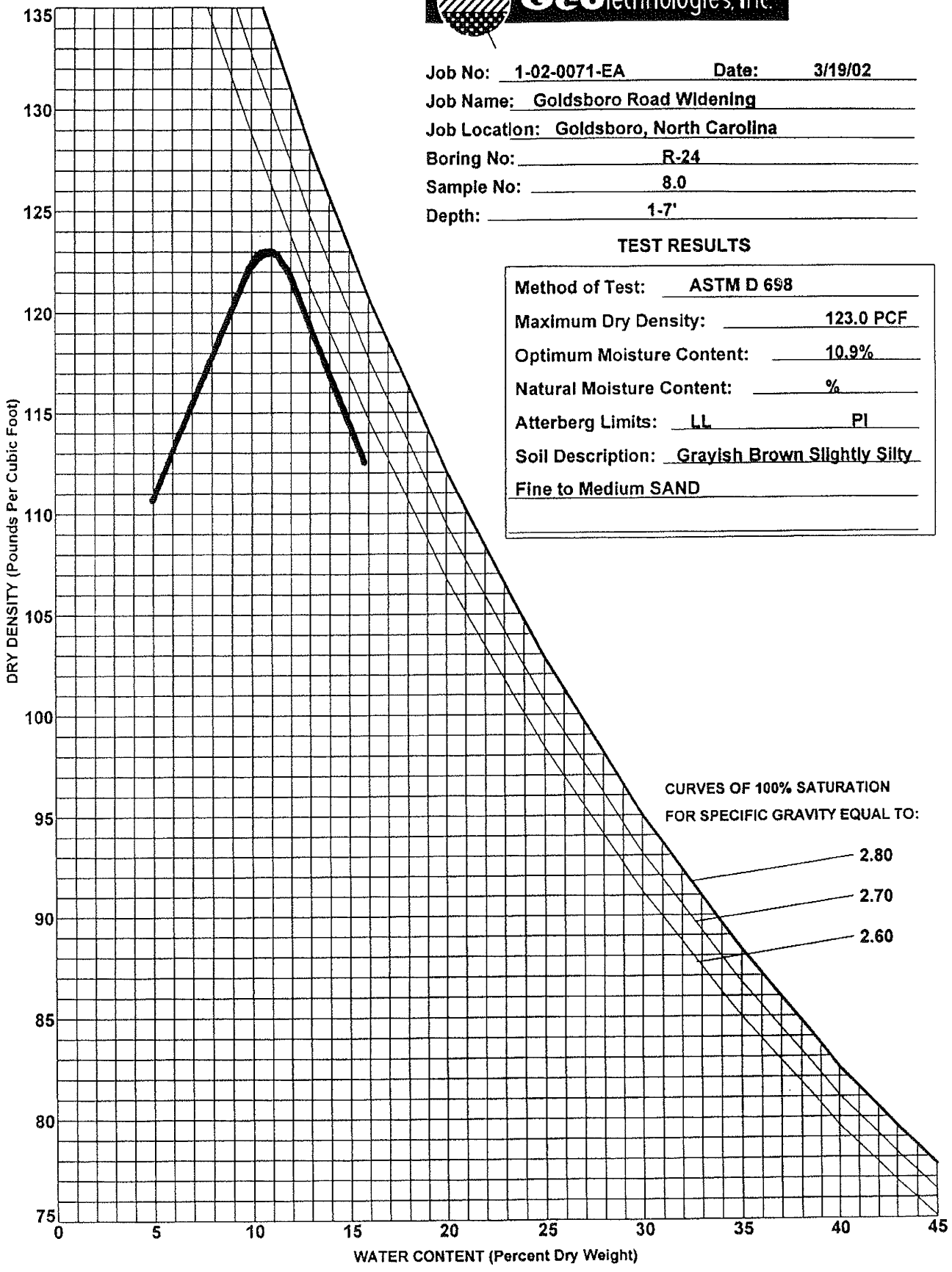
Boring No: R-24

Sample No: 8.0

Depth: 1-7'

