Geotechnical Engineering Study, 444 Maple Ave West, Vienna, Virginia (DWK Contract Number 14107.D)

D.W. KOZERA, INC.

PROFESSIONAL ENGINEERS & GEOLOGISTS

November 17, 2014

Vienna Development Associates, LLC
c/o Hekemian & Co., Inc.
505 Main Street
Annapolis, MD 21403

Attn: Mr. Christopher P. Bell, Senior Vice President
(cbell@hekemian.com)

Subject: Geotechnical Engineering Study, 444 Maple Avenue West, Vienna, Virginia (DWK Contract Number 14107.D)

Dear Mr. Bell,

This report presents the results of our geotechnical study prepared for the proposed building to be constructed at 444 Maple Avenue in Vienna, Virginia. This report was prepared in accordance with our contract dated July 16, 2014.

We appreciate the opportunity to be of service to you and the project team. Please contact us to answer questions related to this study, should they arise.

Very truly yours,
D.W. KOZERA, INC.

I hereby certify that this document was prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the Commonwealth of Virginia.

Andrew MacLeod, P.E.
Geotechnical Engineer

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EXECUTIVE SUMMARY

The following indicates a summary of the geotechnical findings and recommendations contained within this report.

Proposed Construction- A new seven story mixed use building is planned for the site at 444 Maple Avenue West in Vienna, Virginia. Construction is to consist of a four level concrete podium structure with three levels of residential units on top. Two of the four concrete levels are to be below grade with a lower floor elevation of EL 363. Maximum column and wall loads of 1200 kips and 9 klf, respectively, were provided by TCE & Associates, Inc.

Subsurface Conditions- The site is underlain by a thin layer of existing fill soils, which sit on top of natural residual soils formed by the weathering of the underlying bedrock.

-The groundwater elevation is estimated to be at EL 381±, which is 18 feet above the lower floor elevation.

Seismic Site Class- The site is considered a Site Class D, per IBC 2012.

Earthwork- After demolition of the existing structures, conventional earthmoving equipment is expected to be feasible for the cut to fill operations. Cuts of up to 30 feet are required to reach lower floor grades.

-The on-site soils are expected to be suitable for reuse as compacted structural fill.

-The on-site residual soils are expected to become unstable when exposed to construction activity and wet weather; therefore, an allowance should be included in the construction budget for subgrade repair.

Construction Dewatering- Extensive dewatering is required during construction to drawdown the water table beneath excavation grades. A series of perimeter ejector wells with two lines of interior wells is considered a feasible option. In addition, the installation of localized temporary sumps adjacent to footings will be required during footing excavation.

Foundation System- The project is expected to be supported on a shallow foundation system of spread footings. Foundations are to be founded on suitable natural residual soils of Stratum B. New foundations may be designed for an allowable bearing pressure of 6.0 ksf.

-Temporary sumps are expected to be required adjacent to footings during footing excavation. In addition, sumps within the footprint of the footing may also be required, depending on water flow into the excavation during construction. If neither of these are successful, individual shoring of each footing excavation may be required.

Floor Slab- The floor slab will be supported on natural soils, and may be designed using a modulus of subgrade reaction (k) of 90 pci.

-An underfloor subdrainage system is considered necessary for the floor slab of the building.

Pavements- The on-site soils have a low CBR value, and a subbase layer with a minimum thickness of 24 inches is required for the paving sections.

Construction Considerations- Geotechnical observations and testing of foundation installation and earthwork construction should be provided by D. W. Kozera, Inc., in order to verify that the assumptions and recommendations contained in this report require modifications due to unforeseen changes in the subsurface conditions.

1.0 INTRODUCTION

1.1 Purpose and Scope

This report contains the results of our geotechnical investigation and analysis performed for the proposed mixed-use building to be constructed at 444 Maple Avenue West in Vienna, Virginia. This study was conducted to characterize the subsurface conditions, and to establish engineering properties of the underlying materials in order to develop recommendations for foundation and slab design, as well as earthwork, and constructability issues related to the foundation and site.

The geotechnical investigation was performed in accordance with our proposal dated July 16, 2014 and included:

- Review of available geotechnical and geological data from our previous studies.
- Performance of 21 test borings.
- Evaluation and analysis of the subsurface data.
- Development of preliminary foundation design and construction recommendations.

Refer to our proposal for a list of specific scope items that were included in this work.

1.2 Limitations

This geotechnical study has been prepared in accordance with generally accepted geotechnical engineering practices. It is intended for the exclusive use of Vienna Development Associates, LLC for the design and construction of the building as described herein. This report includes both factual and interpreted information. Factual information is defined as objective data based on direct observations, such as soil samples and laboratory testing results. Interpreted information or geotechnical engineering interpretation is based on the engineering judgment, correlation, or extrapolation from factual information.

This report is based on information for the proposed structure that was made available to us at the time of the writing of this report. No warranties, express or implied, are intended or should be assumed. D.W. Kozera, Inc. should be allowed to review the project drawings and specifications as a continuation of our design recommendations and as a precursor to our providing geotechnical engineering services during construction. In the event that any changes in the floor grades, building loads, or structure location as described in this report are planned, the conclusions and recommendations contained herein shall not be considered valid unless D.W. Kozera, Inc. reviews the changes, and either verifies or modifies the conclusions of this report in writing.

Information contained in this report is based on data obtained from limited subsurface exploration that represents the soil conditions only at the specific location and time investigated, and only to the depth penetrated. Subsurface conditions and groundwater levels at other locations or depths may differ from conditions occurring at the investigated locations. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction.

D.W. Kozera, Inc. considers construction observations and testing of the foundations and earthwork an integral part of the geotechnical design, and therefore, these services should be provided by the geotechnical engineer of record. This is necessary so that we may modify our assumptions and recommendations based on actual conditions that are exposed during construction and observed by us. We cannot assume responsibility or liability for the adequacy of our foundation recommendations if we do not observe the construction.

1.3 Site Description

The project site is located at 444 Maple Avenue West in Vienna, Virginia. The site is bordered by Maple Avenue to the north, Nutley Street to the West, residential properties to the south, and a neighboring commercial property to the east. The site is currently occupied by a hotel on the eastern portion and a restaurant on the western portion. The existing buildings are surrounded by asphalt drives and parking areas. The ground surface of the site slopes gently down from the northeast to southwest with a change in ground surface elevation from EL 394± to EL 384±.

1.4 Proposed Construction

Proposed for this project is a seven story mixed-use building which will consist of four levels of concrete podium construction and three wood-framed levels. The two lower levels will be below grade parking, with a lower floor finished floor elevation of EL 363.0. As the ground surface varies from EL 384± to EL 394±, the basement varies from approximately 20 to 30 feet below existing site grades. The maximum column loads of 1200 kips were provided by TCE & Associates, Inc. Two residential courtyards are planned above the concrete podium. Two asphalt entrance drives are also planned: one entering from Nutley Street on the south side of the building, and one entering from Maple Avenue on the east side of the building.

1.5 Adjacent Construction/Site History

The proposed building is located approximately 60 feet from adjacent buildings, and this appears to be sufficient distance such that loads from the new building will not adversely affect any adjacent structures. We have no knowledge of the site's development prior to its current use.

1.6 Regional Geology

The site is located within the Piedmont Physiographic Province. The soils below the site consist of the residual material formed by the weathering of the underlying bed rock. The bedrock is mapped as the Peters Creek Schist formation. A layer of existing fill soils, up to 7 feet thick was encountered at the surface of the soil profile. These fill soils are believed to due to previous episodes of construction on the site.

2.0 SUBSURFACE INVESTIGATION

2.1 Test Boring Investigation

The subsurface investigation for this project was performed from September 22 to October 2, 2014. This investigation consisted of 21 test borings using hollow stem auger drilling techniques. Standard Penetration Tests (SPT) were conducted, in accordance with ASTM D-1586, at changes in strata or at intervals not exceeding 5 feet. The boring location plan and the test boring logs are included in Appendix A of this report.

2.2 Groundwater Conditions

Water was observed in the test borings during and after completion of the drilling. Temporary standpipes were set in several borings, and wells were installed at 4 locations for long term groundwater readings. Based on measurements at the test borings, temporary standpipes, and wells, the groundwater surface is estimated to lie as high as EL 381±, which is approximately 18 feet above the proposed lower floor elevation. Groundwater levels will fluctuate due to seasonal changes, precipitation, and construction activity.

2.3 Soil Laboratory Testing

Laboratory tests were conducted on a limited number of the collected soil samples. These tests consisted of:

Natural Moisture Content Tests	ASTM D2216
Atterberg Limits Test	ASTM D4318
Particle Size Analysis	ASTM D422
Moisture v. Density	VTM-1
California Bearing Ratio	VTM-8

Nine samples from the project area were tested for classification purposes, per the appropriate ASTM standards. The soils were found to classify SILT (ML). One sample was tested for Moisture v. Density and California Bearing Ratio per the appropriate Virginia Test Methods. The results of the soils laboratory testing are included in Appendix B.

2.4 In-Situ Testing

Dilatometer testing was performed at five locations on the site on August 6, 2014. The dilatometer testing was performed at an offset of approximately 5 feet from test borings B-1, B-5, B-8, B-10, and B-15.This testing was performed to probe refusal, which was encountered from depths of 40 to 50 ft beneath the ground surface. Soil modulus values resulting from these tests were used to estimate settlements of the proposed shallow foundations. The results of the dilatometer testing are included in Appendix D.

Wells were installed in four of the test borings to allow for the performance of rising head "slug" tests. The Bouwer and Rice method was utilized to determine the hydraulic conductivity of the in-situ soils. Wells were installed to the bottom depth of the test borings. Wells EX-1 and EX-4 were screened to 10 feet above the bottom and a bentonite seal was installed 1 foot above the top of screen. Wells EX-3 and EX-6 were screened to 20 feet above the bottom and no seal was installed. Table 2-1 presents the hydraulic conductivity determined from these tests. The results of the slug tests are included in Appendix E.

Table 2-1: Hydraulic Conductivity Determined

Well	Bottom of Well (EL)	Top of Screen (EL)	Hydraulic Conductivity (gpd/ft^2)
EX-1	360	370	4.0
EX-3	362	382	16.9
EX-4	357	367	6.4
EX-6	360	380	11.5

3.0 SUBSURFACE CONDITIONS

3.1 Stratification

The test boring data, visual and laboratory classification of the sampled soils, and our knowledge of local geology were used to separate the soils into three distinct strata, having the following generalized properties.

3.1.1 Stratum A: Man-Placed Fill

Man-placed fill was encountered in all of the test borings to depths of 1 to 7 feet below the ground surface. The fill is variable in composition and consistency, and generally consisted of silt and sandy silt. The penetration resistance in the man-placed fill indicated a generally loose to medium density, with SPT "N" values ranging from 3 to 21 blows per foot (bpf).

3.1.2 Stratum B: Residual Soils

Residual soils were encountered below the man-placed fill soils. The degree of weathering within the soil profile appears varied with the mineralogy and jointing within the profile. The residual soils are interlayered with the denser disintegrated rock of Stratum C. Although these materials generally become denser with depth, grading into disintegrated rock, these residual soils were encountered to the bottom depths of some borings, 60 feet beneath the ground surface. The residual soils were predominantly classified as SILT (ML) and SANDY SILT (ML). The density of these soils varied significantly due to degree of weathering within the profile, with SPT "N" values of 4 to 52 bpf.

3.1.3 Stratum C: Disintegrated Rock

Disintegrated rock is defined as residual material with SPT "N" values greater than 60 blows per foot. This rock like material was encountered to maximum depths of the test borings, approximately 60 feet beneath the ground surface. The disintegrated rock is interlayered within the soils of Stratum B in some of the test borings and was encountered as shallow as 30 feet beneath the ground surface.

4.0 SEISMIC CONSIDERATIONS AND SITE CLASS

This section presents the testing and analysis conducted to evaluate the liquefaction potential of the soils and to determine the 2012 International Building Code (IBC) seismic site class for this project site.

4.1 Liquefaction Potential

Liquefaction typically occurs in loose cohesionless sands located below the water table. The test borings did not encounter these conditions, and therefore a liquefaction analysis is not warranted.

4.2 IBC 2012 Seismic Site Class and Design Parameters

Seismic design parameters were determined in accordance with the 2012 International Building Code (IBC). The "U.S. Seismic Design Map Web Application" available through the USGS website provides hazard curves, uniform hazard response spectra, and design parameters for sites in the 50 states of the United States, Puerto Rico, and the U.S. Virgin Islands. These parameters were developed using two-percent probability of exceedence (PE) in 50 years. Following are the mapped spectral response acceleration values for the project site at Latitude (38.8949) and Longitude (-77.2731).

Table No. 4-1: Mapped Spectral Response Acceleration Values for Soil Factors of 1.0		
Description	**Period (Sec)**	**Sa**
Mapped Short Period Spectral Response Acceleration (S_S)	0.2	0.121 g
Mapped 1-Second Period Spectral Response Acceleration (S_1)	1.0	0.052 g

The Seismic Site Classification influences the determination of the Site Coefficients, the Design Spectral Response Acceleration values, and ultimately the Seismic Design Category. Note that the Seismic Site Classification is based on the characteristics of the upper 100 feet of soils and rock below the site. The IBC requires the use of Standard Penetration Test Resistance (test borings), Shear Wave Velocity (geophysical methods), and/or Undrained Shear Strength (soil laboratory testing) to categorize the Seismic Site Classification.

The Seismic Site Classification was determined to be Site Class D based on the test borings performed for this study. For a Site Class D, with the above-indicated mapped spectral acceleration values, the following are the calculated Site Coefficient values and the Maximum and Design Spectral Response Acceleration values, per IBC Section 1613.5.

Table No. 4-2: Site Class, Site Coefficients, and Design Spectral Response Acceleration	
Site Class	D
Soil Profile	Stiff Soil Profile
Site Coefficient (Fa)	1.6
Site Coefficient (Fv)	2.4
Short Period, Maximum Spectral Response Acceleration (S_{MS})	0.193 g
1.0 Second Period, Maximum Spectral Response Acceleration (S_{M1})	0.124 g
Short Period, Design Spectral Response Acceleration (S_{DS})	0.129 g
1.0 Second Period, Design Spectral Response Acceleration (S_{D1})	0.083 g

The Design Spectral Response Acceleration values are to be used with the Occupancy Category (IBC 2012, Table 1604.5) of the building or structure to determine the Seismic Design Category. Complete results of Spectral Acceleration with varying period are given in Appendix C.

5.0 EARTHWORK

5.1 Discussion

Cuts and fills of up to 30 feet are anticipated to reach proposed lower level floor grades. Excavation will extend beneath the groundwater table and an extensive dewatering system is required for construction of the lower levels. The southern portion of the site is expected to be partially laid back for construction of the lower levels; therefore, significant backfilling along the southern portion of the site is expected. Minimal cuts and fills for grading purposes are expected around the other three sides of the proposed building. The majority of on-site soils are expected to be suitable for re-use as backfill; however, it is expected that there will be limited space for stockpiling, and offsite borrow may be required at the time of backfilling.

Careful subgrade preparation, including stripping of existing asphalt, organic layers, and/or soft surface soils, is required to prepare a suitable fill subgrade. Earthwork is recommended to take place in the warmer, drier months between May and October.

5.2 Excavation Characteristics

After demolition of the existing buildings, the excavation of this site is expected to be performed using conventional earthmoving equipment. Careful preparation of fill subgrades, proper placement and compaction of structural fill and backfill are both necessary to prepare a suitable site for the support of the proposed structures. Details of these requirements are included in the following sections.

5.3 Fill Subgrade Preparation

The fill subgrades should be proofrolled to assure that all unsuitable, soft and loose soils have been removed from below the building and pavement areas. During proofrolling, the subgrades should be observed by the geotechnical engineer of record. Any unsuitable soils that are observed to be excessively settling or pumping during proofrolling, should be removed down to firm soils and then replaced with satisfactory soil materials compacted in accordance with the project specifications.

Care must be taken to protect fill subgrades during construction. The on-site, residual soils will become unstable in wet weather and under construction traffic. Undercutting of floor, fill, and pavement subgrades should be expected if the subgrades are exposed to the above events. The Project Specifications should require the contractor be responsible for protecting the subgrades from weather and equipment damage. An allowance should be included in the construction budget for repair of subgrades.

5.4 Compacted Structural Fill

Compacted structural fill and backfill should consist of satisfactory soils classified as ML or better in accordance with the Unified Soil Classification System, ASTM D2487. Soils meeting this requirement are classified as ML, SM, SP, SW, GM, GP, and GW. The majority of on-site soils are expected to meet this requirement and may be used in fills. Unsatisfactory soils are those classified as CL, OL, OH, MH, and CH. SC and GC materials may be suitable depending on plasticity. Suitable material must have a Plasticity Index (PI) of less than 10.

Soils used for compacted fill should be free of unsuitable materials such as topsoil, other organics, rubble, and rocks larger than three inches in diameter. The in-place moisture content of the satisfactory soils material shall be adjusted by the contractor, through wetting or drying, to within three percent of the optimum moisture content. Additives such as quick lime, kiln dust, fly ash, or Portland cement may be useful in expediting fill operations.

Compacted fill should be placed on subgrades which have first been stripped of vegetation, existing asphalt, topsoil, and unsuitable soft areas. Compacted structural fill should be placed in approximately horizontal layers, each layer having a loose thickness of not more than eight inches. All structural fill in the

building and pavement areas should be compacted to 95 percent of the maximum dry density in accordance with VTM-1. Structural fill placed in the top 24 inches beneath pavements should be compacted to 100 percent of this same standard, while compacted structural fill in lawns and unpaved areas may be compacted to 90 percent of the same standard, when placed as indicated above. The contractor should select appropriate compaction equipment to achieve the required compaction.

5.5 Dewatering During Construction

Depending upon the depths of the foundations, the groundwater table is expected to be 20 to 25 feet above the bottom of the excavation required for foundation construction. A comprehensive dewatering system will be required to keep the groundwater level below the bottom of footing elevations during construction. A series of perimeter ejector wells with two lines of interior ejector wells are expected to be suitable for dewatering to maintain the water surface below the excavation subgrade. Due to the relatively low hydraulic conductivity of the soils beneath this site, ejector well spacing of approximately 5 to 10 feet is anticipated. A wellpoint system may also be considered, but a two-stage wellpoint system with wellpoint spacing of 3 to 5 feet will likely be required if well points in lieu of ejector wells are used. If wells cannot be installed outside of the excavation due to property line constraints, battered wellpoints may be installed within the excavation. The dewatering system is expected to take approximately four weeks to reach the required drawdown of 25 feet.

Even with the extensive dewatering system in place, the excavation is expected to weep. Individual footing excavations will require their own temporary sumps placed lower than the foundation subgrade in order to provide a stable subgrade suitable for footing placement. Additional temporary sumps are also expected in other areas throughout the excavation where the bottom of excavation is observed to be soft or weeping during construction. The dewatering contract shall provide the design for the dewatering system. The contractor shall determine the number of ejector wells, wellpoint stages, sumps, and spacing required to achieve a sufficient level of dewatering.

The dewatering contractor shall also determine the drawdown near adjacent structures. If the drawdown beneath adjacent structures exceeds that which would cause intolerable settlements of the structures, the need for a cut-off wall around the site should be evaluated. The nearest existing building appears to be approximately 60 feet from the proposed building, and from our preliminary analysis, it appears that drawdown beneath this structure would be less than 5 feet. Settlements due to this amount of drawdown are expected to be less than 0.25 inches; however, this will depend on the final design of the dewatering system. The dewatering contractor may install a monitoring well adjacent to this structure to measure the drawdown at this point during the dewatering operation.

6.0 FOUNDATION DESIGN

6.1 Summary

We have conducted our geotechnical analysis for foundation design based on the results of the test borings, dilatometer probes, laboratory tests, and our experience with similar geologic conditions. The maximum column and wall loads for the building are expected to be 1200 kips and 9 klf, respectively. Typical interior column loads are expected to range from 850 to 1000 kips, while the typical exterior column load is 500 kips. The structural loading information was provided by TCE & Associates, Inc. Conventional spread footings founded on suitable residual soils are feasible to support these loads.

6.2 Spread Footings on Natural Soil

An allowable soil bearing pressure of 6.0 ksf is recommended for footings founded on suitable natural soils of Stratum B. Based on the test borings performed in the building area and a proposed finished floor elevation of EL 363, these suitable soils are expected to be encountered at foundation grades. Extensive dewatering is required to drawdown the water table beneath foundation grades. It is expected that temporary sumps will be required adjacent to individual footings to sufficiently dewater the footing excavation. Depending on the size of the footing and the rate of water inflow, additional sumps may be required within the footprint of the footing. It is expected that these sumps will be 12 inches below bottom of footing elevation. All sumps must be lined with filter fabric to prevent the migration of fine material from beneath the footing. These temporary sumps may be filled with stone and/or concrete during the pouring of the footing. It is imperative that footings be excavated and concrete placed in the same day in order to minimize disturbance to the footing subgrades.

During excavation for footings, some unsuitable, soft or loose natural soils or existing fill soils may be encountered, which must be removed by undercutting. If undercutting is required, sumps may also be required to be lowered. If the groundwater cannot be lowered below the footing subgrades, individual footing shoring may be required. The footing should be placed directly on the lowered subgrade. Alternatively, the undercut subgrade may be backfilled with lean concrete, allowing the footing to be placed at the designed elevation.

All footings should be at least 16 inches wide for shear considerations and a maximum slope of 2H:1V should be maintained between the bottom edges of adjacent footings where foundation grades are at different levels. Hand cleaning of the footing subgrades will be required to remove disturbed soils. This may occur from the backhoe excavation, ponding of water, trench collapse, etc. All footings should be placed at least 30 inches below final exterior grade for frost protection.

We expect that total foundation settlement of less than one inch and distortional settlement of 0.002 in/in can be expected when spread footings are placed in accordance with the recommendations provided in this report. The suitability of footing subgrades should be evaluated during construction by a geotechnical engineer from our office.

6.3 Spread Footings - Lightly Loaded Structures

We expect that some lightly loaded structures (wall loads of less than 3 klf and column loads of less than 50 kips) founded at nominal depths below existing grade may be required at the site. These structures may include small site walls, equipment foundations, etc. These lightly loaded structures may be founded on spread footings. The fill material found in Stratum A may not have been placed in a controlled manner; therefore, we believe that these existing fill soils are not suitable for direct support of footings. Where the fill soils of Stratum A or soft natural soils are encountered, the lightly loaded footings should be undercut to a minimum depth of 1B for square footings and 2B for strip footings, where B is equal to the footing width. If suitable natural soils are encountered prior to reaching the minimum depth indicated above, the undercut may be stopped. The resulting undercut excavation should be backfilled with new compacted structural fill. A design soil bearing pressure of 2.0 ksf is recommended for these lightly loaded footings founded on

natural soils or newly placed compacted structural fill when installed as described herein. Toe pressures for retaining walls should not exceed 3.0 ksf.

Undercutting of unsuitable existing fill soils should be expected where footings are founded near the existing ground surface. Unit rates and an allowance should be established for undercutting of unsuitable soil. The undercut and backfill should be performed in accordance with the earthwork recommendations in Section 5 of this report.

Strip footings should be at least 16 inches wide and column footings at least 30 inches for shear considerations. A maximum slope of 1.5H:1V should be maintained between the bottom edges of footings at different levels. Exterior footings and interior footings in unheated areas should be placed at least 30-inches below grade for frost protection.

Based on wall loads of less than 3 klf and column loads less than 50 kips, we estimate total settlements of less than one inch. Where spread footings are founded adjacent to below grade walls or within a slope of 1H:1V, the walls should be structurally evaluated for the ability to withstand the surcharge from the new footings.

7.0 FLOOR SLAB

7.1 Floor Slab Support

The floor slab subgrades are expected to consist of natural soils. Prior to placement of the floor slabs, the suitability of the slab subgrades should be determined by proofrolling. Proofrolling should be performed using a loaded 20 ton dump truck (or equivalent heavy-construction equipment) under the observation of a geotechnical engineer from our office. Any additional loose or unsuitable soils found during proofrolling should be removed and replaced with compacted fill. A stone working platform may be required to support heavy equipment during construction. The slab may be placed directly on this stone working platform if it is found to be stable during proofrolling.

As discussed in Section 5.5 of this report, an extensive dewatering system is required for construction of the lower levels. Due to the relatively low hydraulic conductivity of the soils, it is anticipated the bottom of excavation will weep and may become soft during construction. Temporary sumps will be required where this occurs in order to provide a suitable subgrade for slab support. The placement of a stone working platform underlain by a geotextile may be required to maintain a stable subgrade.

Floor slabs-on-grade may be designed using a modulus of subgrade reaction, k, equal to 90 pci. Groundwater is estimated to be up to 18 feet above the proposed finished floor grade of the lower level, and a special underfloor subdrainage system is considered necessary; see below. Included above the subdrainage system should be a vapor barrier or waterproofing membrane between the concrete floor slab and the gravel. The subdrainage system should be placed shortly before slab construction to minimize damage to the piping from construction operations.

7.2 Subdrainage System

The lower floor slab is expected to be at EL 363, which is approximately 18 feet below groundwater table. A subdrainage system designed to collect groundwater around the perimeter walls and below the floor slab of the structure is required to maintain groundwater below the floor level.

The use of both a waterproofing system and underfloor subdrainage system is recommended. The below grade walls and floor need not be designed for hydrostatic water pressure when subdrainage is installed as detailed herein; however, walls below grade and slabs-on-grade must be waterproofed.

General requirements of the drainage system are as follows:

The subdrainage system should consist of four-inch diameter, perforated, corrugated polyethylene tubing according to ASTM F405 with a maximum slot width of ¼ inch. Tubing should be placed with slots down using straight section and standard available connections.

Drainage lines may be placed without a slope, with inverts at least six inches below final floor grades. The subdrainage system may drain by gravity to daylight or to a storm drain line, provided that provisions are made to avoid back pressures from acting in the event storm sewers flow full. A maximum spacing of 30 feet between subdrainage lines below the floor slab should be maintained.

The use of a true waterproofing membrane such as Paraseal or Tegraseal, which are Bentonite/HPDE composites, is recommended directly below the floor slab. This membrane can be placed directly on the washed gravel drainage layer. All penetration and seals should be performed in accordance with the manufacturer's recommendations. This waterproofing membrane is to provide a seal that will minimize moisture vapor transmission through the floor slab.

A uniformly graded stone filter, (washed gravel), should be placed around the perforated drainage line. This stone filter should have a thickness of at least six inches at the bottom and sides. The drainage invert should be at least 12 inches below the slab subgrade. The stone filter should have uniform gradation and

AASHTO M43, Size No. 67 or 7 is recommended. The stone drainage filter should also be wrapped in geotextile. The underfloor washed gravel should be a minimum of 6 inches thick, and be underlain by a continuous layer of geotextile. The geotextile shall have an apparent opening size of greater than an equivalent opening size of the No. 70 sieve. (Mirafi 140N or equal).

The below grade walls should be constructed with a vertical drainage panel, which extends to within two feet of the ground surface, and with a gravel layer at the base of the exterior walls. The gravel layer should consist of open-graded washed gravel such as AASHTO M43, Size No. 67 or 7. Weep holes should consist of four inch PVC pipe packed with the same pea gravel and connected to the six inch layer of washed gravel or crushed stone below the floor slab. Weep holes if used in lieu of a perimeter drain should be spaced a maximum of six-feet on center. Typical subdrainage details are included in this report as Figure 7-1. Weepholes are unnecessary if the perimeter drain system is discharged independently of the underfloor system.

It should be noted that inspection of the subdrainage system should occur and the system may require flushing at periodic intervals if soil particles infiltrate the pipes. Clean–outs should be incorporated into the subdrainage system after each right angle bend to allow flushing of the system.

A design memorandum, dated October 17, 2014 discusses the expected discharge flows from the subdrainage system. Flow quantities ranging from 120 to 445 gpm were predicted. This design memorandum has been included as Appendix F of this report. Pump sizes may be selected based on the predicted flow quantities. A redundant power source, such as a backup generator, must be connected to the pumps so that the pumps do not stop running in the event of failure of the primary power source.

SECTION 8: LATERAL EARTH PRESSURES

8.1 Discussion of Excavation Support Systems

Based on a finished floor elevation of EL 363 for the lower level and a ground surface elevation of EL 384± to 394±, excavations of 20 to 30 feet are anticipated for the for this project. The retention of these excavations can be done by a variety of excavation support systems, but we recommend that a free-draining soldier beam and wood lagging wall be employed. This soldier pile wall may be cantilevered, braced with internal rakers, anchored with earth tiebacks, or a combination of the above. A soldier pile wall will require that piles be embedded into the dense residual soils, which may prove difficult to penetrate using vibratory or driven methods; therefore, pre-drilling will be required. Soldier pile shafts should be grouted during auger removal to prevent caving of the shaft. The soldier pile can then be inserted into the drilled, pre-grouted shaft.

Soldier pile spacing should be a maximum of eight feet, and the wood lagging should not be less than three inches thick, unfinished. The location of the wales, soldier beams, spacing, and embedment depth must be based on an analysis provided by the excavation support contractor. It is expected that braced excavation support is required to support the excavations near property lines. Tiebacks or internal rakers may be used for bracing. Typical arrangements of tiebacks or rakers are shown on Figure 8-1. Struts or tiebacks will require preloading in order to minimize wall movement. We expect that if tiebacks will be used, they will extend below the public rights of way, and would require easements. Research of the existing utilities and other below grade structures should be performed to verify that these structures will not interfere with the tiebacks. If easements cannot be obtained, internal rakers will be required.

A precondition survey of adjacent buildings, utilities, and structures should be performed prior to the start of work. The precondition survey should document the condition of the adjacent buildings/structures prior to construction. The adjacent buildings should be monitored for horizontal and vertical movement during construction, and this monitoring program should be required by the project specifications to be submitted and reviewed prior to construction. All foundations located within a 2H:1V slope of the lowest excavation level should be monitored for movement.

Any vertical surcharge load from temporary construction equipment should be added to the lateral earth pressure with a rectangular force diagram with an active earth pressure coefficient of 0.5 times the vertical surcharge load. The surcharge load from construction equipment should be a minimum of 250 psf.

Excavation is expected extend beneath the water table, and it is expected that a comprehensive dewatering system will be installed prior to excavation beneath the groundwater level, EL 381. Even with the dewatering system installed, it is expected that there will be some seepage through the walls of the excavation support system. Lagging beneath EL 381 should be stuffed with straw or filter fabric in order to prevent the migration of fine material into the excavation. If allowed to occur, this migration will cause settlements of the ground surface outside of the excavation.

The excavation support systems should also be designed in such a way that an acceptable lateral deformation of the excavation support systems and settlement of adjacent structures and utilities less than 1/4-inch and 1/2-inch, respectively, can be achieved.

All excavation support systems should be designed by a registered professional engineer. A submittal of the engineered system(s) including shop drawings and design computations should be reviewed by the structural engineer and D.W. Kozera, Inc. for approval prior to construction.

8.2 Temporary Sloped Excavations

Sloped excavation may be used on site where excavation depth is shallow, the extent of excavation is small, and ground movements as a result of excavation would not impact the performance of existing structures. It is expected that a sloped excavation may be utilized in the southern portion of the site, in combination with an excavation support system. The Occupational Safety and Health Administration

(OSHA) Technical Manual (OTM) Section V, Chapter 2, "Excavations: Hazard Recognition in Trenching and Shoring," provides guidelines that should be followed to ensure a safe excavation. The soils found on site can be considered Type C in accordance with the OTM; therefore, excavations of up to 20 feet deep with slopes of 1.5H:1V are permitted. All sloped faces should be covered with polyethylene sheeting to minimize the wetting and/or drying of the soils on the slope. Sloped excavations below the groundwater table are not recommended, and mechanical excavation support systems should be used if excavations extend below the groundwater table, EL 381. The construction dewatering system will lower the water table and temporary sloped excavations may be permitted below EL 381 in the dewatered zone.

8.3 Cantilevered/Braced Walls

The lower level is expected to be 20 to 30 feet below final exterior grade. As such, the perimeter walls are required to resist lateral earth pressure loads. Recommended parameters for cantilevered and braced retaining wall design are indicated on Figures 8-2 and 8-3, respectively. The ponding of precipitation behind the walls should be avoided during construction as the pressure diagrams included do not include hydrostatic pressure. A Factor of Safety of at least 1.5 should be used for evaluation of overturning and sliding of the walls using the parameters indicated on the lateral earth pressure diagrams.

All walls below grade, including those poured directly against sheeting and shoring, should be waterproofed and include a synthetic drainage panel to allow water against the wall to flow into the perimeter foundation drain. These walls will extend be beneath the groundwater table and the lateral earth pressure diagrams do not include hydrostatic pressure. Conventional foundation subdrainage or weep holes must be used to prevent buildup of hydrostatic pressure behind walls. Typical subdrainage details are included in Figures 7-1 and 7-2.

Specific material and compaction requirements for fill against walls below grade are included in Section 5.4. Compacted fill behind and in front of the walls should be free of organics and rocks larger than three inches in diameter and should consist of soils classifying ML or coarser. Most of the on-site soils are expected to meet these criteria. Compaction equipment exceeding 3,000 pounds in dead weight should not be used within five feet of the walls in order to avoid overloading the walls. All building walls should be braced prior to backfilling, unless they are designed to be cantilevered walls.

SECTION 9: PAVEMENT DESIGN

9.1 Discussion

Proposed pavement construction includes new entrance drives from Maple Avenue and Nutley Street, as well as a delivery area to the south of the proposed building. It is suspected that all pavements will be subject to delivery truck loading, and a heavy-duty asphalt section has been provided. Pavement subgrade elevations are expected to be near existing grades and require cuts and fills of less than three feet. Therefore pavement subgrades are expected consist of existing fill soils, newly placed compacted fill, and/or natural soil. Depending on the support of excavation scheme utilized along the south wall, the southern pavement area may be supported on significant depths of newly placed fill.

9.2 Pavement Subgrade Preparation

Careful subgrade preparation, including the stripping of existing asphalt, topsoil and organic layers, and re-compaction and proofrolling, is strongly recommended. All subgrades should be proofrolled with a loaded 20 ton dump truck, and any unsuitable soft or loose areas detected should be removed and replaced with satisfactory compacted fill or stone base course. Some undercutting of unsuitable soils should be expected, in order to produce a pavement subgrade suitable for the pavement design provided below. The residual soils are expected to become unstable under construction activity and if they are exposed to wet weather. It is recommended that the subbase course be placed immediately after proofrolling in order to protect the subgrades. Compacted fill placed for pavement support should be placed in accordance with the recommendations contained in Section 5.4 of this report. The pavement subgrades should be observed carefully to determine that the soils meet the soil classification that is used in our analysis.

9.3 Design/Analysis

Pavements are expected to be subject to heavy loads of delivery trucks and a heavy-duty pavement section may be used for new pavements. Soil laboratory testing for the on-site soils indicated a CBR value of 1.0 for the SANDY SILT soils. The CBR value is generally considered as "poor" for pavement support and a granular subbase with a minimum thickness of 24 inches is recommended to stabilize the subgrades. We expect these soils to make up the majority of pavement subgrades. The laboratory CBR value was reduced by a factor of 0.67 to yield a design CBR value of 0.67. This design CBR value was used for our analysis.

Table 9-1: Recommended Heavy-Duty Pavement Section
500,000 ESALs
2.0 Inches Asphalt Surface Course
4.0 Inches Asphalt Base Course
8.0 Inches Stone Base Course
24.0 Inches Granular Subbase Course

The bituminous concrete surface and base course material should be selected by the civil engineer to provide a stable and relatively impervious pavement section. The stone base and granular subbase courses should meet the specifications of VDOT #21A or #21B, and be compacted to at least 100 percent of the maximum dry density per VTM-1.

9.4 Pavements During Construction

The recommended pavement sections are not designed to accommodate construction traffic. It should be expected that damage will occur due to overloading of the pavement sections if they are subjected to construction traffic. This will be prevalent especially if water is allowed to collect on or in the pavement subgrades, and if only the base course is placed prior to the completion of the construction. Provisions should be made to minimize damage to the pavements during construction including the use of subdrainage, temporary swales or berms, the limitation of construction traffic to certain areas, and/or an

increased thickness of stone or base asphalt. An allowance should be reserved for the cost of repairs to the base paving prior to completion of the final surface-course of asphalt.

The pavement design assumes that a continual maintenance program will be implemented during the service life of the project. This should include crack and surface sealing, and patching of deteriorated areas.

9.5 Rigid Pavement

A rigid concrete pavement should be used in areas of concentrated, repeated, heavy wheel loads such as at the trash dumpster area or loading dock area. The recommended rigid section is 7.0-inches of reinforced Portland cement concrete. The concrete should be 4,000 psi, air entrained, and be reinforced with a minimum 6x6, W2.9xW2.9, welded wire fabric. Construction and expansion joints should be doweled at 12 o.c., with 7/8-inch diameter, 18-inch long smooth dowels. Joint spacing should not exceed 14-feet in any horizontal direction. Subgrades for rigid pavement should be prepared in the same manner as those for heavy-duty flexible pavements, which includes both the 24 inch subbase, and 8 inch stone base courses.

10.0 CONSTRUCTION CONSIDERATIONS

Specific recommendations for foundation construction are given below:

10.1 Earthwork

The site surface asphalt should be stripped, as well as all existing topsoil from landscape areas and soft surface soils. The resulting subgrades should be proofrolled under the observation of our representative. Any soft or unsuitable soils encountered should be removed and replaced with compacted structural fill. Excavations are expected to extend up to approximately 25 feet beneath the water table and a comprehensive dewatering system is required.

10.2 Spread Footings

Care should be exercised during the excavation for all footings to minimize disturbance of the footing and fill subgrades. If subgrades are disturbed, the subgrades should be lowered to undisturbed soils. Due to the susceptibility of the on-site soils to damages from weather and/or construction activity, footings should be excavated and concreted the same day in order to avoid ponding of surface runoff water in footing excavations, and to avoid other disturbances such as freezing, extreme moisture variations (wetting or drying), etc. A mud mat consisting of a minimum of two inches of lean concrete may be placed to preserve the subgrades after the subgrade is approved by an engineer from our office. Hand cleaning of the disturbed soils left by the backhoe excavation will be required to produce a minimally disturbed subgrade. A flat-bladed excavation bucket will help to minimize the hand work.

10.3 Compacted Structural Fill

Compacted fill should meet the requirements outlined in this report. All compacted structural fill and backfill below slabs, and as backfill behind walls should be compacted to 95 percent of the maximum dry density per VTM-1. Compacted fill placed as subbase and base courses directly beneath pavements shall be compacted to 100% of the same standard. Moisture conditioning, such as wetting or drying, should be expected to be required depending on the time of year construction occurs. Soil additives such as lime, cement or kiln dust may be used to expedite compaction in soils above the optimum moisture for compaction.

10.4 Review of Construction Documents

Any deviation to the project design subsequent to the date of this report, such as changes in floor grades, building loads and building location, should be brought to our attention to determine if our recommendations contained herein remain valid.

The information provided in this report may be used to produce project drawings and specifications. We should be allowed to review the project drawings and specifications, as a follow-up to our design recommendations and as a precursor to our providing the geotechnical engineering services during construction.

10.5 Construction Observations and Testing

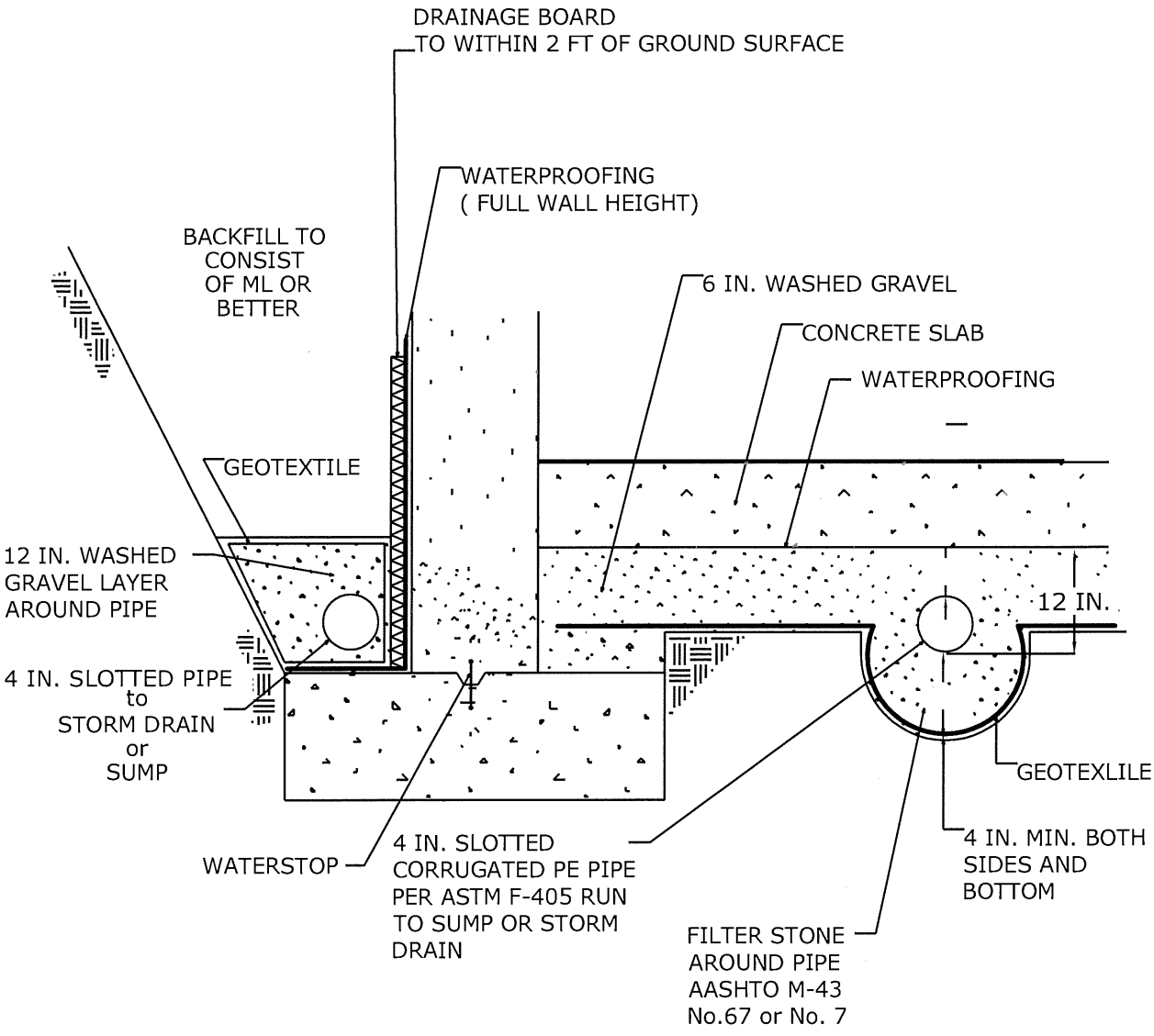
Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions will vary from those encountered in the test borings, that conditions are not as anticipated by the designers, or that the construction process has altered the soil conditions. D.W. Kozera, Inc. considers construction observation and testing of the foundations and earthwork an integral part of the geotechnical design, and therefore these services should be provided by the geotechnical engineer of record. As actual subsurface conditions are exposed and observed by us during construction, modifications to our report recommendations can be made promptly and efficiently as needed.

