GeoTechnologies, Inc.
Geotechnical and Construction Materials Testing Services

September 24, 2024

Tiffani Bylow
GLANDON FOREST EQUITY
3825 Barrett Drive, Suite 100
Raleigh, NC 27609

Re: Subsurface Investigation
Proposed Dollar General Store
Highway 87
Pittsboro, North Carolina
GeoTechnologies Project No. 1-24-0804-EA

Dear Ms. Bylow:

GeoTechnologies, Inc. has completed test borings to evaluate subsurface soil conditions for the referenced project located off Highway 87 in Pittsboro, North Carolina. Subsurface conditions were investigated by completing 11 soil test borings at the approximate locations shown on the attached Figure 1. The boring locations were established in the field using a handheld GPS unit with coordinates from a provided CAD file and should be considered approximate. The test borings were advanced to termination depths of approximately 6 to 16 feet below site grade utilizing standard penetration test procedures at selected intervals to evaluate the consistency and density of the subsurface soils. This report presents the findings of our investigation and our recommendations regarding site grading and foundation support considerations.

SITE AND PROJECT INFORMATION

It is our understanding that a portion of a wooded parcel (#68517) on the east side of Highway 87 will be developed with a Dollar General store. The Dollar General store will encompass about 10,000 square feet of space, with pavements to the north and west of the building. A storm water area is planned on the northeast corner of the property.

We anticipate that cuts and fills will generally be less than about 5 to 8 feet. Based on our experience with similar projects, we expect that maximum column loads will be about 90 kips with walls loads not exceeding 2 to 3 klf.

SUBSURFACE CONDITIONS

Generalized subsurface profiles prepared from the test boring data are attached to this report as Figures 2A and 2B 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.

Conditions in the borings consisted of a surface layer of topsoil which was typically underlain by residual low to high plasticity silts or clays to depths of about 2.5 to 10 feet. Clayey to silty sands were also present in some of the borings after the initial few feet from grade. Penetration resistances in these soils were on the order of 4 to 20+ blows per foot (bpf).

With increasing depth, all of the borings encountered apparent rock or partially weathered rock (PWR), which is defined as material with penetration resistances of 100 bpf+ which can be penetrated by the soil drilling process. The borings were terminated at depths of about 6 to 16 feet, with drilling refusal occurring in about half of the bore locations prior to reaching plan depth.

Groundwater was not encountered at the time of boring completion. It should also be noted that the near surface soils at this site are conducive to the temporary development of perched groundwater conditions during periods of wet weather and that groundwater levels will fluctuate during different periods of the year.

RECOMMENDATIONS

The following recommendations are made based upon a review of the attached test boring data, our understanding of the proposed construction, and experience with similar projects and subsurface conditions. Once structural and civil drawings are available, that information should be provided to us so that our recommendations can be extended or modified as necessary.

Site Grading Considerations. Site grading should begin with stripping of all topsoil and vegetation. Exposed subgrade evaluations should consist of proofrolling with a loaded dump truck and performing hand auger borings. Repairs should be performed as directed by the geotechnical engineer. Our borings indicate that the need for surface stabilization will range in depth from about 0 to 2.5 feet in most locations. These soils can be repaired with undercut and replacement or undercut and reuse if the materials are suitable (dry and not highly plastic).

The site should be graded during a period of warm and dry weather to facilitate moisture conditioning of in-place soils and undercut soils which will be reused. During an average year, the best time of the year for site work occurs from about April through October. If the site is graded during an unfavorable period, undercut quantities will increase as shallow drying/recompacting type repairs will not be effective during this time of year. Drying will also not be effective if the contractor does not provide a farm disc to turn wet soils. As such, contractor documents should require that a disc be provided as needed.

Borrow Sources/Fill Placement. The on-site soils, excluding topsoil and highly plastic soils (use only where 3 feet of cover can be established), are suitable for reuse as structural fill. In order to achieve density and stability, all fill soils should be compacted within about 2% of optimum moisture content unless otherwise directed by the geotechnical engineer. As such, the contractor should be prepared to moisture condition (dry) the soils as necessary. Attempting to dry and compact wet soils during a wet period of the year will be difficult. Rock particle sizes should be limited to about 2 inches.

If off-site borrow is needed, we recommend this material consist of silty and clayey sands or low plasticity silts and clays having Unified Soil Classifications of SM, SC, ML, or CL. All fill materials in structural and pavement areas should be compacted to not less than 95% of the standard Proctor maximum dry density except in the final foot where this requirement should be increased to 98%. In order to achieve density and stability, the soils should be compacted within about 2% of optimum moisture content unless otherwise directed by the geotechnical engineer.

Fill Induced Settlements. In any area where site grade will be raised by more than 6 feet, some settlement of the underlying soils will occur. It is recommended that fill induced settlements be allowed to subside before construction begins. As such, we recommend that the project surveyors establish monitoring points in deep fill areas (any area with more than 6 feet) to verify that fill induced settlements have subsided. Based on experience, we anticipate that the monitoring period will not exceed 30 days following the completion of filling. Because fill induced settlements will subside before paving operations, monitoring these areas is not necessary.

Difficult Excavation Considerations. The subsurface profile includes PWR in all of the borings. Our experience has been that PWR exhibiting penetration resistances of 50 blows per 2 inches of penetration and softer can generally be preloosened with a D-8 dozer drawing a single tooth ripper during general site grading. Material harder than 50

blows per 2 inches of penetration, including auger refusal material, generally requires blasting to remove with conventional mass grading equipment.

The equipment used for installation of utilities and foundations is less powerful than that which is used in general excavation and our experience has been that excavation of PWR harder than 50 blows per 4 inches of penetration is typically impossible with most equipment available for trench excavation, such as track mounted backhoes equivalent to a CAT 330. Large track mounted backhoes with rock teeth can sometimes excavate PWR with penetration resistances ranging from 50 blows per 4 inches to 50 blows per 6 inches of penetration; however, the rate of excavation is slow and most contractors will request a trench rock price for any removal of PWR, even if that removal is performed with a very large machine (such as a CAT 345), and/or one equipped with a ripper shank. A CAT 345 with a ripper shank can sometimes remove material as hard as 50 blows per 2 inches of penetration.

We recommend that contract documents clearly specify the type of equipment which will be used to demonstrate difficult excavation. We recommend that a fair unit price be established for difficult excavation removal, and that verification/measurement protocols be established at the start of construction. All difficult excavation quantification should be based on bank yardage and not on loose material piles or truck load counts which are not accurate.

Prior to performing any blasting on the site, we recommend that preblast surveys be performed on all nearby structures. Additionally, vibration monitoring should be performed to demonstrate that blasting operations are generating ground motions below accepted threshold values. The blasting contractor should be careful not to over blast below plan grade/design invert. Areas which are over blasted will have to be cleaned off loose rock and backfill with compacted soil.

Shallow Foundations. Assuming the site is prepared as discussed, we have used the FHA Settlement Estimation Procedure to estimate that column/wall loads of about 100 kips or 6 klf can be supported with the resulting settlement being about 1 inch or less (0.5 inches differential) for a design bearing of 3 ksf. Our estimates should be considered preliminary in nature and should be verified once structural and civil design drawings are available.

Bearing conditions should be inspected by a geotechnical engineer during footing construction to verify that adequate bearing and suitable materials have been encountered. Should foundations need to be extended to provide adequate bearing, we recommend that over-excavated footings be backfilled to design bearing elevation utilizing uniformly graded #57 or #67 washed stone. An exception will be if undercut is needed due to highly plastic soils. In this case, the undercut footings should be backfilled with lean concrete. Washed stone must be compacted in lifts of 24 inches with appropriate equipment and must be thoroughly compacted at the top with vibratory equipment or heavy tamping.

Slab-on-Grades. We recommend that conventional slab-on-grades be designed for an assumed subgrade modulus of 100 pci (for a 1 foot by 1 foot area). Highly plastic soils should be excluding from the upper 12 inches of subgrade. A minimum of 4 inches of compacted CABC stone should be placed under all concrete slabs.

Below Grade Walls and Retaining Walls. Rigid below grade walls and retaining walls with level backfill should be designed assuming the adjacent soils will behave as an equivalent fluid having a unit weight of 60 pcf for the at-rest condition and 45 pcf for the active earth pressure condition. These values do not account for any loading associated with slopes or other surcharging. An equivalent fluid pressure of 250 pcf will be applicable for the passive pressure for level ground on the front of the wall. This is an ultimate value and an appropriate safety factor should be applied. An allowable bearing pressure of 3 ksf may be used for the design of below grade walls bearing on approved soils. A design moist soil unit weight of 120 psf and a friction factor of 0.35 may also be used.

Any fill material placed adjacent to below grade walls should be compacted to a minimum of 95% of the standard Proctor maximum dry density, except where 98% is required at subgrade. Additionally, any soils placed within 3 to 4 feet of below grade walls should be compacted with light hand held equipment to prevent overstressing of the walls. This will necessitate that backfill be placed in 4 to 6 inch lifts. We recommend that all below grade walls be properly waterproofed and that a drain be placed against those walls to intercept seepage and prevent a build-up of hydrostatic pressure behind the walls. The drain should be connected to a collector drain that daylights to a down gradient area unless a sump pump is used.