TEST RESULTS

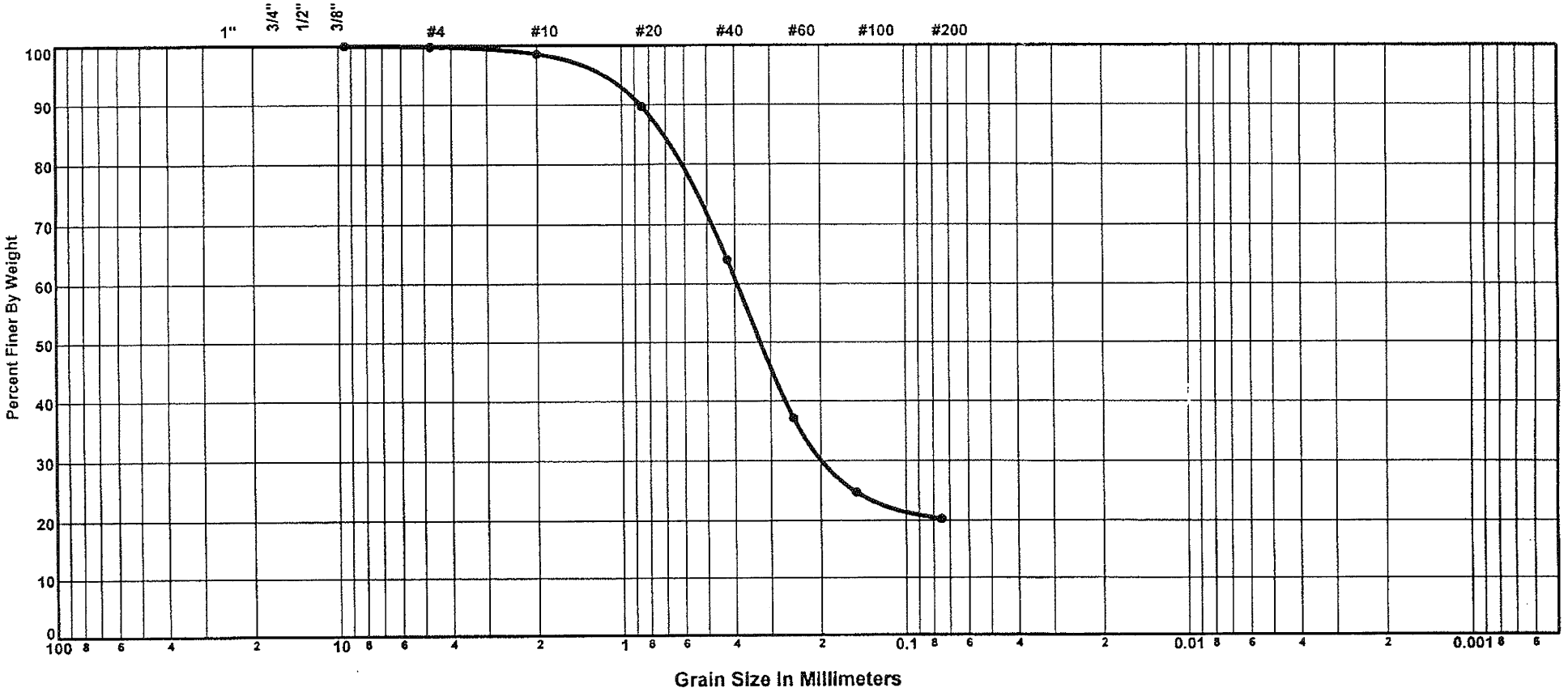
Method of Test:	ASTM D 698
Maximum Dry Density:	123.0 PCF
Optimum Moisture Content:	10.9%
Natural Moisture Content:	%
Atterberg Limits:	LL PI
Soil Description:	Grayish Brown Slightly Silty Fine to Medium SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
R-24 8	1-7'					Grayish Brown Slightly Silty Fine to Medium SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/19/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** R-24 **DEPTH:** 1.0-7.0'

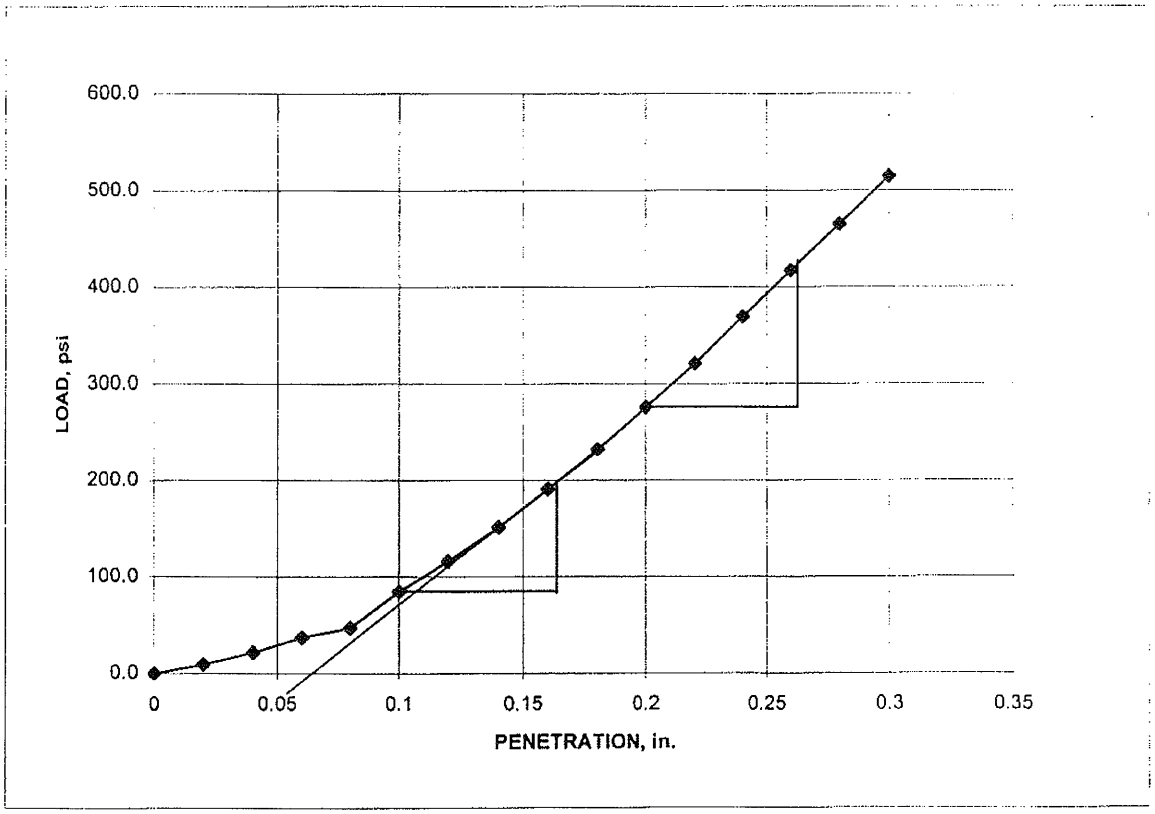
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 10.9% Max. Dry Density = 123.0 PCF

SOIL DESCRIPTION: Gray Brown Silty Medium-Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	10.9%	Initial Reading	0.160
WET DENSITY	136.4 lbs./cu.ft.	Final Reading	0.158
DRY DENSITY	123.0 lbs./cu.ft.	Mold Height	4.584
% COMPACTION	100.0 %	% Swell	0.0

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	Corrected	20.0
CBR @ 0.2"	Corrected	28.0
% SWELL		0.0

GeoTechnologies, Inc.