Observations and testing should at minimum include full-time observations of the excavation of footing, fill, and floor subgrades, and field density testing of compacted structural fill. Other services, including

materials testing (concrete, reinforcing steel, bituminous concrete, masonry, etc) can be provided upon request.

Figure 7-1

Typical Subdrainage Detail



TYPICAL SUBDRAINAGE DETAIL

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PROFESSIONAL ENGINEERS AND GEOLOGISTS
1408 Bare Hills Rd. Baltimore, MD 21209
PH. 410.823.1060 FAX. 410.823.1062

444 MAPLE AVENUE

VIENNA, VA

Proj #: 14107.D

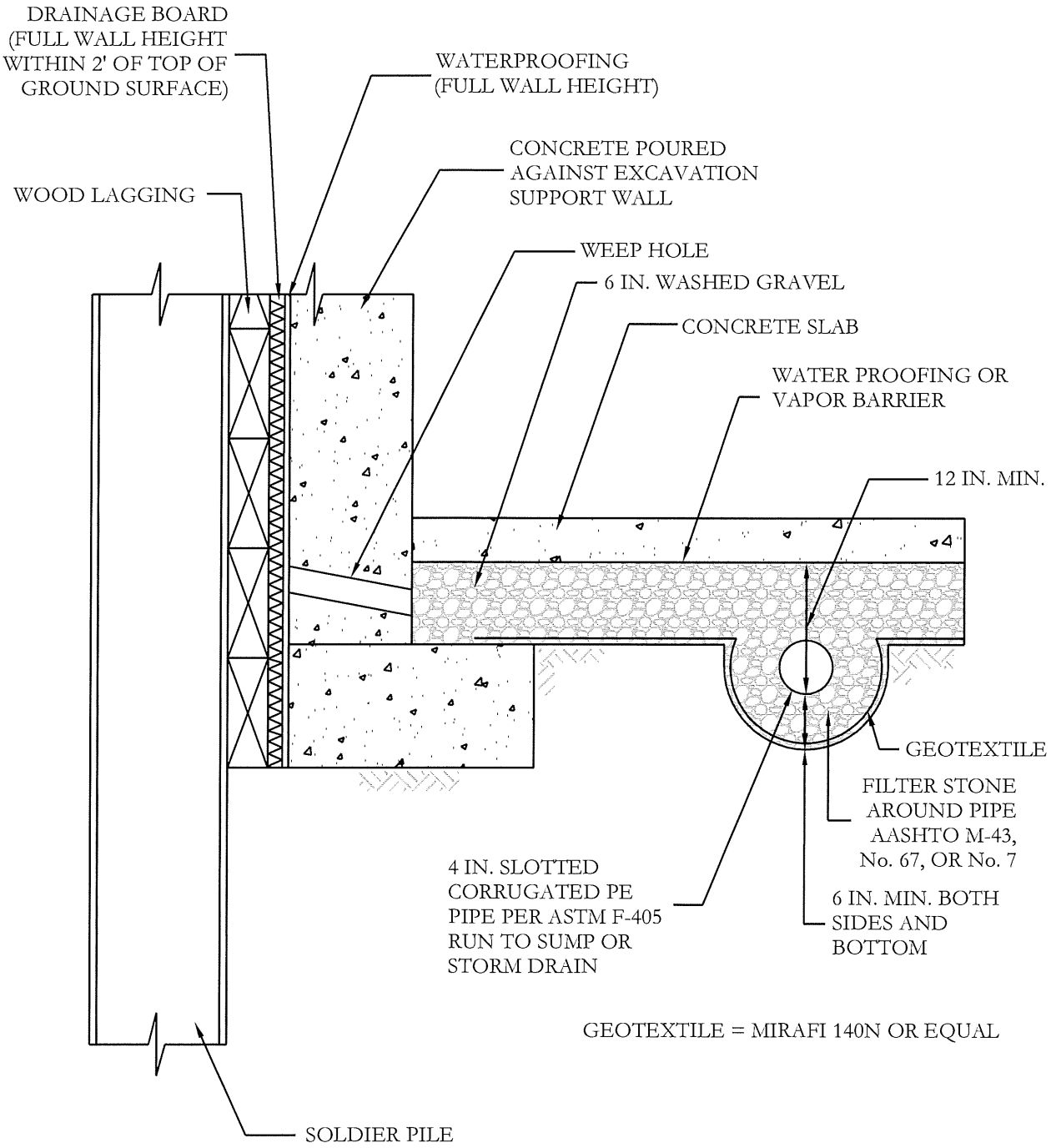
Date: 10.15.14

Figure: 7-1 | Prep. by: NM

Scale: NTS | Rev. by: AM

Figure 7-2

Typical Subdrainage Detail – Property Line



TYPICAL SUBDRAINAGE DETAIL - PROPERTY LINE

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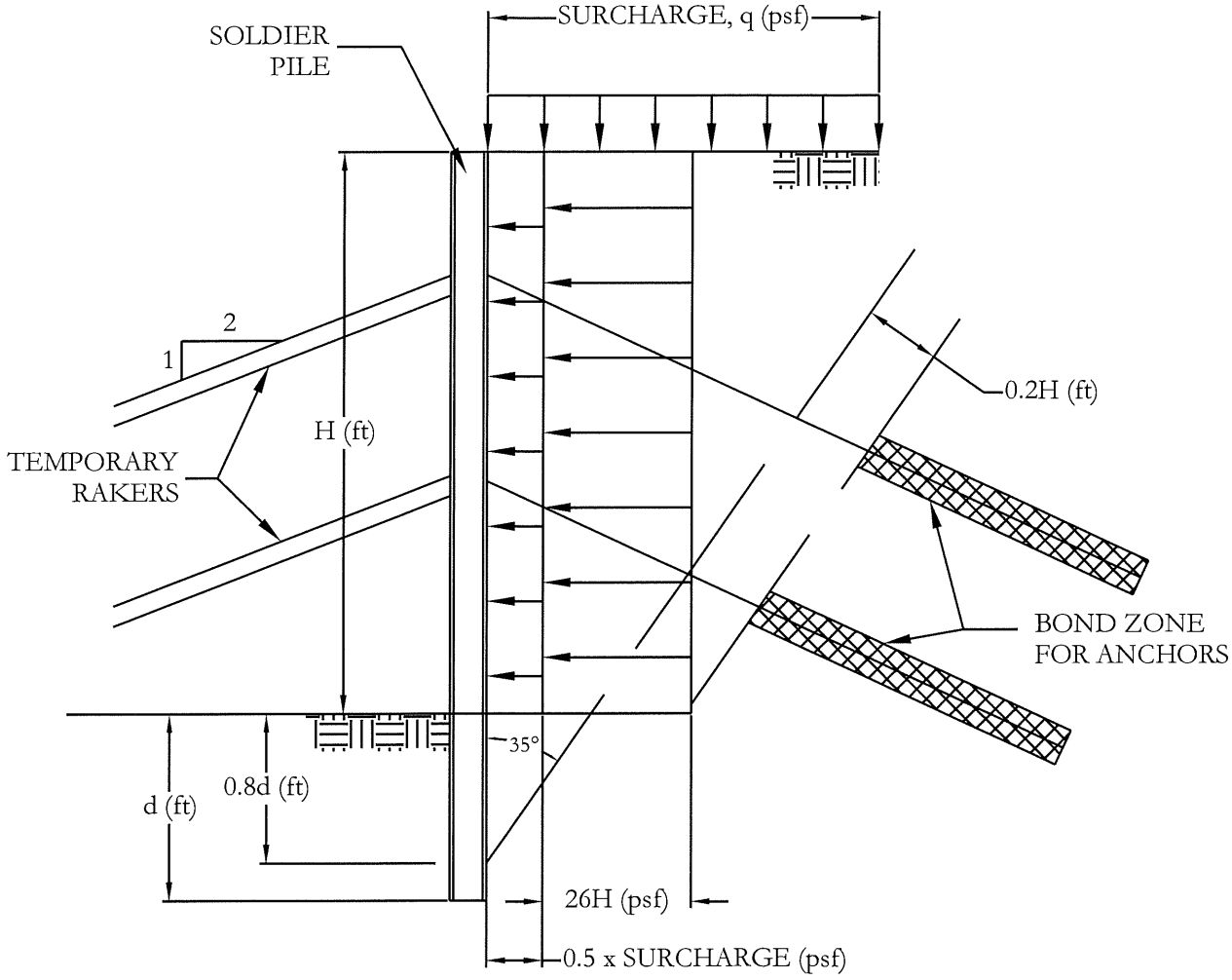
444 MAPLE AVENUE

VIENNA, VA

Proj #: 14107.D	
Date: 10.15.14	
Figure: 7-2	Prep. by: NM
Scale: NTS	Rev. by: AM

Figure 8-1

Typical Temporary Excavation Support System Section



NOTES: THE DESIGNER SHOULD DETERMINE THE PILE EMBEDMENT, TIE BACK/RAKER FORCE, NUMBER OF TIE BACK/ RAKER LEVELS, ETC. TIEBACKS SHOULD EXTEND INTO RESIDUAL SOILS.

LATERAL PRESSURES BASED ON PECK'S APPARENT PRESSURE ENVELOPE FOR BRACED CUTS IN SAND AND Ka = 0.33

TYPICAL TEMPORARY EXCAVATION SUPPORT SYSTEM SECTION

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VIENNA, VA

Proj #: 14107.D

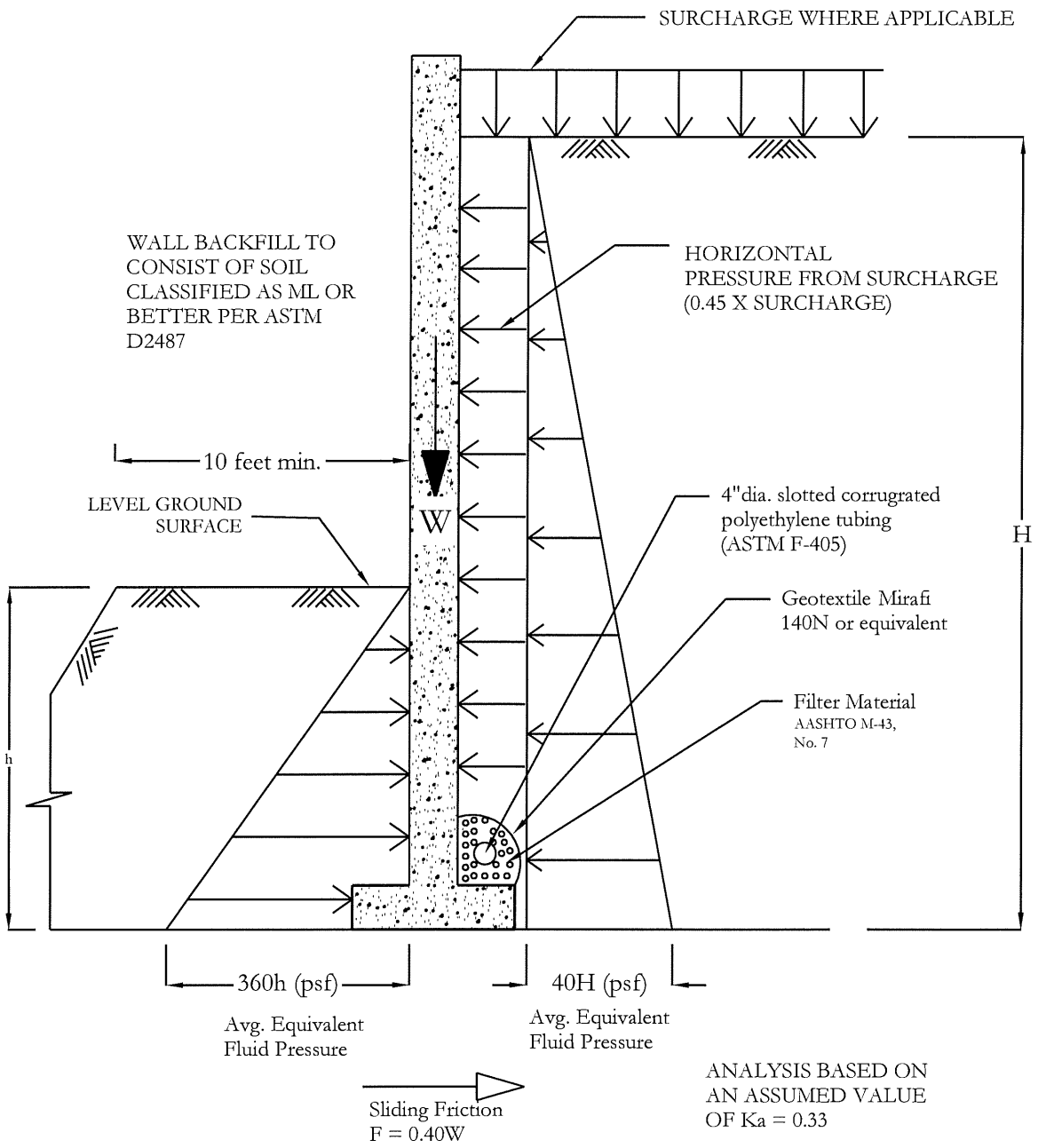
Date: 10.15.14

Figure: 8-1 | Prep. by: NM

Scale: NTS | Rev. by: AM

Figure 8-2

Lateral Earth Pressures – Cantilevered Walls



CANTILEVERED WALLS

NOTE: LATERAL EARTH PRESURE DIAGRAMS DO NOT INCLUDE HYDROSTATIC PRESSURES

LATERAL EARTH PRESSURE DIAGRAM

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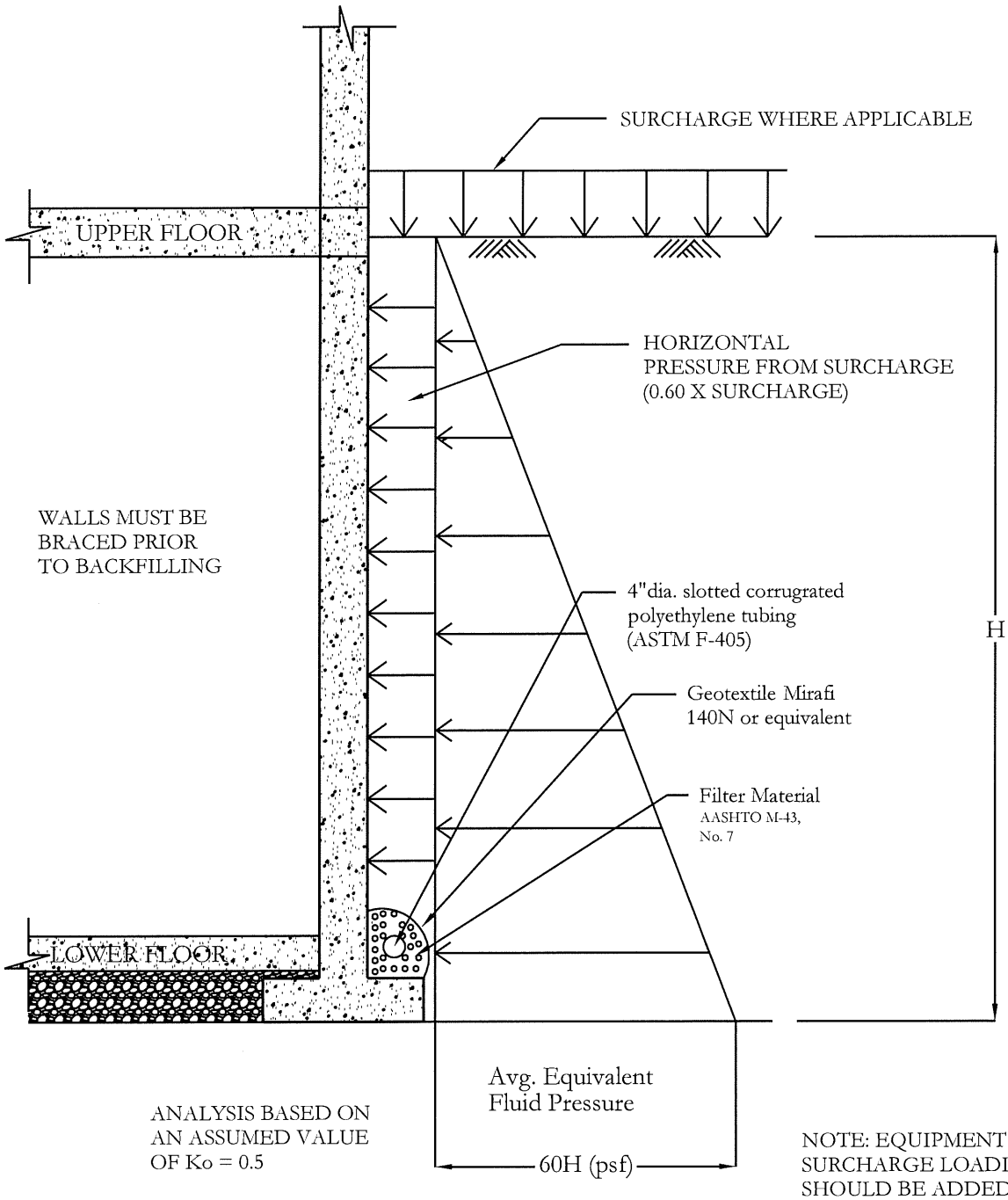
Proj #: 14107.D	
Date: 10.15.14	
Figure: 8-2	Prep. by: NM
Scale: NTS	Rev. by: AM

Figure 8-3

Lateral Earth Pressures – Braced Walls



BRACED WALLS

(BACKFILLED AFTER CONSTRUCTION)

NOTE: LATERAL EARTH PRESURE DIAGRAMS DO NOT INCLUDE HYDROSTATIC PRESSURES

LATERAL EARTH PRESSURE DIAGRAM

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444 MAPLE AVENUE

VIENNA, VA

Proj #: 14107.D	
Date: 10.15.14	
Figure: 8-3	Prep. by: NM
Scale: NTS	Rev. by: AM

APPENDIX A

Subsurface Investigation

APPENDIX A
GENERAL NOTES FOR TEST BORINGS AND TEST PITS

Geotechnical Engineering Study, 444 Maple Avenue West
Vienna, Virginia
(DWK Contract Number 14107.D)

1. Test Borings

Test borings are advanced by turning an auger with a center opening of 2-1/2 or 3-1/4 inches. Cuttings are brought to the surface by the auger flights. Sampling is performed through the center opening in the hollow stem auger by standard methods. No water was introduced into the borings using this procedure.

1.1 Standard Penetration Tests

Testing is performed by driving a two-inch O.D., 1-3/8 inch I.D. sampling spoon through three, six-inch intervals or as indicated, using a 140 pound hammer falling 30 inches according to ASTM D1586. The number given as the 'N' value is the sum of the blows required to drive the samples for the second and third intervals.

2.0 Test Pits

Test pits are logged to provide a record for geotechnical evaluation, construction inspection, or other specialized purpose such as building damage investigations, subgrade inspections, etc.

2.1 Test Procedures

PP, when indicated, denotes the results of tests performed with a Pocket Penetrometer. The numbers indicate the unconfined compressive strength of the undisturbed soils in tsf. DCP, when indicated, denotes the results of tests performed with a Dynamic Cone Penetrometer at an initial seating increment of two-inches, and 1-3/4-inch increments thereafter. The penetrometer is driven by a 15-pound hammer falling 20-inches, and the number of hammer blows per increment is recorded.

3.0 General

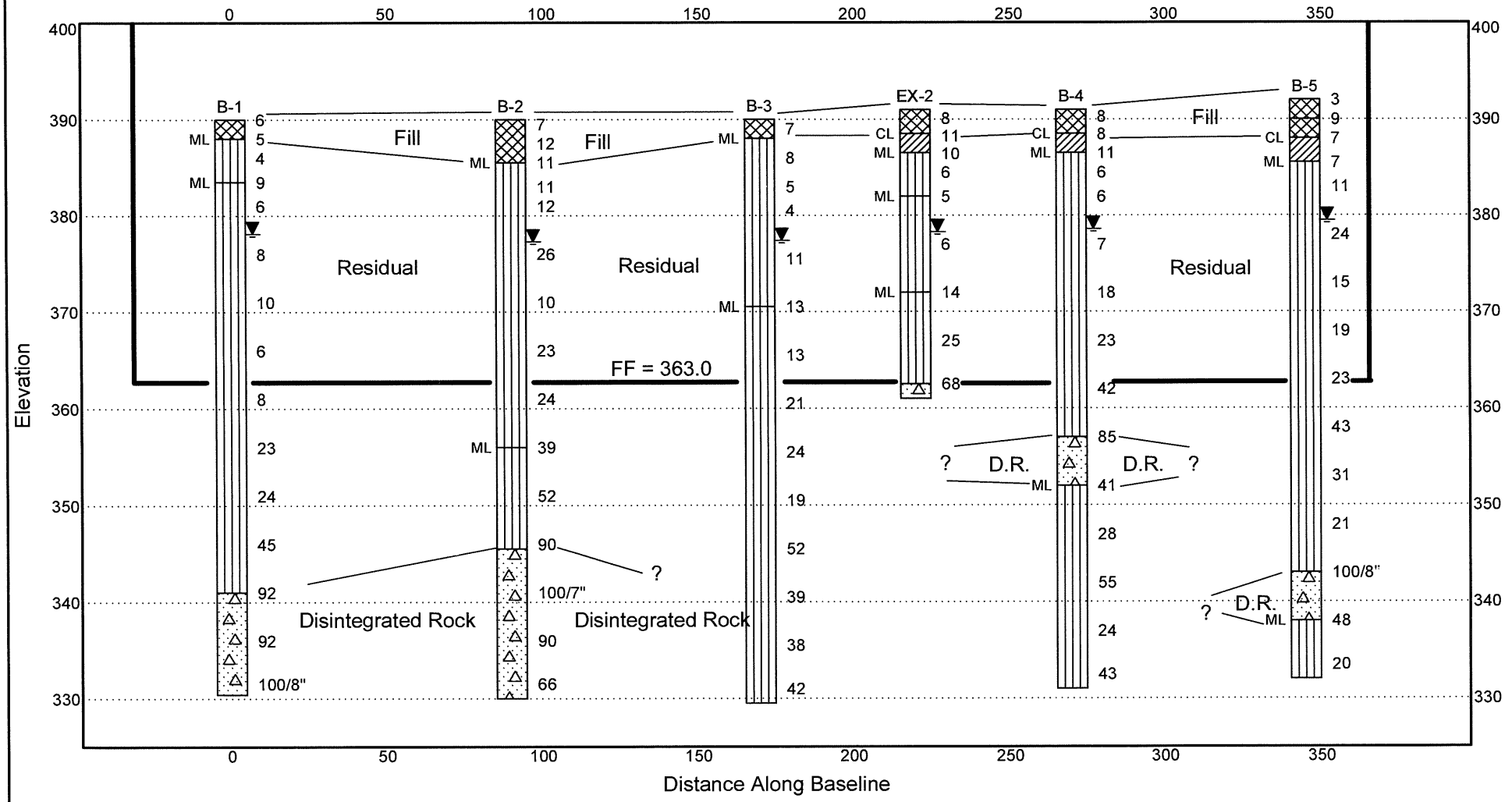
The test pits and test boring logs represent subsurface conditions only at the specified location and at the particular time excavated. The passage of time may result in changes in these conditions. Conditions at other locations on the site may differ from conditions occurring at the test pit or test boring location.

The stratification lines represent the approximate boundary line between soil and rock types as observed in the test pit and test boring. The soil profile, foundation dimensions, water level observations, and test results presented on the log have been made with reasonable care and accuracy, but must be considered only an approximate representation of the subsurface conditions to be encountered at that particular location.

The observed water levels are considered a reliable indication of the groundwater table levels at the time indicated. The groundwater table may be completely dependent on the amount of precipitation at the site during a particular period of time. Fluctuations in the water table should be expected with variations in precipitation, surface run-off, evaporation, construction activity, etc.

4.0 Locations and Grades

The test borings were located in the field by D.W. Kozera, Inc. based on drawings provided to us. The ground surface elevations were estimated from the drawings.



D. W. KOZERA, INC.
Baltimore, Maryland

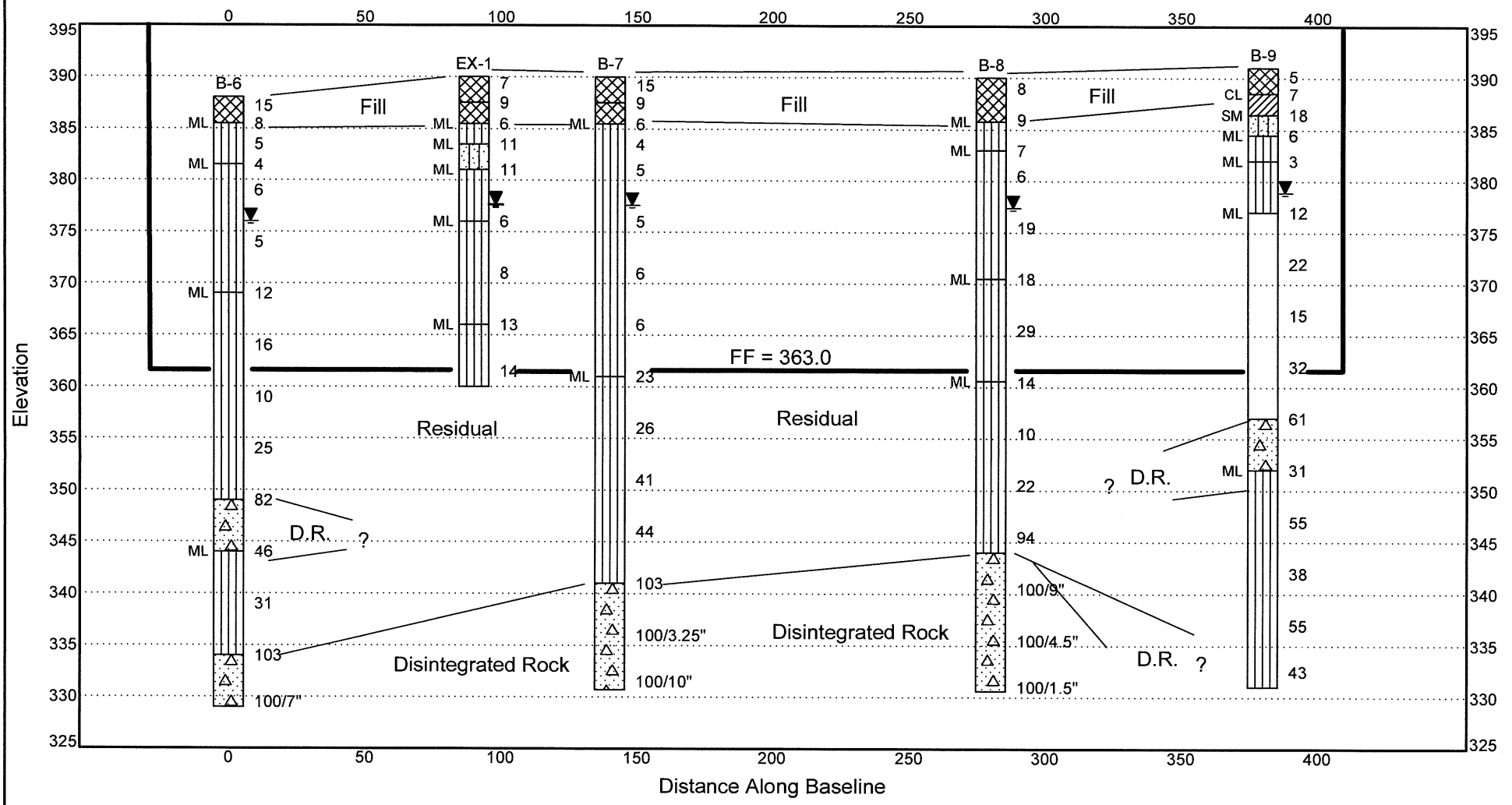
PROFESSIONAL ENGINEERS & GEOLOGISTS

SUBSURFACE PROFILE
Section A-A'

444 Maple Avenue

Contract No.	Date	Drawing No.
14107.D	Aug 14	1

ABC 14107.GPJ KOZERA.GDT 8/19/14



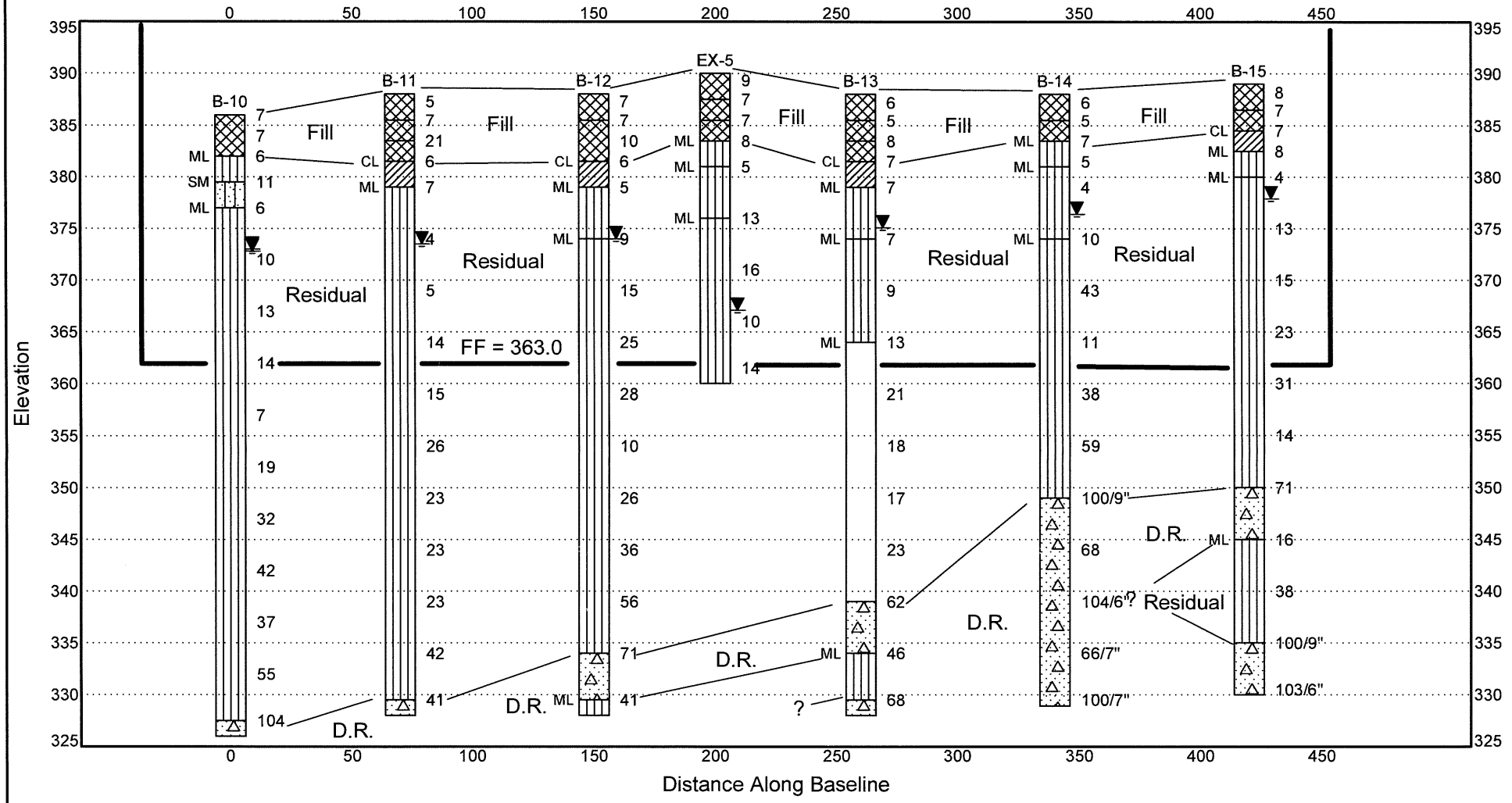
D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

SUBSURFACE PROFILE
Section B-B'

444 Maple Avenue

Contract No.	Date	Drawing No.
14107.D	Aug 14	1

ABC 14107.GPJ KOZERA.GDT 8/25/14



D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

SUBSURFACE PROFILE
Section C-C'

444 Maple Avenue

Contract No.	Date	Drawing No.
14107.D	Aug 14	1

ABC 14107.GPJ KOZERA.GDT 8/25/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-1
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-1-14
Date Completed : 8-1-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

	GROUNDWATER OBSERVATIONS				
	Date	Time	Depth	Casing	Caved
Encountered	8-1	08:20	26.6	29.0	---
Completion	8-1	09:40	36.7	36.7	---
Casing Pulled	8-1	10:25	12.7	48.0	39.1
	8-5	01:55	11.9	48.0	---
	8-6	08:05	12.1	48.0	---

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	3-3-3	6				sandy silt, FILL, rock fragments, roots, moist, brown	Fill	A	Topsoili = 0.2'
		2	3-2-3	5				SILT with sand, moist, light brown-brown		B	
5	385	3	1-2-2	4			ML	contains trace roots @ 2.0'			Temporary Standpipe set to a depth of 48' after completion of drilling
		4	3-4-5	9				SANDY SILT, moist, brown			
10	380	5	2-3-3	6	▼						
15	375	6	3-3-5	8							
20	370	7	4-4-6	10							
25	365	8	3-3-3	6	▽			contains trace quartz fragments @ 24.0'	Residual		
							ML				
30	360	9	3-4-4	8							
35	355	10	6-10-13	23							
40	350	11	8-10-14	24							
45	345	12	14-23-22	45							
50	340	13	18-35-57	92				DISINTEGRATED ROCK, moist, brown	Disintegrated Rock	C	
55	335	14	17-32-60	92							
		15	25-64-36/1.5	100/8"							
								Bottom of Test Boring @ 59.6'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-2
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-4-14
Date Completed : 8-4-14
Contractor : GeoServices, Corp., Inc
Driller : R. Stidham
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-4	07:40	32.8	34.0	---
Completion	8-4	08:30	53.1	58.5	---
Casing Pulled	8-4	09:05	13.8	---	47.0
	8-5	06:40	12.7	---	32.0

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	5-3-4	7				sandy silt, FILL, moist, brown	Fill	A	Blacktop = 4" Gravel Base = 0.5'
		2	6-5-7	12							
5	385	3	4-5-6	11				SILT with sand, moist, brown	Residual	B	
		4	4-5-6	11							
10	380	5	4-5-7	12	▼						
15	375	6	5-9-17	26							
20	370	7	3-4-6	10			ML				
25	365	8	5-10-13	23							
30	360	9	3-7-17	24	▽			trace quartz @ 30.4'			
35	355	10	12-17-22	39				SANDY SILT, moist, brown			
40	350	11	12-22-30	52			ML				
45	345	12	25-38-52	90				DISINTEGRATED ROCK, moist, brown	Disintegrated Rock	C	
50	340	13	25-65-35/.5	100/7"							
55	335	14	25-41-49	90							
60	330	15	12-28-38	66							
								Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-3
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-4-14
Date Completed : 8-4-14
Contractor : GeoServices, Corp., Inc
Driller : R. Stidham
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS	Date	Time	Depth	Casing	Caved
Encountered	8-4	12:35	34.0	34.5	---
Completion	8-4	13:15	43.3	59.0	---
Casing Pulled	8-4	13:45	14.3	---	52.0
	8-5	06:55	12.6	---	19.7

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	4-3-4	7				silt, FILL, moist, brown	Fill	A	Blacktop = 9" Gravel Base = 6"
								SILT, with sand, moist, brown	Residual	B	
5	385	2	3-4-4	8							
		3	2-2-3	5				redish brown @ 7.0'			
10	380	4	1-2-2	4	▼		ML				
15	375	5	3-5-6	11				trace quartz @ 14.5'			
20	370	6	3-5-8	13				SILT, trace sand, moist, brown			
25	365	7	4-7-6	13							
30	360	8	5-8-13	21							
					▽						
35	355	9	4-8-16	24				white layers, wet			
40	350	10	5-8-11	19			ML				
45	345	11	11-16-36	52							
50	340	12	19-15-24	39							
55	335	13	11-17-21	38							
60	330	14	13-18-24	42							
								Bottom of Test Boring @ 60.5'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-4
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

	GROUNDWATER OBSERVATIONS				
	Date	Time	Depth	Casing	Caved
Encountered	8-5	09:10	47.6	49.0	---
Completion	8-5	09:40	39.2	58.5	---
Casing Pulled	8-5	10:10	17.4	None	24.0
	8-6	06:40	12.4	None	31.5

Ground Surf. El. (±) : 391.0
Date Started : 8-5-14
Date Completed : 8-5-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

Depth (ft)	Surf. Elev. 391.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	4-4-4	8				silt with sand, silty sand, FILL, rock fragments, moist, brown	Fill	A	Asphalt = 0.7'
		2	4-4-4	8			CL	LEAN CLAY, trace sand, moist, brown	Residual	B	
5	385	3	2-5-6	11				SANDY SILT, moist, brown contains rock fragments @ 4.5'			
		4	2-3-3	6							
10	380	5	2-2-4	6	▼			trace roots @ 9.0'			
15	375	6	2-3-4	7							
20	370	7	5-8-10	18			ML				
25	365	8	4-9-14	23							
30	360	9	9-17-25	42							
35	355	10	16-33-52	85				DISINTEGRATED ROCK, moist, brown	Disintegrated Rock	C	
40	350	11	12-17-24	41				SANDY SILT, moist, light brown-brown	Residual	B	
45	345	12	7-13-15	28	▽			moist, brown @ 44.0'			
50	340	13	19-26-29	55			ML				
55	335	14	9-10-14	24							
60		15	15-17-26	43				Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-5
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 392.0
Date Started : 7-31-14
Date Completed : 7-31-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	7-31	01:10	---	---	---
Completion	7-31	01:15	None	58.5	---
Casing Pulled	7-31	02:05	29.7	None	38.4
	8-1	07:00	12.8	45.0	---
	8-6	08:13	12.5	45.0	---

Depth (ft)	Surf. Elev. 392.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	1-1-2	3				sandy silt, FILL, plastic, moist, brown	Fill	A	Topsoil = 0.3'
	390	2	3-4-5	9				silty sand, FILL, trace rock fragments, moist, brown			1/4" PVC, 15' Screen
5		3	2-3-4	7			CL	SANDY LEAN CLAY, moist, brown		B	
	385	4	3-3-4	7				SANDY SILT, moist, brown contains trace rock fragments @ 6.5'			
10		5	2-5-6	11							Temporary standpipe set to a depth of 45 feet after completion of drilling
	380				▼						
15		6	7-11-13	24							
	375										
20		7	5-6-9	15							
	370										
25		8	5-8-11	19					Residual		
	365						ML				
30		9	4-9-14	23							
	360										
35		10	12-18-25	43							
	355										
40		11	7-13-18	31							
	350										
45		12	8-9-12	21							
	345										
50		13	26-76-24/2"	100/8"				DISINTEGRATED ROCK, moist, light brown-brown, contains rock fragments	*	C	* Disintegrated Rock
	340										
55		14	17-25-23	48				SANDY SILT, moist, brown	*	B	* Residual
	335						ML				
60		15	7-10-10	20				Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-6
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 388.0
Date Started : 8-6-14
Date Completed : 8-6-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-6	09:25	21.2	29.0	---
Completion	8-6	10:35	57.2	58.5	---
Casing Pulled	8-6	11:05	13.5	None	22.1
	8-7	06:50	12.0	None	23.4