Segmental Walls. On most local projects, design parameters/specifications exclude the use of the on-site soils unless they comply with design parameters. Local import materials which are generally used in place of the on-site soils include CABC base course stone, washed stone, granular processed fill, or screenings which are available from area quarries.

We recommend that all retaining wall designs include an assessment of global stability, to include tiered walls and walls located in or on slopes. These analyses should be considered part of the wall design package, and designs which do not explicitly address global stability should not be considered complete. If segmental walls will be used on this project, we recommend that the wall designer contact us to discuss appropriate parameters.

Wall designs should include appropriate drainage provisions both directly behind the face block as well as behind the reinforced zone. Although true groundwater is not prevalent at this site, it may be encountered as the potential for perched water exists. As such, adequate provisions should be included in the wall design details.

Slopes. The maximum angle for unreinforced fill slopes should be 2.5H:1V, while steeper slopes can be used with properly designed and installed geosynthetic reinforcement. Cut slopes should also be on the order of 2.5H:1V. Steeper slopes should be reviewed and approved by the geotechnical engineer, and all cut slopes and excavations for retaining walls should be evaluated by the engineer to verify that recommended angles are appropriate for the site specific soils.

Pavement Design. Following proper completion of grading, the site should be suitable for support of conventional pavement structures. All pavement subgrades should be moisture conditioned and recompacted to not less than 98% of the standard Proctor maximum dry density immediately prior to placement of base course stone. Highly plastic soils should be excluded from the upper 12 inches of subgrade. The subgrades should also be proofrolled for stability. Due to the high potential for perched groundwater conditions to develop during periods of wet weather, site grades should be detailed to promote drainage away from the pavement areas, and underdrains or ditches should be provided along the high side of all pavements. Strip drains should be provided inside all irrigated traffic islands.

We are assuming that the upper 12 inches of subgrade will consist of a material with a minimum design CBR value of 4%. Specific pavement sections can be provided once traffic loading and volume details are known; however, typical sections include 4 inches of asphalt over 8 inches of CABC stone for a heavy duty section, and 3 inches of asphalt over 6 inches of stone for light duty areas.

Seismic Design Considerations. Based on SPT N-values, and experience in the area, the site should be given a seismic design classification of “C”.

SUMMARY

In summary, our borings indicate that near surface undercut repairs will range from 0 to 2.5 feet provided that the site is graded during a period of warm and dry weather. The site profile includes highly plastic soils and difficult

excavation materials. The difficult excavation materials were present in each of the borings with depths starting as shallow as 2.5 feet. Shallower PWR or rock will likely be present intermediate of the bore locations.

Once building loads and foundation geometries are known, settlements can be evaluated in greater detail.

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.

Ernest L. Stitzinger, P.E.
NC Registration No. 25534

NORTH CAROLINA PROFESSIONAL SEAL 25534 ENGINEER ERNEST L. STITZINGER

9/24/24

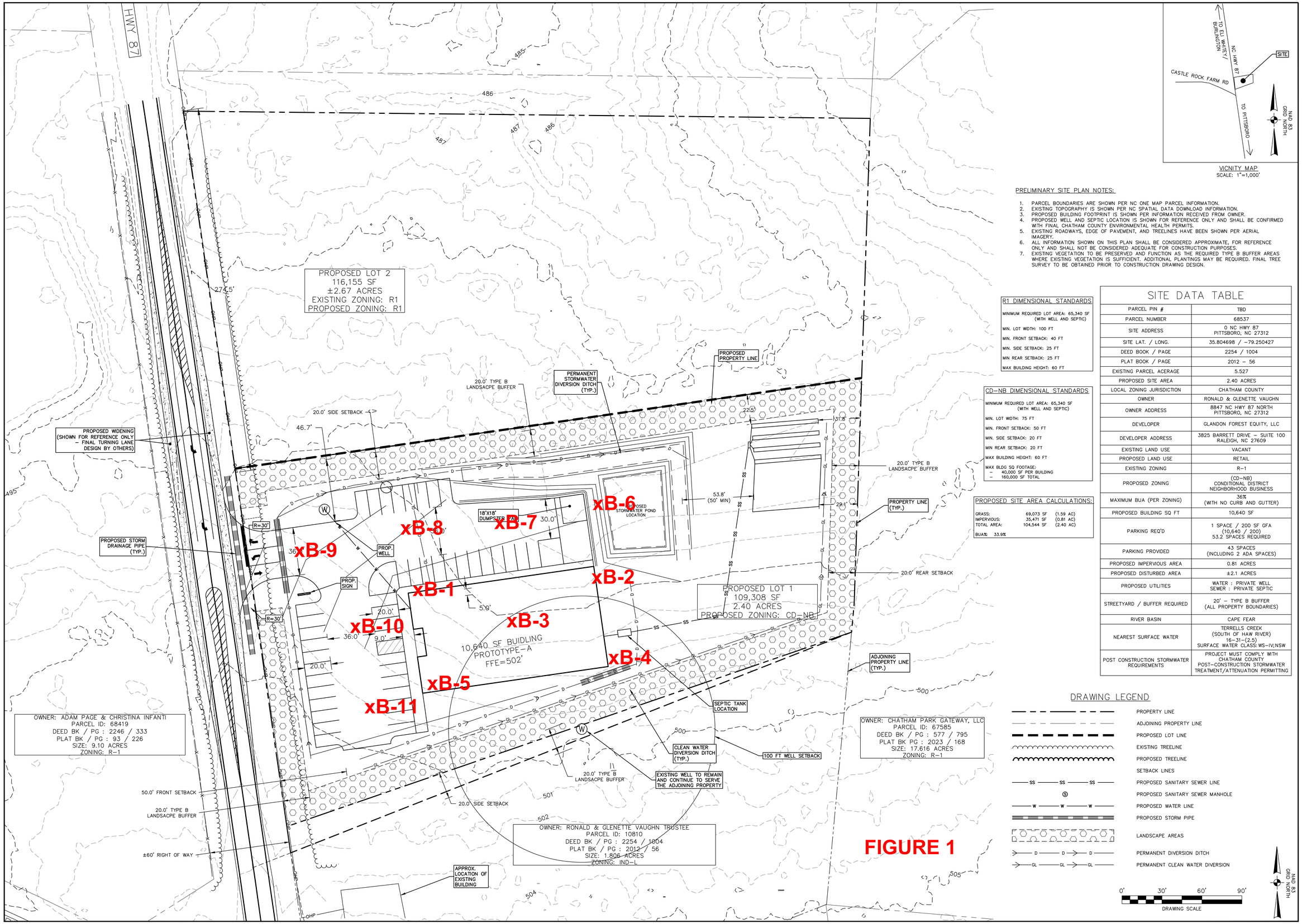


FIGURE 1

VICINITY MAP
SCALE: 1"=1,000'

PRELIMINARY SITE PLAN NOTES:

1. PARCEL BOUNDARIES ARE SHOWN PER NC ONE MAP PARCEL INFORMATION.
2. EXISTING TOPOGRAPHY IS SHOWN PER NC SPATIAL DATA DOWNLOAD INFORMATION.
3. PROPOSED BUILDING FOOTPRINT IS SHOWN PER INFORMATION RECEIVED FROM OWNER.
4. PROPOSED WELL AND SEPTIC LOCATION IS SHOWN FOR REFERENCE ONLY AND SHALL BE CONFIRMED WITH FINAL CHATHAM COUNTY ENVIRONMENTAL HEALTH PERMITS.
5. EXISTING ROADWAYS, EDGE OF PAVEMENT, AND TREELINES HAVE BEEN SHOWN PER AERIAL IMAGERY.
6. ALL INFORMATION SHOWN ON THIS PLAN SHALL BE CONSIDERED APPROXIMATE, FOR REFERENCE ONLY AND SHALL NOT BE CONSIDERED ADEQUATE FOR CONSTRUCTION PURPOSES.
7. EXISTING VEGETATION TO BE PRESERVED AND FUNCTION AS THE REQUIRED TYPE B BUFFER AREAS WHERE EXISTING VEGETATION IS SUFFICIENT. ADDITIONAL PLANTINGS MAY BE REQUIRED. FINAL TREE SURVEY TO BE OBTAINED PRIOR TO CONSTRUCTION DRAWING DESIGN.