Job No: 1-02-0071-EA Date: 3/14/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: R-26

Sample No: 3.0

Depth: 1-6'

TEST RESULTS

Method of Test: ASTM D 698

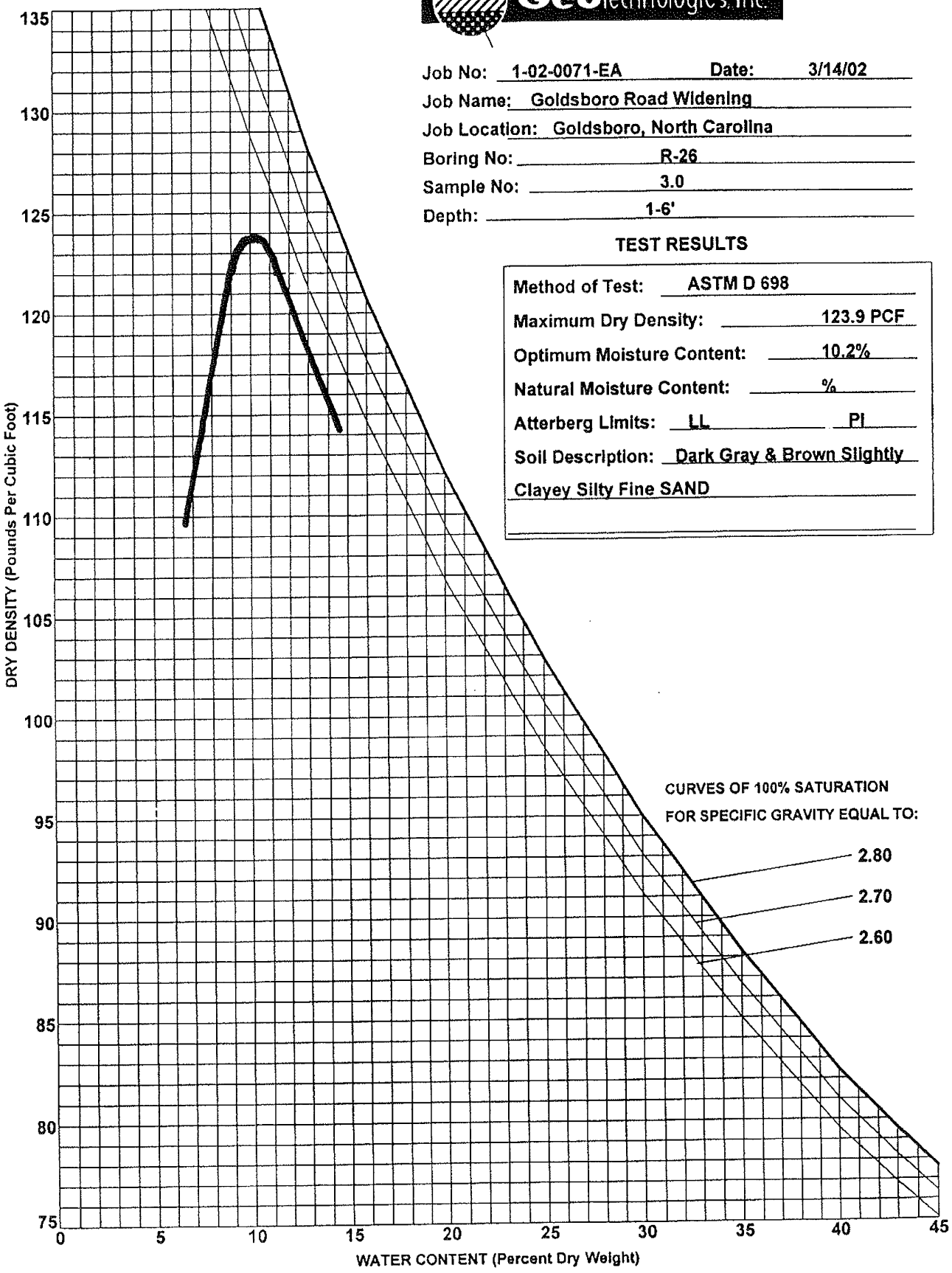
Maximum Dry Density: 123.9 PCF

Optimum Moisture Content: 10.2%

Natural Moisture Content: %

Atterberg Limits: LL PI

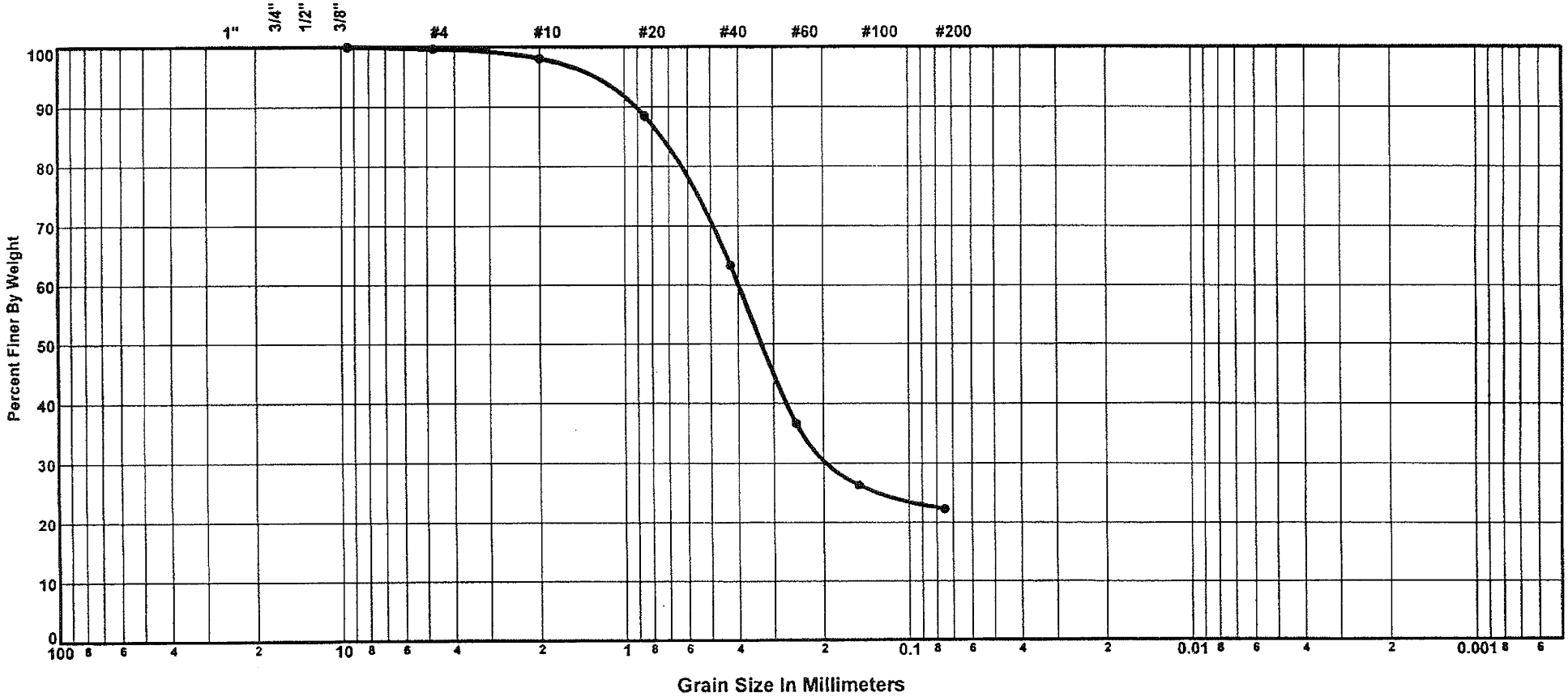
Soil Description: Dark Gray & Brown Slightly Clayey Silty Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
R-26 3	1-6'					Dark Gray & Brown Slightly Clayey Silty Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/14/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** R-26 **DEPTH:** 1.0-6.0'