Depth (ft)	Surf. Elev. 388.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	2-7-8	15				sandy lean clay, silty sand, rock fragments, FILL, moist, brown	Fill	A	Asphalt = 0.7
	385	2	3-4-4	8			ML	SANDY SILT, moist, brown	Residual	B	
5		3	3-2-3	5				contains trace quartz fragments @ 4.5'			
	380	4	3-2-2	4				SILT with sand, moist, brown			
10		5	2-3-3	6	▼		ML				
	375	6	2-2-3	5							
15											
	370	7	4-5-7	12	▽			SANDY SILT, moist, brown			
20											
	365	8	3-7-9	16							
25											
	360	9	3-4-6	10			ML				
30											
	355	10	6-11-14	25							
35											
	350	11	17-34-48	82				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
40											
	345	12	16-22-24	46				SANDY SILT, moist, brown	Residual	B	
45											
	340	13	9-14-17	31			ML				
50											
	335	14	20-27-76	103				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
55											
	330	15	74-26/.5"	100/7"				Bottom of Test Boring @ 59.0'			

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-7
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-8-14
Date Completed : 8-8-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MadLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-8	12:20	43.1	44.0	---
Completion	8-8	13:10	23.9	58.5	---
Casing Pulled	8-8	13:45	17.8	None	18.2
	8-11	07:10	12.4	None	13.2

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	7-8-7	15				sandy lean clay, silty sand, rock fragments, FILL, moist, gray, brown	Fill	A	Asphalt = 0.7'
		2	3-4-5	9				lean clay with sand, trace gravel and organic matter, FILL, moist, brown			
5	385	3	3-3-3	6				SILT with sand, moist, brown		B	
		4	1-2-2	4							
10	380	5	2-2-3	5	▼						
15	375	6	2-2-3	5			ML		Residual		
20	370	7	2-3-3	6							
25	365	8	2-3-3	6							
30	360	9	5-10-13	23				SANDY SILT, moist, brown			
35	355	10	7-12-14	26							
40	350	11	11-18-23	41	▽		ML				
45	345	12	12-19-25	44							
50	340	13	24-103	103				DISINTEGRATED ROCK, moist, brown	Disintegrated Rock	C	
55	335	14	100/3.25"	00/3.25"							
		15	32-68/4"	100/10"				Bottom of Test Boring @ 59.3'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-8
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-4-14
Date Completed : 8-4-14
Contractor : GeoServices, Corp., Inc
Driller : R. Stidham
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-4	10:10	29.7	34.5	---
Completion	8-4	11:00	19.9	59.0	---
Casing Pulled	8-4	11:50	17.2	---	48.0
	8-5	12:45	12.6	---	39.9

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	3-4-4	8				silt, FILL, moist, gray brown	Fill	A	Blacktop = 9.0" Gravel Base = 3.0"
5	385	2	3-4-5	9			ML	SILT, with sand, moist, brown	Residual	B	
		3	3-3-4	7				SANDY SILT, trace quartz, moist, redish brown			
10	380	4	2-3-3	6	▼			silt layer			
							ML				
15	375	5	4-7-12	19							
20	370	6	4-7-11	18				SILT with sand, moist, brown			
25	365	7	7-11-18	29			ML				
30	360	8	4-6-8	14	▽			SANDY SILT, trace quartz, moist, redish brown			
35	355	9	3-4-6	10				brown @ 34.5'			
							ML				
40	350	10	5-9-13	22				wet @ 39.5'			
45	345	11	16-29-65	94				DISINTEGERATED ROCK, moist, brown	*	C	
50	340	12	50-50/3"	100/9"							
55	335	13	100/4.5"	100/4.5"							
		14	100/1.5"	100/1.5"				Bottom of Test Boring @ 59.4'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 11/7/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-9
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 391.0
Date Started : 8-6-14
Date Completed : 8-6-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-6	12:40	33.4	39.0	---
Completion	8-6	13:35	26.6	58.5	---
Casing Pulled	8-6	14:10	15.3	None	30.4
	8-7	06:40	12.1	None	33.1

Depth (ft)	Surf. Elev. 391.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	3-2-3	5				sandy silt, FILL, moist, brown	Fill	A	Asphalt = 0.7'
		2	3-3-4	7			CL	SANDY LEAN CLAY, moist, brown	Residual	B	
5	385	3	3-7-11	18			SM	SILTY SAND, moist, brown, contains quartz fragments			
		4	3-3-3	6			ML	SANDY SILT, moist, brown, light brown			
10	380	5	1-1-2	3	▼		ML	SILT with sand, moist, light brown			
15	375	6	5-6-6	12				SANDY SILT, moist, brown			
20	370	7	6-9-13	22							
25	365	8	5-7-8	15			ML				
30	360	9	7-11-21	32	▽						
35	355	10	12-26-35	61				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
40	350	11	6-13-18	31				SANDY SILT, moist, brown	Residual	B	
45	345	12	12-23-32	55							
50	340	13	10-17-21	38			ML				
55	335	14	16-25-30	55							
60		15	10-18-25	43				Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-10
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 386.0
Date Started : 7-31-14
Date Completed : 7-31-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	7-31	08:55	27.6	29.0	---
Completion	7-31	10:05	47.7	58.5	---
Casing Pulled	7-31	10:55	14.6	45.0	---
	8-1	07:05	13.0	45.0	---
	8-6	08:08	13.2	45.0	---

Depth (ft)	Surf. Elev. 386.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	385	1	3-4-3	7				silty sand, FILL, rock fragmetns, moist, brown	Fill	A	Topsoil = 0.1'
		2	2-2-5	7							
5	380	3	3-3-3	6			ML	SANDY SILT, moist, brown		B	Temporary standpipe set to a depth of 45 feet after completion of drilling.
		4	4-4-7	11			SM	SILTY SAND, moist, brown			
10	375	5	3-3-3	6	▼			SANDY SILT, moist, brown			
15	370	6	2-4-6	10							
20	365	7	3-5-8	13							
25	360	8	2-6-8	14	▽						
30	355	9	2-3-4	7							
35	350	10	4-8-11	19			ML				
40	345	11	7-13-19	32							
45	340	12	9-18-24	42							
50	335	13	9-15-22	37							
55	330	14	21-27-28	55							
60		15	21-38-66	104				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
								Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-11
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 388.0
Date Started : 8-7-14
Date Completed : 8-7-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-7	12:20	25.9	29.0	---
Completion	8-7	13:25	52.8	58.5	---
Casing Pulled	8-7	14:00	17.1	None	40.4
	8-8	06:35	14.5	None	14.8

Depth (ft)	Surf. Elev. 388.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	3-2-3	5				sandy silt, trace gravel, FILL, moist, brown	Fill	A	
	385	2	3-3-4	7				sandy silt, trace gravel, contains roots, FILL, moist, brown			
5		3	4-8-13	21				sandy silt, sand, rock fragments, asphalt, FILL, moist, gray, brown			
	380	4	3-3-3	6			CL	SANDY LEAN CLAY, moist, brown		B	
10		5	4-4-3	7				SANDY SILT, moist, brown contains trace quartz fragments @ 9.0'			
	375										
15		6	3-2-2	4	▼			moist, brown, light brown @ 14.0'			
	370										
20		7	3-2-3	5							
	365										
25		8	3-6-8	14	▽			contains rock fragments @ 24.0'			
	360										
30		9	6-6-9	15				moist, brown @ 29.0'			
	355						ML		Residual		
35		10	6-10-16	26							
	350										
40		11	5-8-15	23							
	345										
45		12	5-10-13	23							
	340										
50		13	5-10-13	23							
	335										
55		14	10-18-24	42							
	330										
60		15	20-36-55	41				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
								Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-12
Contract No.: 14107.D
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Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 388.0
Date Started : 8-8-14
Date Completed : 8-8-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-8	10:10	---	---	---
Completion	8-8	10:15	34.9	58.5	---
Casing Pulled	8-8	10:40	24.2	None	30.2
	8-11	07:05	14.0	None	24.1

Depth (ft)	Surf. Elev. 388.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	4-3-4	7				lean clay, with sand, silt with sand, trace rock fragments, FILL, moist, brown	Fill	A	Asphalt = 0.6'
	385	2	3-3-4	7				silt with sand, rock fragments, trace organic matter, FILL, moist, brown			
5		3	2-6-4	10				moist, gray-brown at 4.5'			
	380	4	2-2-4	6			CL	SANDY LEAN CLAY, moist, brown		B	
10		5	3-2-3	5			ML	SILT with sand, moist, brown, light brown			
	375				▼						
15		6	2-4-5	9				SANDY SILT, moist, brown	Residual		
	370										
20		7	4-5-10	15							
	365										
25		8	5-11-14	25							
	360										
30		9	4-11-17	28				contains quartz fragments @ 29.0'			
	355						ML				
35		10	4-4-6	10							
	350										
40		11	8-11-15	26							
	345										
45		12	8-13-23	36							
	340										
50		13	19-24-32	56							
	335										
55		14	15-30-41	71				DISINTEGRATED ROCK, moist, brown	*	C	Disintegrated Rock
	330						ML	SANDY SILT, moist, brown	*	B	Residual
60		15	6-15-26	41				Bottom of Test Boring @ 60.0'			

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-13
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

	GROUNDWATER OBSERVATIONS				
	Date	Time	Depth	Casing	Caved
Encountered	8-7	09:40	43.8	44.0	---
Completion	8-7	10:15	44.5	58.5	---
Casing Pulled	8-7	10:55	17.3	None	18.6
	8-8	06:45	12.9	None	30.3

Ground Surf. El. (±) : 388.0
Date Started : 8-7-14
Date Completed : 8-7-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

Depth (ft)	Surf. Elev. 388.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	4-3-3	6				silt, with sand, rock fragments, FILL, moist, brown	Fill	A	Asphalt = 0.7'
	385	2	4-3-2	5				silt, with sand, trace rock fragments, FILL, moist, brown			
5		3	2-2-6	8				silt with sand, trace rock fragments and organic matter, FILL, moist, brown			
		4	2-3-4	7			CL	LEAN CLAY, with sand, moist, brown	Residual	B	
	380										
10		5	2-4-3	7	▼		ML	SANDY SILT, moist, brown			
	375										
15		6	2-3-4	7			ML	SILT with sand, moist, brown			
	370										
20		7	3-4-5	9							
	365										
25		8	4-5-8	13				SANDY SILT, moist, brown			
	360										
30		9	5-10-11	21							
	355										
35		10	6-9-9	18			ML				
	350										
40		11	4-7-10	17							
	345				▽						
45		12	7-10-13	23				moist, light brown, brown @ 44.0'			
	340										
50		13	18-29-33	62				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
	335										
55		14	6-19-27	46			ML	SANDY SILT, moist, brown	Residual	B	
	330										
60		15	20-31-37	68				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
								Bottom of Test Boring @ 60.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-14
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

	GROUNDWATER OBSERVATIONS				
	Date	Time	Depth	Casing	Caved
Encountered	8-5	11:40	20.8	29.0	---
Completion	8-5	13:10	41.8	58.5	---
Casing Pulled	8-5	13:45	13.1	None	51.8
	8-6	06:35	11.6	None	40.2

Ground Surf. El. (±) : 388.0
Date Started : 8-5-14
Date Completed : 8-5-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

Depth (ft)	Surf. Elev. 388.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	3-3-3	6				silt with sand, FILL, gravel, trace organic matter, moist, graybrown	Fill	A	Asphalt = 0.7'
	385	2	3-2-3	5				sandy silt, FILL, moist, brown			
5		3	2-3-4	7			ML	SANDY SILT, moist, brown	Residual	B	
		4	4-3-2	5				rock fragments @ 6.5'			
	380							SILT with sand, moist, brown			
10		5	1-2-2	4	▼		ML				
	375										
15		6	2-4-6	10				SANDY SILT, moist, brown			
	370										
20		7	10-19-24	43	▽						
	365										
25		8	3-4-7	11			ML				
	360										
30		9	4-16-22	38							
	355										
35		10	17-27-32	59							
	350										
40		11	51-49/3"	100/9"				DISINTEGRATED ROCK, moist, brown	Disintegrated Rock	C	
	345										
45		12	39-31-37	68							
	340										
50		13	104/6"	104/6"							
	335										
55		14	38-56-10/1"	66/7"							
	330										
		15	77-23/1"	100/7"				Bottom of Test Boring @ 59.1'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/19/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: B-15
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 389.0
Date Started : 8-1-14
Date Completed : 8-1-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-1	12:30	26.1	40.0	---
Completion	8-1	13:30	25.1	58.5	---
Casing Pulled	8-1	14:10	13.4	40.0	48.1
	8-5	01:50	11.1	40.0	---
	8-6	08:10	11.1	40.0	---

Depth (ft)	Surf. Elev. 389.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0		1	3-4-4	8				sandy silt, FILL, rock fragments, moist, brown	Fill	A	Asphalt = 0.7'
		2	3-3-4	7				silt with sand, FILL, rock fragments, moist, brown			
5	385	3	2-3-4	7			CL	LEAN CLAY, with sand, moist, brown, contains roots		B	Temporary standpipe set to 40' after completion of drilling
		4	3-4-4	8			ML	SILT with sand, trace gravel, moist, light brown			
10	380	5	1-2-2	4	▼			SANDY SILT, moist, brown, light gray	Residual		
15	375	6	3-6-7	13				moist, brown @ 14.0'			
20	370	7	5-7-8	15							
25	365	8	6-10-13	23	▽		ML				
30	360	9	9-13-18	31							
35	355	10	5-6-8	14							
40	350	11	19-33-38	71				DISINTEGRATED ROCK, moist, gray, brown	*	C	* Disintegrated Rock
45	345	12	6-7-9	16				SILT with sand, moist, brown, light brown	Residual	B	
50	340	13	13-17-21	38			ML	moist, light brown @ 49.0'			
55	335	14	19-52-48/3"	100/9"				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
	330	15	103/6"	103/6"				Bottom of Test Boring @ 59.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: EX-1
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-13-14
Date Completed : 8-13-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-13	08:20	---	---	---
Completion	8-13	08:30	29.6	30.0	2" Well
Casing Pulled	8-13	10:10	12.4	30.0	2" Well
	8-14	06:45	12.3	30.0	2" Well
	8-20	07:40	12.1	30.0	2" Well

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	6-3-4	7				sandy lean clay, sandy silt, rock fragments, roots, FILL, moist, gray-brown	Fill	A	Asphalt = 0.5'
		2	3-4-5	9				sandy silt, gravel, concrete, FILL, moist, brown			
5	385	3	3-3-3	6			ML	SANDY SILT, moist, brown	Residual	B	
		4	4-5-6	11			ML	SILTY SAND, moist, brown			
10	380	5	3-5-6	11	▼		ML	SANDY SILT, moist, brown			
15	375	6	1-3-3	6			ML	SILT with sand, moist, brown			
20	370	7	3-3-5	8							
25	365	8	3-5-8	13			ML	SANDY SILT, moist, brown			
30	360	9	3-6-8	14				Bottom of Test Boring @ 30.0'			

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: EX-2
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 391.0
Date Started : 8-14-14
Date Completed : 8-14-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-14	08:30	28.1	28.5	---
Completion	8-14	08:40	Wet	None	16.4
Casing Pulled	8-14	13:05	12.7	None	13.8

Depth (ft)	Surf. Elev. 391.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	5-5-3	8				silty sand, sandy silt, crushed stone, FILL, moist, brown-gray	Fill	A	Asphalt = 0.8'
		2	5-6-5	11			CL	LEAN CLAY, with sand, moist, brown, contains trace roots	Residual	B	
5	385	3	5-6-4	10			ML	SANDY SILT, moist, brown contains rock fragments @ 4.5'			
		4	3-3-3	6							
10	380	5	2-2-3	5	▼		ML	SILT with sand, moist, brown			
15	375	6	3-3-3	6				moist, light brown @ 14.0'			
20	370	7	6-6-8	14			ML	SANDY SILT, moist, brown			
25	365	8	6-11-14	25	▽						
30		9	13-27-39	68				DISINTEGRATED ROCK, moist, brown	*	C	* Disintegrated Rock
								Bottom of Test Boring @ 30.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 9/3/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: EX-3
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 392.0
Date Started : 8-13-14
Date Completed : 8-13-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-13	12:10	---	---	---
Completion	8-13	12:15	29.5	30.0	2" Well
Casing Pulled	8-13	13:40	12.5	30.0	2" Well
	8-14	06:50	11.0	30.0	2" Well
	8-20	11:20	11.0	30.0	2" Well

Depth (ft)	Surf. Elev. 392.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0											
	390	1	4-3-3	6				silt with sand, rock fragments, roots, FILL, moist, brown	Fill	A	Asphalt = 0.7'
		2	3-4-5	9			CL	LEAN CLAY, with sand, moist, brown	Residual	B	
5		3	3-5-4	9				SANDY SILT, moist, brown contains trace rock fragments @ 4.5'			
	385	4	2-2-3	5							
10		5	2-5-7	12	▼						
	380										
15		6	4-7-9	16			ML				
	375										
20		7	8-12-13	25							
	370										
25		8	6-13-16	29							
	365										
30		9	6-11-12	23				Bottom of Test Boring @ 30.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: EX-4
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 387.0
Date Started : 8-11-14
Date Completed : 8-11-14
Contractor : GeoServices, Corp., Inc.
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-11	10:50	23.8	24.0	---
Completion	8-11	11:20	20.1	30.0	2" Well
Casing Pulled	8-11	13:30	12.8	30.0	2" Well
	8-12	09:00	13.0	30.0	2" Well
	8-20	09:20	12.5	30.0	2" Well

Depth (ft)	Surf. Elev. 387.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	385	1	3-3-4	7				lean clay, with sand, silt with sand, rock fragments, FILL, moist, brown	Fill	A	Asphalt = 0.3'
		2	2-1-4	5				silty sand,rock fragments, organic matter, FILL, moist, brown			
5	380	3	3-3-3	6			CL	SANDY LEAN CLAY, moist, brown		B	
		4	2-3-3	6				SANDY SILT, moist, brown	Residual		
10	375	5	2-2-2	4	▼						
15	370	6	2-4-6	10			ML				
20	365	7	4-5-9	14							
25	360	8	3-6-7	13	▽						
30		9	3-4-6	10				Bottom of Test Boring @ 30.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: EX-5
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

Ground Surf. El. (±) : 390.0
Date Started : 8-14-14
Date Completed : 8-14-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-14	09:40	---	---	---
Completion	8-14	09:45	None	28.5	---
Casing Pulled	8-14	09:55	22.9	None	23.4
	8-14	13:15	Wet	None	16.4

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	4-5-4	9				silt with sand, FILL, moist, brown, contains trace organic matter	Fill	A	Asphalt = 0.6'
		2	4-4-3	7				silt with sand, FILL, moist, brown, contains rock fragments			Poor Recovery @ 2.5'
5	385	3	2-3-4	7				silt with sand, FILL, moist, brown, contains roots adn organic matter			
		4	3-3-5	8			ML	SILT with sand, moist, brown	Residual	B	
10	380	5	2-3-2	5			ML	SILT, trace sand, moist, brown and light brown			
15	375	6	4-5-8	13				SANDY SILT, moist, brown			
20	370	7	4-7-9	16			ML				
25	365	8	3-4-6	10							
30	360	9	3-6-8	14				Bottom of Test Boring @ 30.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14

D. W. KOZERA, INC.
Baltimore, Maryland
PROFESSIONAL ENGINEERS & GEOLOGISTS

TEST BORING LOG

Boring No.: EX-6
Contract No.: 14107.D
Page: 1 of 1

Project: 444 Maple Avenue
Location: Vienna, Virginia

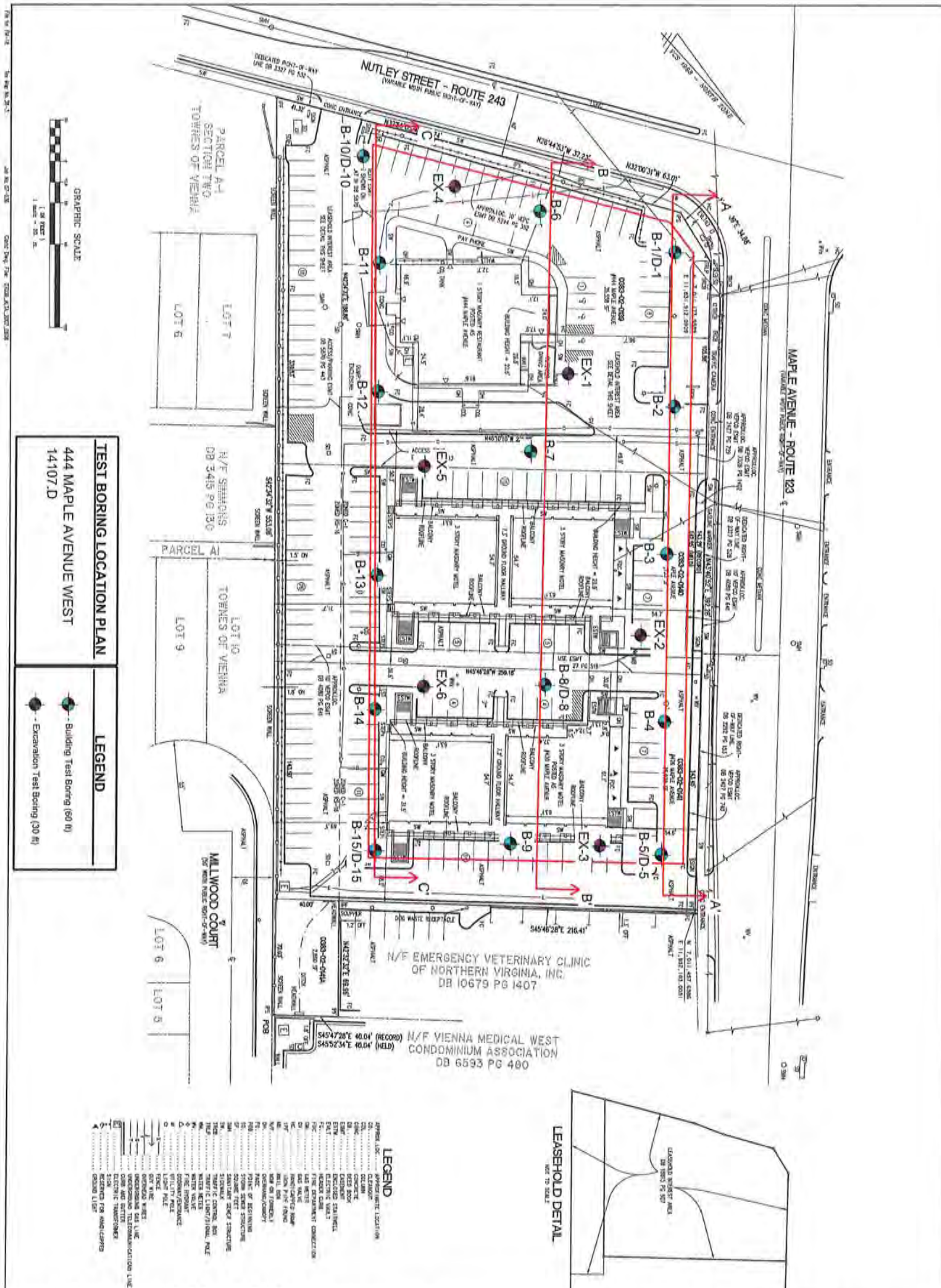
Ground Surf. El. (±) : 390.0
Date Started : 8-14-14
Date Completed : 8-14-14
Contractor : GeoServices, Corp., Inc
Driller : S. Gonzalez
Rig : cme 45, Auto Hammer
Drill Method : 2 1/4" HSA
Inspector : A. MacLeod

GROUNDWATER OBSERVATIONS

	Date	Time	Depth	Casing	Caved
Encountered	8-14	11:30	---	---	---
Completion	8-14	11:45	22.3	30.0	2" Well
Casing Pulled	8-14	13:40	12.1	30.0	2" Well
	8-15	12:00	12.0	30.0	2" Well
	8-20	10:40	12.0	30.0	2" Well

Depth (ft)	Surf. Elev. 390.0	Samples	Blow Counts	"N" Value	Water Level	Graphic	USCS	Description	Formation	Stratum	Remarks
0	390	1	4-5-5	10				silt with sand, rock fragments, FILL, moist, brown	Fill	A	Asphalt = 0.7'
		2	2-3-3	6							
5	385	3	3-4-4	8			CL	LEAN CLAY, with sand, moist, brown, contains roots	Residual	B	
		4	3-3-4	7			SM	SILTY SAND, moist, brown, contains trace rock fragments			
10	380	5	2-2-2	4	▼		ML	SILT with sand, moist, light brown-brown			
15	375	6	6-11-11	22				SANDY SILT, moist, brown			
20	370	7	3-4-7	11			ML				
25	365	8	7-10-12	22							
30	360	9	5-6-10	16				Bottom of Test Boring @ 30.0'			

TEST_BORING_LOG 14107.GPJ KOZERA.GDT 8/26/14



ALTA/ACSM LAND TITLE SURVEY

NORTHERN VIRGINIA MOTEL PARTNERSHIP AND 444 MAPLE AVENUE WEST PARTNERSHIP

TOWN OF VIENNA

FAIRFAX COUNTY, VIRGINIA

REVISIONS		
NO.	DESCRIPTION	DATE
1	REVISED TITLE COMMITMENT	07/18/2007

WALTER L. PHILLIPS
INCORPORATED
CIVIL ENGINEERS LAND SURVEYORS PLANNERS LANDSCAPE ARCHITECTS
207 PARK AVENUE FALLS CHURCH, VIRGINIA 22046
(703) 532-6163 FAX (703) 533-1301 http://www.wlpinc.com

SCALE: 1" = 25' DATE: JUNE 8, 2007 DRAWN:

SHEET 2 OF 2

APPENDIX B

Soil Laboratory Testing

SUMMARY OF LABORATORY TESTING

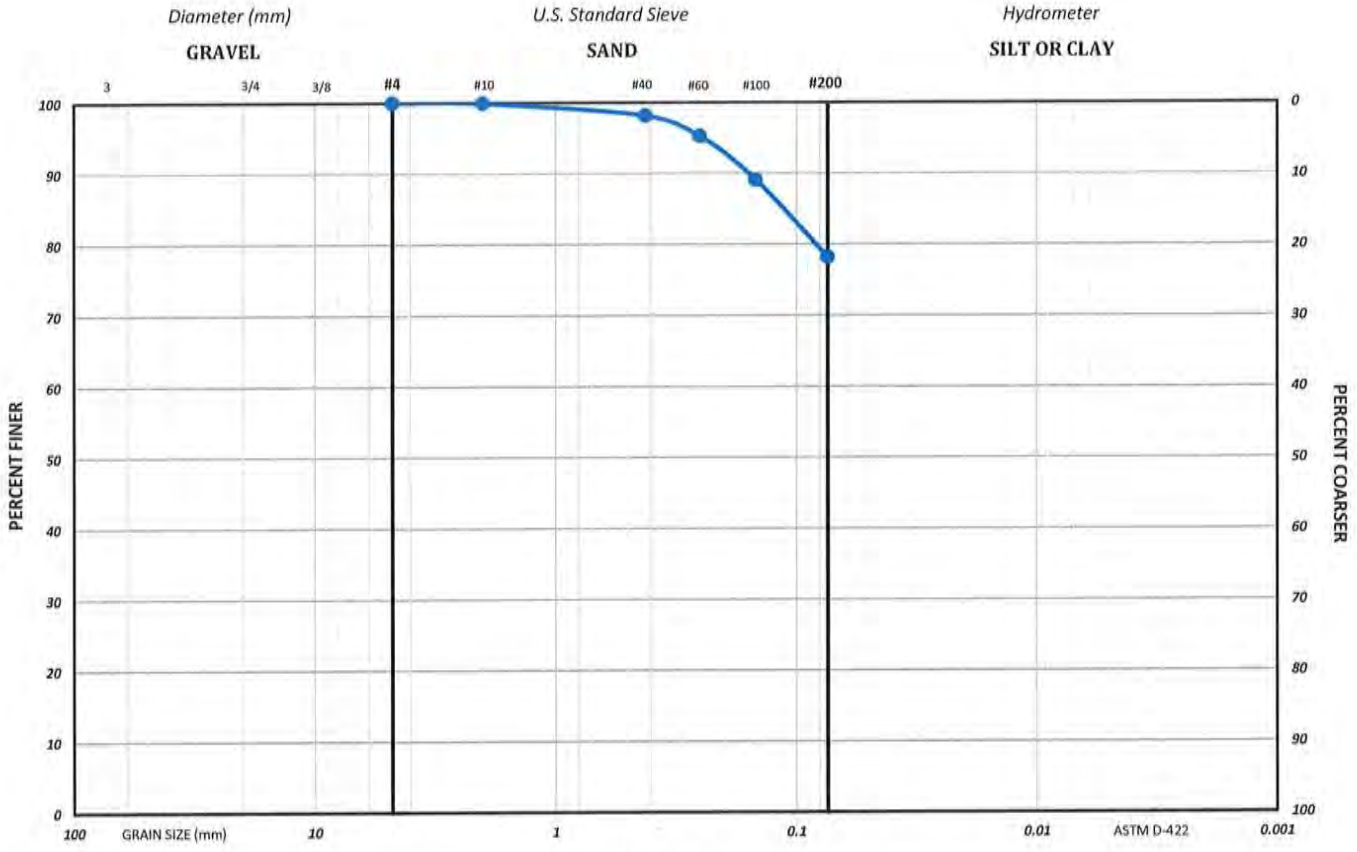
444 MAPLE AVE

PROJECT #:	14107.D	**SAMPLED:**	-	**JAY KAY TESTING**
SAMPLES:	9	**LOCATION:**	*Vienna, VA*	5233 Lehman Road, Suite 110
REPORT:	09/02/14	**REMARKS:**	-	Spring Grove, PA 17362
				Phone: (410) 259-5101

BORING	SAMPLE	DEPTH	MC %	OM %	LL	PL	PI	% FINES	USCS
B-8	Jar	24.5	19.1	-	34	NP	NP	78.2	ML
B-8	Jar	29.5	27.1	-	34	NP	NP	63.9	ML
EX-1	Jar	14.0	34.7	-	39	NP	NP	74.0	ML
EX-1	Jar	19.0	33.1	-	41	NP	NP	83.8	ML
EX-1	Jar	24.0	21.3	-	32	NP	NP	59.4	ML
EX-6	Jar	14.0	20.2	-	33	NP	NP	73.7	ML
EX-6	Jar	19.0	29.1	-	39	NP	NP	78.5	ML
EX-6	Jar	24.0	25.0	-	35	NP	NP	68.2	ML
Bulk	S-1	-	27.0	-	34	NP	NP	67.1	ML
Jay Kay Testing (AASHTO-Accredited)									

444 MAPLE AVE

BORING:	B-8	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:	24.5'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.9	98.2	95.3	89.1	**78.2**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**21.8**	-	-	0.1	1.7	20.0	-	-

Moisture Content	19.1	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

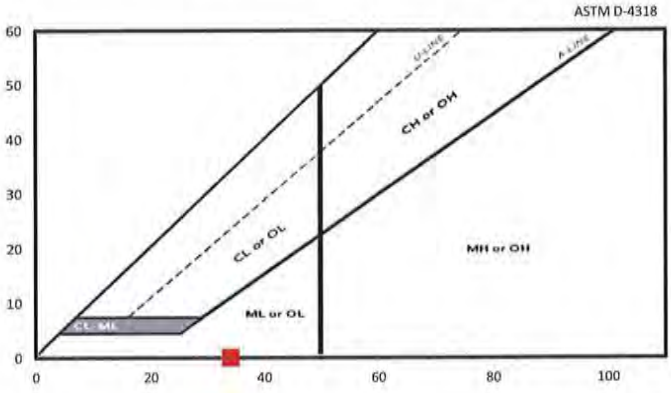
Liquid Limit	34
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

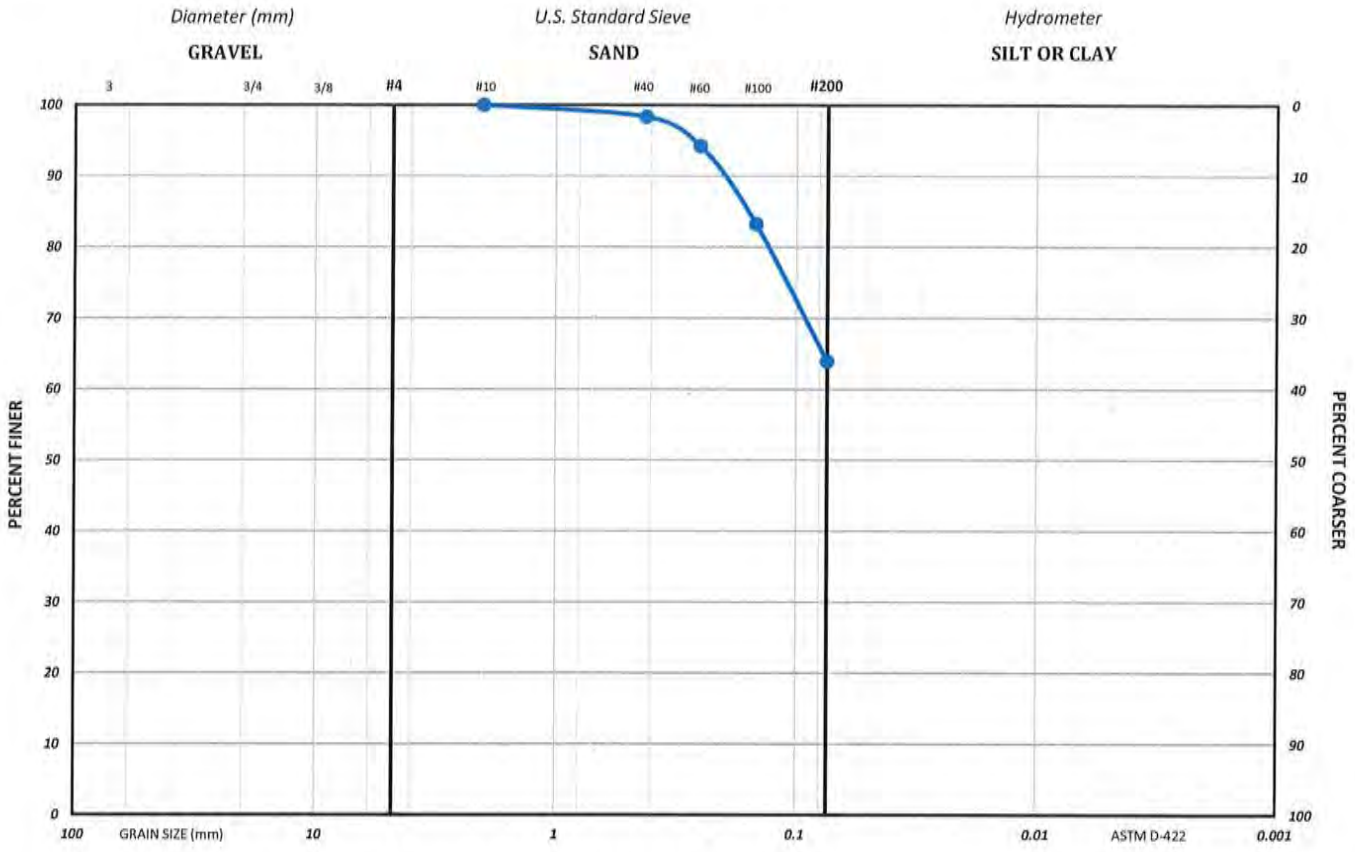
SOIL DESCRIPTION

Brown SILT with sand



444 MAPLE AVE

BORING:	B-8	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:	29.5'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	98.4	94.2	83.3	**63.9**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**36.1**	-	-	-	1.6	34.5	-	-

Moisture Content	27.1	Organic Content	-
pH	-	Other	-

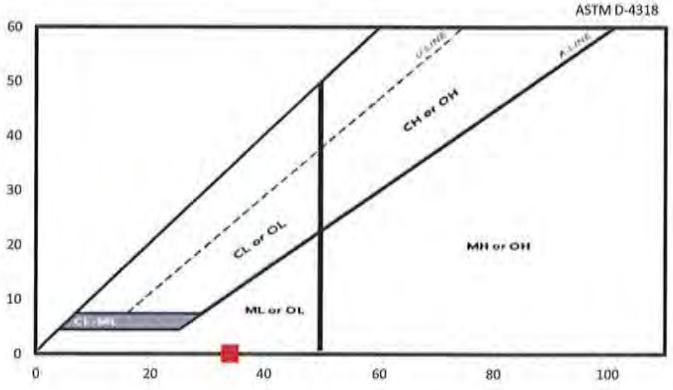
ATTERBERG LIMITS

Liquid Limit	34
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

ASTM D-4318

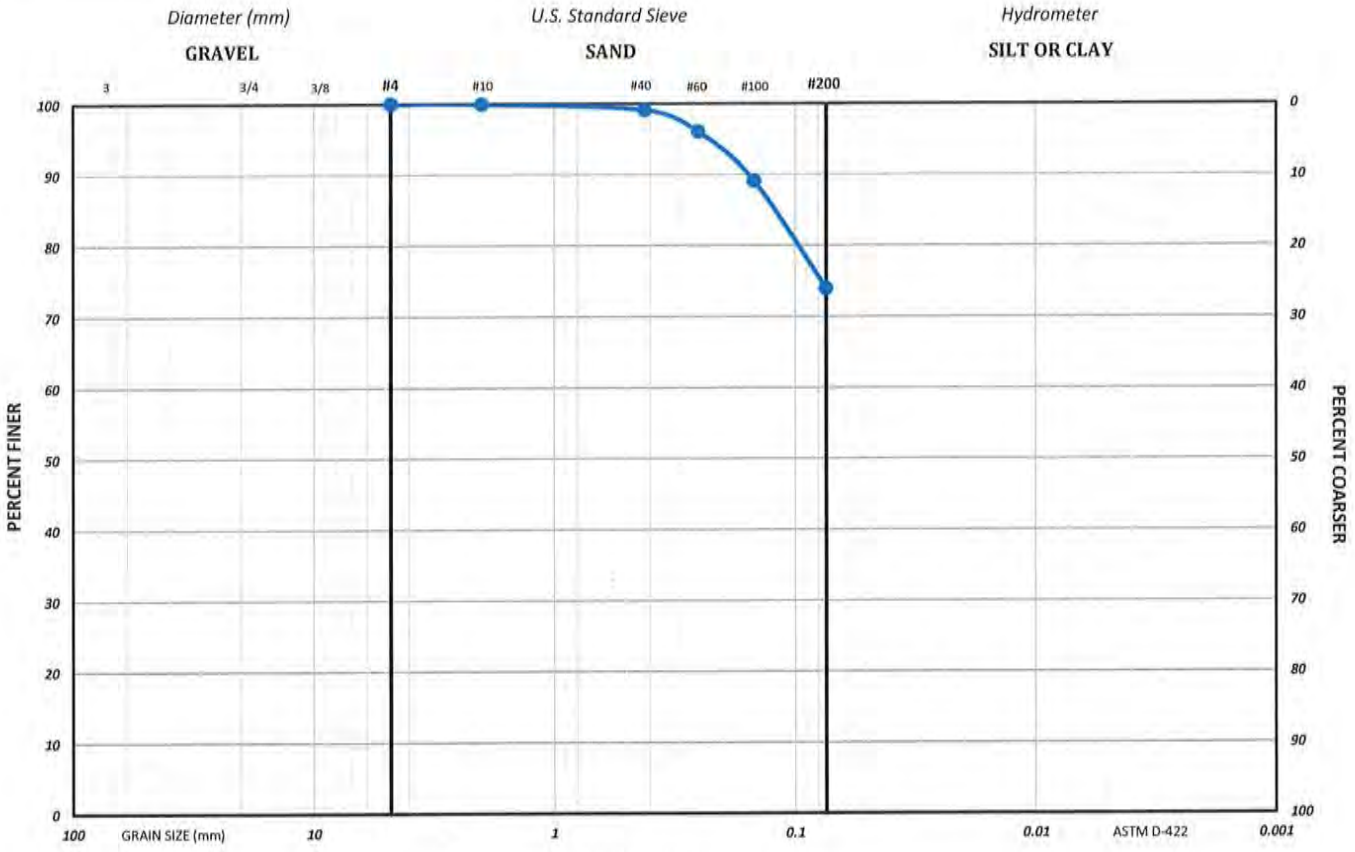


SOIL DESCRIPTION

Brown sandy SILT

444 MAPLE AVE

BORING:	EX-1	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:	14.0'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.9	99.1	96.0	89.1	**74.0**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**26.0**	-	-	0.1	0.8	25.1	-	-

Moisture Content	34.7	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

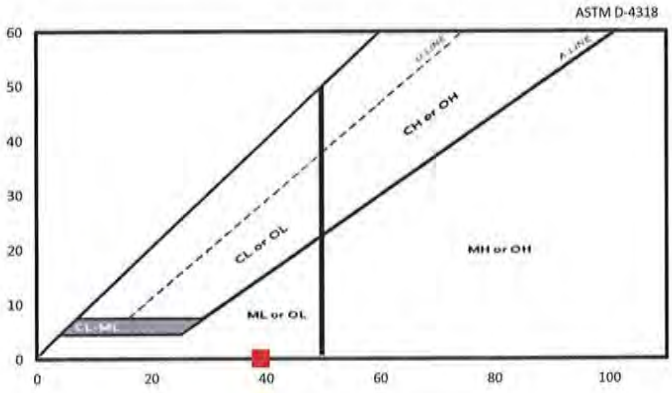
Liquid Limit	39
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