R1 DIMENSIONAL STANDARDS

MINIMUM REQUIRED LOT AREA: 65,340 SF (WITH WELL AND SEPTIC)	
MIN. LOT WIDTH: 100 FT	
MIN. FRONT SETBACK: 40 FT	
MIN. SIDE SETBACK: 25 FT	
MIN REAR SETBACK: 25 FT	
MAX BUILDING HEIGHT: 60 FT	

CD-NB DIMENSIONAL STANDARDS

MINIMUM REQUIRED LOT AREA: 65,340 SF (WITH WELL AND SEPTIC)	
MIN. LOT WIDTH: 75 FT	
MIN. FRONT SETBACK: 50 FT	
MIN. SIDE SETBACK: 20 FT	
MIN REAR SETBACK: 20 FT	
MAX BUILDING HEIGHT: 60 FT	
MAX BLDG SQ FOOTAGE:	
–	40,000 SF PER BUILDING
–	160,000 SF TOTAL

PROPOSED SITE AREA CALCULATIONS:

GRASS:	69,073 SF	(1.59 AC)
IMPERVIOUS:	35,471 SF	(0.81 AC)
TOTAL AREA:	104,544 SF	(2.40 AC)
BUA%:	33.9%	

SITE DATA TABLE

PARCEL PIN #	TBD
PARCEL NUMBER	68537
SITE ADDRESS	0 NC HWY 87 PITTSBORO, NC 27312
SITE LAT. / LONG.	35.804698 / -79.250427
DEED BOOK / PAGE	2254 / 1004
PLAT BOOK / PAGE	2012 – 56
EXISTING PARCEL ACERAGE	5.527
PROPOSED SITE AREA	2.40 ACRES
LOCAL ZONING JURISDICTION	CHATHAM COUNTY
OWNER	RONALD & GLENETTE VAUGHN
OWNER ADDRESS	8847 NC HWY 87 NORTH PITTSBORO, NC 27312
DEVELOPER	GLANDON FOREST EQUITY, LLC
DEVELOPER ADDRESS	3825 BARRETT DRIVE – SUITE 100 RALEIGH, NC 27609
EXISTING LAND USE	VACANT
PROPOSED LAND USE	RETAIL
EXISTING ZONING	R-1
PROPOSED ZONING	(CD-NB) CONDITIONAL DISTRICT NEIGHBORHOOD BUSINESS
MAXIMUM BUA (PER ZONING)	36% (WITH NO CURB AND GUTTER)
PROPOSED BUILDING SQ FT	10,640 SF
PARKING REQ'D	1 SPACE / 200 SF GFA (10,640 / 200) 53.2 SPACES REQUIRED
PARKING PROVIDED	43 SPACES (INCLUDING 2 ADA SPACES)
PROPOSED IMPERVIOUS AREA	0.81 ACRES
PROPOSED DISTURBED AREA	±2.1 ACRES
PROPOSED UTILITIES	WATER : PRIVATE WELL SEWER : PRIVATE SEPTIC
STREETYARD / BUFFER REQUIRED	20' – TYPE B BUFFER (ALL PROPERTY BOUNDARIES)
RIVER BASIN	CAPE FEAR
NEAREST SURFACE WATER	TERRELLS CREEK (SOUTH OF HAW RIVER) 16-31-(2.5) SURFACE WATER CLASS: WS-IV;NSW
POST CONSTRUCTION STORMWATER REQUIREMENTS	PROJECT MUST COMPLY WITH CHATHAM COUNTY POST-CONSTRUCTION STORMWATER TREATMENT/ATTENUATION PERMITTING

DRAWING LEGEND

- PROPERTY LINE
- ADJOINING PROPERTY LINE
- PROPOSED LOT LINE
- EXISTING TREELINE
- PROPOSED TREELINE
- SETBACK LINES
- PROPOSED SANITARY SEWER LINE
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED WATER LINE
- PROPOSED STORM PIPE
- LANDSCAPE AREAS
- PERMANENT DIVERSION DITCH
- PERMANENT CLEAN WATER DIVERSION

0' 30' 60' 90'
DRAWING SCALE

NAD 83 GRID NORTH

PRELIMINARY PLAN NOT FOR CONSTRUCTION

G

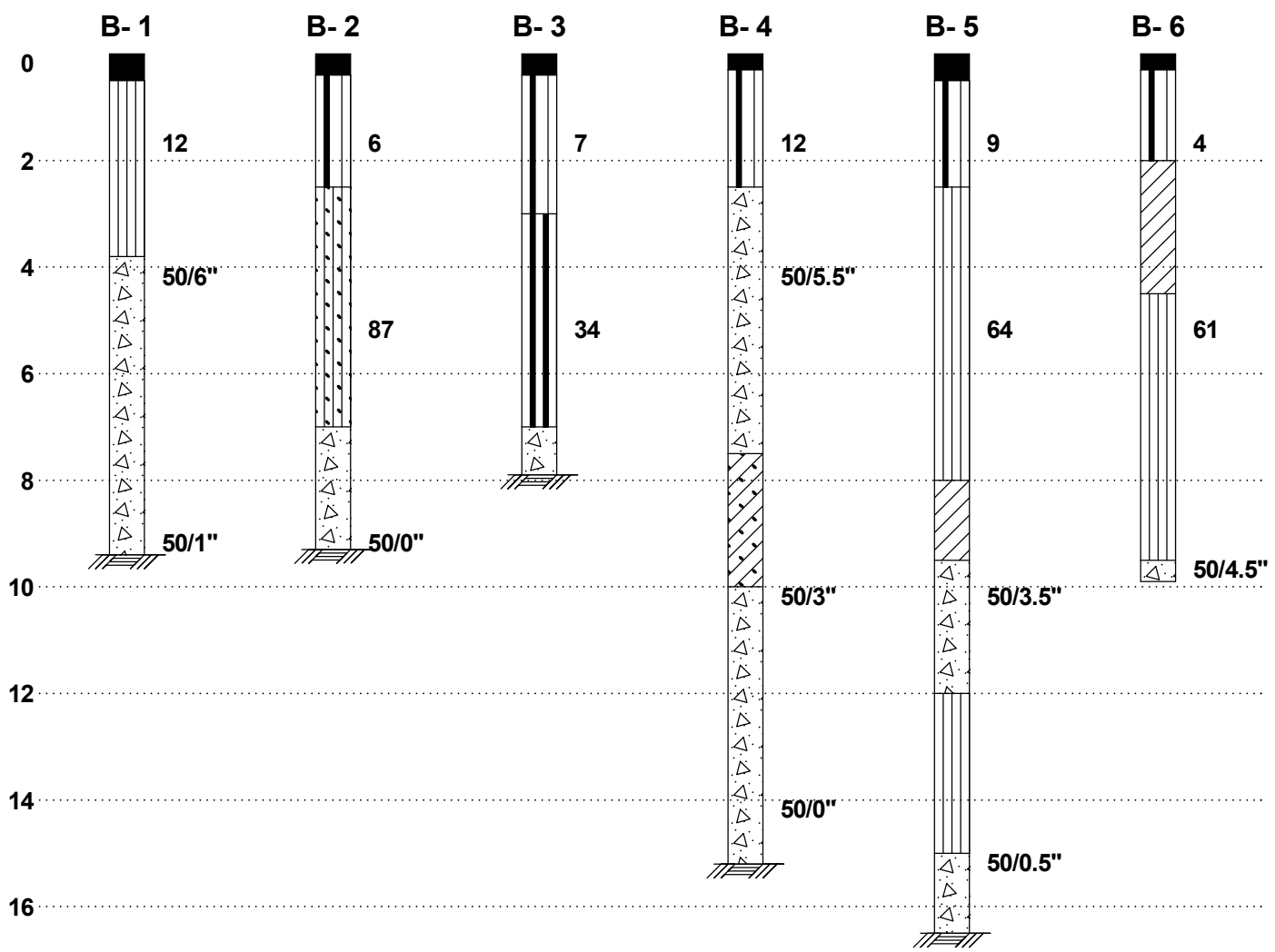
Gardner Engineering, PLLC
Engineering - Land Planning - Permitting
NC Engineering Firm Cert. Auth.# P-2804
P.O. Box 3048
Asheboro, NC 27204
P: (336-302-4849) Email: zach@gardnerengineeringpllc.com
www.gardnerengineeringpllc.com

#	DATE	DESCRIPTION	BY

SITE PLAN
DOLLAR GENERAL
PITTSBORO - NC 87
NC 87
PITTSBORO - NCC - CHATHAM COUNTY

SCALE	AS NOTED
DATE	AUGUST 2024
DRAWN BY	ZHG
CHECKED BY	ZHG
PROJECT NO.	24.0021
SHEET NO.	C-3

GENERALIZED SUBSURFACE PROFILE



LEGEND

- Topsoil
- Low Plasticity Silt
- Partially Weathered Rock
- Moderate Plasticity Silt
- Silty Sand
- High Plasticity Silt
- Clayey Sand
- Low Plasticity Clay
- Standard Penetration Resistance
- Auger Refusal

PROJECT:

Highway 87 Dollar General
Pittsboro, North Carolina

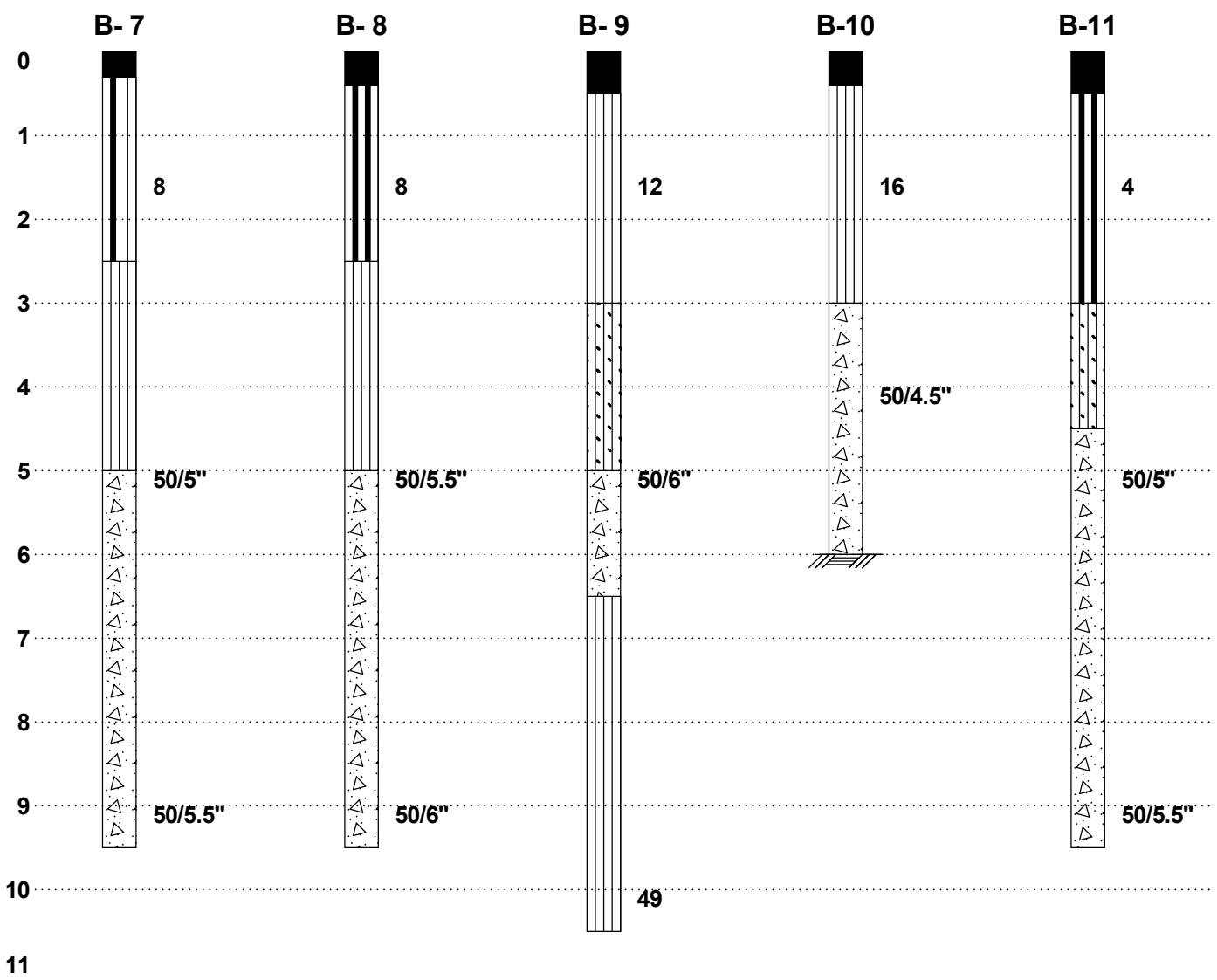
GeoTechnologies, Inc.

SCALE: As Shown

JOB No:124-0804-EA

FIGURE No: 2A

GENERALIZED SUBSURFACE PROFILE



LEGEND

- Topsoil
- Moderate Plasticity Silt
- Low Plasticity Silt
- Partially Weathered Rock
- High Plasticity Silt
- Silty Sand
- Standard Penetration Resistance
- Auger Refusal

PROJECT:

Highway 87 Dollar General
Pittsboro, North Carolina

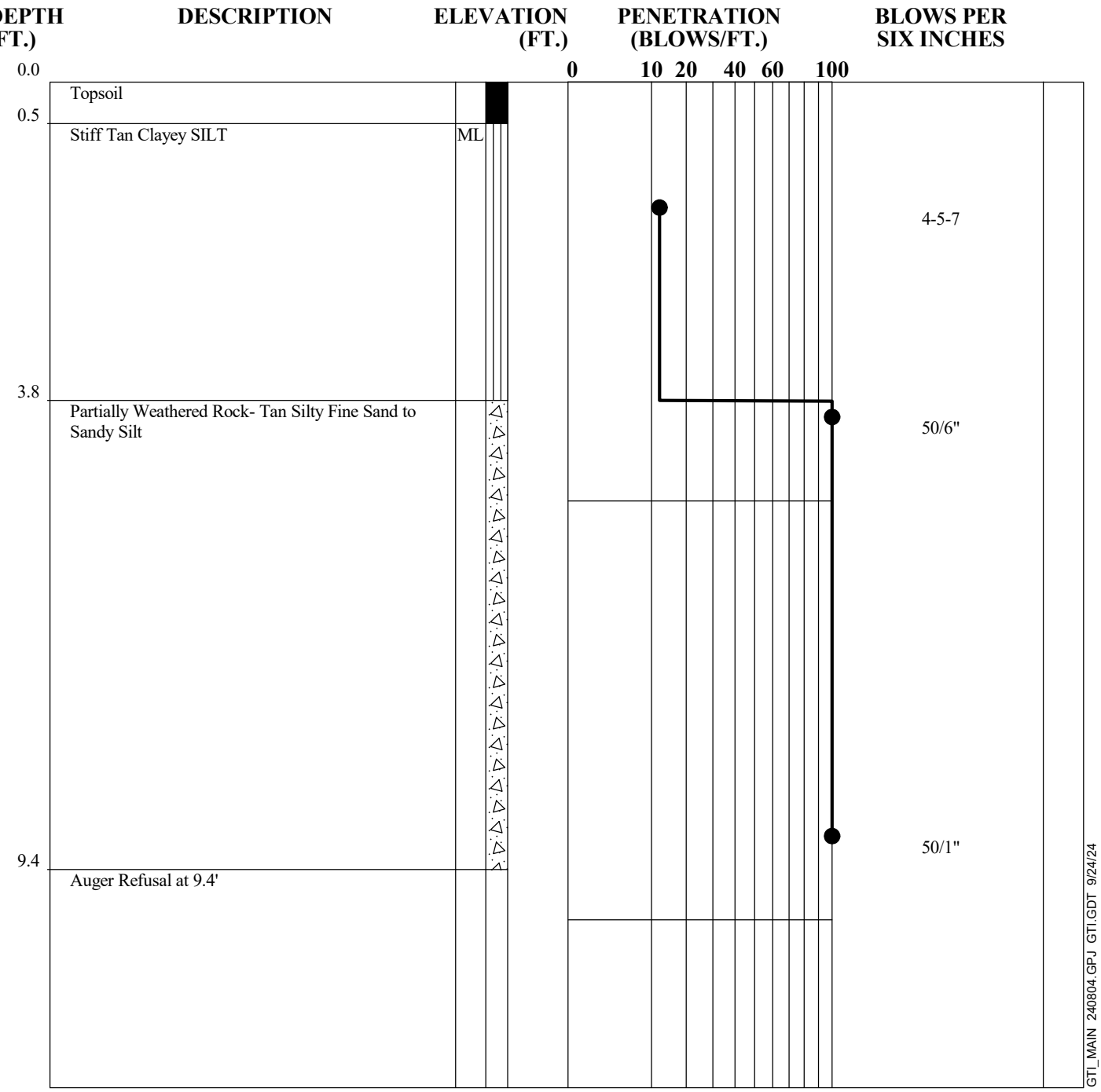
GeoTechnologies, Inc.