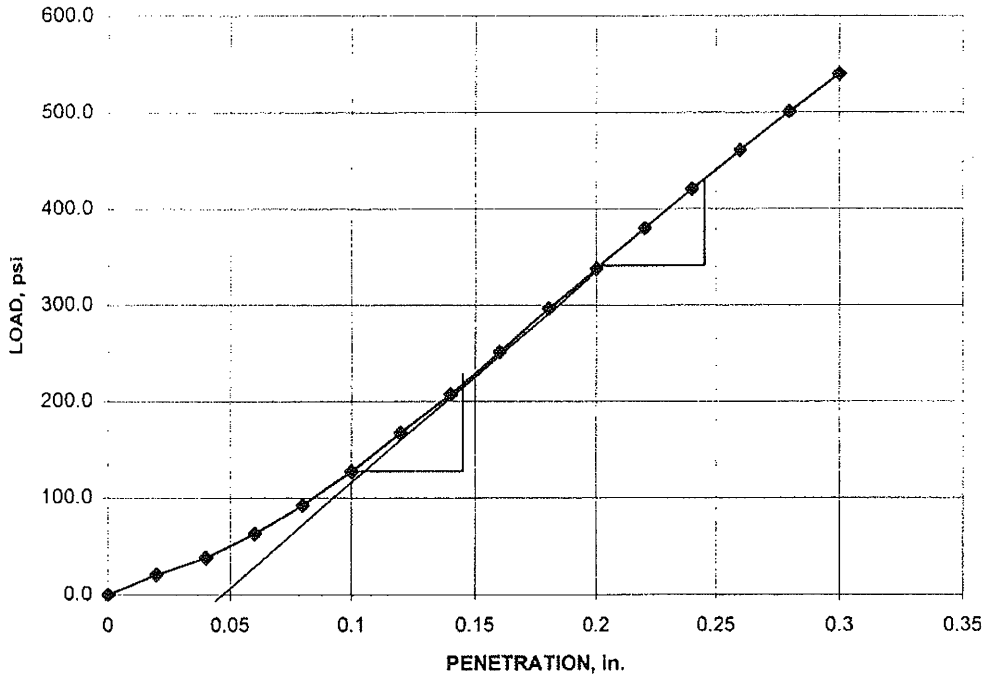
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 10.2% Max. Dry Density = 123.9 PCF

SOIL DESCRIPTION: Dark Gray Brown Slightly Clayey Silty Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	10.2%	Initial Reading	0.151
WET DENSITY	134.6 lbs./cu.ft.	Final Reading	0.150
DRY DENSITY	122.1 lbs./cu.ft.	Mold Height	4.583
% COMPACTION	98.6 %	% Swell	0.0

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	Corrected	21.0
CBR @ 0.2"	Corrected	28.0
% SWELL		0.0

GeoTechnologies, Inc.