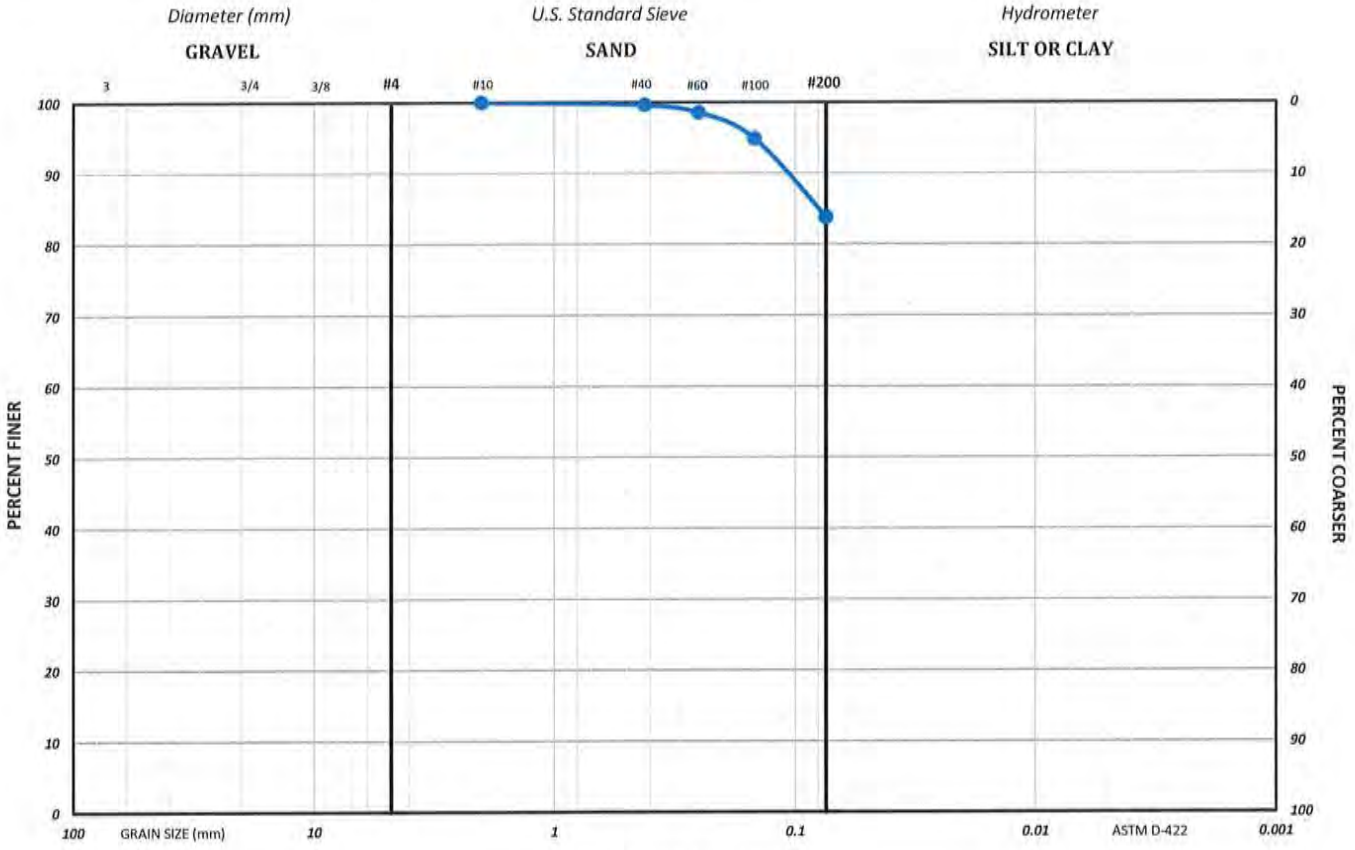
SOIL DESCRIPTION

Brown SILT with sand



444 MAPLE AVE

BORING:	EX-1	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:	19.0'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	99.6	98.6	94.9	**83.8**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**16.2**	-	-	-	0.4	15.8	-	-

Moisture Content	33.1	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

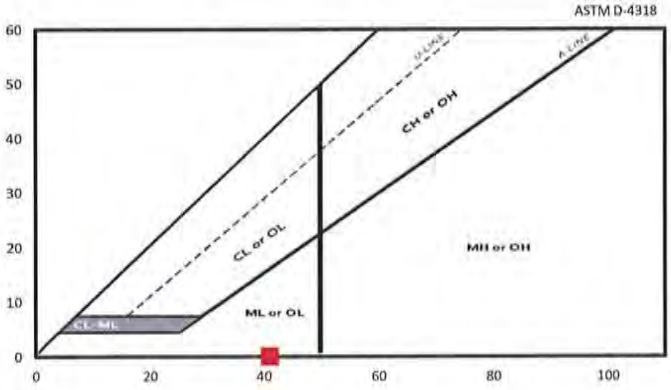
Liquid Limit	41
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-5
USCS	ML

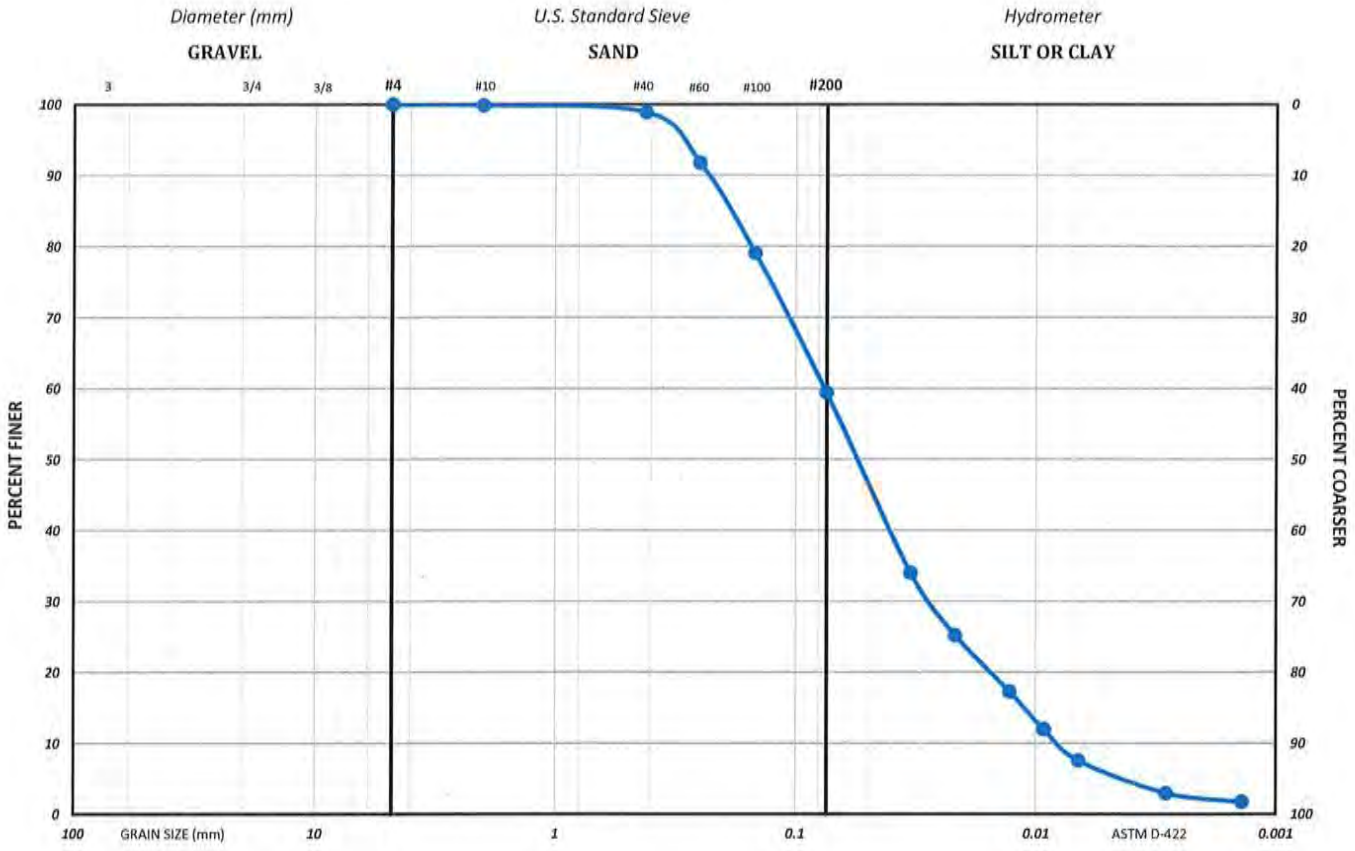
SOIL DESCRIPTION

Orange brown SILT with sand



444 MAPLE AVE

BORING:	EX-1	**PROJECT #:**	14107.D	**JAY KAY TESTING**
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110
DEPTH:	24.0'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362
				Phone: (410) 259-5101



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.9	98.9	91.8	79.1	**59.4**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**40.6**	-	-	0.1	1.0	39.5	-	-

Moisture Content	21.3	Organic Content	-
pH	-	Other	-

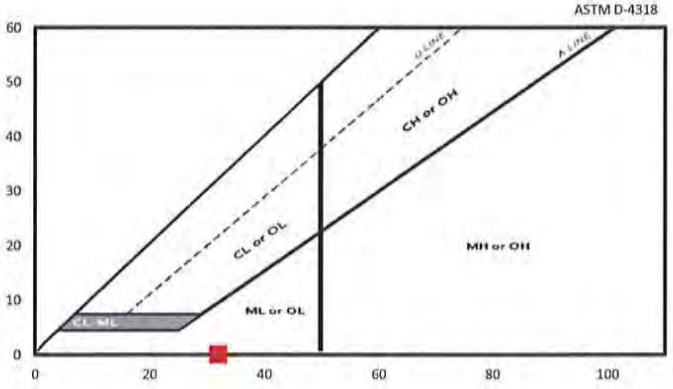
ATTERBERG LIMITS

Liquid Limit	32
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

ASTM D-4318

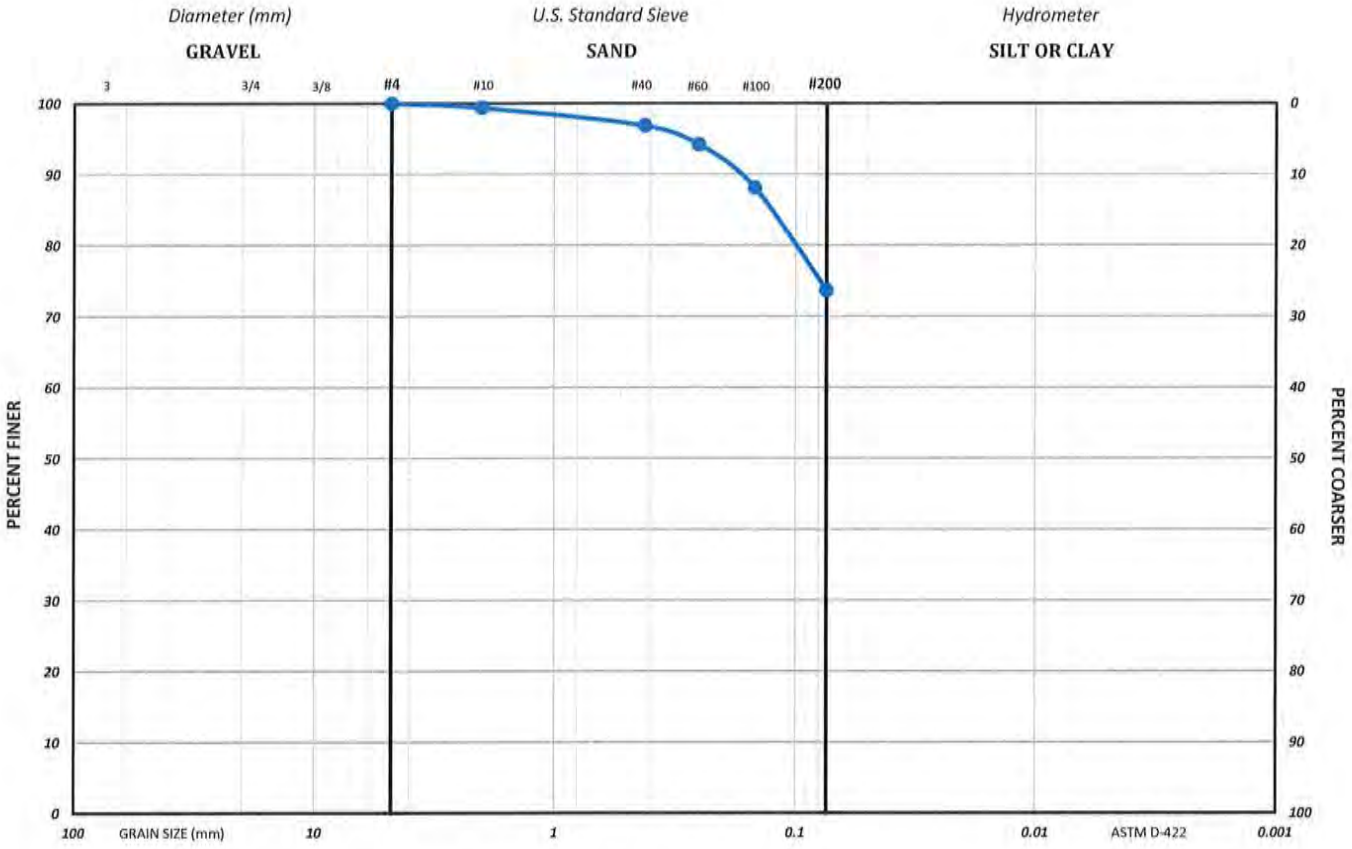


SOIL DESCRIPTION

Brown sandy SILT

444 MAPLE AVE

BORING:	EX-6	**PROJECT #:**	14107.D	**JAY KAY TESTING**
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110
DEPTH:	14.0'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362
				Phone: (410) 259-5101



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	100.0	99.4	96.9	94.2	88.1	**73.7**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**26.3**	-	-	0.6	2.5	23.2	-	-

Moisture Content	20.2	Organic Content	-
pH	-	Other	-

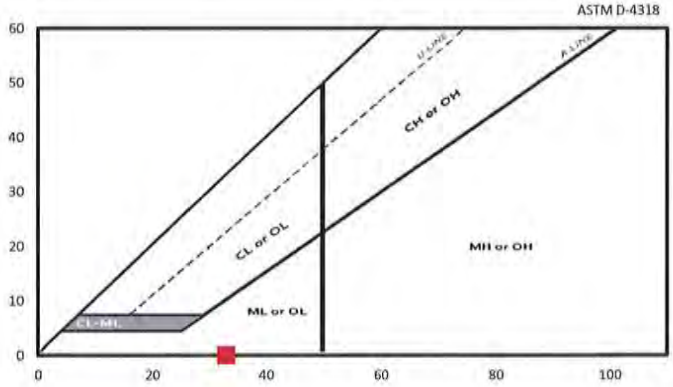
ATTERBERG LIMITS

Liquid Limit	33
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

ASTM D-4318

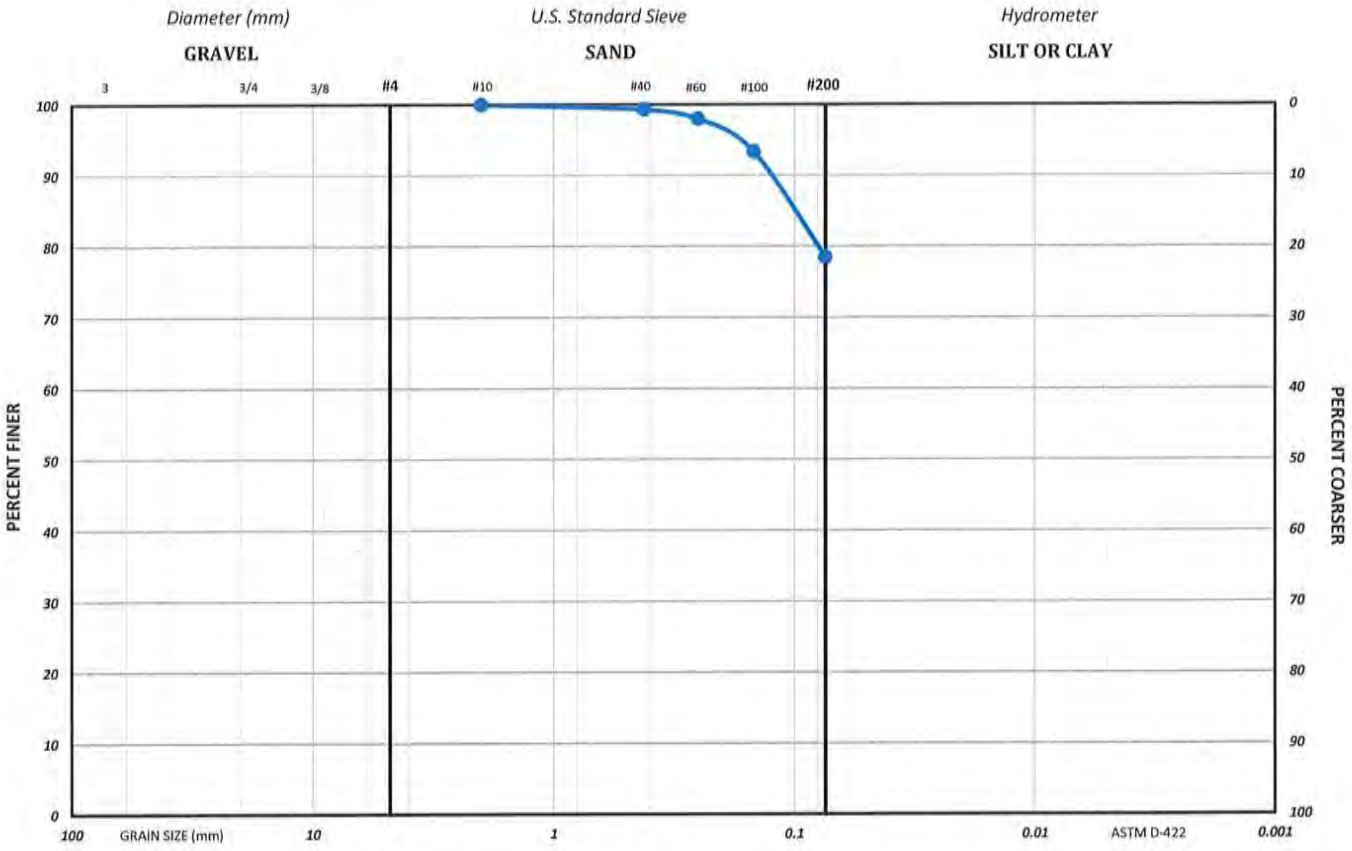


SOIL DESCRIPTION

Brown SILT with sand

444 MAPLE AVE

BORING:	EX-6	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:	19.0'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	100.0	99.3	98.0	93.4	**78.5**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**21.5**	-	-	-	0.7	20.8	-	-

Moisture Content	29.1	Organic Content	-
pH	-	Other	-

ATTERBERG LIMITS

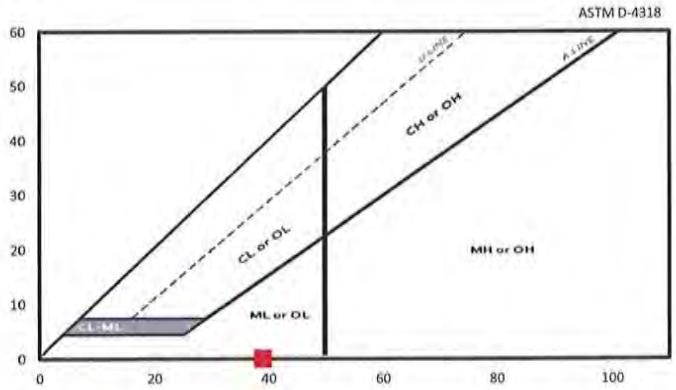
Liquid Limit	39
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

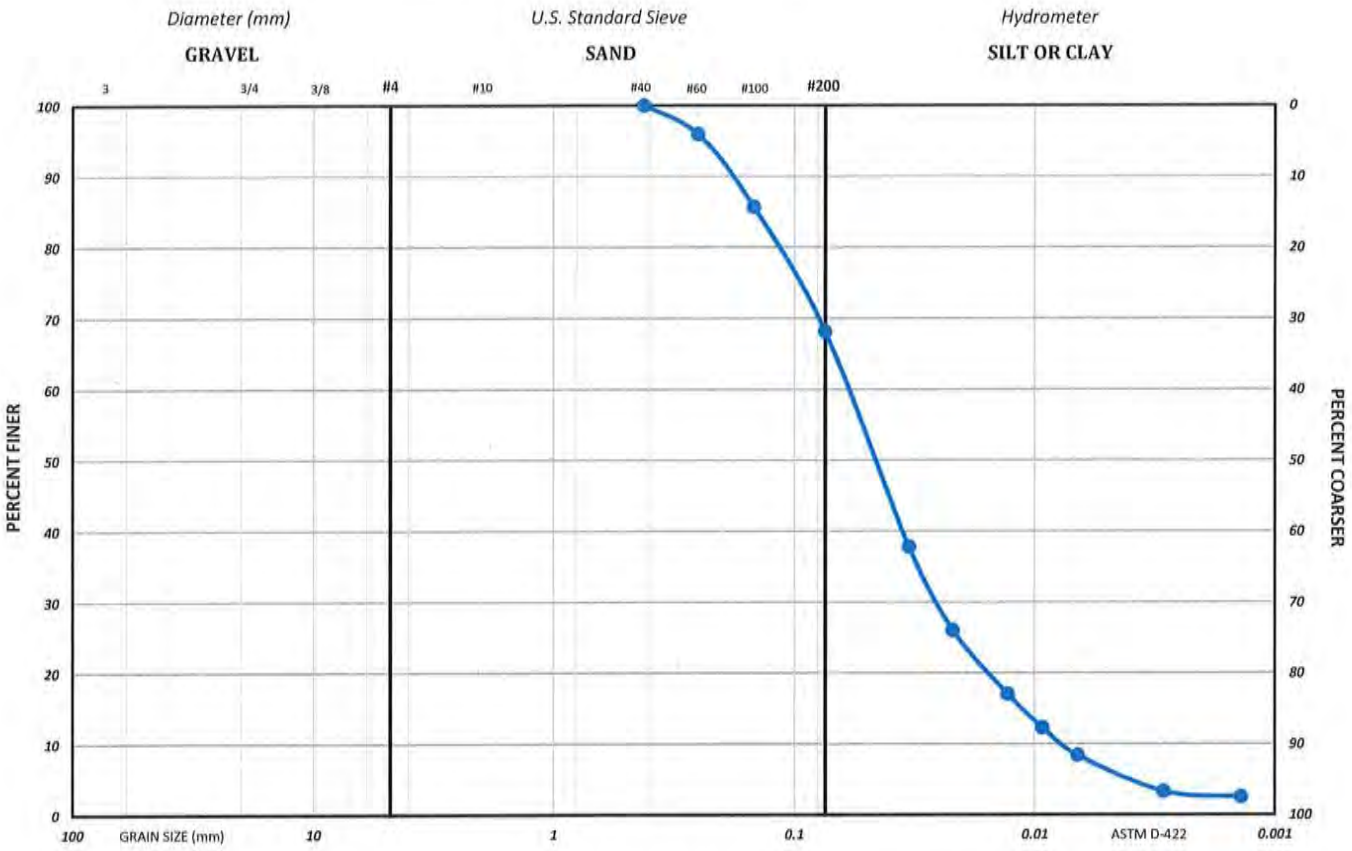
SOIL DESCRIPTION

Brown SILT with sand



444 MAPLE AVE

BORING:	EX-6	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	Jar	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:	24.0'	**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	-	-	-	-	-	100.0	96.0	85.7	**68.2**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
-	**31.8**	-	-	-	-	31.8	-	-

Moisture Content	25.0	Organic Content	-
pH	-	Other	-

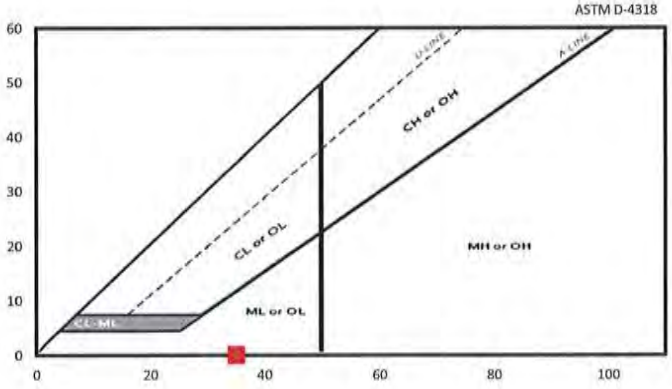
ATTERBERG LIMITS

Liquid Limit	35
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

ASTM D-4318

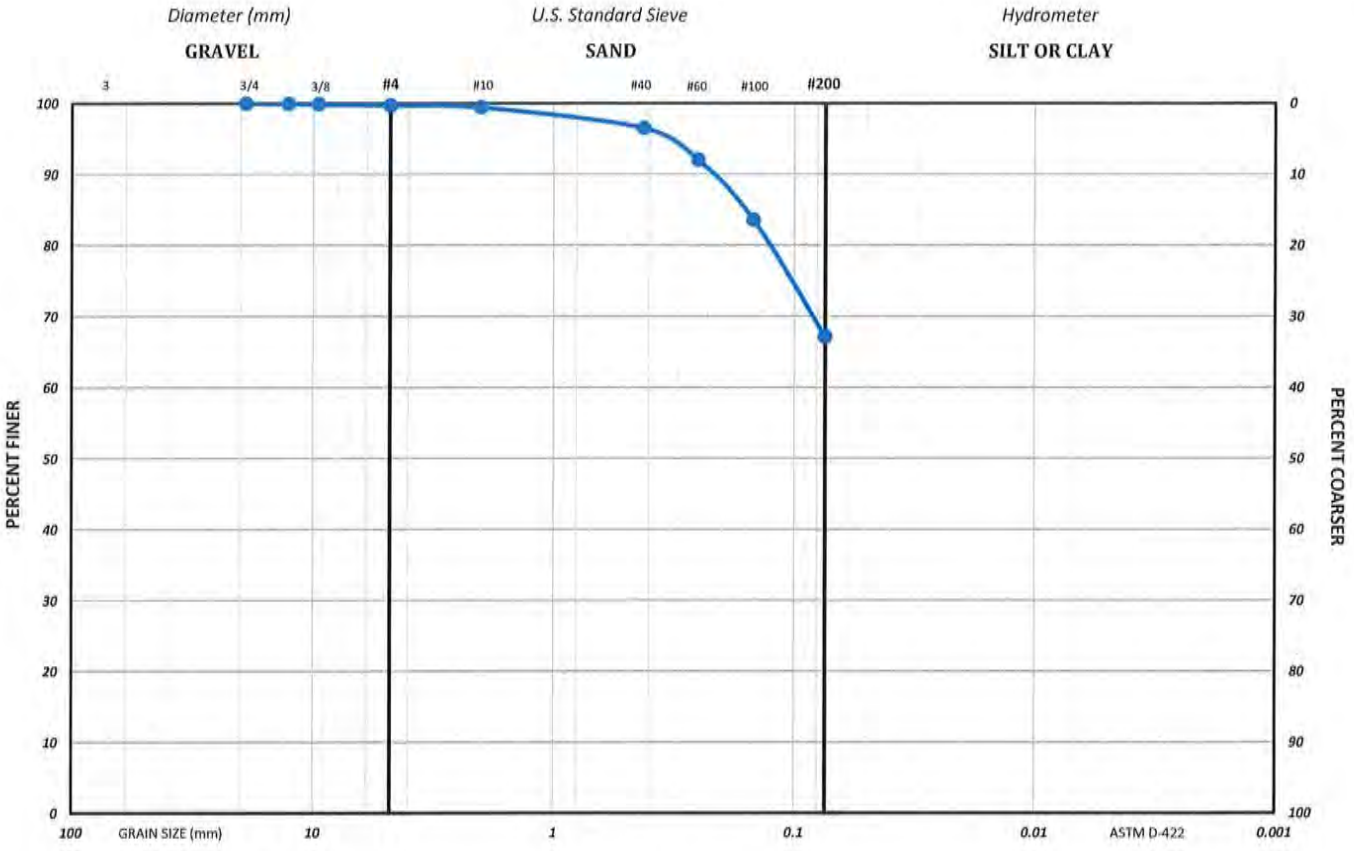


SOIL DESCRIPTION

Brown sandy SILT

444 MAPLE AVE

BORING:	Bulk	**PROJECT #:**	14107.D	**JAY KAY TESTING**	
SAMPLE:	S-1	**SAMPLED:**	-	5233 Lehman Road, Suite 110	
DEPTH:		**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362	
				Phone: (410) 259-5101	



GRAIN SIZE ANALYSIS

Diameter	75.0	50.8	37.5	25.4	19.0	12.7	9.51	4.75	2.0	0.42	0.25	0.147	0.074
Sieve Size	3"	2"	1.5"	1"	3/4"	1/2"	3/8"	#4	#10	#40	#60	#100	**# 200**
% Passing	-	-	-	-	100.0	99.9	99.9	99.7	99.4	96.5	92.1	83.6	**67.1**

% GRAVEL	% SAND	Coarse Gravel	Fine Gravel	Coarse Sand	Medium Sand	Fine Sand	CC	CU
0.3	**32.6**	-	0.3	0.3	2.9	29.4	-	-

Moisture Content	27.0	Organic Content	-
pH	-	Other	-

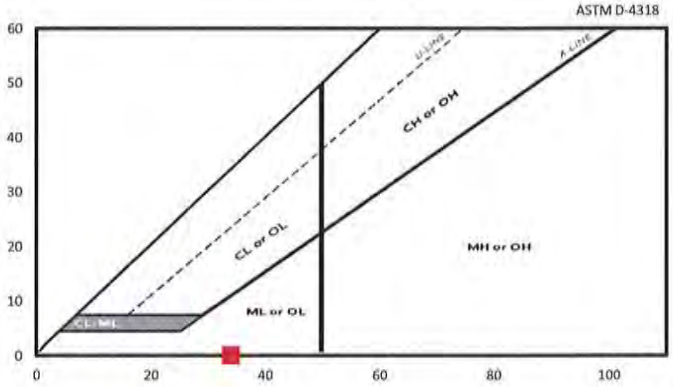
ATTERBERG LIMITS

Liquid Limit	34
Plastic Limit	NP
Plasticity Index	NP

CLASSIFICATION

AASHTO	A-4
USCS	ML

ASTM D-4318



SOIL DESCRIPTION

Brown sandy SILT

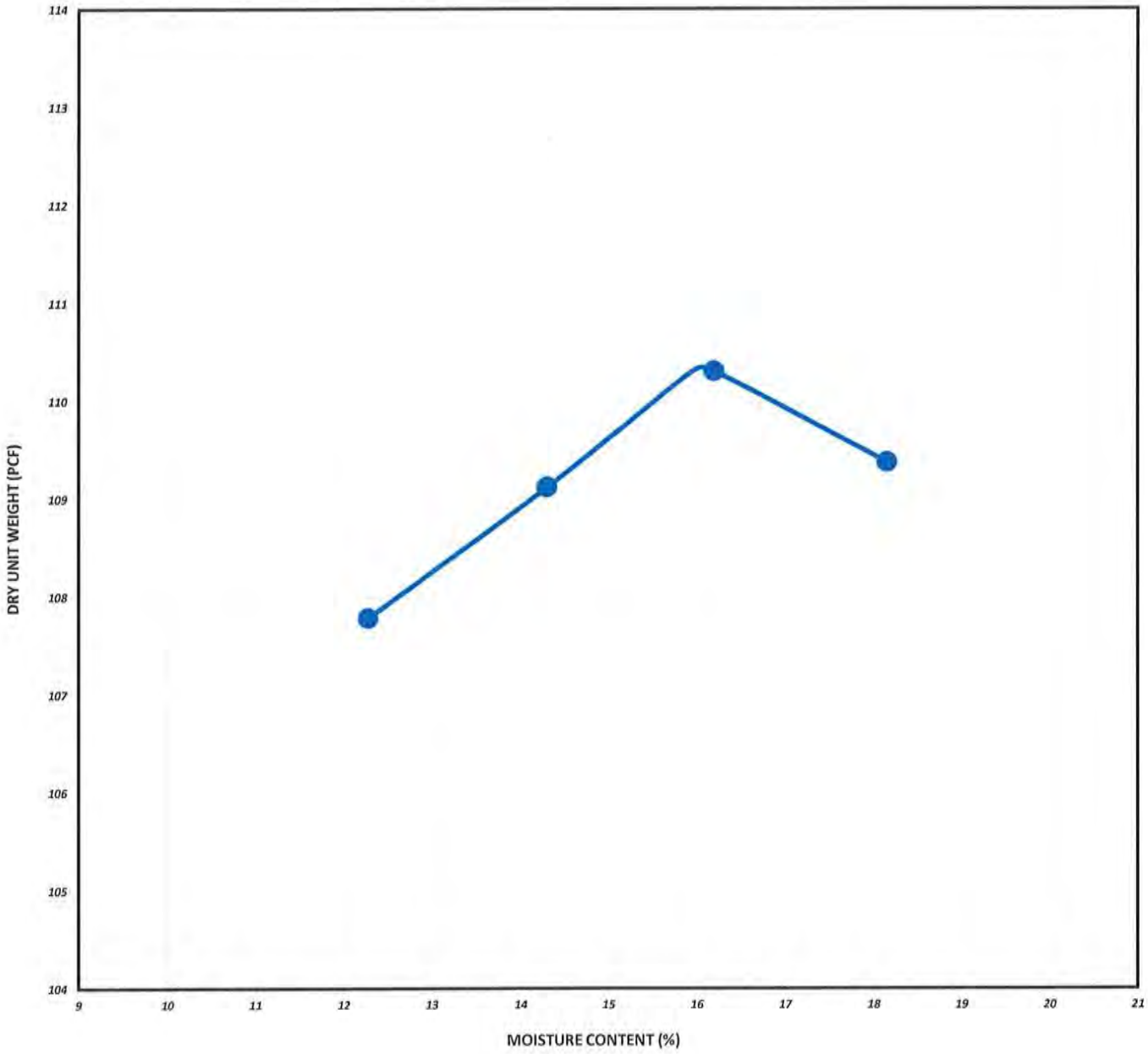
444 MAPLE AVE

BORING:	Bulk	**PROJECT #:**	14107.D	**JAY KAY TESTING**
SAMPLE:	S-1	**SAMPLED:**	-	5233 Lehman Road, Suite 110
DEPTH:		**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362
				Phone: (410) 259-5101

STANDARD PROCTOR TEST RESULTS

TEST METHOD: VTM-1

Maximum Dry Unit Weight	*Optimum Moisture Content*
110.3	**16.0**
PCF	%



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
27.0	34	NP	NP	ML	A-4	67.1	Brown sandy SILT

444 MAPLE AVE

BORING:	Bulk	**PROJECT #:**	14107.D	**JAY KAY TESTING**
SAMPLE:	S-1	**SAMPLED:**	-	5233 Lehman Road, Suite 110
DEPTH:		**LOCATION:**	*Vienna, VA*	Spring Grove, PA 17362
				Phone: (410) 259-5101

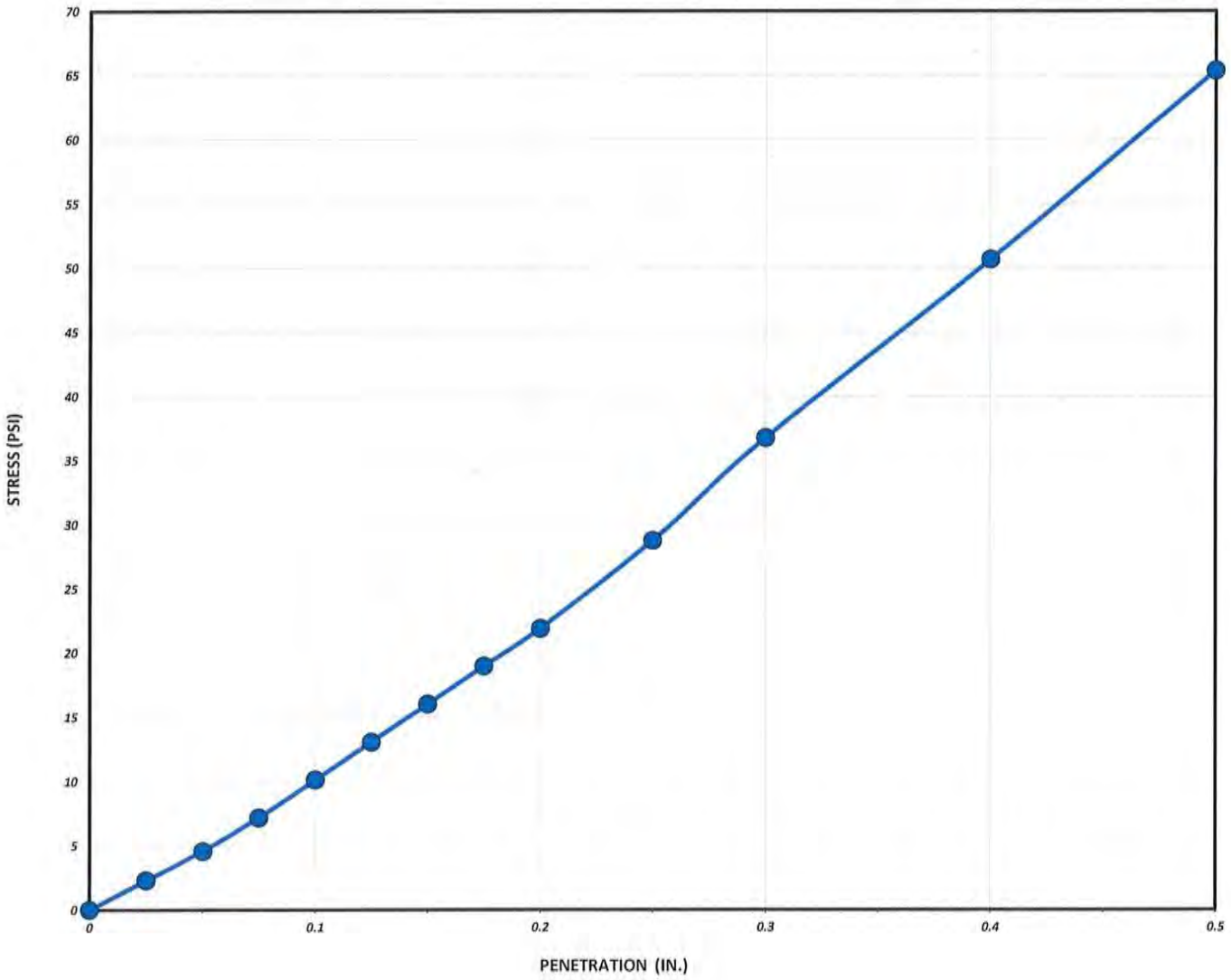
CALIFORNIA BEARING RATIO TEST RESULTS

METHOD: VTM-8, COMPACTION: VTM-1

SURCHARGE: 50 PSF

	CBR AT 0.1"	CBR AT 0.2"
	1.0	**1.5**

	DRY UNIT WEIGHT (PCF)	MOISTURE CONTENT (%)	COMPACTION (%)	SWELL (%)
As Molded	112.4	15.7	101.9	-
After Soak	-	-	-	6.03