SCALE: As Shown

JOB No:124-0804-EA

FIGURE No: 2B

TEST BORING RECORD

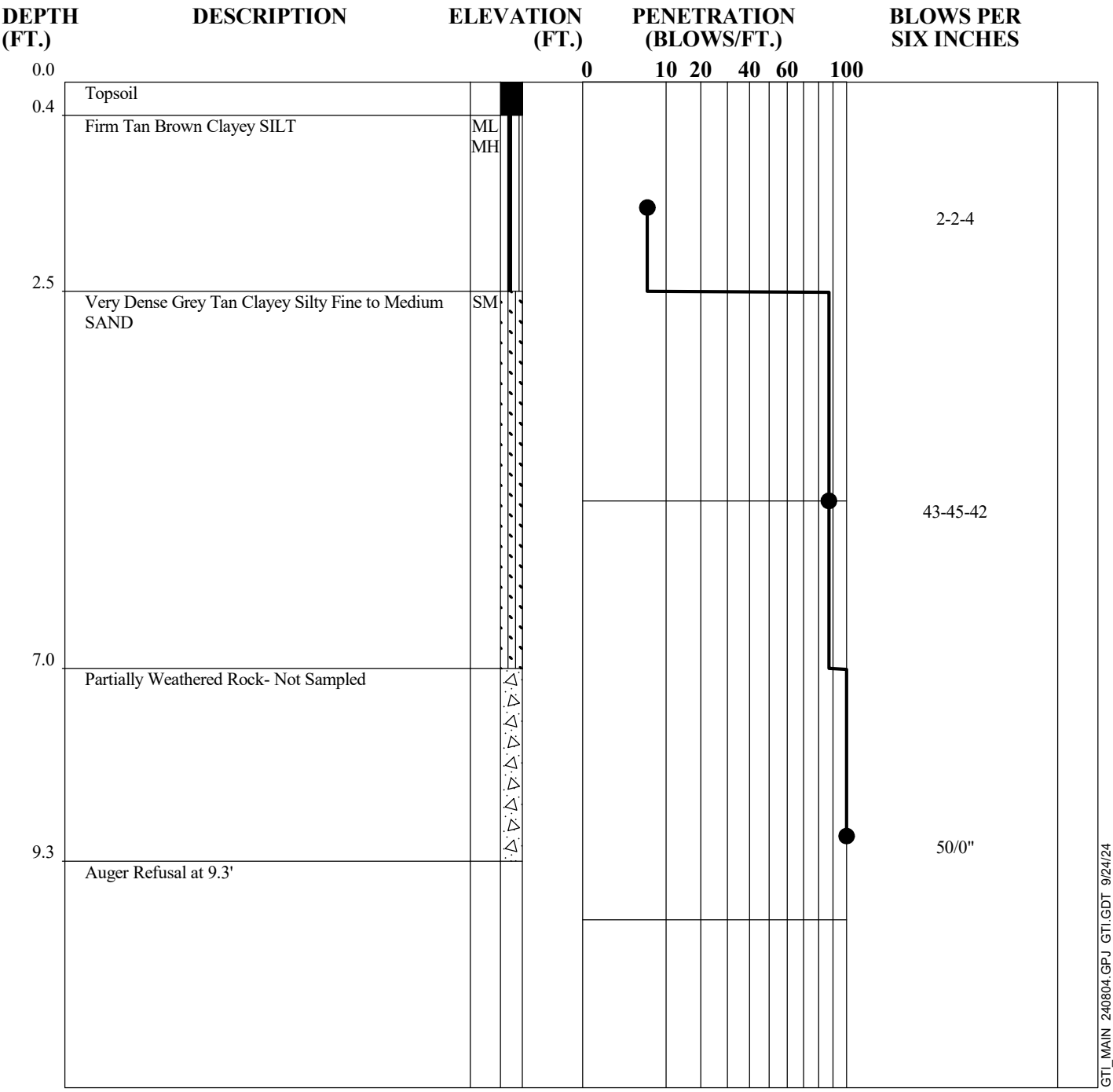


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 1
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD



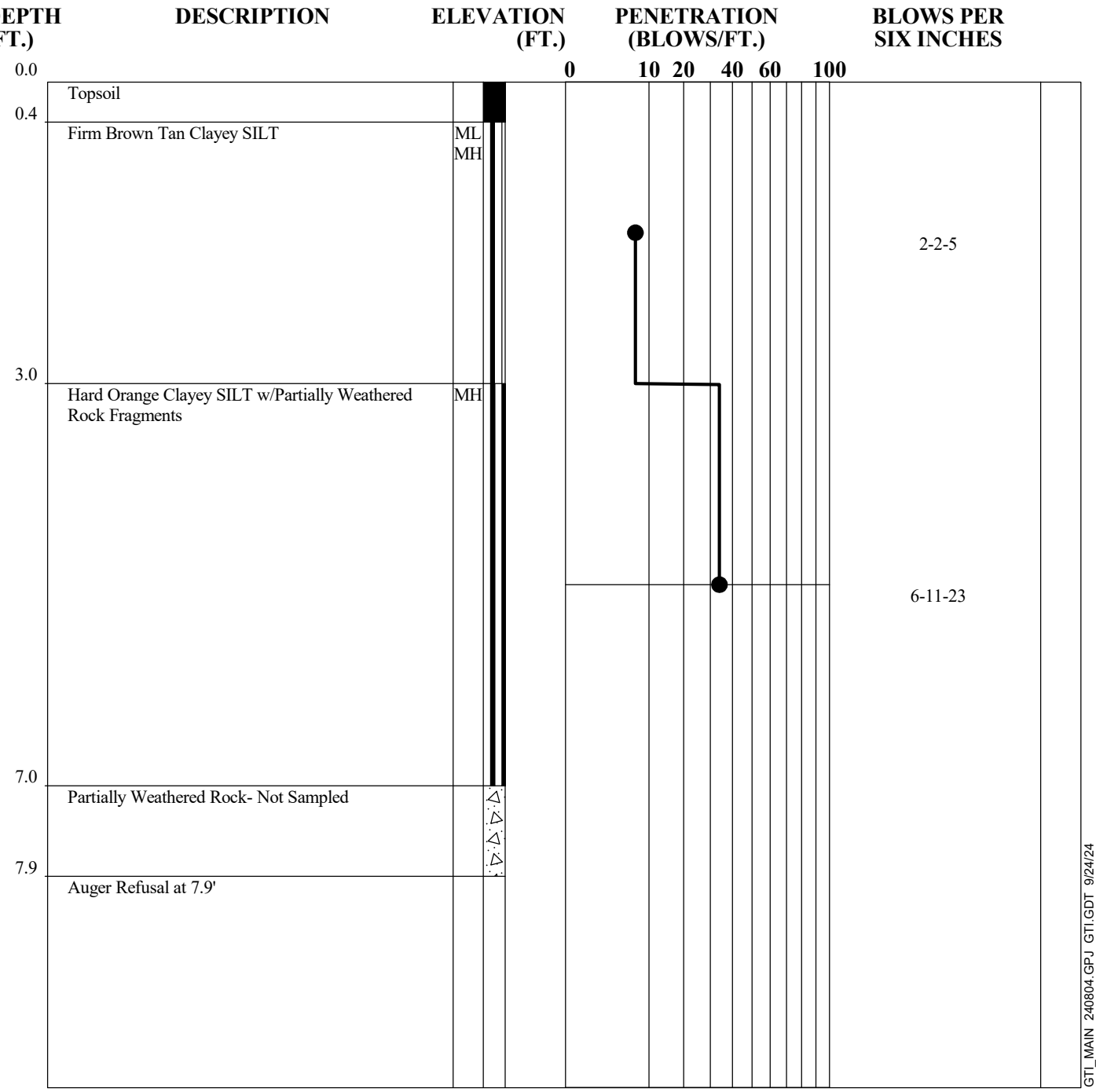
Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 2
DATE 9-19-24

PAGE 1 OF 1

GeoTechnologies, Inc.

TEST BORING RECORD

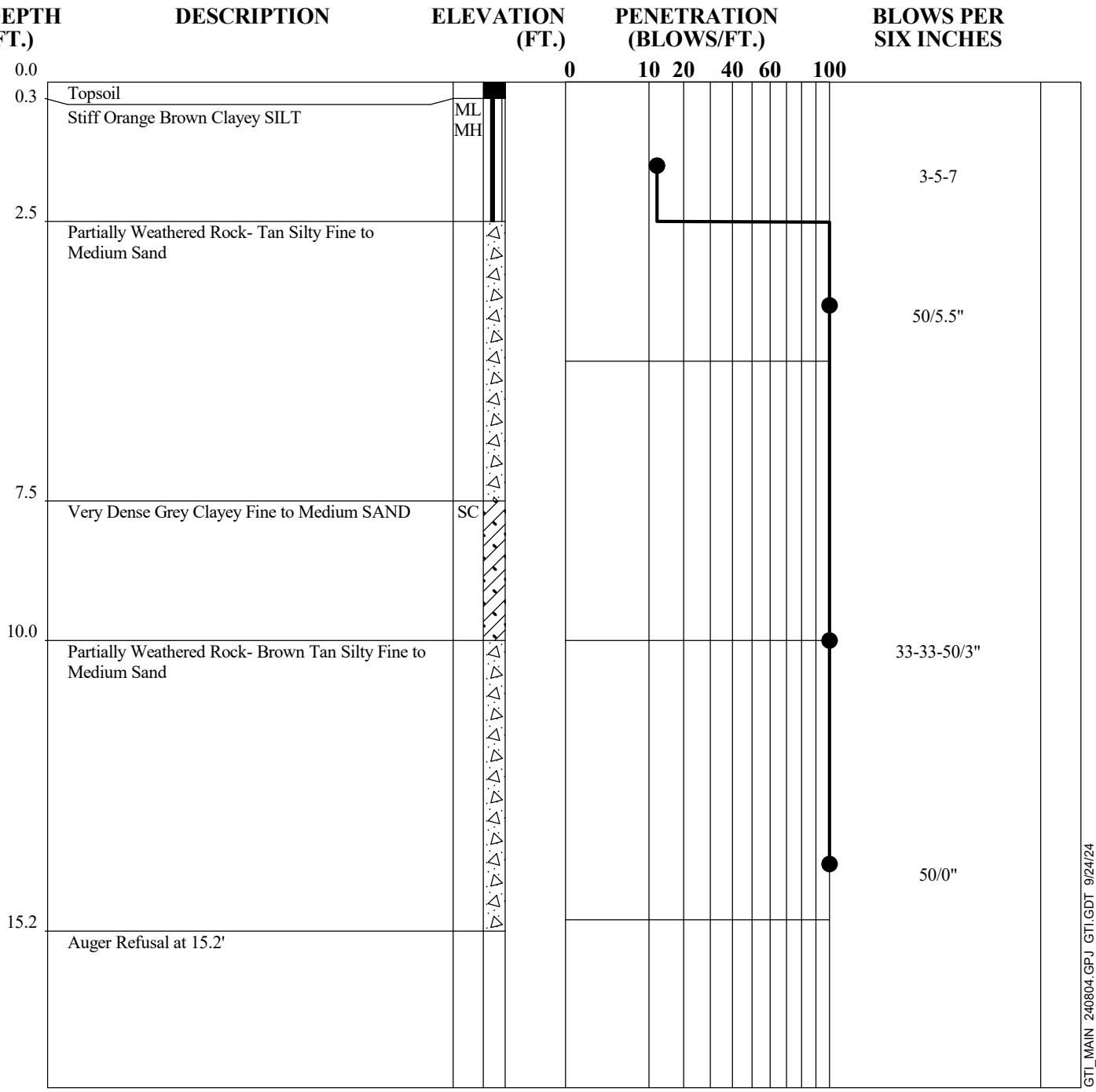


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 3
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD

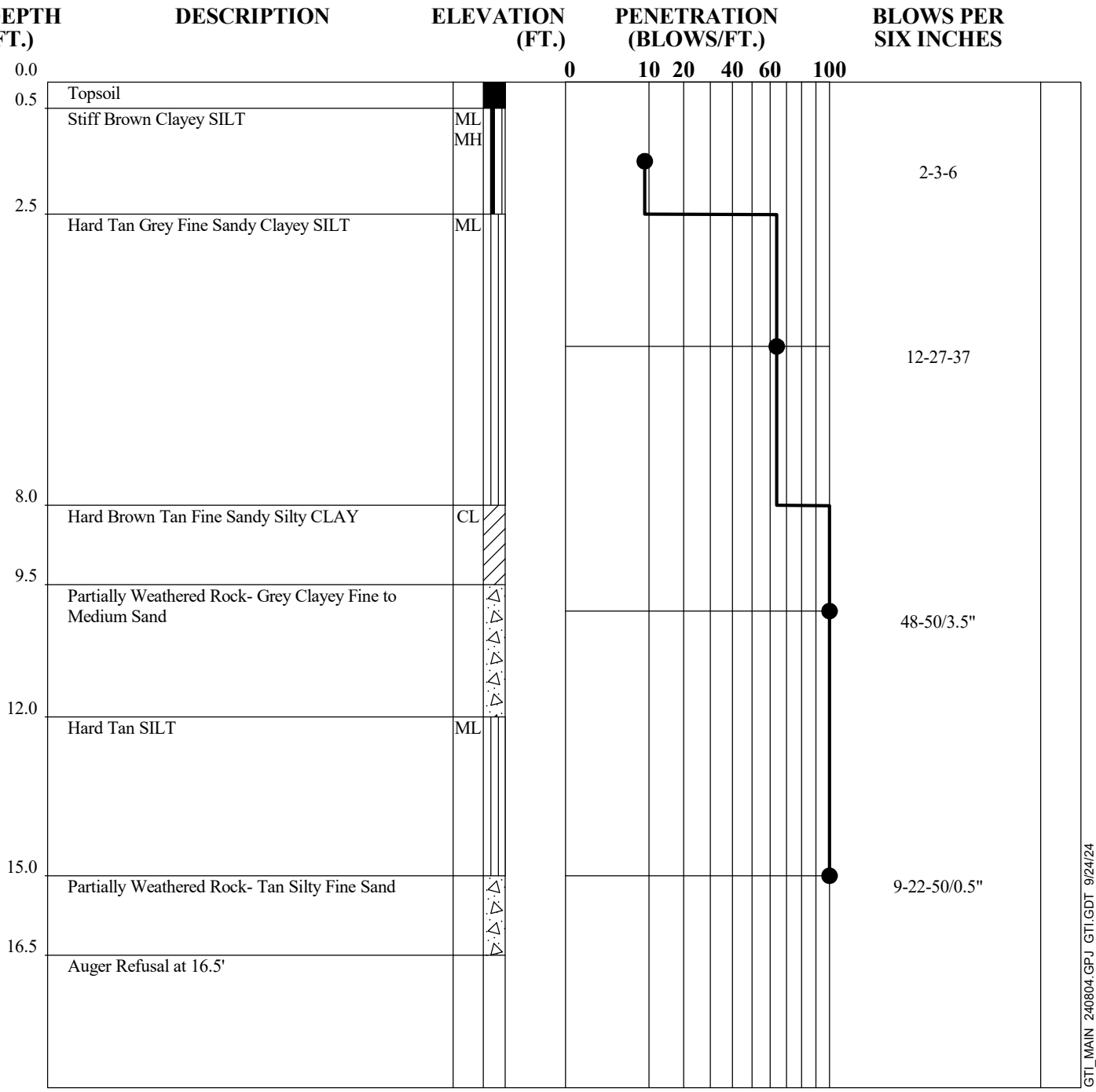


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 4
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD



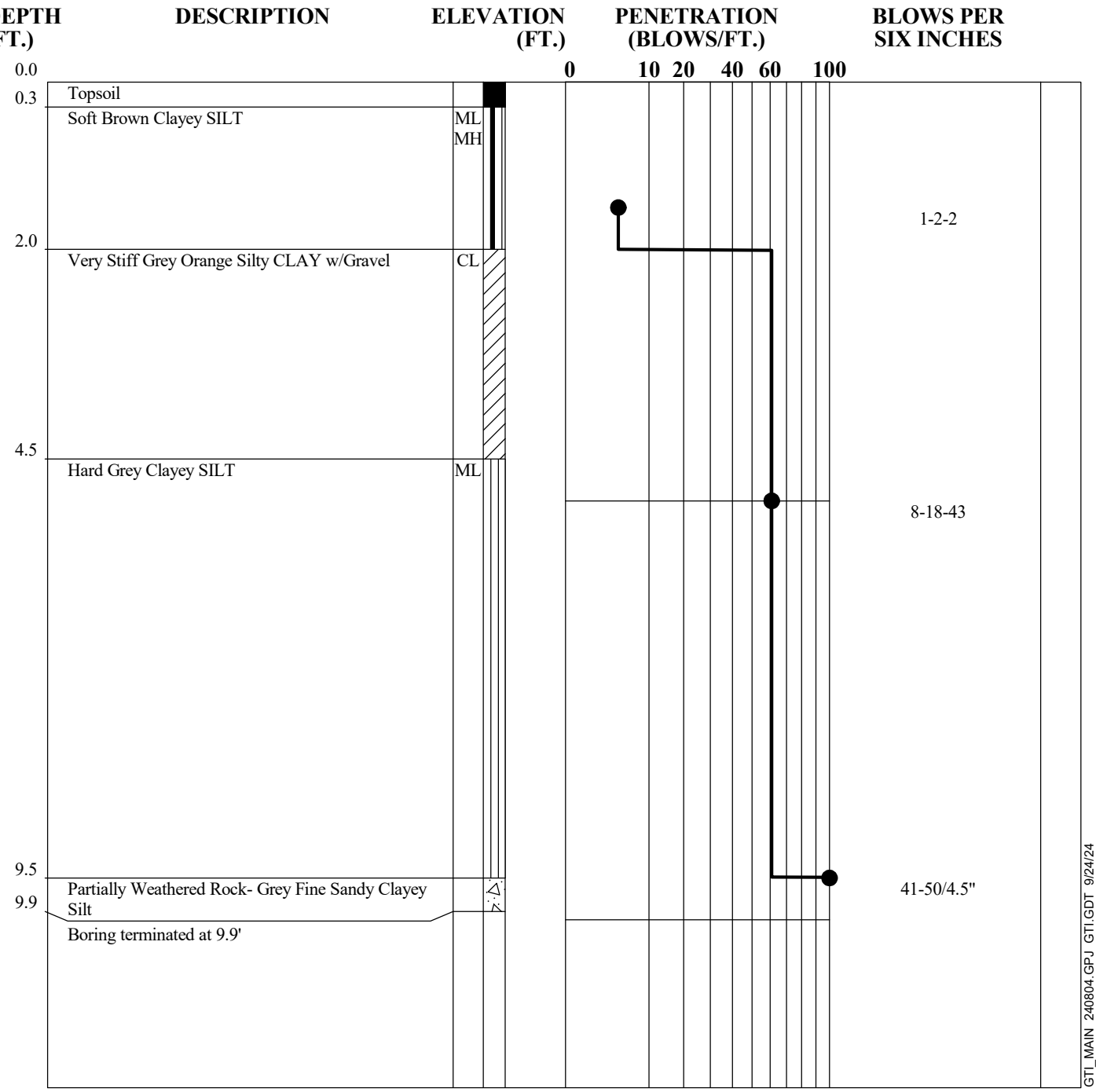
Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 5
DATE 9-19-24

PAGE 1 OF 1

GeoTechnologies, Inc.