Job No: 1-02-0071-EA Date: 3/19/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

Boring No: R-29

Sample No: 5.0

Depth: 0.5-5.5'

TEST RESULTS

Method of Test: ASTM D 698

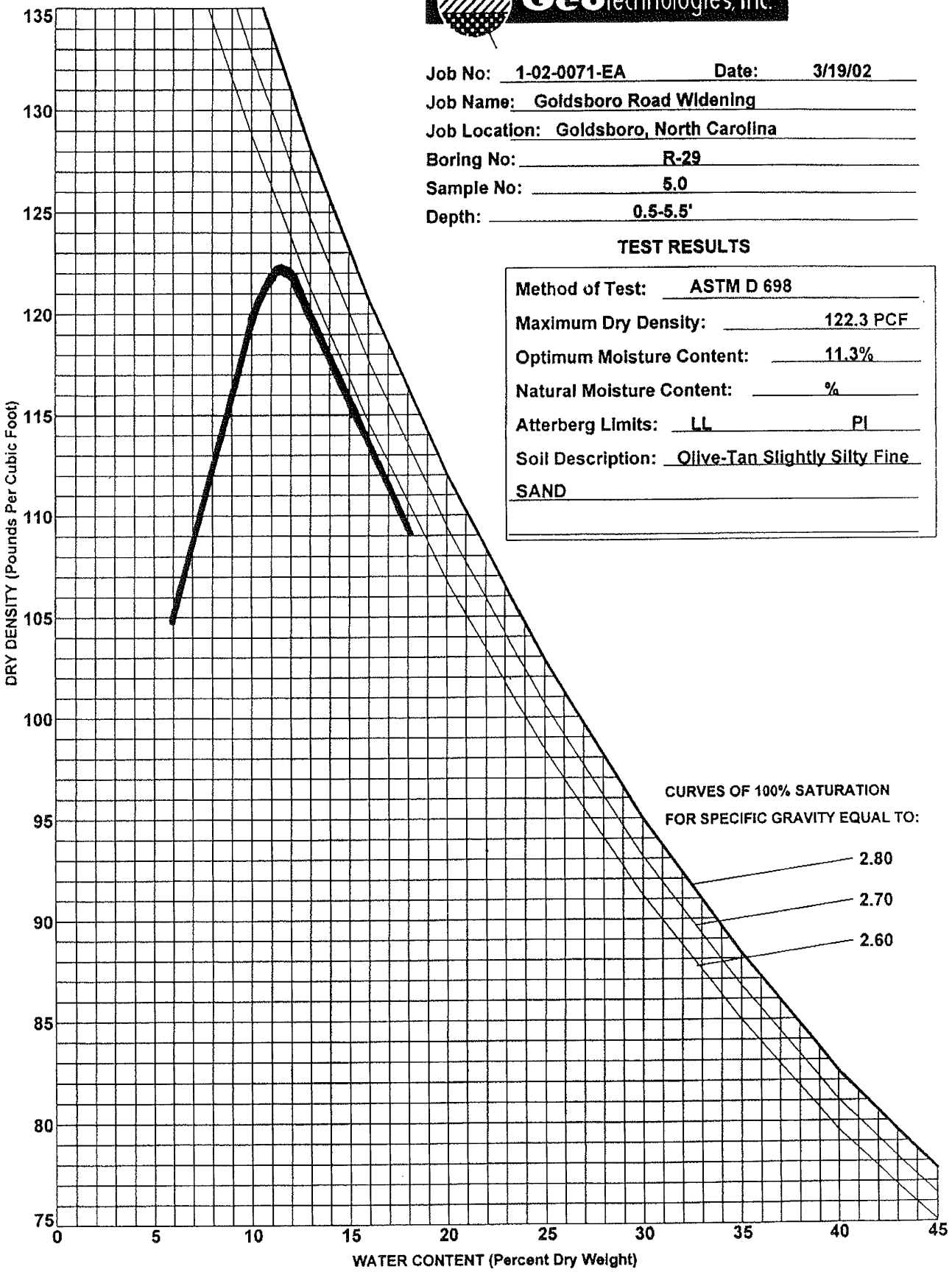
Maximum Dry Density: 122.3 PCF

Optimum Moisture Content: 11.3%

Natural Moisture Content: %

Atterberg Limits: LL PI

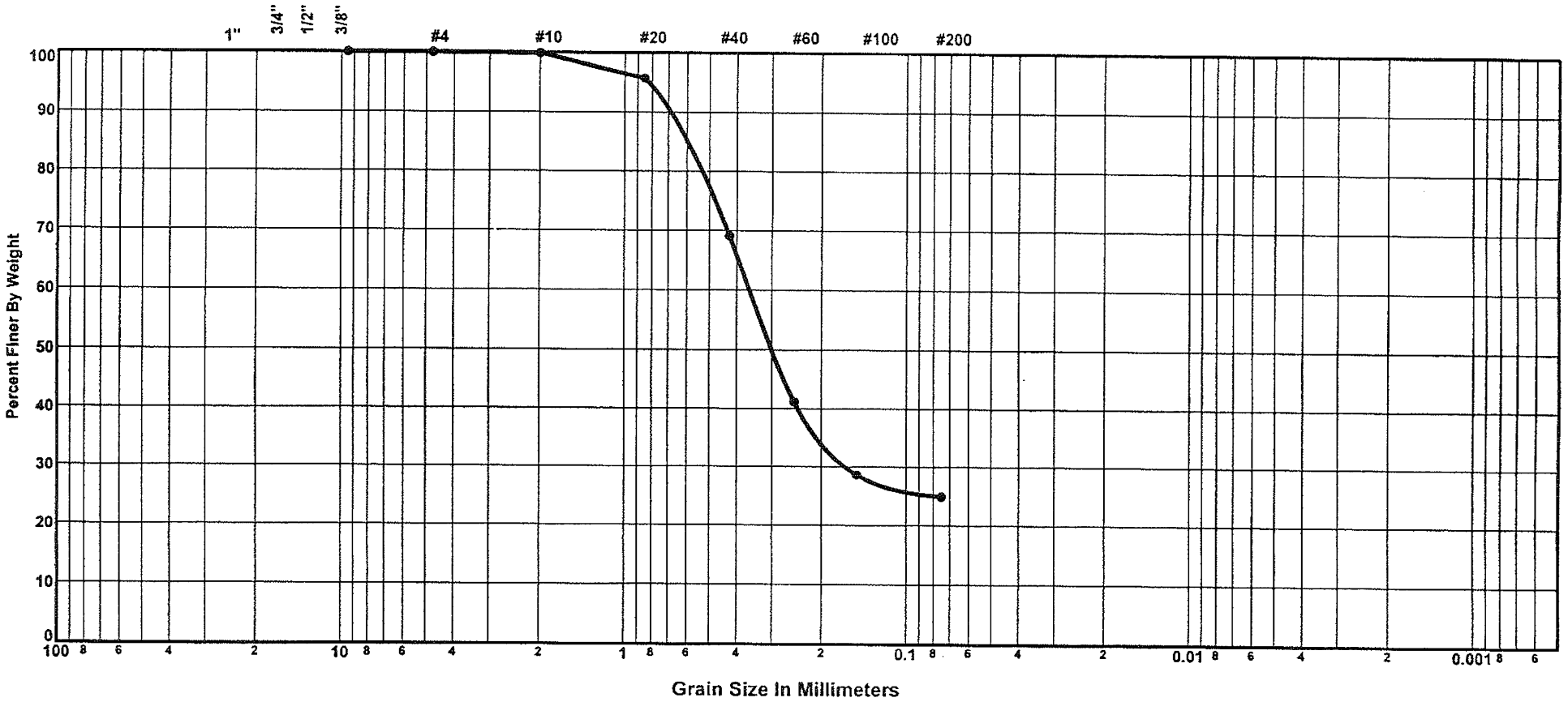
Soil Description: Olive-Tan Slightly Silty Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
R-29 5	0.5-5.5'					Olive-Tan Slightly Silty Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/19/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.