MC	LL	PL	PI	USCS	AASHTO	FINES	SOIL DESCRIPTION
27.0	34	NP	NP	ML	A-4	67.1	Brown sandy SILT

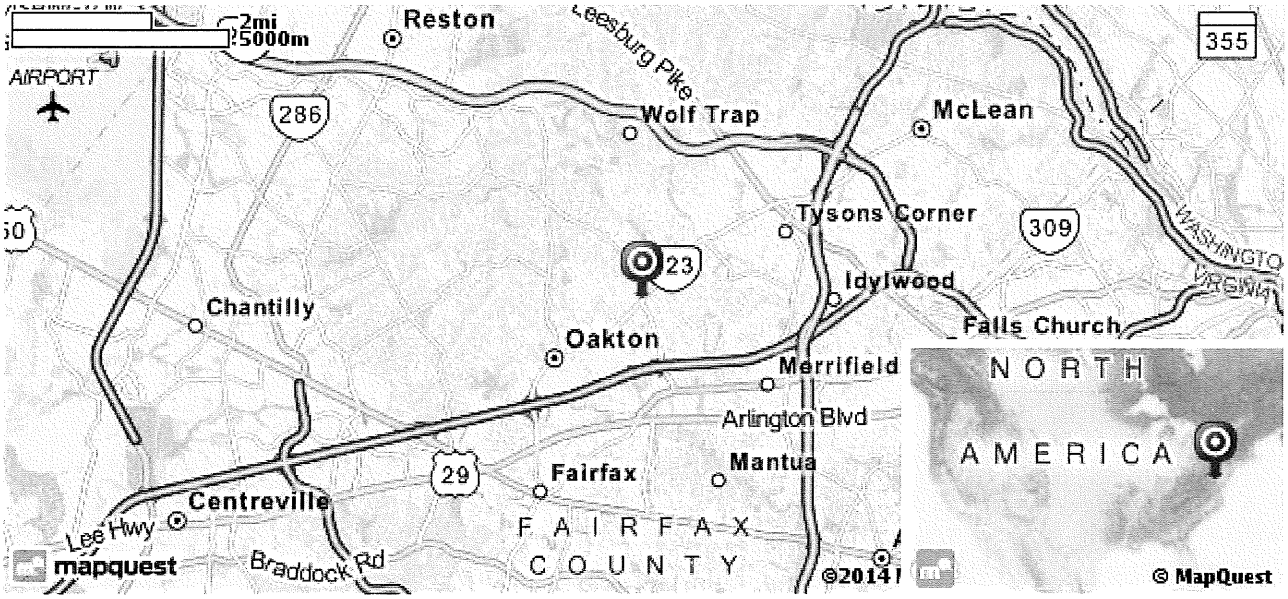
APPENDIX C

Spectral Acceleration Response

USGS Design Maps Summary Report

User–Specified Input

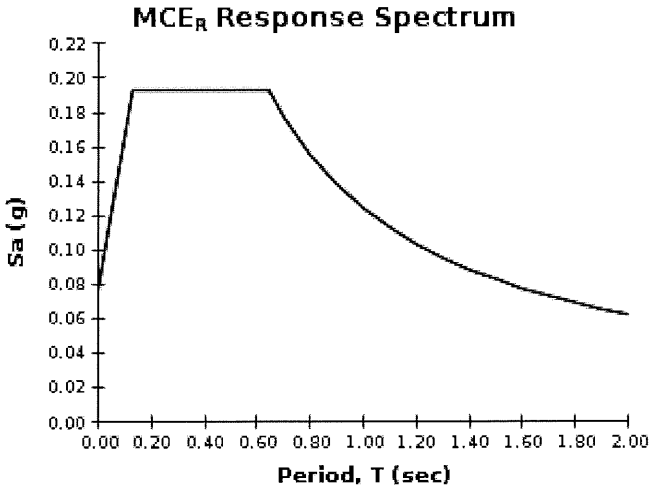
Report Title	444 Maple Avenue West Fri October 24, 2014 18:34:22 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	38.8949°N, 77.2731°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

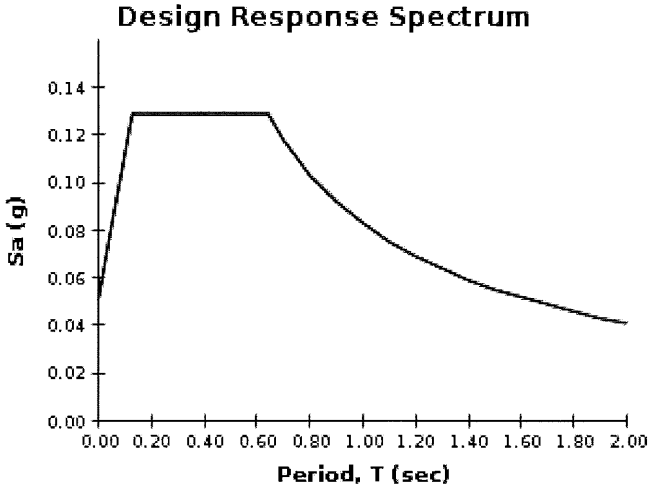


USGS–Provided Output

S_S =	0.121 g	S_{MS} =	0.193 g	S_{DS} =	0.129 g
S_1 =	0.052 g	S_{M1} =	0.124 g	S_{D1} =	0.083 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





APPENDIX D

Dilatometer Results

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. :D-1

FILE NO. : 2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.9 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.6 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.14 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.63 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
0.20	118.70	950	3.45	8.02		0.14	0.63	9.50	0.00	0.00	0.00	3.40	7.39		0.000	1.80	0.035
0.40	118.50	1440	1.50	4.92		0.14	0.63	9.50	0.00	0.00	0.00	1.51	4.29		0.000	1.80	0.070
0.60	118.30	1110	1.91	13.47		0.14	0.63	9.50	0.00	0.00	0.00	1.51	12.84		0.000	1.90	0.107
0.80	118.10	770	1.03	3.98		0.14	0.63	9.50	0.00	0.00	0.00	1.06	3.35		0.000	1.70	0.142
1.00	117.90	450	2.28	5.69		0.14	0.63	9.50	0.00	0.00	0.00	2.29	5.06		0.000	1.70	0.175
1.20	117.70	660	2.75	7.33		0.14	0.63	9.50	0.00	0.00	0.00	2.70	6.70		0.000	1.80	0.210
1.40	117.50	810	2.58	7.97		0.14	0.63	9.50	0.00	0.00	0.00	2.49	7.34		0.000	1.90	0.246
1.60	117.30	830	2.02	8.20		0.14	0.63	9.50	0.00	0.00	0.00	1.89	7.57		0.000	1.80	0.282
1.80	117.10	910	1.88	5.82		0.14	0.63	9.50	0.00	0.00	0.00	1.86	5.19		0.000	1.70	0.317
2.00	116.90	850	1.70	6.75		0.14	0.63	9.50	0.00	0.00	0.00	1.63	6.12		0.000	1.80	0.351
2.20	116.70	750	2.77	6.97		0.14	0.63	9.50	0.00	0.00	0.00	2.74	6.34		0.000	1.80	0.386
2.40	116.50	670	2.19	4.73		0.14	0.63	9.50	0.00	0.00	0.00	2.24	4.10		0.000	1.70	0.421
2.60	116.30	790	4.52	13.48		0.14	0.63	9.50	0.00	0.00	0.00	4.25	12.85		0.000	1.90	0.456
2.80	116.10	590	1.98	3.58		0.14	0.63	9.50	0.00	0.00	0.00	2.08	2.95		0.000	1.60	0.490
3.00	115.90	430	2.03	3.71		0.14	0.63	9.50	0.00	0.00	0.00	2.12	3.08		0.000	1.60	0.522
3.20	115.70	750	4.12	8.22		0.14	0.63	9.50	0.00	0.00	0.00	4.09	7.59		0.000	1.80	0.555
3.40	115.50	980	4.52	10.42		0.14	0.63	9.50	0.00	0.00	0.00	4.40	9.79		0.000	1.80	0.590
3.60	115.30	810	2.75	4.88		0.14	0.63	9.50	0.00	0.00	0.00	2.82	4.25		0.000	1.70	0.625
3.80	115.10	770	4.21	9.76		0.14	0.63	9.50	0.00	0.00	0.00	4.11	9.13		0.020	1.80	0.640
4.00	114.90	910	3.48	8.09		0.14	0.63	9.50	0.00	0.00	0.00	3.43	7.46		0.039	1.80	0.655
4.20	114.70	900	3.33	6.88		0.14	0.63	9.50	0.00	0.00	0.00	3.33	6.25		0.059	1.80	0.671
4.40	114.50	910	3.37	8.05		0.14	0.63	9.50	0.00	0.00	0.00	3.31	7.42		0.079	1.80	0.687
4.60	114.30	910	4.46	9.51		0.14	0.63	9.50	0.00	0.00	0.00	4.39	8.88		0.098	1.80	0.702
4.80	114.10	1060	4.27	10.03		0.14	0.63	9.50	0.00	0.00	0.00	4.16	9.40		0.118	1.80	0.718
5.00	113.90	960	3.56	6.97		0.14	0.63	9.50	0.00	0.00	0.00	3.57	6.34		0.137	1.80	0.734
5.20	113.70	1180	1.71	6.94		0.14	0.63	9.50	0.00	0.00	0.00	1.63	6.31		0.157	1.80	0.749
5.40	113.50	1140	2.45	5.56		0.14	0.63	9.50	0.00	0.00	0.00	2.47	4.93		0.177	1.70	0.764
5.60	113.30	1370	3.98	8.83		0.14	0.63	9.50	0.00	0.00	0.00	3.92	8.20		0.196	1.80	0.779
5.80	113.10	2130	5.96	12.87		0.14	0.63	9.50	0.00	0.00	0.00	5.79	12.24		0.216	1.95	0.796
6.00	112.90	2200	4.31	13.81		0.14	0.63	9.50	0.00	0.00	0.00	4.01	13.18		0.236	1.90	0.814
6.20	112.70	2000	3.09	11.45		0.14	0.63	9.50	0.00	0.00	0.00	2.85	10.82		0.255	1.90	0.832
6.40	112.50	1940	6.13	14.64		0.14	0.63	9.50	0.00	0.00	0.00	5.88	14.01		0.275	1.95	0.850
6.60	112.30	1850	4.96	11.39		0.14	0.63	9.50	0.00	0.00	0.00	4.82	10.76		0.294	1.80	0.867
6.80	112.10	1580	4.32	9.79		0.14	0.63	9.50	0.00	0.00	0.00	4.23	9.16		0.314	1.80	0.883
7.00	111.90	1450	2.28	10.70		0.14	0.63	9.50	0.00	0.00	0.00	2.04	10.07		0.334	1.90	0.900
7.20	111.70	1460	4.65	12.63		0.14	0.63	9.50	0.00	0.00	0.00	4.43	12.00		0.353	1.90	0.917
7.40	111.50	1330	2.83	6.02		0.14	0.63	9.50	0.00	0.00	0.00	2.85	5.39		0.373	1.70	0.933
7.60	111.30	1560	4.35	9.56		0.14	0.63	9.50	0.00	0.00	0.00	4.27	8.93		0.393	1.80	0.948
7.80	111.10	2330	8.93	22.52		0.14	0.63	9.50	0.00	0.00	0.00	8.43	21.89		0.412	1.95	0.965
8.00	110.90	2500	5.79	12.39		0.14	0.63	9.50	0.00	0.00	0.00	5.64	11.76		0.432	1.80	0.982
8.20	110.70	2390	6.13	15.82		0.14	0.63	9.50	0.00	0.00	0.00	5.82	15.19		0.451	1.95	0.999
8.40	110.50	3380	11.69	25.67		0.14	0.63	9.50	0.00	0.00	0.00	11.17	25.04		0.471	2.10	1.019
8.60	110.30	3700	10.92	25.18		0.14	0.63	9.50	0.00	0.00	0.00	10.39	24.55		0.491	2.10	1.041
8.80	110.10	2920	6.47	18.44		0.14	0.63	9.50	0.00	0.00	0.00	6.05	17.81		0.510	2.00	1.061
9.00	109.90	1890	2.47	6.38		0.14	0.63	9.50	0.00	0.00	0.00	2.45	5.75		0.530	1.70	1.078
9.20	109.70	1960	6.45	14.20		0.14	0.63	9.50	0.00	0.00	0.00	6.24	13.57		0.550	1.95	1.094
9.40	109.50	2660	4.99	13.63		0.14	0.63	9.50	0.00	0.00	0.00	4.74	13.00		0.569	1.90	1.113
9.60	109.30	2480	4.50	12.84		0.14	0.63	9.50	0.00	0.00	0.00	4.26	12.21		0.589	1.90	1.130
9.80	109.10	3400	10.63	27.87		0.14	0.63	9.50	0.00	0.00	0.00	9.95	27.24		0.608	2.15	1.150
10.00	108.90	5470	16.13	41.29		0.14	0.63	9.50	0.00	0.00	0.00	15.05	40.66		0.628	2.10	1.172
10.20	108.70	6500	12.70	42.78		0.14	0.63	9.50	0.00	0.00	0.00	11.37	42.15		0.648	2.15	1.194
10.40	108.50	6860	13.36	45.91		0.14	0.63	9.50	0.00	0.00	0.00	11.91	45.28		0.667	2.15	1.217
10.60	108.30	6800	5.14	42.87		0.14	0.63	9.50	0.00	0.00	0.00	3.43	42.24		0.687	2.00	1.238
10.80	108.10	6830	21.92	54.02		0.14	0.63	9.50	0.00	0.00	0.00	20.49	53.39		0.707	2.10	1.259
11.00	107.90	7140	18.60	53.23		0.14	0.63	9.50	0.00	0.00	0.00	17.05	52.60		0.726	2.15	1.281
11.20	107.70	8510	25.42	59.47		0.14	0.63	9.50	0.00	0.00	0.00	23.90	58.84		0.746	2.10	1.303
11.40	107.50	8720	23.43	62.07		0.14	0.63	9.50	0.00	0.00	0.00	21.68	61.44		0.765	2.15	1.325
11.60	107.30	8410	17.21	56.65		0.14	0.63	9.50	0.00	0.00	0.00	15.42	56.02		0.785	2.15	1.348
11.80	107.10	6380	11.70	37.07		0.14	0.63	9.50	0.00	0.00	0.00	10.61	36.44		0.805	2.15	1.370
12.00	106.90	4510	10.25	24.65		0.14	0.63	9.50	0.00	0.00	0.00	9.71	24.02		0.824	1.95	1.391
12.20	106.70	4130	7.77	20.99		0.14	0.63	9.50	0.00	0.00	0.00	7.29	20.36		0.844	2.00	1.410
12.40	106.50	3610	4.57	11.08		0.14	0.63	9.50	0.00	0.00	0.00	4.42	10.45		0.864	1.80	1.428
12.60	106.30	4510	13.11	31.25		0.14	0.63	9.50	0.00	0.00	0.00	12.38	30.62		0.883	2.10	1.446
12.80	106.10	6560	18.41	44.33		0.14	0.63	9.50	0.00	0.00	0.00	17.29	43.70		0.903	2.10	1.468
13.00	105.90	7360	17.98	41.68		0.14	0.63	9.50	0.00	0.00	0.00	16.97	41.05		0.922	2.10	1.489

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-1
Page 1b
FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.9 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.6 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.14 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.63 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
0.20	118.70	97.14	1.17		138	6.50						14.96	427.3	644	SILT
0.40	118.50	21.44	1.85		97									311	SILTY SAND
0.60	118.30	14.16	7.50		393	1.51		38.1	46.3	0.18	42.7	1.80	16.9	1112	SAND
0.80	118.10	7.47	2.16		79	0.87		27.1	43.7	0.24	40.2	0.80	5.6	177	SILTY SAND
1.00	117.90	13.05	1.21		96	1.85		9.3	33.9	0.27	29.5	4.38	25.0	265	SANDY SILT
1.20	117.70	12.87	1.48		139	1.78		15.5	36.1	0.33	32.3	4.74	22.6	380	SANDY SILT
1.40	117.50	10.12	1.95		168	1.40		22.3	37.9	0.40	34.6	3.33	13.5	423	SILTY SAND
1.60	117.30	6.69	3.01		197	0.96		26.1	38.9	0.46	36.0	1.75	6.2	424	SILTY SAND
1.80	117.10	5.88	1.79		115	0.86		29.6	39.2	0.52	36.5	1.54	4.9	231	SANDY SILT
2.00	116.90	4.63	2.76		156	0.72		28.5	38.7	0.57	36.1	1.18	3.4	284	SILTY SAND
2.20	116.70	7.09	1.32		125	1.11		19.9	34.9	0.61	32.2	3.07	7.9	270	SANDY SILT
2.40	116.50	5.33	0.83		64	1.21						1.94	4.6	120	CLAYEY SILT
2.60	116.30	9.32	2.02		298	1.45		16.3	31.9	0.70	29.2	6.48	14.2	726	SILTY SAND
2.80	116.10	4.24	0.42		30	1.03	0.28					1.58	3.2	49	SILTY CLAY
3.00	115.90	4.07	0.45		33	1.00	0.28					1.58	3.0	52	SILTY CLAY
3.20	115.70	7.37	0.85		121	1.51						4.25	7.7	266	CLAYEY SILT
3.40	115.50	7.46	1.22		187	1.20		23.2	32.9	0.91	30.9	5.44	9.2	413	SANDY SILT
3.60	115.30	4.52	0.51		50	1.08	0.38					2.23	3.6	84	SILTY CLAY
3.80	115.10	6.40	1.23		174	1.14		17.3	30.5	0.96	28.4	5.01	7.8	359	SANDY SILT
4.00	114.90	5.17	1.19		140	1.19						2.88	4.4	259	SILT
4.20	114.70	4.88	0.89		101	1.14						2.70	4.0	180	CLAYEY SILT
4.40	114.50	4.71	1.27		142	0.86		25.7	33.3	1.06	31.5	2.98	4.3	251	SANDY SILT
4.60	114.30	6.11	1.05		156	1.33						4.01	5.7	313	SILT
4.80	114.10	5.63	1.30		182	0.97		28.3	33.4	1.11	31.7	4.09	5.7	352	SANDY SILT
5.00	113.90	4.68	0.81		96	1.11						2.76	3.8	167	CLAYEY SILT
5.20	113.70	1.96	3.19		163	0.44		44.6	37.5	1.21	36.1	0.82	1.1	176	SILTY SAND
5.40	113.50	3.01	1.07		85	0.79						1.44	1.9	111	SILT
5.60	113.30	4.78	1.15		149	1.12						3.03	3.9	263	SILT
5.80	113.10	7.01	1.16		224	1.46						5.63	7.1	481	SILT
6.00	112.90	4.64	2.43		318	0.70		75.0	39.4	1.33	38.3	2.63	3.2	574	SILTY SAND
6.20	112.70	3.12	3.07		277	0.51		73.0	39.7	1.36	38.6	1.40	1.7	412	SILTY SAND
6.40	112.50	6.60	1.45		282	1.01		56.3	36.7	1.36	35.5	5.63	6.6	591	SANDY SILT
6.60	112.30	5.22	1.31		206	0.84		57.7	37.1	1.39	36.0	3.82	4.4	384	SANDY SILT
6.80	112.10	4.43	1.26		171	0.76		49.9	36.2	1.40	35.1	3.12	3.5	291	SANDY SILT
7.00	111.90	1.89	4.71		279	0.42		55.2	37.7	1.45	36.7	0.93	1.0	294	SAND
7.20	111.70	4.44	1.86		263	0.79		44.7	35.2	1.45	34.1	3.40	3.7	456	SILTY SAND
7.40	111.50	2.65	1.03		88	0.71						1.45	1.6	104	SILT
7.60	111.30	4.09	1.20		162	0.73		49.7	35.8	1.50	34.8	3.02	3.2	262	SANDY SILT
7.80	111.10	8.31	1.68		467	1.24		61.8	36.0	1.53	35.0	9.76	10.1	1085	SANDY SILT
8.00	110.90	5.30	1.18		212	1.21						4.49	4.6	398	SILT
8.20	110.70	5.38	1.74		325	0.83		76.1	37.9	1.61	37.1	4.46	4.5	621	SANDY SILT
8.40	110.50	10.50	1.30		481	1.46		90.8	37.5	1.64	36.7	14.96	14.7	1225	SANDY SILT
8.60	110.30	9.51	1.43		492	1.31		106.9	38.7	1.69	37.9	12.23	11.8	1205	SANDY SILT
8.80	110.10	5.22	2.12		408	0.78		96.9	39.2	1.73	38.4	4.24	4.0	775	SILTY SAND
9.00	109.90	1.78	1.71		114	0.39		73.1	38.5	1.75	37.7	0.96	0.9	98	SANDY SILT
9.20	109.70	5.20	1.29		254	0.87		58.3	35.6	1.73	34.8	5.09	4.7	473	SANDY SILT
9.40	109.50	3.75	1.98		287	0.60		93.5	39.1	1.81	38.5	2.59	2.3	454	SILTY SAND
9.60	109.30	3.25	2.16		276	0.55		88.8	38.9	1.84	38.2	2.16	1.9	403	SILTY SAND
9.80	109.10	8.12	1.85		600	1.16		98.6	37.9	1.86	37.3	10.45	9.1	1382	SILTY SAND
10.00	108.90	12.30	1.78		889	1.62		156.5	39.5	1.92	39.0	21.59	18.4	2396	SANDY SILT
10.20	108.70	8.98	2.87		1068	1.12		216.5	42.2	2.00	41.7	10.77	9.0	2569	SILTY SAND
10.40	108.50	9.24	2.97		1158	1.15		228.6	42.3	2.04	41.9	11.50	9.4	2815	SILTY SAND
10.60	108.30	2.22	14.14		1347									1605	SAND
10.80	108.10	15.72	1.66		1142	2.03		185.2	39.4	2.06	38.9	37.28	29.6	3343	SANDY SILT
11.00	107.90	12.74	2.18		1234	1.63		214.3	40.7	2.12	40.3	24.10	18.8	3367	SILTY SAND
11.20	107.70	17.77	1.51		1213	2.26		235.8	40.2	2.14	39.8	47.61	36.5	3691	SANDY SILT
11.40	107.50	15.78	1.90		1380	1.99		255.3	40.9	2.19	40.5	37.45	28.3	4046	SILTY SAND
11.60	107.30	10.86	2.78		1409	1.34		274.7	42.3	2.25	42.0	17.38	12.9	3632	SILTY SAND
11.80	107.10	7.16	2.63		896	0.91		217.7	41.9	2.29	41.7	8.12	5.9	1973	SILTY SAND
12.00	106.90	6.39	1.61		497	0.90		146.5	39.7	2.28	39.4	7.65	5.5	1028	SANDY SILT
12.20	106.70	4.57	2.03		454	0.67		143.5	40.1	2.32	39.8	4.25	3.0	803	SILTY SAND
12.40	106.50	2.49	1.69		209	0.41		137.3	40.6	2.36	40.3	1.56	1.1	246	SANDY SILT
12.60	106.30	7.95	1.59		633	1.13		134.1	38.4	2.35	38.2	12.40	8.6	1443	SANDY SILT
12.80	106.10	11.17	1.61		916	1.48		192.4	39.7	2.41	39.5	22.39	15.3	2387	SANDY SILT
13.00	105.90	10.78	1.50		835	1.40		226.1	40.6	2.46	40.5	20.45	13.7	2148	SANDY SILT

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. :D-1

FILE NO. : 2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.9 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.6 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.14 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.63 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
13.20	105.70	7140	16.75	40.19		0.14	0.63	9.50	0.00	0.00	0.00	15.76	39.56		0.942	2.10	1.511
13.40	105.50	6960	20.49	42.05		0.14	0.63	9.50	0.00	0.00	0.00	19.59	41.42		0.962	2.10	1.533
13.60	105.30	6940	20.64	43.64		0.14	0.63	9.50	0.00	0.00	0.00	19.67	43.01		0.981	2.10	1.554
13.80	105.10	7670	21.56	52.84		0.14	0.63	9.50	0.00	0.00	0.00	20.17	52.21		1.001	2.10	1.576
14.00	104.90	7770	21.46	49.52		0.14	0.63	9.50	0.00	0.00	0.00	20.24	48.89		1.021	2.10	1.597
14.20	104.70	8370	23.21	51.38		0.14	0.63	9.50	0.00	0.00	0.00	21.98	50.75		1.040	2.10	1.619
14.40	104.50	9300	28.65	58.19		0.14	0.63	9.50	0.00	0.00	0.00	27.35	57.56		1.060	2.10	1.640
14.60	104.30	10500	41.07	70.30		0.14	0.63	9.50	0.00	0.00	0.00	39.79	69.67		1.079	2.10	1.662

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
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SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-1
Page 2b
FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.9 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.6 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.14 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.63 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
13.20	105.70	9.80	1.61		826	1.28		223.6	40.7	2.50	40.6	17.29	11.4	2049	SANDY SILT
13.40	105.50	12.16	1.17		757	2.07						25.59	16.7	2034	SILT
13.60	105.30	12.02	1.25		810	1.59		197.0	39.3	2.54	39.2	27.66	17.8	2166	SANDY SILT
13.80	105.10	12.17	1.67		1112	1.59		223.7	39.9	2.59	39.8	28.03	17.8	2986	SANDY SILT
14.00	104.90	12.03	1.49		994	1.57		227.7	40.0	2.62	39.9	27.74	17.4	2660	SANDY SILT
14.20	104.70	12.93	1.37		998	1.68		243.3	40.1	2.66	40.0	32.16	19.9	2739	SANDY SILT
14.40	104.50	16.03	1.15		1048	2.44						42.16	25.7	3089	SILT
14.60	104.30	23.29	0.77		1037	3.03						76.52	46.0	3422	CLAYEY SILT

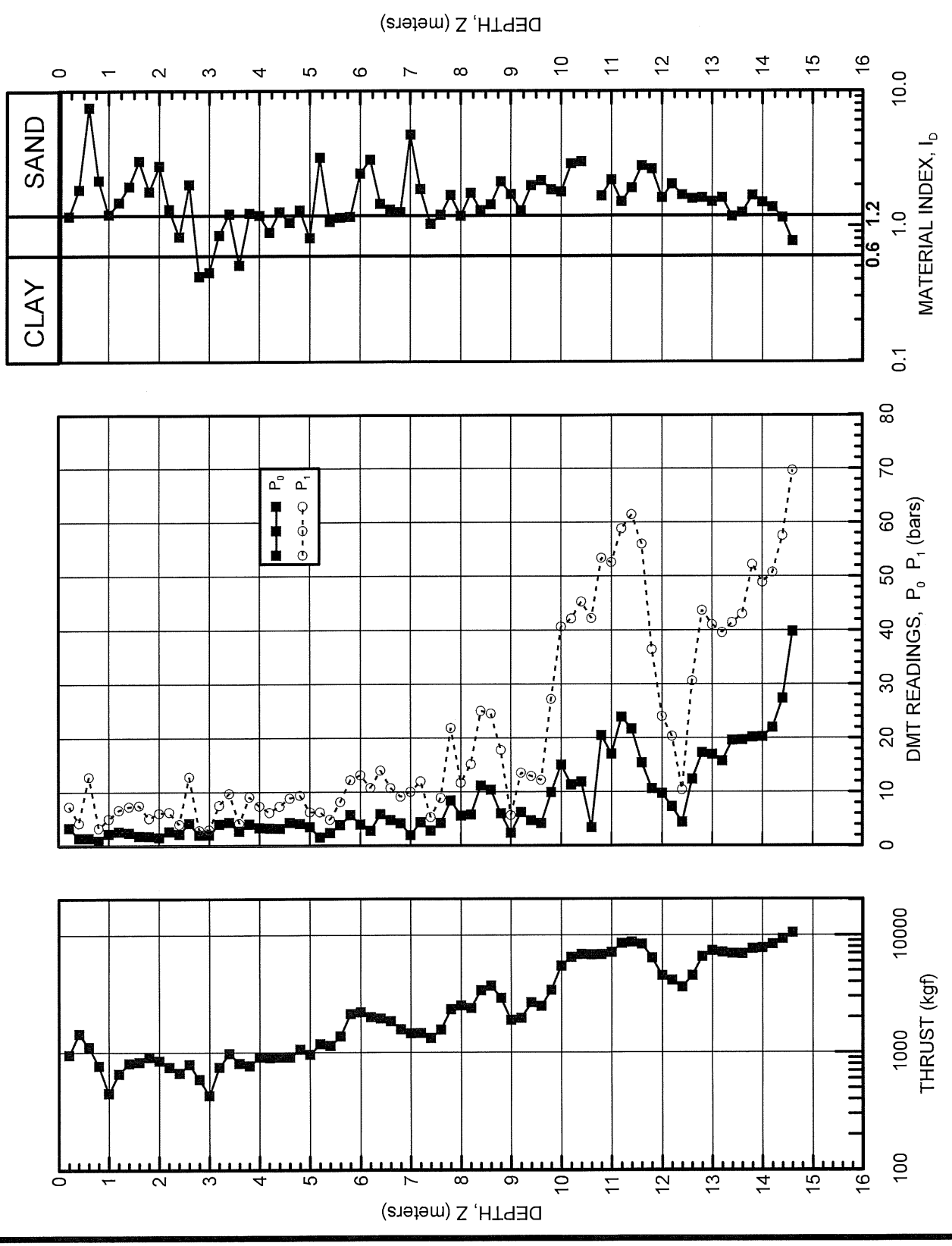
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-1

DILATOMETER RESULTS

Ground Surface Elev.: ~ 118.9 m
Water Depth: ~ 3.6 m

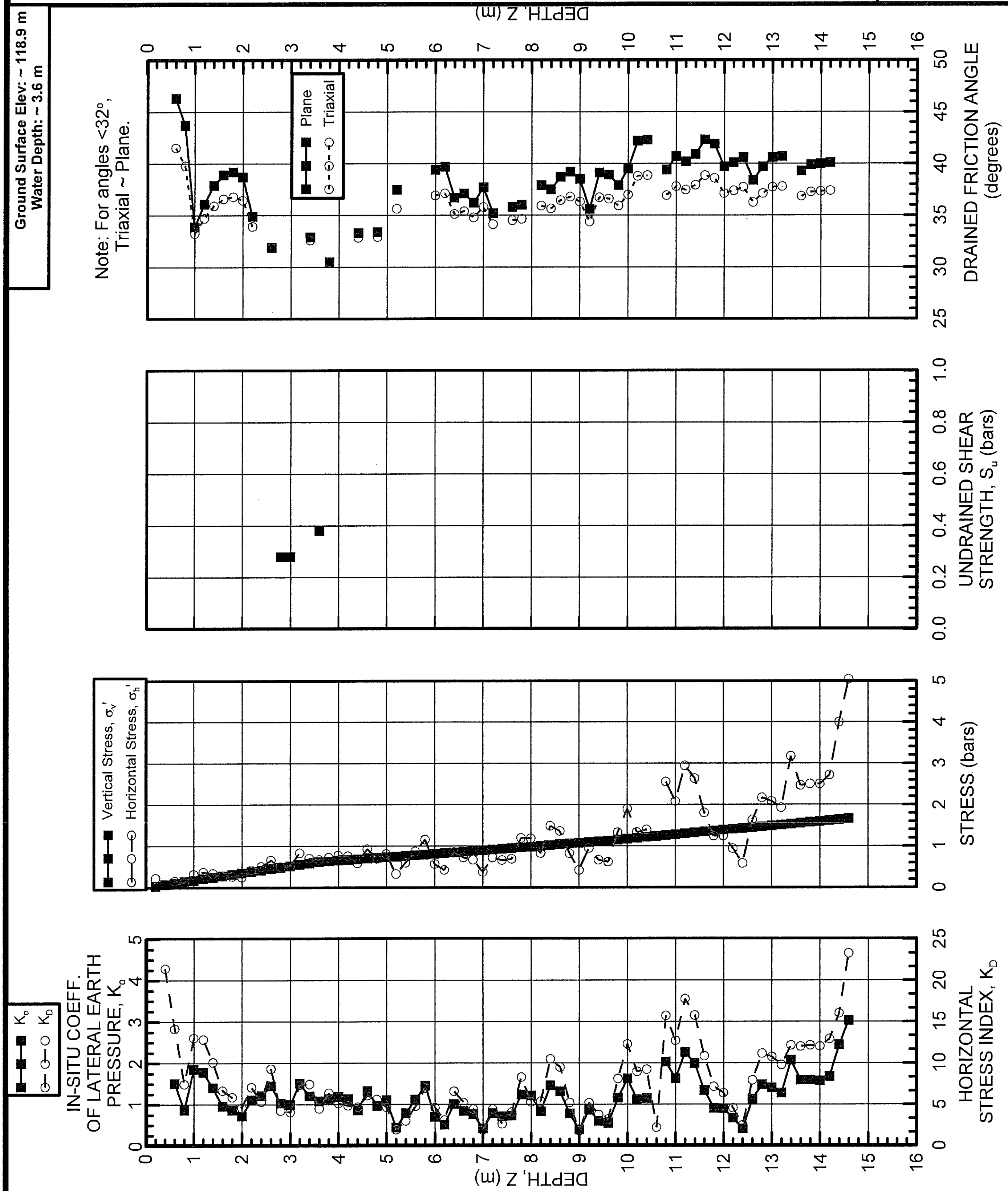


PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-1

INTERPRETED DMT STRENGTH PARAMETERS



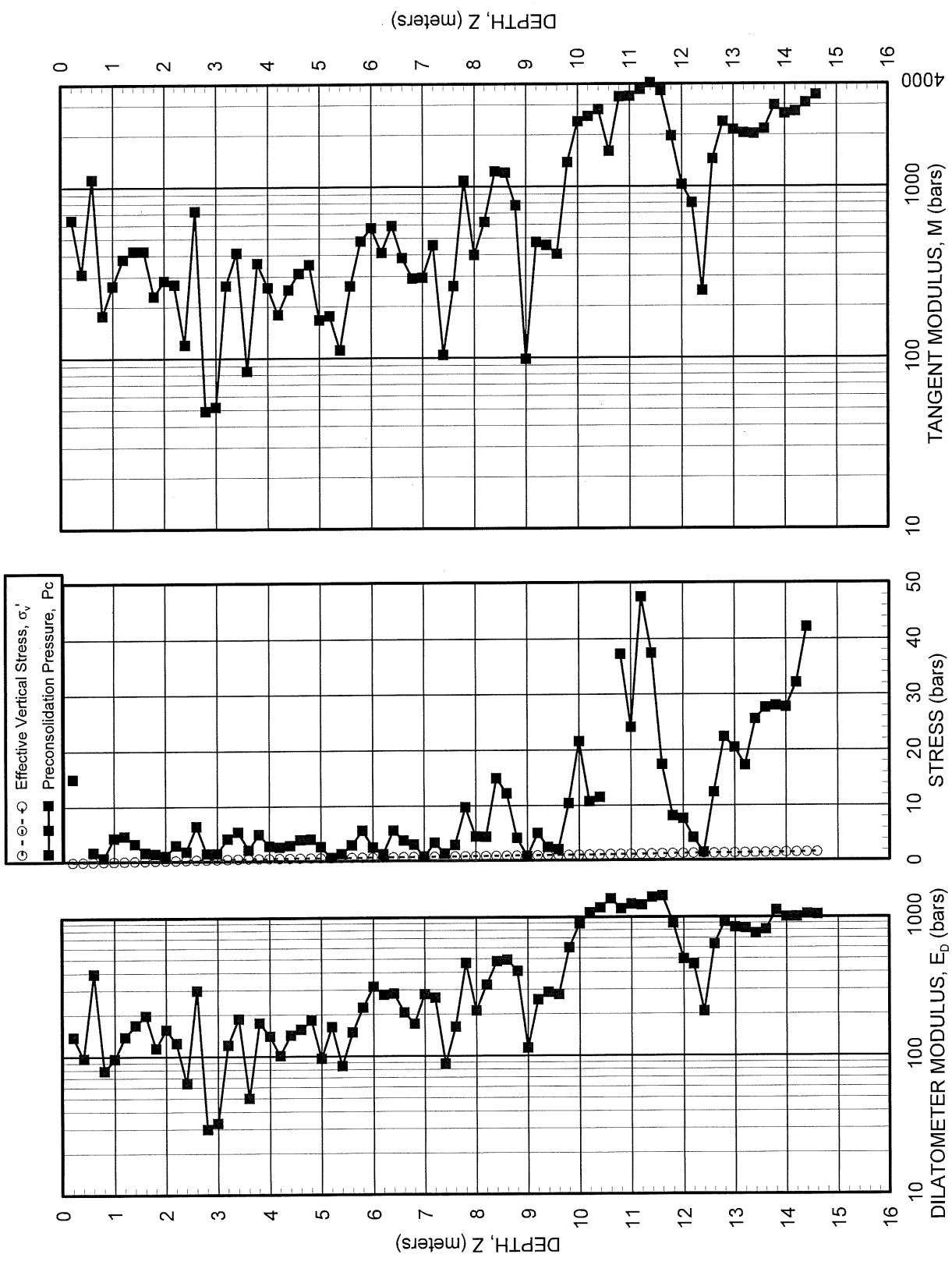
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-1

INTERPRETED DMT DEFORMATION PARAMETERS

Ground Surface Elev.: ~ 118.9 m
Water Depth: ~ 3.6 m



DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. :D-5

FILE NO. : 2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 119.5 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.8 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.20 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.58 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
0.20	119.30	440	2.05	5.19		0.20	0.58	9.50	0.00	0.00	0.00	2.13	4.61		0.000	1.70	0.035
0.40	119.10	470	2.19	5.60		0.20	0.58	9.50	0.00	0.00	0.00	2.26	5.02		0.000	1.70	0.068
0.60	118.90	830	3.78	11.39		0.20	0.58	9.50	0.00	0.00	0.00	3.64	10.81		0.000	1.90	0.104
0.80	118.70	990	3.69	9.13		0.20	0.58	9.50	0.00	0.00	0.00	3.66	8.55		0.000	1.80	0.140
1.00	118.50	630	2.50	5.57		0.20	0.58	9.50	0.00	0.00	0.00	2.59	4.99		0.000	1.70	0.174
1.20	118.30	610	3.12	5.95		0.20	0.58	9.50	0.00	0.00	0.00	3.22	5.37		0.000	1.70	0.208
1.40	118.10	770	3.90	8.02		0.20	0.58	9.50	0.00	0.00	0.00	3.93	7.44		0.000	1.80	0.242
1.60	117.90	1490	4.87	13.39		0.20	0.58	9.50	0.00	0.00	0.00	4.68	12.81		0.000	1.95	0.279
1.80	117.70	1360	4.01	12.50		0.20	0.58	9.50	0.00	0.00	0.00	3.82	11.92		0.000	1.90	0.317
2.00	117.50	1020	3.34	9.56		0.20	0.58	9.50	0.00	0.00	0.00	3.27	8.98		0.000	1.80	0.353
2.20	117.30	900	3.10	8.42		0.20	0.58	9.50	0.00	0.00	0.00	3.07	7.84		0.000	1.80	0.388
2.40	117.10	860	2.80	8.62		0.20	0.58	9.50	0.00	0.00	0.00	2.75	8.04		0.000	1.90	0.425
2.60	116.90	790	2.49	8.97		0.20	0.58	9.50	0.00	0.00	0.00	2.41	8.39		0.000	1.90	0.462
2.80	116.70	1060	3.35	10.93		0.20	0.58	9.50	0.00	0.00	0.00	3.21	10.35		0.000	1.90	0.499
3.00	116.50	1560	3.53	14.00		0.20	0.58	9.50	0.00	0.00	0.00	3.25	13.42		0.000	1.90	0.536
3.20	116.30	2540	9.54	29.33		0.20	0.58	9.50	0.00	0.00	0.00	8.79	28.75		0.000	2.15	0.576
3.40	116.10	3130	8.55	28.22		0.20	0.58	9.50	0.00	0.00	0.00	7.81	27.64		0.000	2.00	0.617
3.60	115.90	3360	9.57	27.62		0.20	0.58	9.50	0.00	0.00	0.00	8.91	27.04		0.000	2.15	0.658
3.80	115.70	3380	10.09	34.61		0.20	0.58	9.50	0.00	0.00	0.00	9.10	34.03		0.000	2.15	0.700
4.00	115.50	3590	9.33	37.72		0.20	0.58	9.50	0.00	0.00	0.00	8.15	37.14		0.020	2.15	0.722
4.20	115.30	3420	7.51	27.48		0.20	0.58	9.50	0.00	0.00	0.00	6.75	26.90		0.039	2.00	0.744
4.40	115.10	3440	12.32	37.10		0.20	0.58	9.50	0.00	0.00	0.00	11.32	36.52		0.059	2.15	0.765
4.60	114.90	3720	12.05	35.30		0.20	0.58	9.50	0.00	0.00	0.00	11.13	34.72		0.079	2.15	0.787
4.80	114.70	3630	14.51	34.15		0.20	0.58	9.50	0.00	0.00	0.00	13.77	33.57		0.098	2.10	0.809
5.00	114.50	3340	8.15	22.67		0.20	0.58	9.50	0.00	0.00	0.00	7.66	22.09		0.118	2.00	0.830
5.20	114.30	2810	7.25	19.11		0.20	0.58	9.50	0.00	0.00	0.00	6.90	18.53		0.137	1.95	0.849
5.40	114.10	2840	7.29	20.32		0.20	0.58	9.50	0.00	0.00	0.00	6.88	19.74		0.157	2.00	0.868
5.60	113.90	3020	6.62	23.59		0.20	0.58	9.50	0.00	0.00	0.00	6.01	23.01		0.177	2.00	0.888
5.80	113.70	3390	8.48	26.50		0.20	0.58	9.50	0.00	0.00	0.00	7.82	25.92		0.196	2.00	0.907
6.00	113.50	3720	9.87	30.96		0.20	0.58	9.50	0.00	0.00	0.00	9.05	30.38		0.216	2.15	0.929
6.20	113.30	4330	9.42	33.36		0.20	0.58	9.50	0.00	0.00	0.00	8.46	32.78		0.236	2.15	0.951
6.40	113.10	4580	12.71	37.32		0.20	0.58	9.50	0.00	0.00	0.00	11.72	36.74		0.255	2.15	0.974
6.60	112.90	5440	13.93	37.64		0.20	0.58	9.50	0.00	0.00	0.00	12.98	37.06		0.275	2.15	0.996
6.80	112.70	5410	10.59	37.54		0.20	0.58	9.50	0.00	0.00	0.00	9.48	36.96		0.294	2.15	1.019
7.00	112.50	5030	14.62	38.17		0.20	0.58	9.50	0.00	0.00	0.00	13.68	37.59		0.314	2.10	1.041
7.20	112.30	5380	16.54	36.75		0.20	0.58	9.50	0.00	0.00	0.00	15.77	36.17		0.334	2.10	1.062
7.40	112.10	5650	16.57	45.26		0.20	0.58	9.50	0.00	0.00	0.00	15.37	44.68		0.353	2.15	1.085
7.60	111.90	6820	22.03	50.00		0.20	0.58	9.50	0.00	0.00	0.00	20.87	49.42		0.373	2.10	1.107
7.80	111.70	6790	18.06	46.69		0.20	0.58	9.50	0.00	0.00	0.00	16.87	46.11		0.393	2.10	1.128
8.00	111.50	5410	16.35	37.46		0.20	0.58	9.50	0.00	0.00	0.00	15.53	36.88		0.412	2.10	1.150
8.20	111.30	4650	15.74	33.94		0.20	0.58	9.50	0.00	0.00	0.00	15.07	33.36		0.432	2.10	1.171
8.40	111.10	4650	11.26	29.79		0.20	0.58	9.50	0.00	0.00	0.00	10.57	29.21		0.451	2.15	1.193
8.60	110.90	5180	15.89	32.01		0.20	0.58	9.50	0.00	0.00	0.00	15.32	31.43		0.471	2.10	1.216
8.80	110.70	6190	11.73	39.27		0.20	0.58	9.50	0.00	0.00	0.00	10.59	38.69		0.491	2.15	1.238
9.00	110.50	6100	17.23	43.30		0.20	0.58	9.50	0.00	0.00	0.00	16.17	42.72		0.510	2.10	1.260
9.20	110.30	5560	12.01	34.87		0.20	0.58	9.50	0.00	0.00	0.00	11.11	34.29		0.530	2.15	1.282
9.40	110.10	5290	12.58	39.86		0.20	0.58	9.50	0.00	0.00	0.00	11.46	39.28		0.550	2.15	1.304
9.60	109.90	5350	13.40	35.87		0.20	0.58	9.50	0.00	0.00	0.00	12.52	35.29		0.569	2.15	1.327
9.80	109.70	5710	12.99	37.99		0.20	0.58	9.50	0.00	0.00	0.00	11.98	37.41		0.589	2.15	1.350
10.00	109.50	5250	11.22	30.40		0.20	0.58	9.50	0.00	0.00	0.00	10.50	29.82		0.608	2.15	1.372
10.20	109.30	4780	12.35	25.20		0.20	0.58	9.50	0.00	0.00	0.00	11.95	24.62		0.628	2.10	1.394
10.40	109.10	4380	11.55	26.25		0.20	0.58	9.50	0.00	0.00	0.00	11.05	25.67		0.648	2.10	1.416
10.60	108.90	4190	11.02	24.09		0.20	0.58	9.50	0.00	0.00	0.00	10.61	23.51		0.667	2.10	1.437
10.80	108.70	4450	11.85	26.87		0.20	0.58	9.50	0.00	0.00	0.00	11.34	26.29		0.687	2.10	1.459
11.00	108.50	4520	10.47	27.55		0.20	0.58	9.50	0.00	0.00	0.00	9.86	26.97		0.707	2.15	1.481
11.20	108.30	4280	13.63	26.36		0.20	0.58	9.50	0.00	0.00	0.00	13.23	25.78		0.726	2.10	1.503
11.40	108.10	4210	10.94	26.76		0.20	0.58	9.50	0.00	0.00	0.00	10.39	26.18		0.746	2.10	1.525
11.60	107.90	4590	10.14	30.73		0.20	0.58	9.50	0.00	0.00	0.00	9.35	30.15		0.765	2.15	1.547
11.80	107.70	5120	9.24	20.16		0.20	0.58	9.50	0.00	0.00	0.00	8.93	19.58		0.785	1.95	1.567
12.00	107.50	4340	9.94	20.14		0.20	0.58	9.50	0.00	0.00	0.00	9.67	19.56		0.805	1.95	1.586
12.20	107.30	4480	13.39	23.77		0.20	0.58	9.50	0.00	0.00	0.00	13.11	23.19		0.824	2.10	1.606
12.40	107.10	5040	11.84	25.38		0.20	0.58	9.50	0.00	0.00	0.00	11.40	24.80		0.844	2.10	1.628
12.60	106.90	5150	4.62	14.30		0.20	0.58	9.50	0.00	0.00	0.00	4.38	13.72		0.864	1.90	1.647
12.80	106.70	4930	4.91	11.39		0.20	0.58	9.50	0.00	0.00	0.00	4.83	10.81		0.883	1.80	1.664
13.00	106.50	5690	6.76	23.80		0.20	0.58	9.50	0.00	0.00	0.00	6.15	23.22		0.903	2.00	1.682