TEST BORING RECORD

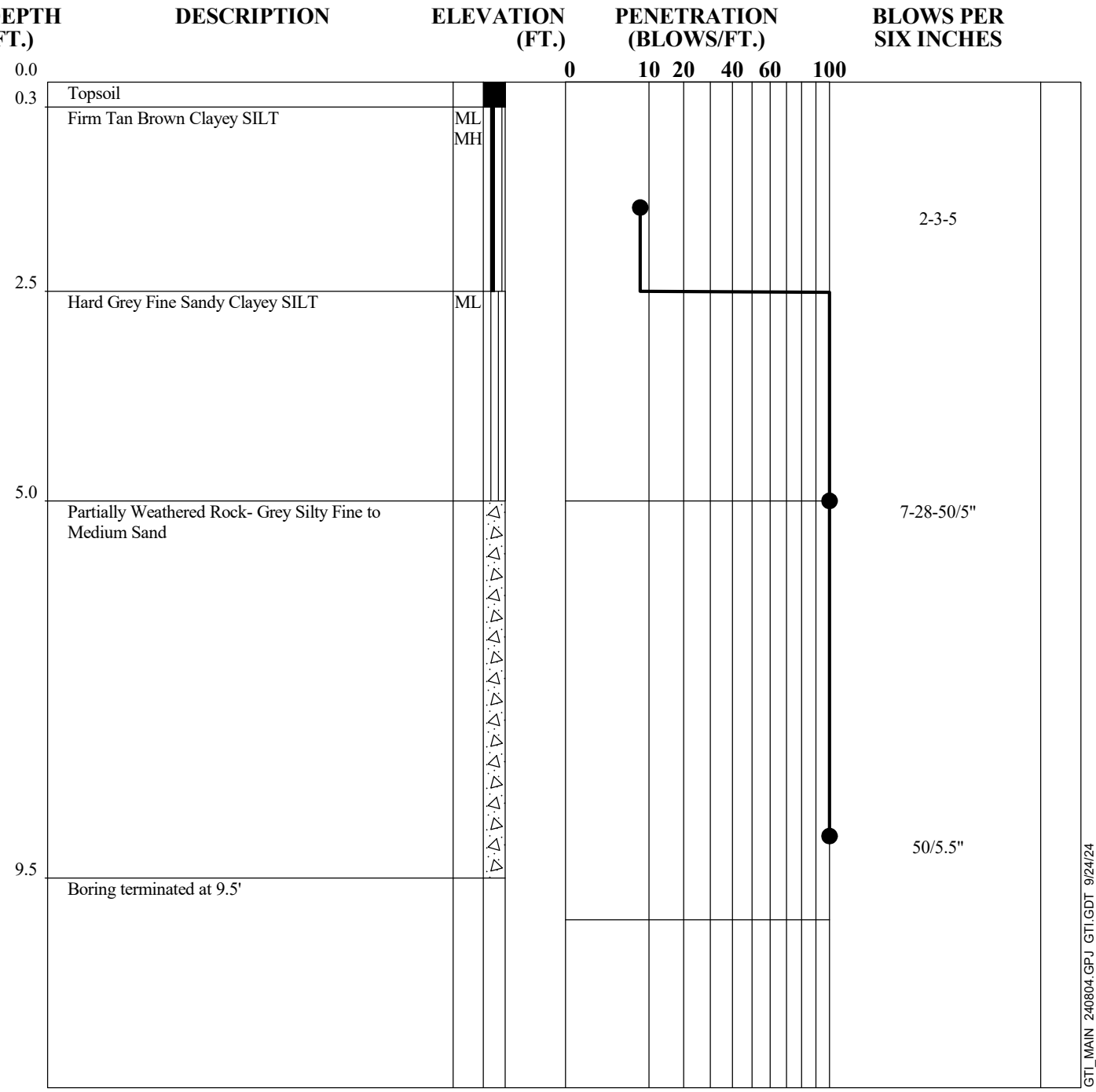


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 6
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD

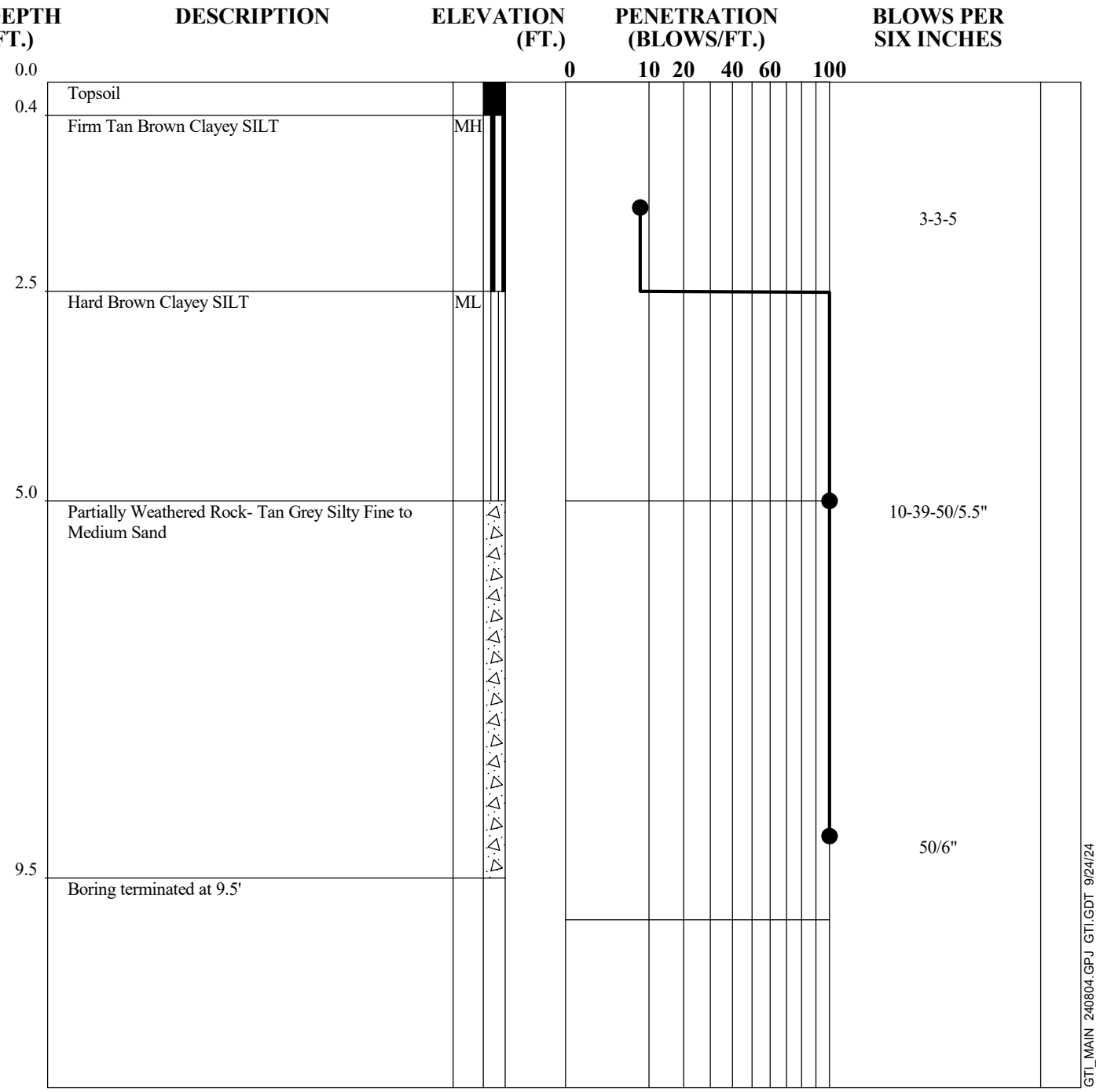


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 7
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD

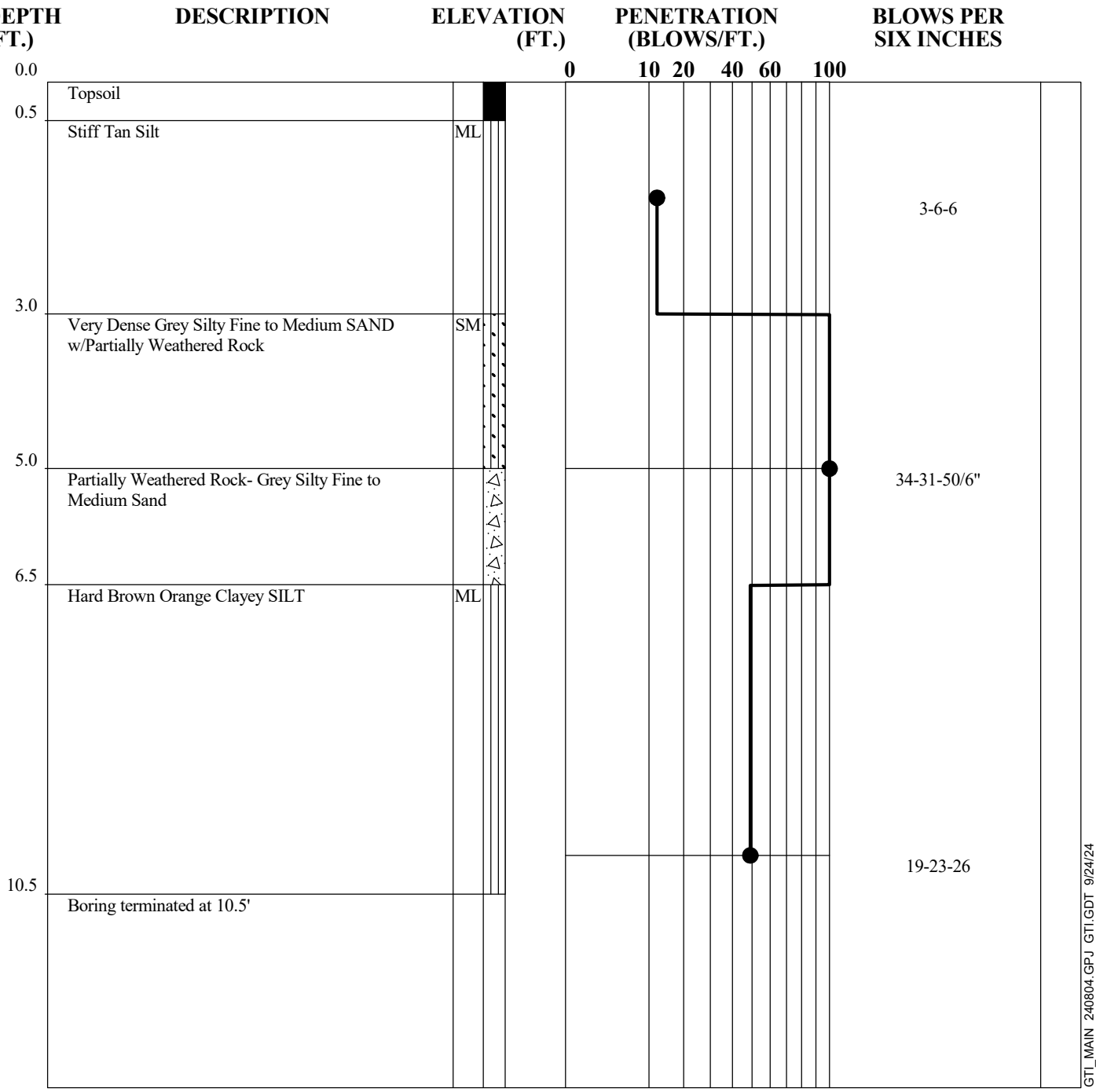


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 8
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD

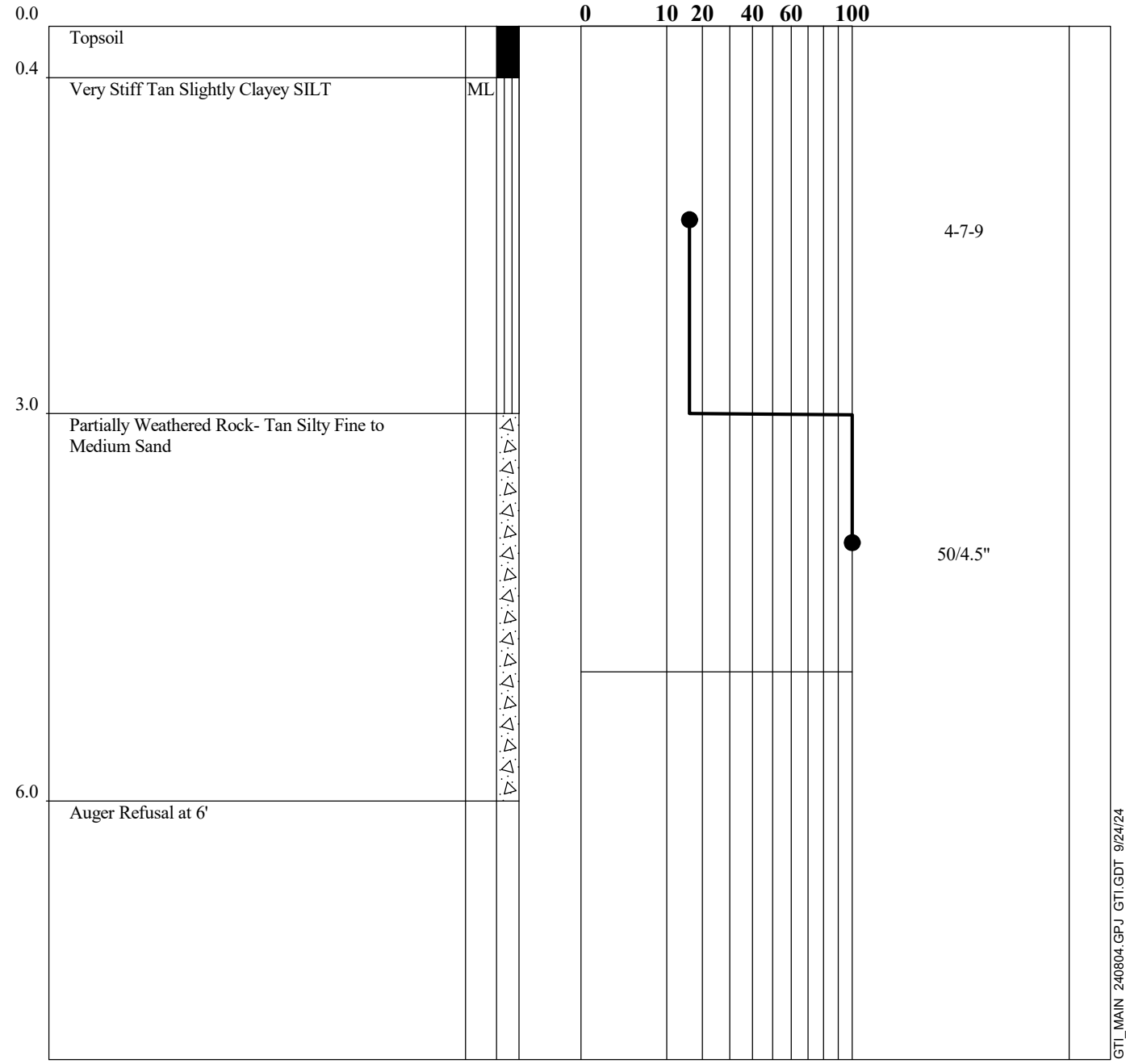


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B- 9
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD

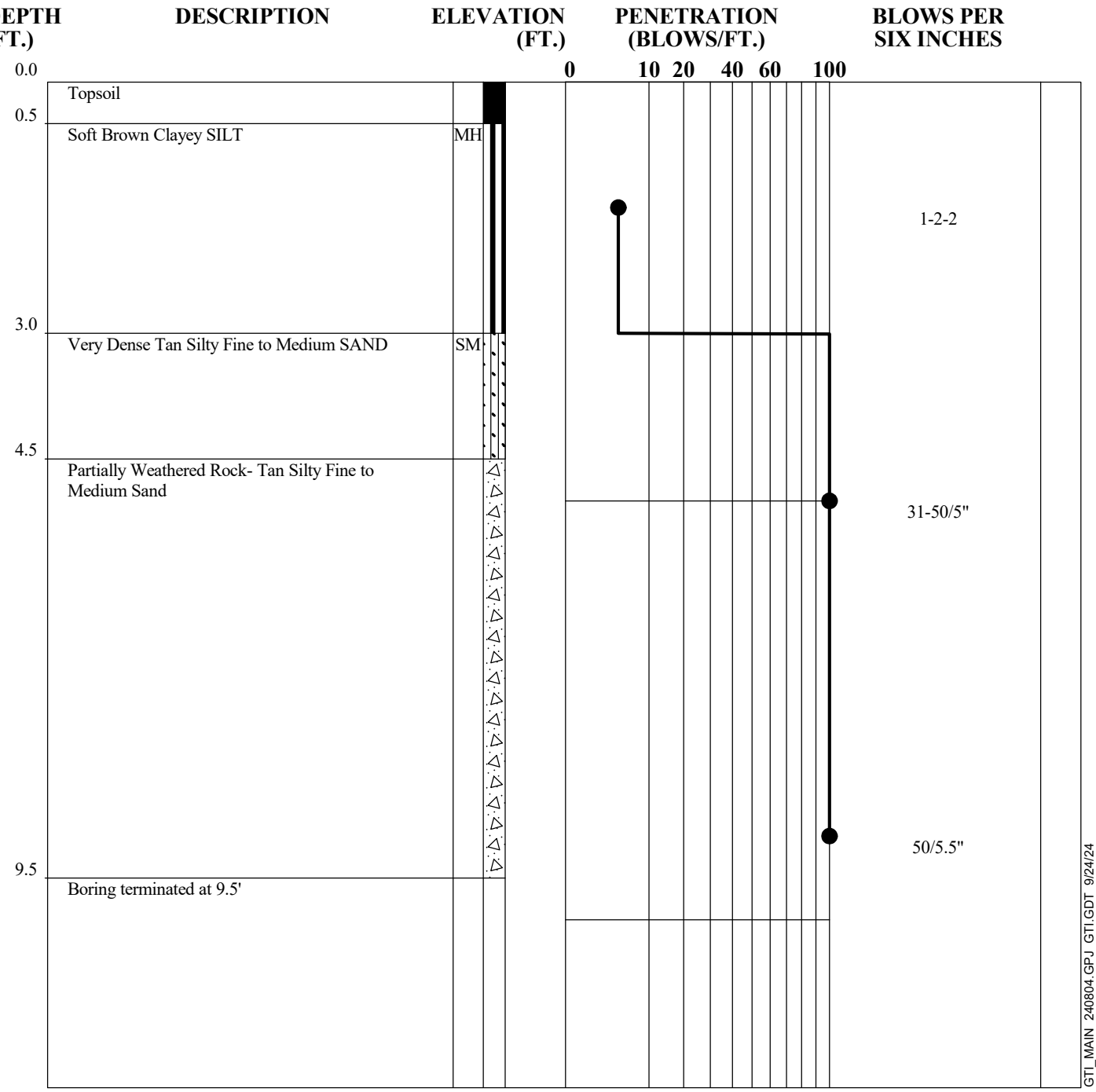


Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B-10
DATE 9-19-24

GeoTechnologies, Inc.

TEST BORING RECORD



Groundwater not encountered at time of boring.

JOB NUMBER 124-0804-EA
BORING NUMBER B-11
DATE 9-19-24

GeoTechnologies, Inc.