GeoTechnologies, Inc. **CBR DATA SHEET**

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** R-29 **DEPTH:** 0.5-5.5

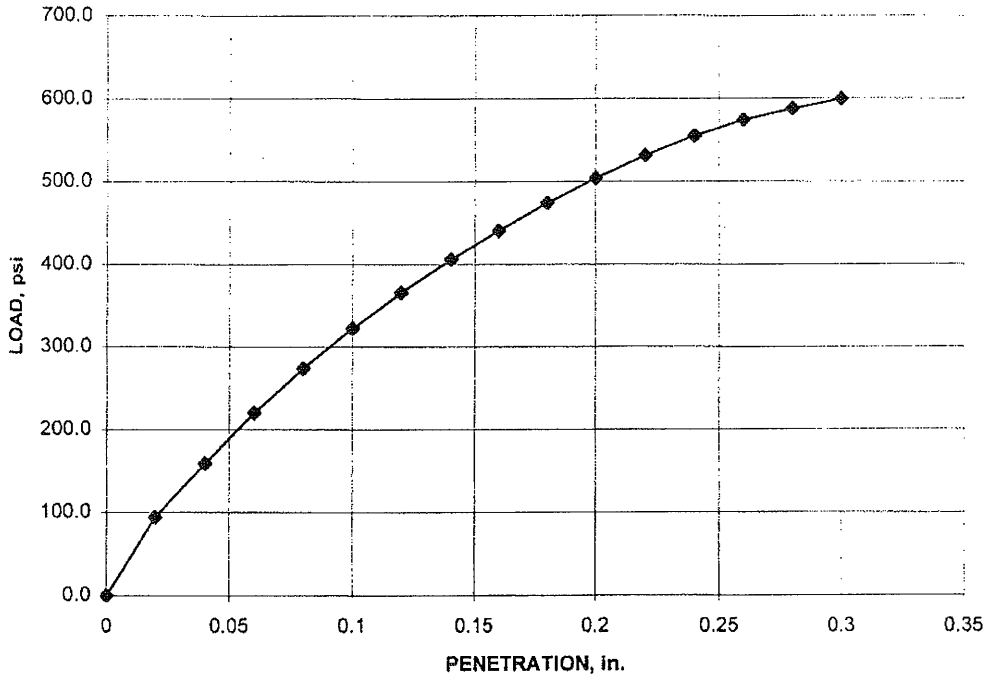
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 11.3% Max. Dry Density = 122.3 PCF

SOIL DESCRIPTION: Olive Tan Silty Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	11.3%	Initial Reading	0.301
WET DENSITY	134.1 lbs./cu.ft.	Final Reading	0.303
DRY DENSITY	120.5 lbs./cu.ft.	Mold Height	4.597
% COMPACTION	98.5 %	% Swell	0.0

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	32.2
CBR @ 0.2"	33.6
% SWELL	0.0

GeoTechnologies, Inc.