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-5

FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

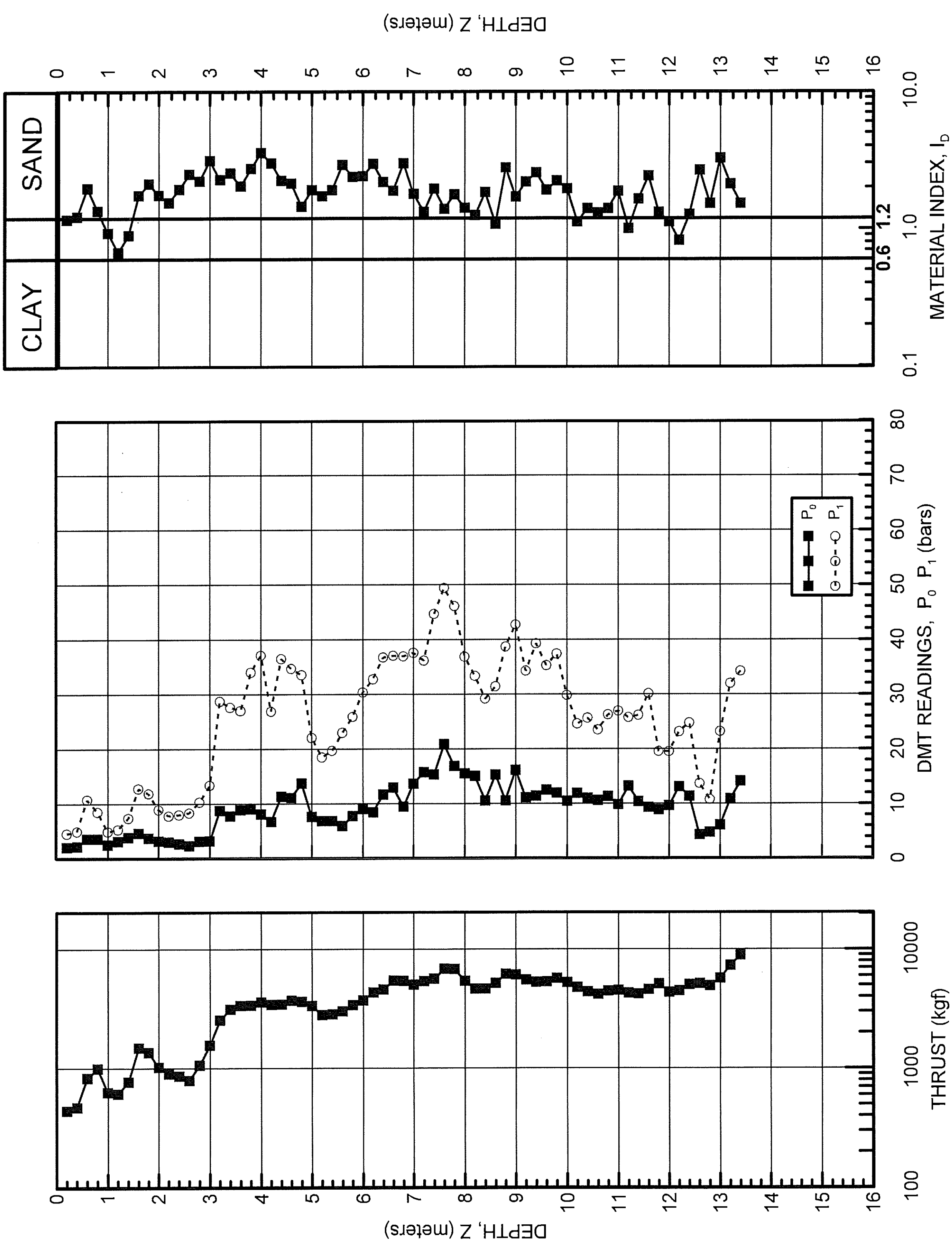
ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 119.5 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.8 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.20 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.58 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

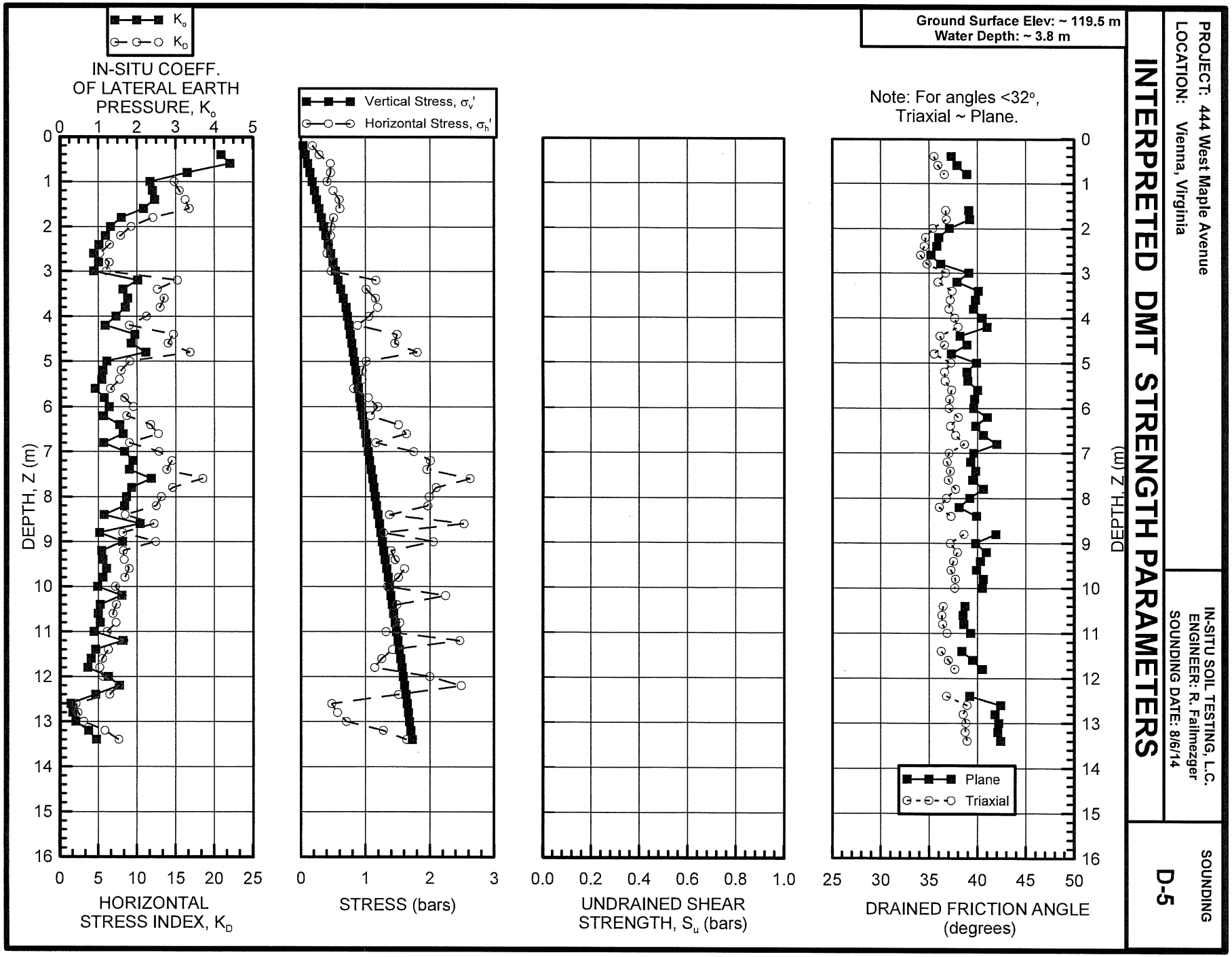
Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
0.20	119.30	60.91	1.16		86	5.10						7.22	206.3	362	SILT
0.40	119.10	33.04	1.22		96	4.18		8.9	37.3	0.11	31.6	9.62	140.7	348	SANDY SILT
0.60	118.90	35.09	1.97		249	4.41		16.8	37.9	0.17	33.1	16.03	154.6	918	SILTY SAND
0.80	118.70	26.12	1.34		170	3.30		23.1	38.9	0.23	34.7	11.45	81.8	579	SANDY SILT
1.00	118.50	14.83	0.93		83	2.34						3.97	22.8	240	SILT
1.20	118.30	15.49	0.67		75	2.40						5.06	24.4	218	CLAYEY SILT
1.40	118.10	16.25	0.89		122	2.46						6.36	26.3	360	CLAYEY SILT
1.60	117.90	16.79	1.74		282	2.17		38.9	39.1	0.45	36.2	9.48	34.0	843	SANDY SILT
1.80	117.70	12.08	2.12		281	1.60		38.1	39.2	0.52	36.4	5.71	18.0	752	SILTY SAND
2.00	117.50	9.26	1.75		198	1.32		27.7	37.1	0.57	34.4	4.17	11.8	481	SANDY SILT
2.20	117.30	7.91	1.55		165	1.19		24.2	36.0	0.62	33.3	3.61	9.3	376	SANDY SILT
2.40	117.10	6.47	1.93		184	1.02		24.2	35.8	0.67	33.3	2.81	6.6	384	SILTY SAND
2.60	116.90	5.21	2.49		208	0.88		23.2	35.2	0.73	32.8	2.18	4.7	397	SILTY SAND
2.80	116.70	6.43	2.22		248	1.01		30.4	36.2	0.79	34.0	3.22	6.4	519	SILTY SAND
3.00	116.50	6.05	3.13		353	0.88		50.2	39.1	0.87	37.3	2.76	5.1	729	SILTY SAND
3.20	116.30	15.25	2.27		693	2.02		63.2	37.9	0.93	36.1	16.99	29.5	2008	SILTY SAND
3.40	116.10	12.65	2.54		688	1.64		91.1	40.1	1.01	38.6	11.73	19.0	1874	SILTY SAND
3.60	115.90	13.54	2.04		629	1.76		95.1	39.8	1.08	38.3	14.41	21.9	1754	SILTY SAND
3.80	115.70	13.01	2.74		865	1.70		95.3	39.6	1.15	38.2	14.32	20.5	2378	SILTY SAND
4.00	115.50	11.25	3.57		1006	1.46		108.5	40.5	1.19	39.3	10.82	15.0	2627	SAND
4.20	115.30	9.03	3.00		699	1.18		108.9	41.0	1.23	39.8	7.21	9.7	1686	SILTY SAND
4.40	115.10	14.73	2.24		874	1.95		88.3	38.2	1.24	36.9	20.80	27.2	2507	SILTY SAND
4.60	114.90	14.03	2.14		819	1.85		100.1	38.9	1.28	37.7	19.05	24.2	2309	SILTY SAND
4.80	114.70	16.89	1.45		687	2.23		85.6	37.3	1.30	36.1	29.65	36.6	2059	SANDY SILT
5.00	114.50	9.09	1.91		501	1.22		102.2	39.9	1.36	38.8	8.56	10.3	1207	SILTY SAND
5.20	114.30	7.96	1.72		404	1.12		84.9	38.9	1.38	37.8	7.15	8.4	922	SANDY SILT
5.40	114.10	7.74	1.91		446	1.09		86.4	39.0	1.41	37.9	6.95	8.0	1008	SILTY SAND
5.60	113.90	6.57	2.91		590	0.92		98.1	40.0	1.46	39.0	5.06	5.7	1258	SILTY SAND
5.80	113.70	8.40	2.38		628	1.15		104.3	39.7	1.49	38.7	8.17	9.0	1471	SILTY SAND
6.00	113.50	9.52	2.41		740	1.28		111.6	39.6	1.52	38.7	10.54	11.4	1817	SILTY SAND
6.20	113.30	8.65	2.96		844	1.13		139.3	41.0	1.58	40.2	8.48	8.9	2003	SILTY SAND
6.40	113.10	11.77	2.18		868	1.55		133.4	39.8	1.60	39.0	16.32	16.8	2305	SILTY SAND
6.60	112.90	12.76	1.89		835	1.64		161.8	40.6	1.64	39.8	18.89	19.0	2281	SILTY SAND
6.80	112.70	9.02	2.99		954	1.14		178.7	42.0	1.70	41.3	9.35	9.2	2298	SILTY SAND
7.00	112.50	12.84	1.79		830	1.68		142.6	39.6	1.70	38.8	20.77	19.9	2271	SANDY SILT
7.20	112.30	14.53	1.32		708	1.89		146.8	39.3	1.74	38.6	27.13	25.5	2020	SANDY SILT
7.40	112.10	13.85	1.95		1017	1.80		159.6	39.8	1.78	39.1	24.82	22.9	2856	SILTY SAND
7.60	111.90	18.52	1.39		991	2.37		180.0	39.5	1.81	38.8	44.98	40.6	3055	SANDY SILT
7.80	111.70	14.60	1.77		1015	1.86		198.2	40.6	1.86	40.0	27.71	24.6	2901	SANDY SILT
8.00	111.50	13.15	1.41		741	1.73		150.2	39.2	1.88	38.6	24.31	21.1	2044	SANDY SILT
8.20	111.30	12.50	1.25		635	1.68		123.1	38.1	1.89	37.5	23.39	20.0	1721	SANDY SILT
8.40	111.10	8.48	1.84		647	1.15		144.3	39.9	1.96	39.4	10.81	9.1	1516	SILTY SAND
8.60	110.90	12.22	1.08		559	2.08						20.46	16.8	1503	SILT
8.80	110.70	8.16	2.78		975	1.03		207.1	41.9	2.06	41.5	9.41	7.6	2263	SILTY SAND
9.00	110.50	12.43	1.70		921	1.63		175.6	39.8	2.07	39.3	23.45	18.6	2493	SANDY SILT
9.20	110.30	8.25	2.19		804	1.09		179.3	40.9	2.12	40.5	10.56	8.2	1869	SILTY SAND
9.40	110.10	8.36	2.55		966	1.12		166.8	40.3	2.15	39.9	11.32	8.7	2259	SILTY SAND
9.60	109.90	9.00	1.91		790	1.21		164.2	39.9	2.18	39.6	13.43	10.1	1898	SILTY SAND
9.80	109.70	8.44	2.23		882	1.12		181.6	40.6	2.23	40.3	11.77	8.7	2069	SILTY SAND
10.00	109.50	7.21	1.95		670	0.98		170.8	40.5	2.26	40.2	9.00	6.6	1470	SILTY SAND
10.20	109.30	8.12	1.12		440	1.61						12.40	8.9	1009	SILT
10.40	109.10	7.35	1.40		507	1.05		133.5	38.7	2.30	38.4	10.44	7.4	1116	SANDY SILT
10.60	108.90	6.91	1.30		448	1.00		128.5	38.5	2.33	38.2	9.60	6.7	958	SANDY SILT
10.80	108.70	7.30	1.40		519	1.05		135.5	38.6	2.37	38.4	10.67	7.3	1138	SANDY SILT
11.00	108.50	6.18	1.87		594	0.89		145.7	39.3	2.42	39.1	7.82	5.3	1215	SILTY SAND
11.20	108.30	8.32	1.00		435	1.64						13.89	9.2	1009	SILT
11.40	108.10	6.32	1.64		548	0.93		131.1	38.4	2.47	38.3	8.75	5.7	1130	SANDY SILT
11.60	107.90	5.55	2.42		722	0.81		151.7	39.5	2.53	39.4	6.73	4.3	1419	SILTY SAND
11.80	107.70	5.20	1.31		369	0.73		175.5	40.5	2.58	40.4	5.74	3.7	687	SANDY SILT
12.00	107.50	5.59	1.12		343	1.26						7.88	5.0	660	SILT
12.20	107.30	7.65	0.82		350	1.55						13.02	8.1	780	CLAYEY SILT
12.40	107.10	6.49	1.27		465	0.93		160.6	39.2	2.66	39.2	9.40	5.8	965	SANDY SILT
12.60	106.90	2.13	2.66		324	0.29		202.3	42.4	2.76	42.4	1.00	0.6	364	SILTY SAND
12.80	106.70	2.37	1.52		208	0.34		190.8	41.8	2.77	41.8	1.38	0.8	231	SANDY SILT
13.00	106.50	3.12	3.26		592	0.42		215.2	42.2	2.81	42.2	2.10	1.3	881	SILTY SAND

PROJECT: 444 West Maple Avenue LOCATION: Vienna, Virginia	IN-SITU SOIL TESTING, L.C. ENGINEER: R. Failmezger SOUNDING DATE: 8/6/14	SOUNDING D-5

DILATOMETER RESULTS

Ground Surface Elev.: ~ 119.5 m
Water Depth: ~ 3.8 m




PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia
INTERPRETED DMT STRENGTH PARAMETERS
IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14
SOUNDING
D-5
Ground Surface Elev: ~ 119.5 m
Water Depth: ~ 3.8 m
Note: For angles <32°, Triaxial ~ Plane.
K_o
K_D
IN-SITU COEFF. OF LATERAL EARTH PRESSURE, K_o
HORIZONTAL STRESS INDEX, K_D
Vertical Stress, σ_v'
Horizontal Stress, σ_h'
STRESS (bars)
UNDRAINED SHEAR STRENGTH, S_u (bars)
Plane
Triaxial
DRAINED FRICTION ANGLE (degrees)
DEPTH, Z (m)

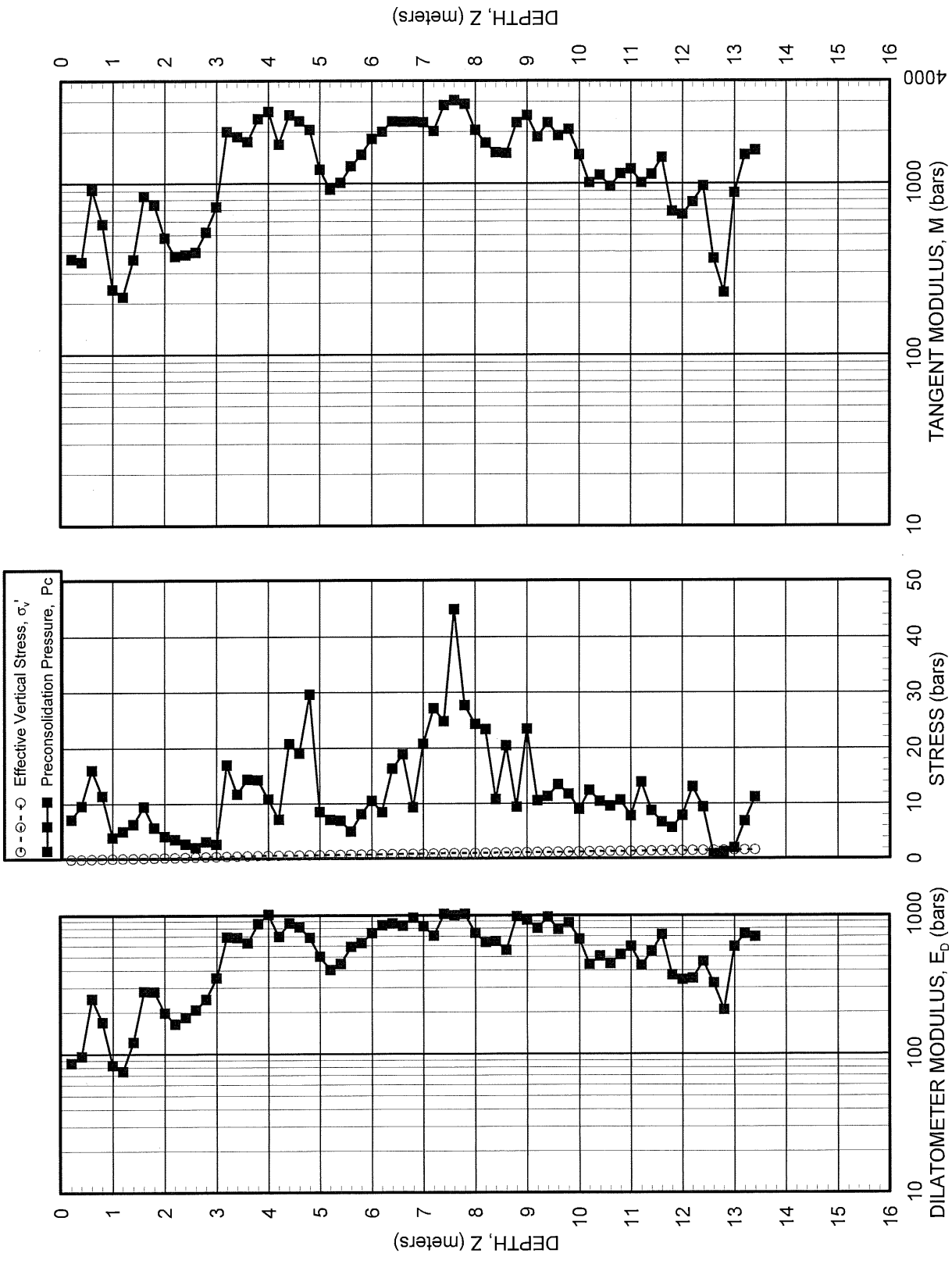
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-5

INTERPRETED DMT DEFORMATION PARAMETERS

Ground Surface Elev.: ~ 119.5 m
Water Depth: ~ 3.8 m



DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. :D-8

FILE NO. : 2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.9 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.8 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.24 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.28 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
0.60	118.30	1330	3.97	8.24		0.24	0.28	9.50	0.00	0.00	0.00	4.02	7.96		0.000	1.80	0.105
0.80	118.10	2460	5.62	16.40		0.24	0.28	9.50	0.00	0.00	0.00	5.35	16.12		0.000	2.00	0.142
1.00	117.90	1590	3.44	10.99		0.24	0.28	9.50	0.00	0.00	0.00	3.33	10.71		0.000	1.90	0.181
1.20	117.70	1130	3.63	6.81		0.24	0.28	9.50	0.00	0.00	0.00	3.74	6.53		0.000	1.80	0.217
1.40	117.50	860	2.04	4.60		0.24	0.28	9.50	0.00	0.00	0.00	2.18	4.32		0.000	1.70	0.251
1.60	117.30	570	2.18	4.24		0.24	0.28	9.50	0.00	0.00	0.00	2.34	3.96		0.000	1.70	0.285
1.80	117.10	970	4.20	8.31		0.24	0.28	9.50	0.00	0.00	0.00	4.26	8.03		0.000	1.80	0.319
2.00	116.90	1480	4.89	11.06		0.24	0.28	9.50	0.00	0.00	0.00	4.85	10.78		0.000	1.80	0.354
2.20	116.70	1650	4.66	10.62		0.24	0.28	9.50	0.00	0.00	0.00	4.63	10.34		0.000	1.80	0.390
2.40	116.50	1440	4.17	9.54		0.24	0.28	9.50	0.00	0.00	0.00	4.17	9.26		0.000	1.80	0.425
2.60	116.30	1200	3.80	9.32		0.24	0.28	9.50	0.00	0.00	0.00	3.79	9.04		0.000	1.80	0.460
2.80	116.10	1110	3.68	8.06		0.24	0.28	9.50	0.00	0.00	0.00	3.73	7.78		0.000	1.80	0.496
3.00	115.90	1080	4.25	9.39		0.24	0.28	9.50	0.00	0.00	0.00	4.26	9.11		0.000	1.80	0.531
3.20	115.70	1260	5.62	12.19		0.24	0.28	9.50	0.00	0.00	0.00	5.56	11.91		0.000	1.95	0.568
3.40	115.50	1550	4.77	11.30		0.24	0.28	9.50	0.00	0.00	0.00	4.71	11.02		0.000	1.80	0.605
3.60	115.30	1730	5.17	11.31		0.24	0.28	9.50	0.00	0.00	0.00	5.13	11.03		0.000	1.80	0.640
3.80	115.10	1790	5.67	13.63		0.24	0.28	9.50	0.00	0.00	0.00	5.54	13.35		0.000	1.95	0.677
4.00	114.90	2100	6.06	14.11		0.24	0.28	9.50	0.00	0.00	0.00	5.92	13.83		0.020	1.95	0.695
4.20	114.70	2320	7.07	15.54		0.24	0.28	9.50	0.00	0.00	0.00	6.91	15.26		0.039	1.95	0.714
4.40	114.50	2340	7.69	17.19		0.24	0.28	9.50	0.00	0.00	0.00	7.48	16.91		0.059	1.95	0.733
4.60	114.30	2350	7.03	16.68		0.24	0.28	9.50	0.00	0.00	0.00	6.81	16.40		0.079	1.95	0.751
4.80	114.10	2420	7.74	17.30		0.24	0.28	9.50	0.00	0.00	0.00	7.53	17.02		0.098	1.95	0.770
5.00	113.90	2490	7.03	17.37		0.24	0.28	9.50	0.00	0.00	0.00	6.78	17.09		0.118	1.95	0.789
5.20	113.70	2600	8.20	17.98		0.24	0.28	9.50	0.00	0.00	0.00	7.98	17.70		0.137	1.95	0.807
5.40	113.50	3150	12.03	29.52		0.24	0.28	9.50	0.00	0.00	0.00	11.42	29.24		0.157	2.10	0.827
5.60	113.30	3640	11.23	27.88		0.24	0.28	9.50	0.00	0.00	0.00	10.66	27.60		0.177	2.10	0.849
5.80	113.10	4110	11.94	29.12		0.24	0.28	9.50	0.00	0.00	0.00	11.35	28.84		0.196	2.10	0.870
6.00	112.90	4360	11.75	33.39		0.24	0.28	9.50	0.00	0.00	0.00	10.93	33.11		0.216	2.15	0.893
6.20	112.70	4800	11.31	34.67		0.24	0.28	9.50	0.00	0.00	0.00	10.41	34.39		0.236	2.15	0.915
6.40	112.50	5050	10.08	37.32		0.24	0.28	9.50	0.00	0.00	0.00	8.98	37.04		0.255	2.15	0.938
6.60	112.30	4850	12.23	38.02		0.24	0.28	9.50	0.00	0.00	0.00	11.21	37.74		0.275	2.15	0.960
6.80	112.10	4160	7.36	24.25		0.24	0.28	9.50	0.00	0.00	0.00	6.78	23.97		0.294	2.00	0.981
7.00	111.90	3890	12.94	27.49		0.24	0.28	9.50	0.00	0.00	0.00	12.48	27.21		0.314	2.10	1.002
7.20	111.70	3560	6.90	19.32		0.24	0.28	9.50	0.00	0.00	0.00	6.55	19.04		0.334	2.00	1.023
7.40	111.50	2970	7.71	18.48		0.24	0.28	9.50	0.00	0.00	0.00	7.44	18.20		0.353	1.95	1.042
7.60	111.30	2890	8.08	20.73		0.24	0.28	9.50	0.00	0.00	0.00	7.71	20.45		0.373	1.95	1.060
7.80	111.10	2910	11.17	24.06		0.24	0.28	9.50	0.00	0.00	0.00	10.79	23.78		0.393	2.10	1.080
8.00	110.90	3080	11.94	26.28		0.24	0.28	9.50	0.00	0.00	0.00	11.49	26.00		0.412	2.10	1.102
8.20	110.70	3050	11.74	23.21		0.24	0.28	9.50	0.00	0.00	0.00	11.43	22.93		0.432	2.10	1.124
8.40	110.50	2800	10.40	23.90		0.24	0.28	9.50	0.00	0.00	0.00	9.99	23.62		0.451	2.10	1.145
8.60	110.30	2740	9.35	22.98		0.24	0.28	9.50	0.00	0.00	0.00	8.93	22.70		0.471	1.95	1.165
8.80	110.10	3000	9.72	21.25		0.24	0.28	9.50	0.00	0.00	0.00	9.41	20.97		0.491	1.95	1.184
9.00	109.90	3030	8.15	16.90		0.24	0.28	9.50	0.00	0.00	0.00	7.98	16.62		0.510	1.95	1.203
9.20	109.70	2840	9.42	19.22		0.24	0.28	9.50	0.00	0.00	0.00	9.20	18.94		0.530	1.95	1.221
9.40	109.50	2540	8.66	15.99		0.24	0.28	9.50	0.00	0.00	0.00	8.56	15.71		0.550	1.95	1.240
9.60	109.30	2590	8.14	16.97		0.24	0.28	9.50	0.00	0.00	0.00	7.96	16.69		0.569	1.95	1.259
9.80	109.10	2950	9.35	21.76		0.24	0.28	9.50	0.00	0.00	0.00	9.00	21.48		0.589	1.95	1.277
10.00	108.90	3060	10.01	20.32		0.24	0.28	9.50	0.00	0.00	0.00	9.76	20.04		0.608	1.95	1.296
10.20	108.70	3160	7.97	15.45		0.24	0.28	9.50	0.00	0.00	0.00	7.86	15.17		0.628	1.95	1.315
10.40	108.50	3190	10.58	23.39		0.24	0.28	9.50	0.00	0.00	0.00	10.21	23.11		0.648	1.95	1.333
10.60	108.30	3280	9.72	20.70		0.24	0.28	9.50	0.00	0.00	0.00	9.44	20.42		0.667	1.95	1.352
10.80	108.10	3060	11.03	20.87		0.24	0.28	9.50	0.00	0.00	0.00	10.80	20.59		0.687	1.95	1.370
11.00	107.90	3210	8.12	15.66		0.24	0.28	9.50	0.00	0.00	0.00	8.01	15.38		0.707	1.95	1.389
11.20	107.70	2960	8.41	16.39		0.24	0.28	9.50	0.00	0.00	0.00	8.28	16.11		0.726	1.95	1.408
11.40	107.50	2720	6.85	13.84		0.24	0.28	9.50	0.00	0.00	0.00	6.77	13.56		0.746	1.95	1.426
11.60	107.30	2590	6.96	16.17		0.24	0.28	9.50	0.00	0.00	0.00	6.77	15.89		0.765	1.95	1.445
11.80	107.10	2500	6.25	13.85		0.24	0.28	9.50	0.00	0.00	0.00	6.14	13.57		0.785	1.95	1.464
12.00	106.90	2560	5.16	10.64		0.24	0.28	9.50	0.00	0.00	0.00	5.15	10.36		0.805	1.80	1.481
12.20	106.70	2120	3.99	7.50		0.24	0.28	9.50	0.00	0.00	0.00	4.08	7.22		0.824	1.80	1.497
12.40	106.50	1710	2.27	3.53		0.24	0.28	9.50	0.00	0.00	0.00	2.47	3.25		0.844	1.60	1.510
12.60	106.30	2250	3.29	9.30		0.24	0.28	9.50	0.00	0.00	0.00	3.26	9.02		0.864	1.90	1.525
12.80	106.10	3870	11.42	21.92		0.24	0.28	9.50	0.00	0.00	0.00	11.16	21.64		0.883	1.95	1.543
13.00	105.90	4590	11.20	20.29		0.24	0.28	9.50	0.00	0.00	0.00	11.01	20.01		0.903	1.95	1.562
13.20	105.70	7330	21.44	41.40		0.24	0.28	9.50	0.00	0.00	0.00	20.71	41.12		0.922	2.10	1.582

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-8

FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.9 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.8 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.24 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.28 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
0.60	118.30	38.31	0.98		137	3.99						10.51	100.1	515	SILT
0.80	118.10	37.58	2.01		374	4.49		72.6	43.8	0.24	40.3	19.62	137.9	1403	SILTY SAND
1.00	117.90	18.43	2.22		256	2.24		48.5	42.8	0.30	39.5	6.40	35.5	789	SILTY SAND
1.20	117.70	17.23	0.75		97	2.55						6.24	28.8	292	CLAYEY SILT
1.40	117.50	8.67	0.98		74	1.68						2.48	9.9	175	SILT
1.60	117.30	8.23	0.69		56	1.63						2.59	9.1	129	CLAYEY SILT
1.80	117.10	13.36	0.88		131	2.19						6.17	19.3	363	CLAYEY SILT
2.00	116.90	13.68	1.22		206	1.83		38.4	38.2	0.57	35.5	8.39	23.7	576	SANDY SILT
2.20	116.70	11.88	1.23		198	1.58		46.2	39.1	0.64	36.7	6.83	17.5	528	SANDY SILT
2.40	116.50	9.81	1.22		177	1.36		40.4	38.2	0.69	35.9	5.38	12.7	438	SANDY SILT
2.60	116.30	8.23	1.39		182	1.21		33.0	36.8	0.74	34.5	4.46	9.7	421	SANDY SILT
2.80	116.10	7.52	1.09		141	1.53						3.91	7.9	312	SILT
3.00	115.90	8.02	1.14		168	1.60						4.64	8.7	384	SILT
3.20	115.70	9.79	1.14		220	1.81						6.76	11.9	546	SILT
3.40	115.50	7.79	1.34		219	1.15		43.4	36.9	0.97	35.1	5.29	8.8	494	SANDY SILT
3.60	115.30	8.02	1.15		205	1.60						5.58	8.7	467	SILT
3.80	115.10	8.18	1.41		271	1.20		49.4	36.9	1.08	35.3	6.46	9.5	625	SANDY SILT
4.00	114.90	8.49	1.34		274	1.21		60.0	37.9	1.12	36.4	6.85	9.9	642	SANDY SILT
4.20	114.70	9.63	1.21		290	1.35		64.3	37.9	1.15	36.4	8.84	12.4	713	SANDY SILT
4.40	114.50	10.13	1.27		327	1.42		62.8	37.4	1.18	36.0	10.11	13.8	822	SANDY SILT
4.60	114.30	8.97	1.42		333	1.27		66.4	37.9	1.21	36.5	8.16	10.9	796	SANDY SILT
4.80	114.10	9.65	1.28		329	1.36		66.1	37.5	1.24	36.2	9.68	12.6	812	SANDY SILT
5.00	113.90	8.45	1.55		358	1.19		72.4	38.3	1.28	37.0	7.59	9.6	836	SANDY SILT
5.20	113.70	9.71	1.24		337	1.36		71.5	37.7	1.30	36.5	10.21	12.6	834	SANDY SILT
5.40	113.50	13.62	1.58		618	1.84		77.8	37.2	1.33	36.0	20.04	24.2	1726	SANDY SILT
5.60	113.30	12.35	1.62		588	1.65		100.3	38.8	1.38	37.7	16.16	19.0	1587	SANDY SILT
5.80	113.10	12.81	1.57		607	1.68		115.8	39.4	1.42	38.4	17.38	20.0	1660	SANDY SILT
6.00	112.90	12.01	2.07		770	1.57		127.9	40.0	1.47	39.1	15.41	17.3	2057	SILTY SAND
6.20	112.70	11.12	2.36		832	1.43		148.3	41.0	1.52	40.1	13.14	14.4	2164	SILTY SAND
6.40	112.50	9.31	3.21		974	1.17		166.0	42.0	1.56	41.1	9.16	9.8	2373	SILTY SAND
6.60	112.30	11.38	2.43		921	1.47		146.8	40.6	1.58	39.7	14.68	15.3	2415	SILTY SAND
6.80	112.10	6.61	2.65		596	0.86		141.7	41.6	1.63	40.8	5.14	5.2	1271	SILTY SAND
7.00	111.90	12.14	1.21		511	1.64		103.6	38.1	1.62	37.2	18.95	18.9	1372	SANDY SILT
7.20	111.70	6.07	2.01		434	0.84		119.0	40.4	1.69	39.7	4.94	4.8	882	SILTY SAND
7.40	111.50	6.80	1.52		373	0.99		91.1	38.4	1.69	37.6	6.79	6.5	795	SANDY SILT
7.60	111.30	6.92	1.74		442	1.02		86.8	37.9	1.71	37.2	7.26	6.8	950	SANDY SILT
7.80	111.10	9.62	1.25		451	1.39		74.3	36.1	1.72	35.3	14.17	13.1	1110	SANDY SILT
8.00	110.90	10.05	1.31		504	1.44		78.0	36.2	1.75	35.4	15.61	14.2	1261	SANDY SILT
8.20	110.70	9.79	1.05		399	1.81						13.39	11.9	989	SILT
8.40	110.50	8.33	1.43		473	1.24		74.2	36.1	1.82	35.4	11.61	10.1	1098	SANDY SILT
8.60	110.30	7.26	1.63		478	1.10		76.6	36.4	1.86	35.8	9.17	7.9	1048	SANDY SILT
8.80	110.10	7.53	1.30		401	1.12		84.8	36.9	1.90	36.3	9.76	8.2	892	SANDY SILT
9.00	109.90	6.21	1.16		300	1.35						7.04	5.9	608	SILT
9.20	109.70	7.10	1.12		338	1.48						8.81	7.2	730	SILT
9.40	109.50	6.46	0.89		248	1.39						7.72	6.2	511	CLAYEY SILT
9.60	109.30	5.88	1.18		303	1.30						6.76	5.4	598	SILT
9.80	109.10	6.58	1.49		433	1.01		85.7	36.7	2.04	36.2	8.39	6.6	908	SANDY SILT
10.00	108.90	7.06	1.12		357	1.47						9.28	7.2	769	SILT
10.20	108.70	5.50	1.01		254	1.24						6.38	4.8	483	SILT
10.40	108.50	7.17	1.35		448	1.08		90.4	36.7	2.13	36.2	10.18	7.6	974	SANDY SILT
10.60	108.30	6.49	1.25		381	0.99		97.5	37.2	2.17	36.9	8.51	6.3	791	SANDY SILT
10.80	108.10	7.38	0.97		340	1.51						10.51	7.7	746	SILT
11.00	107.90	5.26	1.01		256	1.20						6.27	4.5	475	SILT
11.20	107.70	5.36	1.04		272	1.22						6.56	4.7	511	SILT
11.40	107.50	4.22	1.13		236	1.03						4.57	3.2	388	SILT
11.60	107.30	4.15	1.52		317	0.72		83.4	36.5	2.30	36.2	4.59	3.2	523	SANDY SILT
11.80	107.10	3.66	1.39		258	0.66		82.9	36.5	2.33	36.2	3.85	2.6	392	SANDY SILT
12.00	106.90	2.94	1.20		181	0.77						2.69	1.8	233	SILT
12.20	106.70	2.18	0.96		109	0.59						1.71	1.1	106	SILT
12.40	106.50	1.08	0.48		27	0.26	0.15					0.58	0.4	23	SILTY CLAY
12.60	106.30	1.57	2.41		200	0.39		87.2	37.3	2.45	37.1	1.33	0.9	170	SILTY SAND
12.80	106.10	6.66	1.02		364	1.41						10.08	6.5	762	SILT
13.00	105.90	6.47	0.89		312	1.39						9.76	6.2	644	CLAYEY SILT
13.20	105.70	12.51	1.03		708	2.11						27.62	17.5	1921	SILT

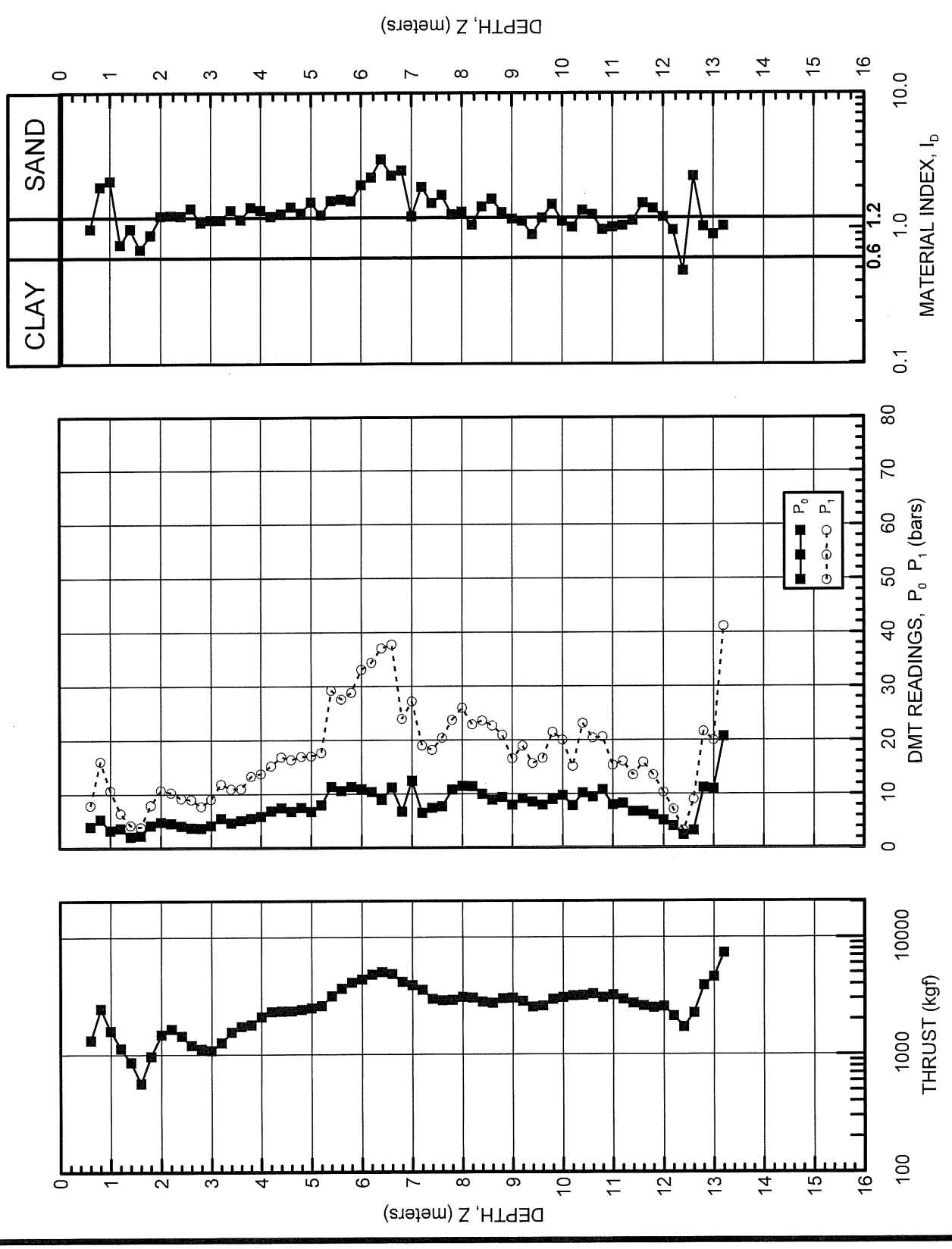
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

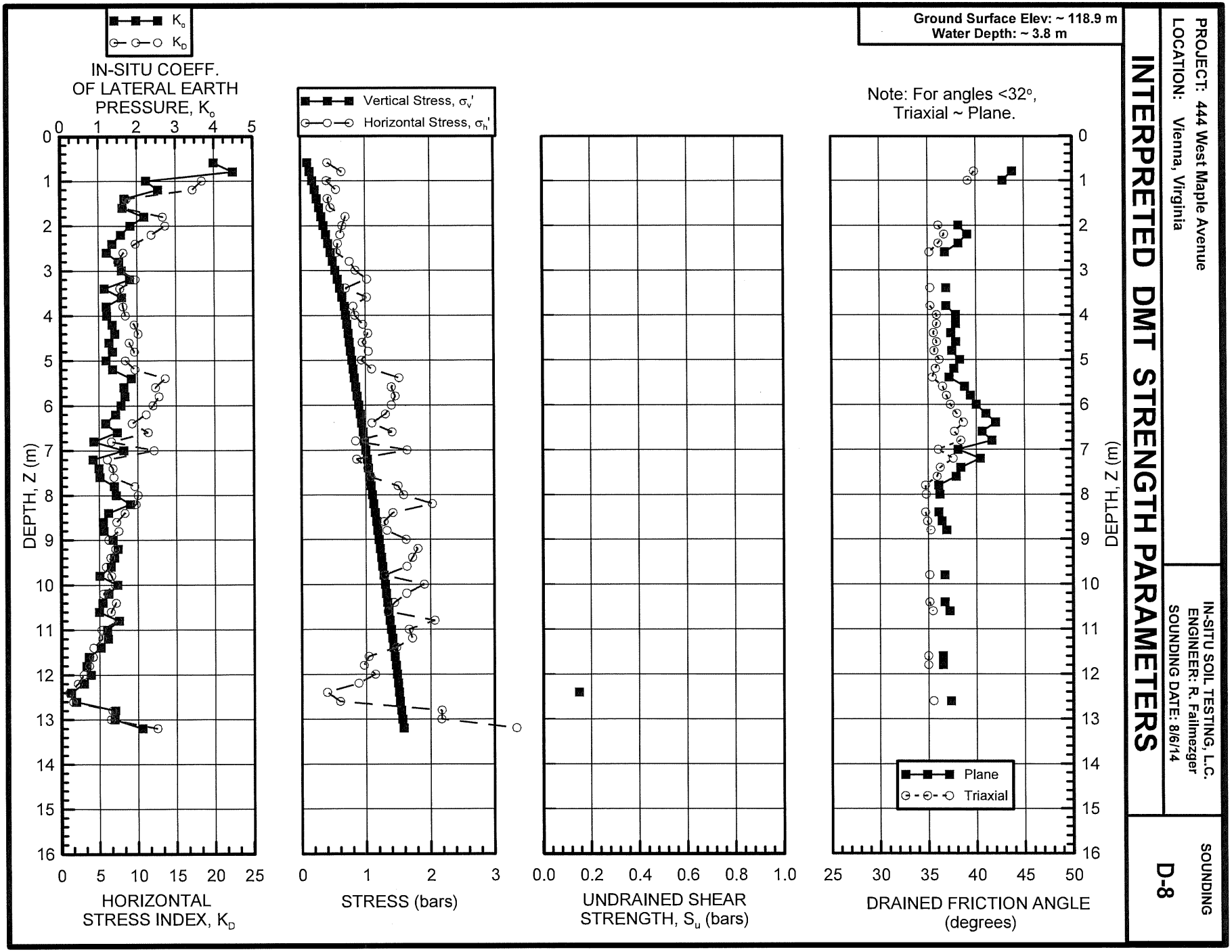
IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-8

DILATOMETER RESULTS

Ground Surface Elev.: ~ 118.9 m
Water Depth: ~ 3.8 m




Ground Surface Elev: ~ 118.9 m
Water Depth: ~ 3.8 m
INTERPRETED DMT STRENGTH PARAMETERS
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia
IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14
SOUNDING
D-8
K_o
K_D
IN-SITU COEFF. OF LATERAL EARTH PRESSURE, K_o
HORIZONTAL STRESS INDEX, K_D
Vertical Stress, σ_v'
Horizontal Stress, σ_h'
STRESS (bars)
UNDRAINED SHEAR STRENGTH, S_u (bars)
Note: For angles <32°, Triaxial ~ Plane.
Plane
Triaxial
DRAINED FRICTION ANGLE (degrees)
DEPTH, Z (m)

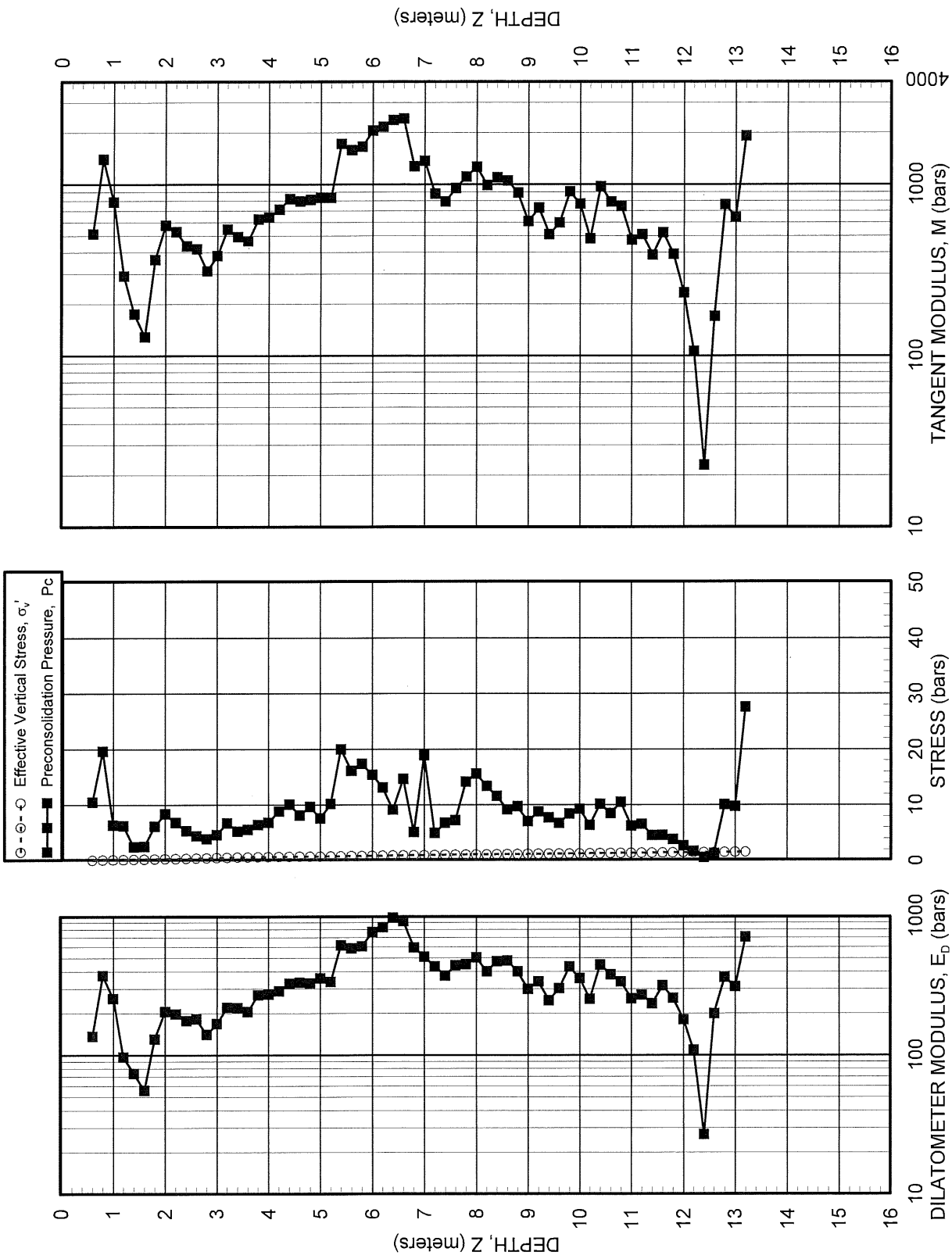
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-8

INTERPRETED DMT DEFORMATION PARAMETERS

Ground Surface Elev.: ~ 118.9 m
Water Depth: ~ 3.8 m



DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL) SNDG. NO. :D-10
In-Situ Soil Testing, L.C. Page 1a
JOB FILE: 444 West Maple Avenue FILE NO. : 2014-45
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger SNDG. DATE: 8/6/14
ANAL.BY : Roger Failmezger, P.E. ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 117.7 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 4.0 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.24 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.34 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
0.60	117.10	650	2.01	4.41		0.24	0.34	9.50	0.00	0.00	0.00	2.16	4.07		0.000	1.70	0.105
0.80	116.90	320	1.01	2.47		0.24	0.34	9.50	0.00	0.00	0.00	1.21	2.13		0.000	1.60	0.137
1.00	116.70	350	1.15	2.49		0.24	0.34	9.50	0.00	0.00	0.00	1.35	2.15		0.000	1.60	0.169
1.20	116.50	2820	1.10	12.17		0.24	0.34	9.50	0.00	0.00	0.00	0.82	11.83		0.000	1.80	0.202
1.40	116.30	2820	6.12	13.26		0.24	0.34	9.50	0.00	0.00	0.00	6.03	12.92		0.000	1.95	0.239
1.60	116.10	1600	10.64	21.26		0.24	0.34	9.50	0.00	0.00	0.00	10.38	20.92		0.000	1.95	0.277
1.80	115.90	1430	2.24	7.78		0.24	0.34	9.50	0.00	0.00	0.00	2.23	7.44		0.000	1.90	0.315
2.00	115.70	720	2.59	5.72		0.24	0.34	9.50	0.00	0.00	0.00	2.70	5.38		0.000	1.70	0.350
2.20	115.50	630	2.23	6.56		0.24	0.34	9.50	0.00	0.00	0.00	2.28	6.22		0.000	1.70	0.384
2.40	115.30	830	3.05	7.35		0.24	0.34	9.50	0.00	0.00	0.00	3.10	7.01		0.000	1.80	0.418
2.60	115.10	1000	2.74	7.38		0.24	0.34	9.50	0.00	0.00	0.00	2.78	7.04		0.000	1.80	0.453
2.80	114.90	880	2.47	6.47		0.24	0.34	9.50	0.00	0.00	0.00	2.54	6.13		0.000	1.70	0.488
3.00	114.70	740	2.20	6.16		0.24	0.34	9.50	0.00	0.00	0.00	2.27	5.82		0.000	1.70	0.521
3.20	114.50	610	1.86	5.47		0.24	0.34	9.50	0.00	0.00	0.00	1.95	5.13		0.000	1.70	0.554
3.40	114.30	570	2.11	5.25		0.24	0.34	9.50	0.00	0.00	0.00	2.22	4.91		0.000	1.70	0.588
3.60	114.10	750	2.67	6.71		0.24	0.34	9.50	0.00	0.00	0.00	2.74	6.37		0.000	1.80	0.622
3.80	113.90	1140	4.95	10.57		0.24	0.34	9.50	0.00	0.00	0.00	4.94	10.23		0.000	1.80	0.658
4.00	113.70	1180	3.32	8.51		0.24	0.34	9.50	0.00	0.00	0.00	3.33	8.17		0.000	1.80	0.693
4.20	113.50	1130	3.92	9.14		0.24	0.34	9.50	0.00	0.00	0.00	3.93	8.80		0.020	1.80	0.709
4.40	113.30	1160	3.76	9.64		0.24	0.34	9.50	0.00	0.00	0.00	3.74	9.30		0.039	1.80	0.724
4.60	113.10	1490	5.77	11.83		0.24	0.34	9.50	0.00	0.00	0.00	5.74	11.49		0.059	1.95	0.741
4.80	112.90	1930	5.38	11.77		0.24	0.34	9.50	0.00	0.00	0.00	5.33	11.43		0.079	1.80	0.759
5.00	112.70	2470	10.45	18.94		0.24	0.34	9.50	0.00	0.00	0.00	10.29	18.60		0.098	1.95	0.776
5.20	112.50	2210	6.20	14.35		0.24	0.34	9.50	0.00	0.00	0.00	6.06	14.01		0.118	1.95	0.794
5.40	112.30	2370	8.94	17.33		0.24	0.34	9.50	0.00	0.00	0.00	8.79	16.99		0.137	1.95	0.813
5.60	112.10	3000	10.98	23.11		0.24	0.34	9.50	0.00	0.00	0.00	10.64	22.77		0.157	2.10	0.833
5.80	111.90	2880	9.95	21.64		0.24	0.34	9.50	0.00	0.00	0.00	9.63	21.30		0.177	1.95	0.853
6.00	111.70	2840	9.74	19.39		0.24	0.34	9.50	0.00	0.00	0.00	9.53	19.05		0.196	1.95	0.872
6.20	111.50	2610	8.91	16.12		0.24	0.34	9.50	0.00	0.00	0.00	8.82	15.78		0.216	1.95	0.891
6.40	111.30	2560	7.64	16.90		0.24	0.34	9.50	0.00	0.00	0.00	7.45	16.56		0.236	1.95	0.909
6.60	111.10	2400	7.68	14.50		0.24	0.34	9.50	0.00	0.00	0.00	7.61	14.16		0.255	1.95	0.928
6.80	110.90	2300	7.47	14.88		0.24	0.34	9.50	0.00	0.00	0.00	7.37	14.54		0.275	1.95	0.947
7.00	110.70	2330	7.52	13.85		0.24	0.34	9.50	0.00	0.00	0.00	7.47	13.51		0.294	1.95	0.965
7.20	110.50	2410	7.49	14.66		0.24	0.34	9.50	0.00	0.00	0.00	7.40	14.32		0.314	1.95	0.984
7.40	110.30	2520	7.67	14.80		0.24	0.34	9.50	0.00	0.00	0.00	7.58	14.46		0.334	1.95	1.002
7.60	110.10	2740	8.47	16.49		0.24	0.34	9.50	0.00	0.00	0.00	8.34	16.15		0.353	1.95	1.021
7.80	109.90	2670	8.47	15.59		0.24	0.34	9.50	0.00	0.00	0.00	8.38	15.25		0.373	1.95	1.040
8.00	109.70	1860	8.36	15.22		0.24	0.34	9.50	0.00	0.00	0.00	8.29	14.88		0.393	1.95	1.058
8.20	109.50	1360	1.69	4.75		0.24	0.34	9.50	0.00	0.00	0.00	1.81	4.41		0.412	1.80	1.076
8.40	109.30	1860	5.35	13.96		0.24	0.34	9.50	0.00	0.00	0.00	5.19	13.62		0.432	1.95	1.093
8.60	109.10	2250	6.70	13.94		0.24	0.34	9.50	0.00	0.00	0.00	6.61	13.60		0.451	1.95	1.111
8.80	108.90	2340	6.81	13.87		0.24	0.34	9.50	0.00	0.00	0.00	6.73	13.53		0.471	1.95	1.130
9.00	108.70	2420	7.36	15.34		0.24	0.34	9.50	0.00	0.00	0.00	7.23	15.00		0.491	1.95	1.149
9.20	108.50	2450	6.19	13.46		0.24	0.34	9.50	0.00	0.00	0.00	6.10	13.12		0.510	1.95	1.167
9.40	108.30	2630	7.06	16.21		0.24	0.34	9.50	0.00	0.00	0.00	6.87	15.87		0.530	1.95	1.186
9.60	108.10	3260	8.93	20.55		0.24	0.34	9.50	0.00	0.00	0.00	8.62	20.21		0.550	1.95	1.205
9.80	107.90	3750	11.10	25.55		0.24	0.34	9.50	0.00	0.00	0.00	10.65	25.21		0.569	2.10	1.225
10.00	107.70	4000	10.90	23.54		0.24	0.34	9.50	0.00	0.00	0.00	10.54	23.20		0.589	2.10	1.246
10.20	107.50	4020	10.33	22.06		0.24	0.34	9.50	0.00	0.00	0.00	10.01	21.72		0.608	1.95	1.266
10.40	107.30	4080	10.04	21.71		0.24	0.34	9.50	0.00	0.00	0.00	9.73	21.37		0.628	1.95	1.285
10.60	107.10	3960	10.69	22.38		0.24	0.34	9.50	0.00	0.00	0.00	10.37	22.04		0.648	1.95	1.304
10.80	106.90	3540	5.79	15.07		0.24	0.34	9.50	0.00	0.00	0.00	5.60	14.73		0.667	2.00	1.323
11.00	106.70	3730	9.59	21.08		0.24	0.34	9.50	0.00	0.00	0.00	9.28	20.74		0.687	1.95	1.342
11.20	106.50	5390	15.52	33.67		0.24	0.34	9.50	0.00	0.00	0.00	14.88	33.33		0.707	2.10	1.362
11.40	106.30	5920	14.06	31.36		0.24	0.34	9.50	0.00	0.00	0.00	13.46	31.02		0.726	2.10	1.384
11.60	106.10	5950	15.80	34.39		0.24	0.34	9.50	0.00	0.00	0.00	15.14	34.05		0.746	2.10	1.405
11.80	105.90	6260	17.41	37.75		0.24	0.34	9.50	0.00	0.00	0.00	16.66	37.41		0.765	2.10	1.427
12.00	105.70	6270	15.77	33.80		0.24	0.34	9.50	0.00	0.00	0.00	15.14	33.46		0.785	2.10	1.448
12.20	105.50	6210	15.64	33.96		0.24	0.34	9.50	0.00	0.00	0.00	14.99	33.62		0.805	2.10	1.470
12.40	105.30	6080	14.88	32.23		0.24	0.34	9.50	0.00	0.00	0.00	14.28	31.89		0.824	2.10	1.492
12.60	105.10	5820	15.09	29.21		0.24	0.34	9.50	0.00	0.00	0.00	14.65	28.87		0.844	2.10	1.513
12.80	104.90	6230	16.25	31.82		0.24	0.34	9.50	0.00	0.00	0.00	15.74	31.48		0.864	2.10	1.535
13.00	104.70	6020	16.36	33.39		0.24	0.34	9.50	0.00	0.00	0.00	15.78	33.05		0.883	2.10	1.556
13.20	104.50	6600	16.15	35.11		0.24	0.34	9.50	0.00	0.00	0.00	15.47	34.77		0.903	2.10	1.578
13.40	104.30	7310	20.73	42.08		0.24	0.34	9.50	0.00	0.00	0.00	19.93	41.74		0.922	2.10	1.600

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-10

FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 117.7 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 4.0 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.24 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.34 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
0.60	117.10	20.56	0.89		66	2.82						3.98	37.9	211	CLAYEY SILT
0.80	116.90	8.78	0.77		32	1.69						1.38	10.0	76	CLAYEY SILT
1.00	116.70	8.01	0.59		28	1.60	0.21					1.47	8.7	63	SILTY CLAY
1.20	116.50	4.03	13.51		382									654	SAND
1.40	116.30	25.24	1.14		239	3.17						12.48	52.2	807	SILT
1.60	116.10	37.43	1.02		366	3.94						26.76	96.5	1372	SILT
1.80	115.90	7.09	2.33		181	0.90		48.8	42.1	0.53	39.6	1.82	5.8	395	SILTY SAND
2.00	115.70	7.71	0.99		93	1.56						2.88	8.2	208	SILT
2.20	115.50	5.95	1.73		137	0.99		17.2	34.2	0.60	31.4	2.32	6.1	274	SANDY SILT
2.40	115.30	7.42	1.26		136	1.16		21.6	34.8	0.66	32.2	3.60	8.6	299	SANDY SILT
2.60	115.10	6.13	1.54		148	0.95		29.7	36.8	0.72	34.5	2.64	5.8	300	SANDY SILT
2.80	114.90	5.21	1.41		125	0.87		26.3	35.7	0.77	33.5	2.26	4.6	232	SANDY SILT
3.00	114.70	4.36	1.56		123	0.80		22.2	34.3	0.81	32.1	1.94	3.7	209	SANDY SILT
3.20	114.50	3.51	1.63		110	0.73		18.6	32.8	0.85	30.6	1.60	2.9	165	SANDY SILT
3.40	114.30	3.78	1.21		93	0.80		16.2	31.2	0.89	29.1	2.00	3.4	144	SANDY SILT
3.60	114.10	4.40	1.33		126	0.84		21.2	32.7	0.96	30.7	2.48	4.0	214	SANDY SILT
3.80	113.90	7.51	1.07		184	1.53						5.18	7.9	407	SILT
4.00	113.70	4.81	1.45		168	0.83		35.6	35.5	1.09	33.8	2.86	4.1	301	SANDY SILT
4.20	113.50	5.52	1.25		169	0.94		31.4	34.2	1.11	32.6	3.80	5.4	324	SANDY SILT
4.40	113.30	5.10	1.51		193	0.88		33.5	34.7	1.14	33.1	3.38	4.7	357	SANDY SILT
4.60	113.10	7.66	1.01		200	1.55						6.02	8.1	446	SILT
4.80	112.90	6.92	1.16		212	1.45						5.26	6.9	452	SILT
5.00	112.70	13.14	0.81		288	2.17						14.63	18.9	795	CLAYEY SILT
5.20	112.50	7.48	1.34		276	1.09		64.8	37.8	1.28	36.5	6.27	7.9	611	SANDY SILT
5.40	112.30	10.64	0.95		285	1.91						11.03	13.6	728	SILT
5.60	112.10	12.59	1.16		421	2.12						14.69	17.6	1144	SILT
5.80	111.90	11.08	1.23		405	1.53		75.5	37.4	1.37	36.2	13.93	16.3	1051	SANDY SILT
6.00	111.70	10.70	1.02		330	1.92						11.93	13.7	847	SILT
6.20	111.50	9.66	0.81		242	1.80						10.39	11.7	595	CLAYEY SILT
6.40	111.30	7.93	1.26		316	1.15		73.5	37.6	1.46	36.5	8.01	8.8	719	SANDY SILT
6.60	111.10	7.92	0.89		227	1.59						7.95	8.6	515	CLAYEY SILT
6.80	110.90	7.49	1.01		249	1.53						7.43	7.9	550	SILT
7.00	110.70	7.44	0.84		210	1.52						7.49	7.8	461	CLAYEY SILT
7.20	110.50	7.20	0.98		240	1.49						7.26	7.4	521	SILT
7.40	110.30	7.23	0.95		239	1.49						7.44	7.4	519	SILT
7.60	110.10	7.82	0.98		271	1.57						8.57	8.4	611	SILT
7.80	109.90	7.70	0.86		238	1.56						8.52	8.2	533	CLAYEY SILT
8.00	109.70	7.46	0.84		229	1.53						8.25	7.8	504	CLAYEY SILT
8.20	109.50	1.30	1.87		90	0.38		53.6	36.4	1.71	35.6	0.84	0.8	77	SILTY SAND
8.40	109.30	4.35	1.77		293	0.76		58.3	35.9	1.73	35.1	3.82	3.5	501	SANDY SILT
8.60	109.10	5.54	1.14		243	1.25						5.44	4.9	465	SILT
8.80	108.90	5.54	1.09		236	1.25						5.53	4.9	452	SILT
9.00	108.70	5.87	1.15		270	1.30						6.16	5.4	532	SILT
9.20	108.50	4.78	1.26		244	0.78		78.3	37.3	1.87	36.6	4.44	3.8	433	SANDY SILT
9.40	108.30	5.35	1.42		312	0.85		82.1	37.3	1.90	36.7	5.39	4.5	591	SANDY SILT
9.60	108.10	6.70	1.44		402	0.99		99.1	38.0	1.95	37.5	7.76	6.4	849	SANDY SILT
9.80	107.90	8.23	1.45		505	1.17		109.2	38.1	1.98	37.6	11.30	9.2	1168	SANDY SILT
10.00	107.70	7.98	1.27		439	1.13		119.9	38.7	2.02	38.2	10.67	8.6	1001	SANDY SILT
10.20	107.50	7.43	1.24		406	1.05		123.4	38.9	2.06	38.4	9.44	7.5	897	SANDY SILT
10.40	107.30	7.08	1.28		404	1.00		127.4	39.1	2.10	38.7	8.72	6.8	873	SANDY SILT
10.60	107.10	7.46	1.20		405	1.53						10.17	7.8	895	SILT
10.80	106.90	3.73	1.85		317	0.57		126.6	40.0	2.17	39.7	2.86	2.2	497	SILTY SAND
11.00	106.70	6.41	1.33		398	0.94		116.2	38.4	2.18	38.1	7.87	5.9	821	SANDY SILT
11.20	106.50	10.41	1.30		640	1.41		155.7	39.1	2.22	38.7	18.64	13.7	1625	SANDY SILT
11.40	106.30	9.21	1.38		609	1.22		183.8	40.3	2.28	40.0	14.36	10.4	1474	SANDY SILT
11.60	106.10	10.24	1.31		656	1.37		177.2	39.7	2.30	39.4	18.23	13.0	1655	SANDY SILT
11.80	105.90	11.14	1.31		720	1.48		182.3	39.5	2.34	39.3	21.79	15.3	1874	SANDY SILT
12.00	105.70	9.91	1.28		636	1.32		190.4	40.0	2.38	39.8	17.43	12.0	1584	SANDY SILT
12.20	105.50	9.65	1.31		646	1.29		188.9	40.0	2.41	39.8	16.89	11.5	1593	SANDY SILT
12.40	105.30	9.02	1.31		611	1.21		187.5	40.0	2.45	39.8	15.10	10.1	1466	SANDY SILT
12.60	105.10	9.13	1.03		493	1.74						16.15	10.7	1188	SILT
12.80	104.90	9.69	1.06		546	1.80						18.00	11.7	1348	SILT
13.00	104.70	9.57	1.16		599	1.79						17.89	11.5	1472	SILT
13.20	104.50	9.23	1.32		670	1.23		203.4	40.1	2.59	40.0	16.60	10.5	1622	SANDY SILT
13.40	104.30	11.88	1.15		757	2.05						25.78	16.1	2016	SILT

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. :D-10
Page 2a
FILE NO. : 2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 117.7 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 4.0 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.24 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.34 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
13.60	104.10	6960	19.48	38.01		0.24	0.34	9.50	0.00	0.00	0.00	18.82	37.67		0.942	2.10	1.621
13.80	103.90	7530	24.48	49.05		0.24	0.34	9.50	0.00	0.00	0.00	23.52	48.71		0.962	2.10	1.643
14.00	103.70	7830	18.96	42.94		0.24	0.34	9.50	0.00	0.00	0.00	18.03	42.60		0.981	2.10	1.664
14.20	103.50	7630	18.45	40.19		0.24	0.34	9.50	0.00	0.00	0.00	17.63	39.85		1.001	2.10	1.686
14.40	103.30	7360	18.74	36.28		0.24	0.34	9.50	0.00	0.00	0.00	18.13	35.94		1.021	2.10	1.708
14.60	103.10	7940	21.50	40.69		0.24	0.34	9.50	0.00	0.00	0.00	20.81	40.35		1.040	2.10	1.729
14.80	102.90	8960	24.55	50.35		0.24	0.34	9.50	0.00	0.00	0.00	23.53	50.01		1.060	2.10	1.751
15.00	102.70	10120	32.84	57.71		0.24	0.34	9.50	0.00	0.00	0.00	31.87	57.37		1.079	2.10	1.772
15.20	102.50	10390	22.07	49.19		0.24	0.34	9.50	0.00	0.00	0.00	20.98	48.85		1.099	2.10	1.794
15.40	102.30	11010	29.94	59.95		0.24	0.34	9.50	0.00	0.00	0.00	28.71	59.61		1.119	2.10	1.816

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-10
Page 2b
FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 117.7 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 4.0 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.24 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.34 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
13.60	104.10	11.03	1.05		654	1.95						23.26	14.3	1696	SILT
13.80	103.90	13.73	1.12		874	2.23						33.18	20.2	2448	SILT
14.00	103.70	10.24	1.44		853	1.34		240.9	40.5	2.75	40.5	20.89	12.6	2151	SANDY SILT
14.20	103.50	9.86	1.34		771	1.30		235.1	40.4	2.78	40.4	19.82	11.8	1917	SANDY SILT
14.40	103.30	10.02	1.04		618	1.84						21.10	12.4	1546	SILT
14.60	103.10	11.43	0.99		678	2.00						26.24	15.2	1781	SILT
14.80	102.90	12.83	1.18		919	2.14						31.82	18.2	2514	SILT
15.00	102.70	17.37	0.83		885	2.56						51.65	29.1	2675	CLAYEY SILT
15.20	102.50	11.08	1.40		967	1.40		330.8	41.7	2.99	41.8	24.83	13.8	2512	SANDY SILT
15.40	102.30	15.20	1.12		1072	2.37						42.95	23.7	3106	SILT

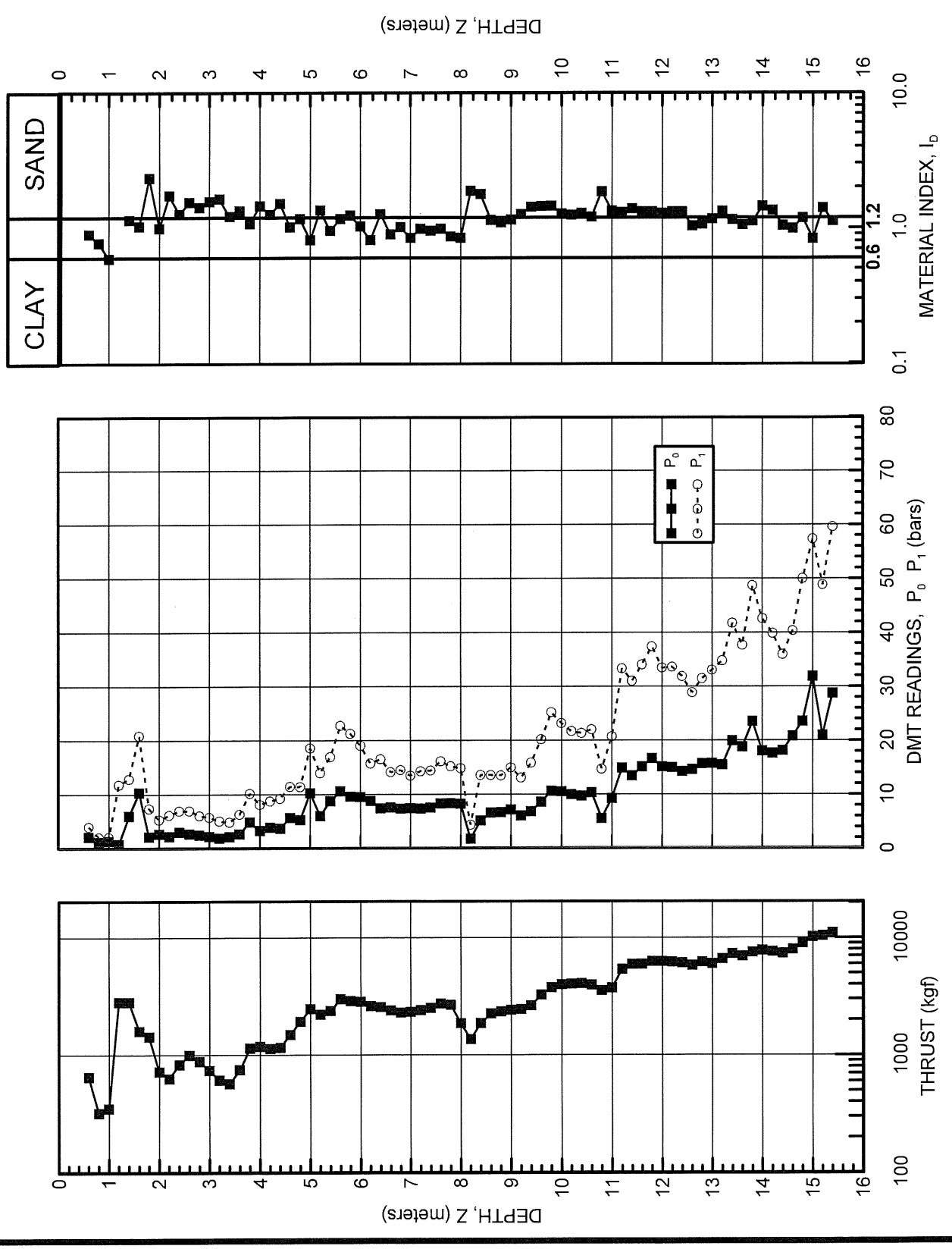
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-10

DILATOMETER RESULTS

Ground Surface Elev.: ~ 117.7 m
Water Depth: ~ 4.0 m

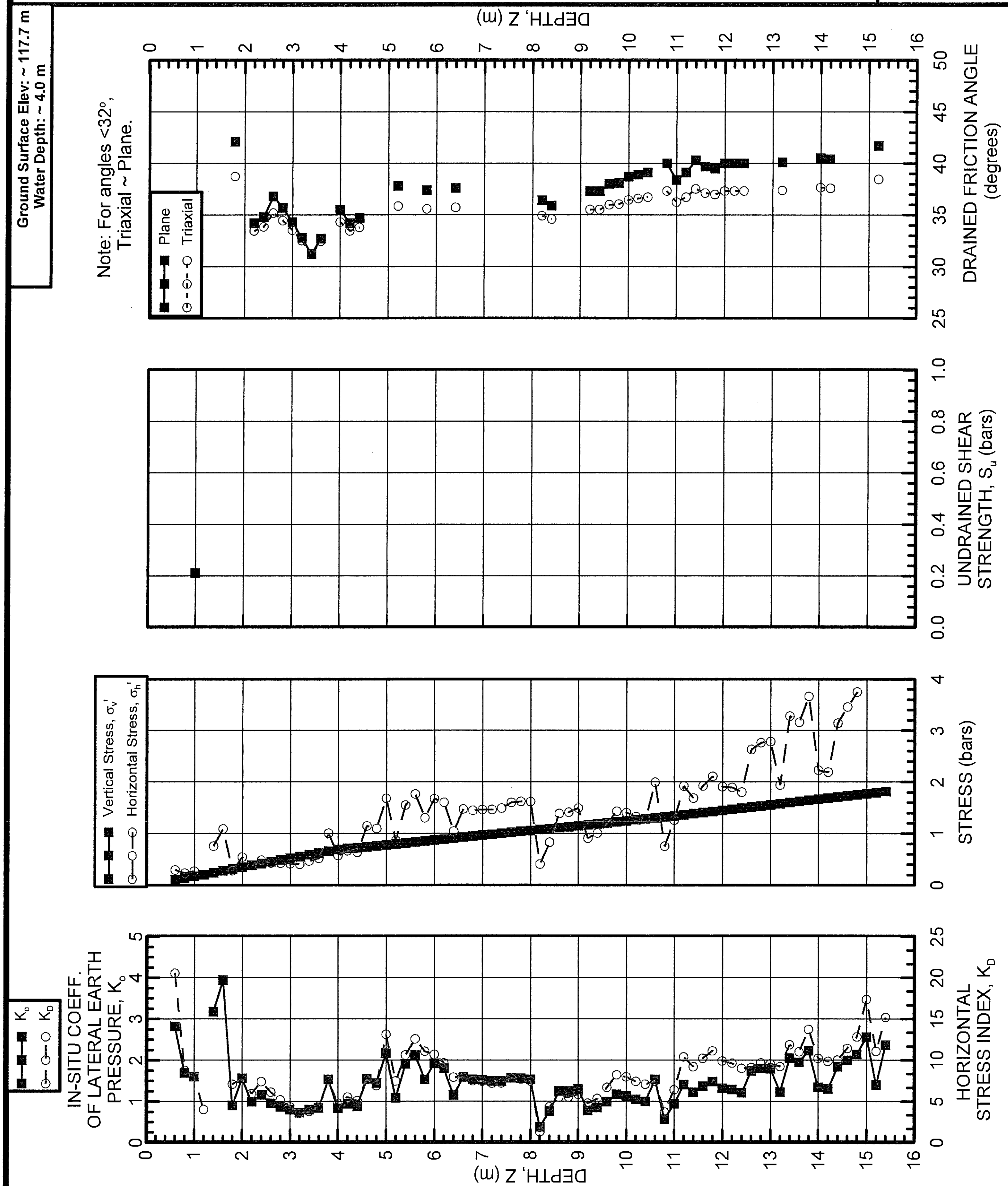


PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-10

INTERPRETED DMT STRENGTH PARAMETERS



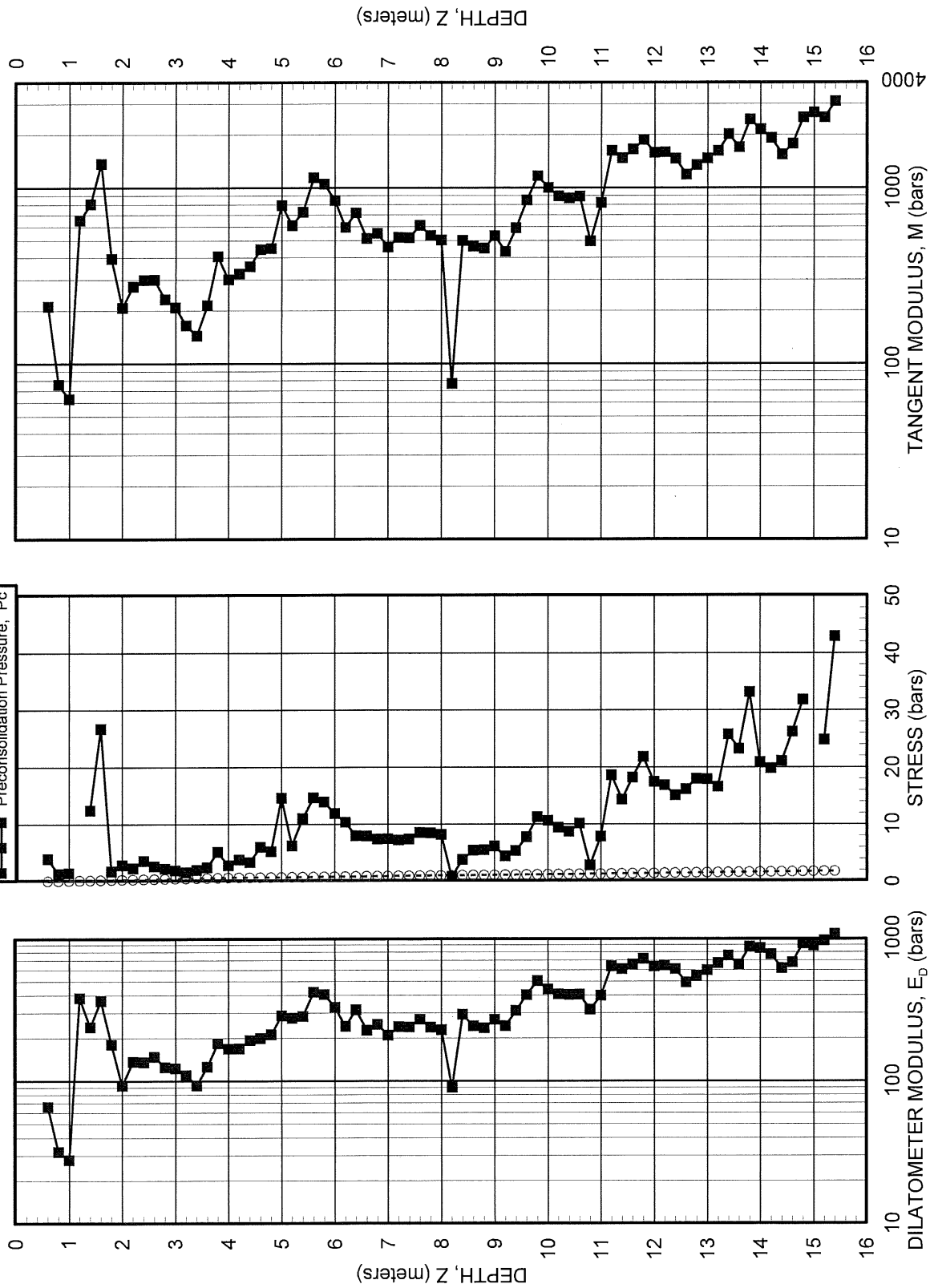
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-10