CBR DATA SHEET

JOB #: 1-02-0071-EA **JOB NAME:** Goldsboro Rd. Widening

DATE: 2/21/02 **SAMPLE I.D.** B-35 **DEPTH:** .05-6.0'

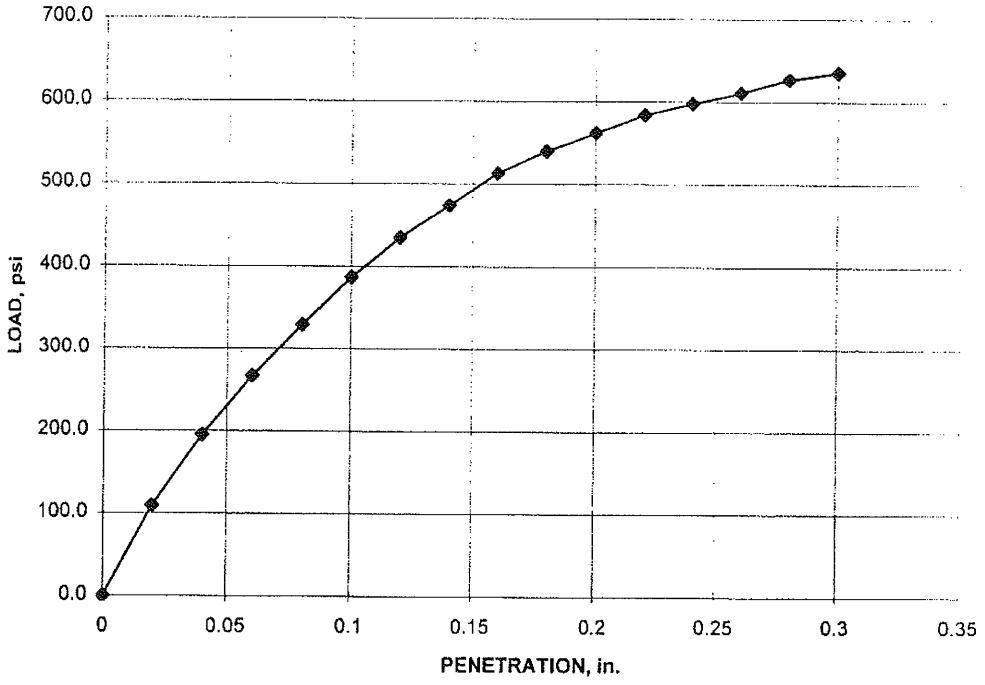
NOTES: **PROCTOR DATA:** TEST PROCEDURE: ASTM D 698

Opt. Moisture = 10.9% Max. Dry Density = 122.0 PCF

SOIL DESCRIPTION: Brown Tan Slightly Silty Fine SAND

CBR SPECIMEN DATA		Swell Data	
MOISTURE CONTENT	10.9%	Initial Reading	0.352
WET DENSITY	135.3 lbs./cu.ft.	Final Reading	0.353
DRY DENSITY	122.0 lbs./cu.ft.	Mold Height	4.594
% COMPACTION	100.0 %	% Swell	0.0

PROVING RING USED	2200 lb.	RATE OF DEFORMATION	.05 in./min.
PROVING RING CONSTANT	1.80	SURCHARGE USED	10 lbs.



CBR @ 0.1"	38.7
CBR @ 0.2"	37.5
% SWELL	0.0

GeoTechnologies Inc.

Job No: 1-02-0071-EA Date: 3/21/02

Job Name: Goldsboro Road Widening

Job Location: Goldsboro, North Carolina

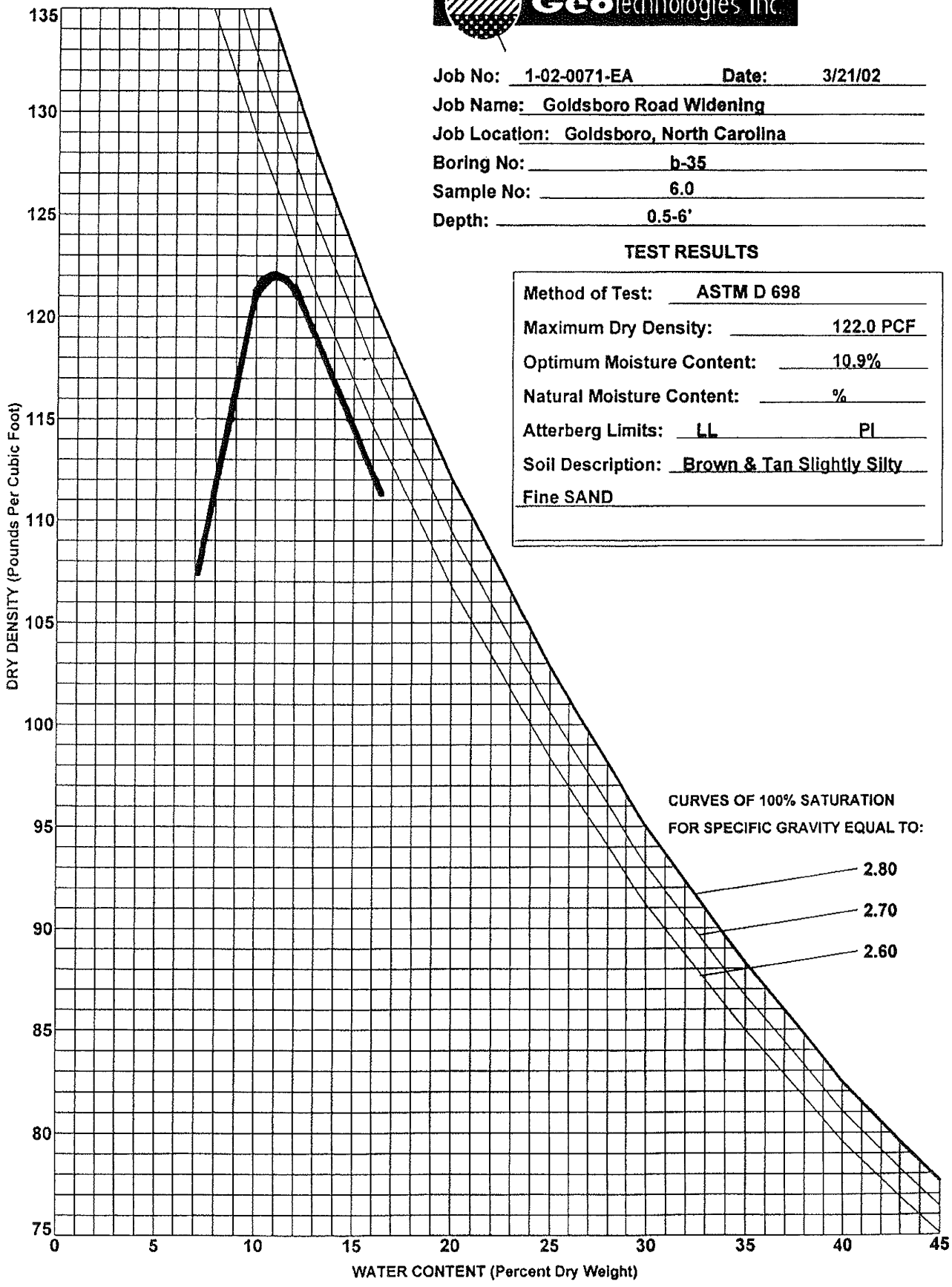
Boring No: b-35

Sample No: 6.0

Depth: 0.5-6'

TEST RESULTS

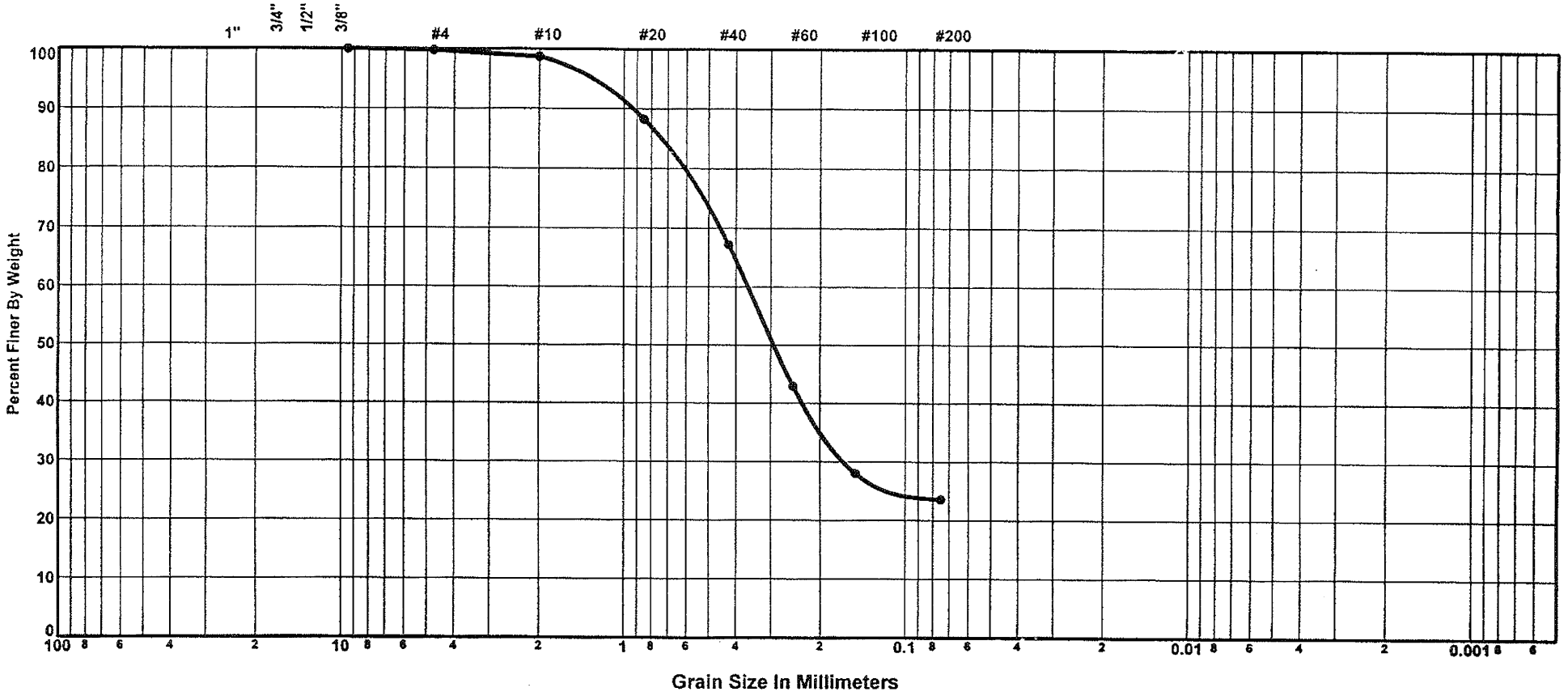
Method of Test:	ASTM D 698
Maximum Dry Density:	122.0 PCF
Optimum Moisture Content:	10.9%
Natural Moisture Content:	%
Atterberg Limits:	LL PI
Soil Description:	Brown & Tan Slightly Silty Fine SAND



MOISTURE-DENSITY RELATIONSHIP

GeoTechnologies, Inc. PA

U.S. Standard Sieve Sizes



Grain Size In Millimeters

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

Boring No.	Elev./Depth	Nat. W.C.	L.L.	P.L.	P.I.	Soil Description or Classification
b-35 6	0.5-6'					Brown & Tan Slightly Silty Fine SAND

Project:

Goldsboro Road Widening
Goldsboro, North Carolina

Job No.: 1-02-0071-EA

Date: 3/21/02

GRAIN SIZE DISTRIBUTION

GeoTechnologies, Inc.