INTERPRETED DMT DEFORMATION PARAMETERS

Ground Surface Elev.: ~ 117.7 m
Water Depth: ~ 4.0 m



DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. :D-15

FILE NO. : 2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.6 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.4 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.19 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.76 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
0.60	118.00	1380	0.95	4.38		0.19	0.76	9.50	0.00	0.00	0.00	1.02	3.62		0.000	1.70	0.105
0.80	117.80	1440	3.68	11.64		0.19	0.76	9.50	0.00	0.00	0.00	3.52	10.88		0.000	1.90	0.140
1.00	117.60	640	2.18	5.00		0.19	0.76	9.50	0.00	0.00	0.00	2.28	4.24		0.000	1.70	0.176
1.20	117.40	560	3.52	6.25		0.19	0.76	9.50	0.00	0.00	0.00	3.62	5.49		0.000	1.70	0.209
1.40	117.20	800	4.87	12.04		0.19	0.76	9.50	0.00	0.00	0.00	4.75	11.28		0.000	1.80	0.243
1.60	117.00	950	5.16	11.50		0.19	0.76	9.50	0.00	0.00	0.00	5.08	10.74		0.000	1.80	0.279
1.80	116.80	1380	6.10	14.17		0.19	0.76	9.50	0.00	0.00	0.00	5.93	13.41		0.000	1.95	0.316
2.00	116.60	1190	2.88	8.27		0.19	0.76	9.50	0.00	0.00	0.00	2.85	7.51		0.000	1.80	0.352
2.20	116.40	630	3.31	6.11		0.19	0.76	9.50	0.00	0.00	0.00	3.41	5.35		0.000	1.70	0.387
2.40	116.20	370	3.02	5.55		0.19	0.76	9.50	0.00	0.00	0.00	3.13	4.79		0.000	1.70	0.420
2.60	116.00	280	1.67	3.83		0.19	0.76	9.50	0.00	0.00	0.00	1.80	3.07		0.000	1.60	0.452
2.80	115.80	390	1.72	4.89		0.19	0.76	9.50	0.00	0.00	0.00	1.80	4.13		0.000	1.70	0.485
3.00	115.60	630	1.97	4.08		0.19	0.76	9.50	0.00	0.00	0.00	2.10	3.32		0.000	1.70	0.518
3.20	115.40	1290	8.20	20.80		0.19	0.76	9.50	0.00	0.00	0.00	7.81	20.04		0.000	1.95	0.554
3.40	115.20	1980	9.49	26.29		0.19	0.76	9.50	0.00	0.00	0.00	8.89	25.53		0.000	2.15	0.594
3.60	115.00	1540	5.89	15.86		0.19	0.76	9.50	0.00	0.00	0.00	5.63	15.10		0.020	1.95	0.615
3.80	114.80	1340	4.85	13.81		0.19	0.76	9.50	0.00	0.00	0.00	4.64	13.05		0.039	2.00	0.634
4.00	114.60	1470	7.91	20.08		0.19	0.76	9.50	0.00	0.00	0.00	7.54	19.32		0.059	1.95	0.653
4.20	114.40	1640	7.84	18.23		0.19	0.76	9.50	0.00	0.00	0.00	7.56	17.47		0.079	1.95	0.672
4.40	114.20	1750	8.55	22.40		0.19	0.76	9.50	0.00	0.00	0.00	8.10	21.64		0.098	1.95	0.690
4.60	114.00	1840	8.42	20.00		0.19	0.76	9.50	0.00	0.00	0.00	8.08	19.24		0.118	1.95	0.709
4.80	113.80	1650	6.19	16.81		0.19	0.76	9.50	0.00	0.00	0.00	5.90	16.05		0.137	1.95	0.728
5.00	113.60	1830	7.77	19.41		0.19	0.76	9.50	0.00	0.00	0.00	7.43	18.65		0.157	1.95	0.746
5.20	113.40	1720	7.08	18.34		0.19	0.76	9.50	0.00	0.00	0.00	6.75	17.58		0.177	1.95	0.765
5.40	113.20	1990	6.85	20.85		0.19	0.76	9.50	0.00	0.00	0.00	6.39	20.09		0.196	2.00	0.784
5.60	113.00	2410	11.76	28.76		0.19	0.76	9.50	0.00	0.00	0.00	11.15	28.00		0.216	2.10	0.805
5.80	112.80	2550	10.16	27.76		0.19	0.76	9.50	0.00	0.00	0.00	9.52	27.00		0.236	2.15	0.827
6.00	112.60	2400	9.75	22.08		0.19	0.76	9.50	0.00	0.00	0.00	9.37	21.32		0.255	1.95	0.847
6.20	112.40	2250	10.02	22.44		0.19	0.76	9.50	0.00	0.00	0.00	9.64	21.68		0.275	1.95	0.866
6.40	112.20	2600	11.72	24.24		0.19	0.76	9.50	0.00	0.00	0.00	11.33	23.48		0.294	2.10	0.886
6.60	112.00	3580	11.80	30.02		0.19	0.76	9.50	0.00	0.00	0.00	11.13	29.26		0.314	2.10	0.908
6.80	111.80	4170	11.78	33.76		0.19	0.76	9.50	0.00	0.00	0.00	10.92	33.00		0.334	2.15	0.930
7.00	111.60	4290	11.61	35.76		0.19	0.76	9.50	0.00	0.00	0.00	10.64	35.00		0.353	2.15	0.952
7.20	111.40	3660	11.69	29.87		0.19	0.76	9.50	0.00	0.00	0.00	11.02	29.11		0.373	2.10	0.974
7.40	111.20	3220	8.77	30.27		0.19	0.76	9.50	0.00	0.00	0.00	7.93	29.51		0.393	2.00	0.995
7.60	111.00	3910	9.55	32.35		0.19	0.76	9.50	0.00	0.00	0.00	8.65	31.59		0.412	2.15	1.016
7.80	110.80	3990	9.87	31.33		0.19	0.76	9.50	0.00	0.00	0.00	9.03	30.57		0.432	2.15	1.039
8.00	110.60	3740	10.17	30.96		0.19	0.76	9.50	0.00	0.00	0.00	9.37	30.20		0.451	2.15	1.061
8.20	110.40	3740	8.65	22.89		0.19	0.76	9.50	0.00	0.00	0.00	8.18	22.13		0.471	2.00	1.082
8.40	110.20	3650	7.98	26.03		0.19	0.76	9.50	0.00	0.00	0.00	7.32	25.27		0.491	2.00	1.102
8.60	110.00	3410	7.76	22.22		0.19	0.76	9.50	0.00	0.00	0.00	7.27	21.46		0.510	2.00	1.122
8.80	109.80	3290	5.12	22.02		0.19	0.76	9.50	0.00	0.00	0.00	4.51	21.26		0.530	2.00	1.141
9.00	109.60	3490	2.73	22.14		0.19	0.76	9.50	0.00	0.00	0.00	2.00	21.38		0.550	1.90	1.160
9.20	109.40	4760	5.72	30.33		0.19	0.76	9.50	0.00	0.00	0.00	4.73	29.57		0.569	2.00	1.179
9.40	109.20	5950	15.46	48.39		0.19	0.76	9.50	0.00	0.00	0.00	14.05	47.63		0.589	2.15	1.200
9.60	109.00	5900	14.41	43.47		0.19	0.76	9.50	0.00	0.00	0.00	13.19	42.71		0.608	2.15	1.222
9.80	108.80	5830	13.77	50.11		0.19	0.76	9.50	0.00	0.00	0.00	12.19	49.35		0.628	2.15	1.245
10.00	108.60	6080	17.19	37.88		0.19	0.76	9.50	0.00	0.00	0.00	16.39	37.12		0.648	2.10	1.267
10.20	108.40	5550	15.24	38.96		0.19	0.76	9.50	0.00	0.00	0.00	14.29	38.20		0.667	2.10	1.289
10.40	108.20	5550	14.58	37.87		0.19	0.76	9.50	0.00	0.00	0.00	13.65	37.11		0.687	2.15	1.311
10.60	108.00	5650	13.53	33.11		0.19	0.76	9.50	0.00	0.00	0.00	12.79	32.35		0.707	2.10	1.333
10.80	107.80	5110	9.20	33.55		0.19	0.76	9.50	0.00	0.00	0.00	8.22	32.79		0.726	2.15	1.355
11.00	107.60	5050	8.01	30.60		0.19	0.76	9.50	0.00	0.00	0.00	7.12	29.84		0.746	2.00	1.376
11.20	107.40	6740	16.18	46.88		0.19	0.76	9.50	0.00	0.00	0.00	14.88	46.12		0.765	2.15	1.397
11.40	107.20	7530	24.67	55.00		0.19	0.76	9.50	0.00	0.00	0.00	23.39	54.24		0.785	2.10	1.419
11.60	107.00	7220	22.11	52.00		0.19	0.76	9.50	0.00	0.00	0.00	20.85	51.24		0.805	2.10	1.441
11.80	106.80	6930	16.89	45.68		0.19	0.76	9.50	0.00	0.00	0.00	15.69	44.92		0.824	2.15	1.463
12.00	106.60	6760	16.70	43.70		0.19	0.76	9.50	0.00	0.00	0.00	15.59	42.94		0.844	2.15	1.485
12.20	106.40	7300	18.06	44.55		0.19	0.76	9.50	0.00	0.00	0.00	16.97	43.79		0.864	2.10	1.507
12.40	106.20	6740	11.48	32.08		0.19	0.76	9.50	0.00	0.00	0.00	10.69	31.32		0.883	2.15	1.529
12.60	106.00	7270	12.01	40.17		0.19	0.76	9.50	0.00	0.00	0.00	10.84	39.41		0.903	2.15	1.552
12.80	105.80	7800	15.79	48.10		0.19	0.76	9.50	0.00	0.00	0.00	14.41	47.34		0.922	2.15	1.575
13.00	105.60	7990	18.11	49.79		0.19	0.76	9.50	0.00	0.00	0.00	16.76	49.03		0.942	2.15	1.597
13.20	105.40	8540	20.12	50.00		0.19	0.76	9.50	0.00	0.00	0.00	18.86	49.24		0.962	2.10	1.619

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-15
Page 1b
FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 118.6 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.4 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.19 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.76 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
0.60	118.00	9.68	2.56		90									223	SILTY SAND
0.80	117.80	25.08	2.09		255	3.05		41.2	42.4	0.23	38.6	9.27	66.1	861	SILTY SAND
1.00	117.60	12.96	0.86		68	2.16						3.24	18.5	187	CLAYEY SILT
1.20	117.40	17.32	0.52		65	2.56	0.68					6.07	29.0	196	SILTY CLAY
1.40	117.20	19.51	1.38		227	2.65		13.4	33.0	0.38	29.2	14.00	57.5	710	SANDY SILT
1.60	117.00	18.23	1.11		196	2.63						8.76	31.4	603	SILT
1.80	116.80	18.81	1.26		259	2.49		29.8	36.4	0.50	33.5	14.74	46.7	804	SANDY SILT
2.00	116.60	8.08	1.64		162	1.12		36.2	39.2	0.57	36.6	3.02	8.6	371	SANDY SILT
2.20	116.40	8.81	0.57		67	1.70	0.54					3.91	10.1	160	SILTY CLAY
2.40	116.20	7.45	0.53		58	1.52	0.48					3.27	7.8	127	SILTY CLAY
2.60	116.00	3.98	0.71		44	0.98						1.32	2.9	69	CLAYEY SILT
2.80	115.80	3.71	1.30		81	0.84		10.7	29.5	0.72	26.8	1.74	3.6	124	SANDY SILT
3.00	115.60	4.06	0.58		42	1.00	0.28					1.56	3.0	67	SILTY CLAY
3.20	115.40	14.09	1.57		424	2.02		22.2	31.7	0.85	29.5	17.45	31.5	1199	SANDY SILT
3.40	115.20	14.96	1.87		577	2.05		42.3	35.3	0.94	33.4	18.42	31.0	1664	SILTY SAND
3.60	115.00	9.12	1.69		329	1.34		39.2	35.8	0.97	34.0	7.40	12.0	793	SANDY SILT
3.80	114.80	7.26	1.83		292	1.12		36.0	35.5	1.00	33.7	5.14	8.1	641	SILTY SAND
4.00	114.60	11.45	1.57		409	1.68		30.0	33.1	1.01	31.3	13.04	20.0	1075	SANDY SILT
4.20	114.40	11.13	1.33		344	1.62		36.1	34.2	1.05	32.5	12.26	18.3	895	SANDY SILT
4.40	114.20	11.58	1.69		470	1.67		38.2	34.3	1.08	32.6	13.53	19.6	1240	SANDY SILT
4.60	114.00	11.23	1.40		387	1.61		41.8	34.8	1.11	33.2	12.91	18.2	1011	SANDY SILT
4.80	113.80	7.91	1.76		352	1.20		43.6	35.7	1.15	34.1	6.83	9.4	803	SANDY SILT
5.00	113.60	9.74	1.54		389	1.43		44.3	35.2	1.18	33.7	10.32	13.8	964	SANDY SILT
5.20	113.40	8.60	1.65		376	1.29		43.2	35.1	1.20	33.6	8.46	11.1	885	SANDY SILT
5.40	113.20	7.90	2.21		475	1.17		55.1	36.7	1.25	35.4	7.07	9.0	1085	SILTY SAND
5.60	113.00	13.58	1.54		585	1.90		51.8	34.9	1.27	33.5	20.99	26.1	1632	SANDY SILT
5.80	112.80	11.23	1.88		607	1.57		63.7	36.5	1.32	35.2	14.24	17.2	1583	SILTY SAND
6.00	112.60	10.76	1.31		415	1.53		58.8	35.9	1.34	34.7	13.73	16.2	1065	SANDY SILT
6.20	112.40	10.81	1.29		418	1.56		52.5	35.1	1.36	33.8	14.57	16.8	1076	SANDY SILT
6.40	112.20	12.45	1.10		422	2.10						15.37	17.3	1142	SILT
6.60	112.00	11.91	1.68		629	1.61		96.9	38.3	1.47	37.3	16.42	18.1	1677	SANDY SILT
6.80	111.80	11.38	2.09		766	1.51		121.3	39.6	1.52	38.7	14.73	15.8	2010	SILTY SAND
7.00	111.60	10.80	2.37		845	1.43		127.7	39.9	1.56	39.1	13.52	14.2	2175	SILTY SAND
7.20	111.40	10.92	1.70		628	1.49		101.3	38.4	1.58	37.5	14.96	15.4	1622	SANDY SILT
7.40	111.20	7.58	2.86		749	1.07		98.6	39.0	1.62	38.1	7.66	7.7	1690	SILTY SAND
7.60	111.00	8.10	2.79		796	1.10		122.9	40.0	1.67	39.3	8.43	8.3	1843	SILTY SAND
7.80	110.80	8.28	2.50		747	1.12		124.5	39.9	1.71	39.2	9.01	8.7	1741	SILTY SAND
8.00	110.60	8.40	2.34		723	1.16		113.1	39.2	1.73	38.4	9.75	9.2	1692	SILTY SAND
8.20	110.40	7.12	1.81		484	0.99		119.2	39.7	1.77	39.1	7.19	6.6	1055	SILTY SAND
8.40	110.20	6.19	2.63		623	0.87		120.1	40.0	1.81	39.3	5.65	5.1	1291	SILTY SAND
8.60	110.00	6.03	2.10		492	0.87		110.8	39.4	1.83	38.8	5.66	5.0	1000	SILTY SAND
8.80	109.80	3.49	4.21		581	0.52		120.3	40.8	1.89	40.2	2.07	1.8	921	SAND
9.00	109.60	1.25	13.39		673	0.16		142.9	43.0	1.95	42.5	0.22	0.2	572	SAND
9.20	109.40	3.53	5.98		862	0.42		180.5	43.2	1.99	42.8	1.57	1.3	1375	SAND
9.40	109.20	11.22	2.49		1165	1.46		180.1	40.5	1.98	40.0	17.90	14.9	3040	SILTY SAND
9.60	109.00	10.30	2.35		1024	1.34		182.6	40.7	2.02	40.2	15.38	12.6	2589	SILTY SAND
9.80	108.80	9.29	3.21		1289	1.21		185.2	40.9	2.06	40.5	12.76	10.2	3141	SILTY SAND
10.00	108.60	12.43	1.32		719	1.63		174.7	39.7	2.08	39.3	23.65	18.7	1946	SANDY SILT
10.20	108.40	10.57	1.75		830	1.41		164.0	39.7	2.11	39.3	17.75	13.8	2118	SANDY SILT
10.40	108.20	9.89	1.81		814	1.32		167.3	39.9	2.15	39.5	15.83	12.1	2027	SILTY SAND
10.60	108.00	9.07	1.62		679	1.21		175.8	40.3	2.19	39.9	13.45	10.1	1633	SANDY SILT
10.80	107.80	5.53	3.28		853	0.74		177.6	41.3	2.25	41.1	5.21	3.8	1693	SILTY SAND
11.00	107.60	4.63	3.57		788	0.62		181.2	41.7	2.29	41.5	3.71	2.7	1444	SAND
11.20	107.40	10.11	2.21		1084	1.31		210.0	40.8	2.31	40.5	16.90	12.1	2721	SILTY SAND
11.40	107.20	15.93	1.36		1070	2.07		200.8	39.1	2.31	38.9	43.54	30.7	3148	SANDY SILT
11.60	107.00	13.92	1.52		1054	1.82		200.6	39.4	2.36	39.2	33.70	23.4	2966	SANDY SILT
11.80	106.80	10.16	1.97		1014	1.33		214.3	40.6	2.41	40.4	18.01	12.3	2551	SILTY SAND
12.00	106.60	9.93	1.86		949	1.31		208.1	40.4	2.45	40.2	17.66	11.9	2366	SILTY SAND
12.20	106.40	10.69	1.66		931	1.39		223.3	40.5	2.49	40.4	20.48	13.6	2385	SANDY SILT
12.40	106.20	6.41	2.10		716	0.82		233.1	42.0	2.55	41.8	7.37	4.8	1495	SILTY SAND
12.60	106.00	6.40	2.88		991	0.80		254.3	42.4	2.60	42.3	7.21	4.6	2091	SILTY SAND
12.80	105.80	8.57	2.44		1143	1.09		257.1	41.7	2.62	41.6	13.34	8.5	2697	SILTY SAND
13.00	105.60	9.91	2.04		1120	1.28		253.1	41.1	2.65	41.1	18.32	11.5	2789	SILTY SAND
13.20	105.40	11.06	1.70		1054	1.42		264.8	41.0	2.68	41.0	22.99	14.2	2735	SANDY SILT

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 119.5 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.8 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.20 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA/PHI = 0.5 DELTA-B = 0.58 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	THRUST (KGF)	A (BAR)	B (BAR)	C (BAR)	DA (BAR)	DB (BAR)	ZMRNG (BAR)	ZMLO (BAR)	ZMHI (BAR)	ZMCAL (BAR)	P0 (BAR)	P1 (BAR)	P2 (BAR)	U0 (BAR)	GAMMA (T/M3)	SVP (BAR)
13.20	106.30	7300	11.70	32.56		0.20	0.58	9.50	0.00	0.00	0.00	10.90	31.98		0.922	2.15	1.703
13.40	106.10	8940	14.89	34.80		0.20	0.58	9.50	0.00	0.00	0.00	14.13	34.22		0.942	2.10	1.725

DILATOMETER DATA LISTING & INTERPRETATION (BASED ON THE 1988 DILATOMETER MANUAL)
In-Situ Soil Testing, L.C.
JOB FILE: 444 West Maple Avenue
LOCATION: Vienna, VA
SNDG.BY : R. Failmezger
ANAL.BY : Roger Failmezger, P.E.

SNDG. NO. : D-5
Page 2b
FILE NO. :2014-45

SNDG. DATE: 8/6/14
ANAL. DATE: 8/6/14

ANALYSIS PARAMETERS: LO RANGE = 9.50 BARS ROD DIAM. = 3.6 CM BL.THICK. = 15.0 MM SU FACTOR = 1
SURF.ELEV. = 119.5 M LO GAGE 0 = 0.00 BARS FR.RED.DIA. = 4.4 CM BL.WIDTH = 96.0 MM PHI FACTOR = 1
WATER DEPTH = 3.8 M HI GAGE 0 = 0.00 BARS LIN.ROD WT. = 6.5 KGF/M DELTA-A = 0.20 BARS OCR FACTOR = 1
SP.GR.WATER = 1.000 CAL GAGE 0 = 0.00 BARS DELTA / PHI = 0.5 DELTA-B = 0.58 BARS M FACTOR = 1
MAX SU ID = 0.6 SU OPTION = 0 MIN PHI ID = 1.2 OCR OPTION = 0 K0 FACTOR = 1
UNIT CONVERSIONS: 1 BAR = 1.019 KGF/CM2 = 100 KPA = 1.044 TSF = 14.51 PSI 1 M = 3.2808 FT

Z (M)	ELEV (M)	KD	ID	UD	ED (BAR)	K0	SU (BAR)	QD (BAR)	PHI (DEG)	SIGFF (BAR)	PHIO (DEG)	PC (BAR)	OCR	M (BAR)	SOIL TYPE
13.20	106.30	5.86	2.11		732	0.75		256.0	42.1	2.84	42.1	6.87	4.0	1467	SILTY SAND
13.40	106.10	7.65	1.52		697	0.95		306.2	42.4	2.89	42.5	11.22	6.5	1562	SANDY SILT

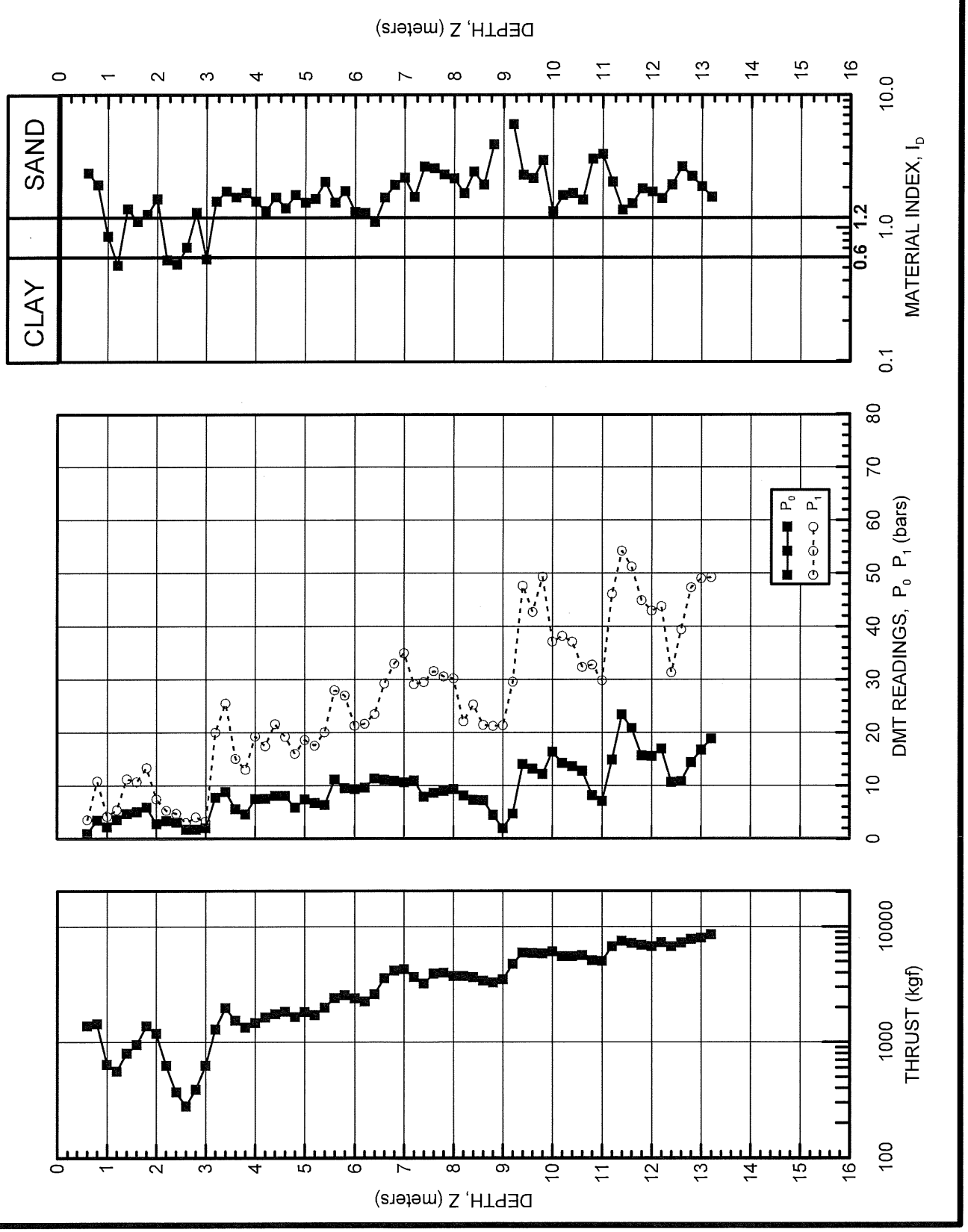
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

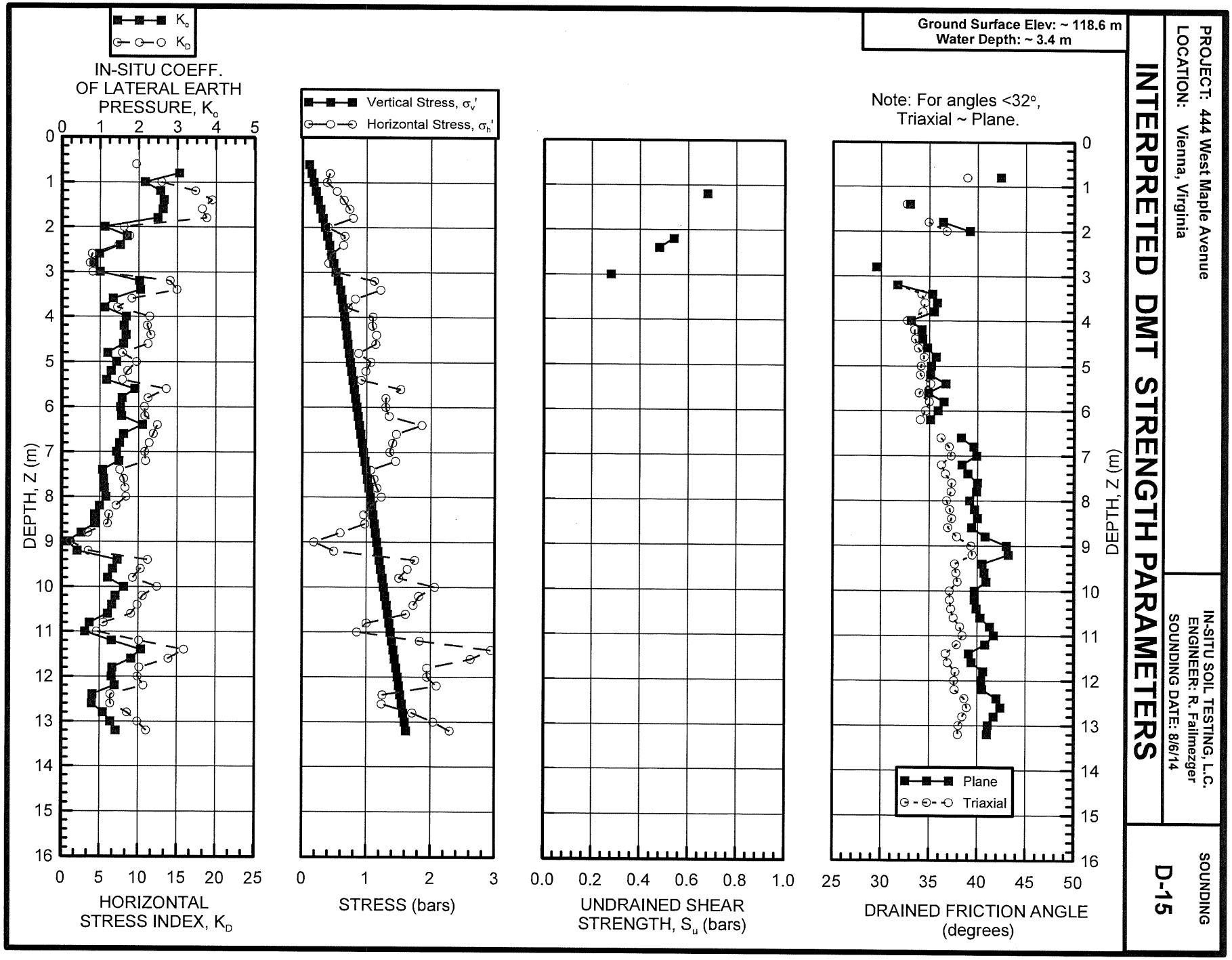
IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-15

DILATOMETER RESULTS

Ground Surface Elev.: ~ 118.6 m
Water Depth: ~ 3.4 m




Ground Surface Elev: ~ 118.6 m
Water Depth: ~ 3.4 m
INTERPRETED DMT STRENGTH PARAMETERS
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia
IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14
SOUNDING
D-15
K_o
K_D
IN-SITU COEFF. OF LATERAL EARTH PRESSURE, K_o
DEPTH, Z (m)
HORIZONTAL STRESS INDEX, K_D
Vertical Stress, σ_v'
Horizontal Stress, σ_h'
STRESS (bars)
UNDRAINED SHEAR STRENGTH, S_u (bars)
Note: For angles <32°, Triaxial ~ Plane.
Plane
Triaxial
DRAINED FRICTION ANGLE (degrees)

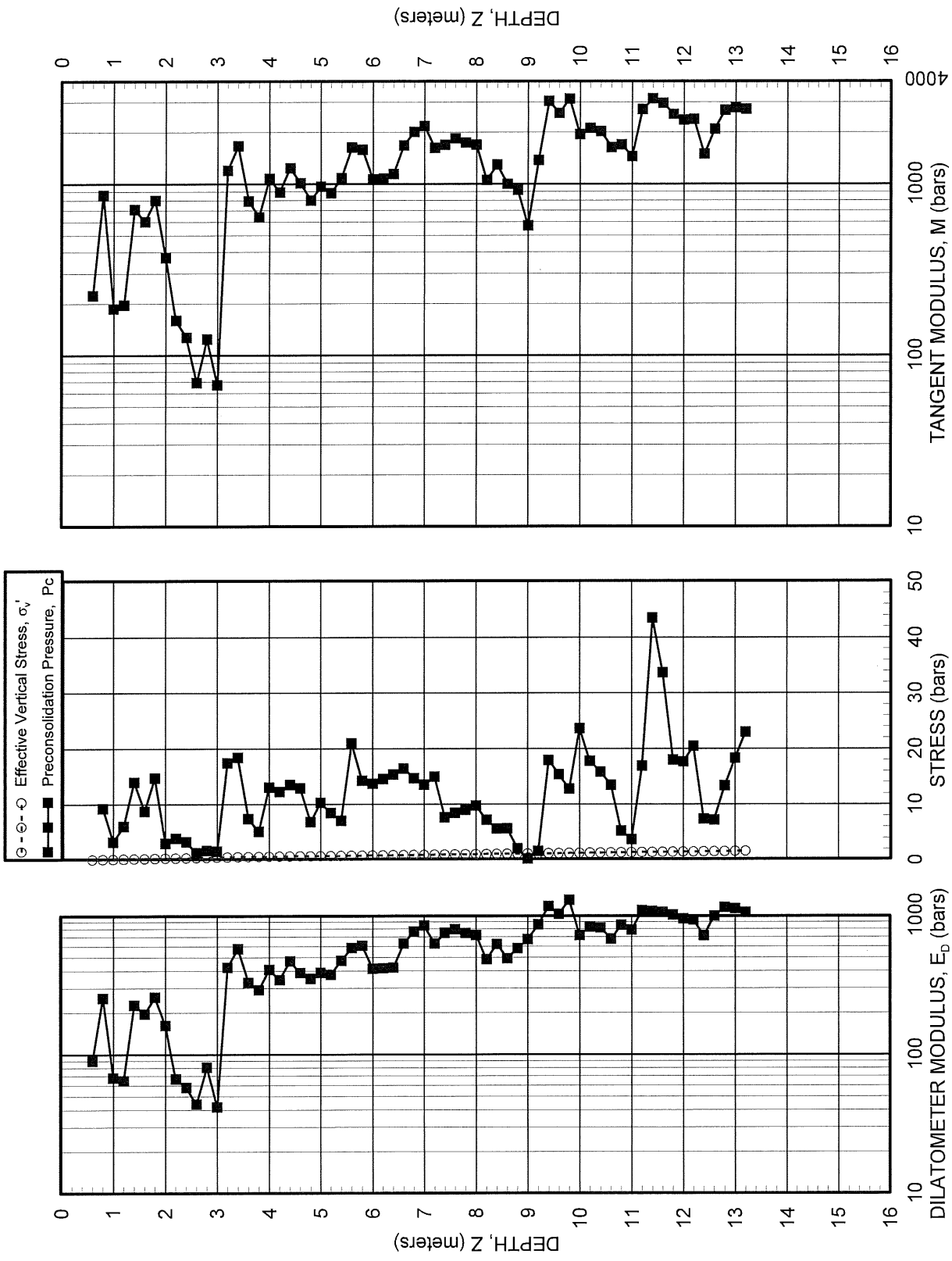
PROJECT: 444 West Maple Avenue
LOCATION: Vienna, Virginia

IN-SITU SOIL TESTING, L.C.
ENGINEER: R. Failmezger
SOUNDING DATE: 8/6/14

SOUNDING
D-15

INTERPRETED DMT DEFORMATION PARAMETERS

Ground Surface Elev.: ~ 118.6 m
Water Depth: ~ 3.4 m

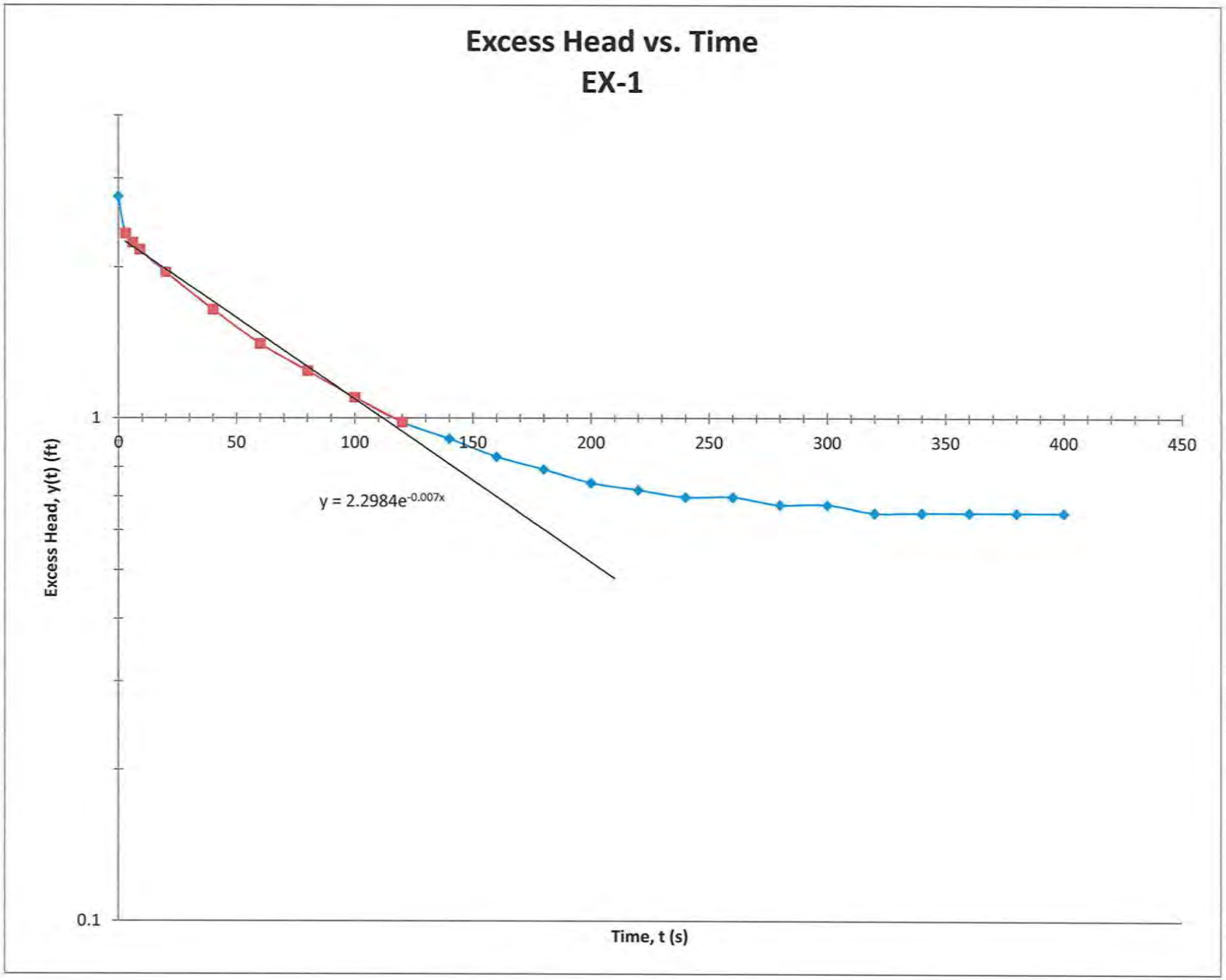


APPENDIX E

Slug Test Results

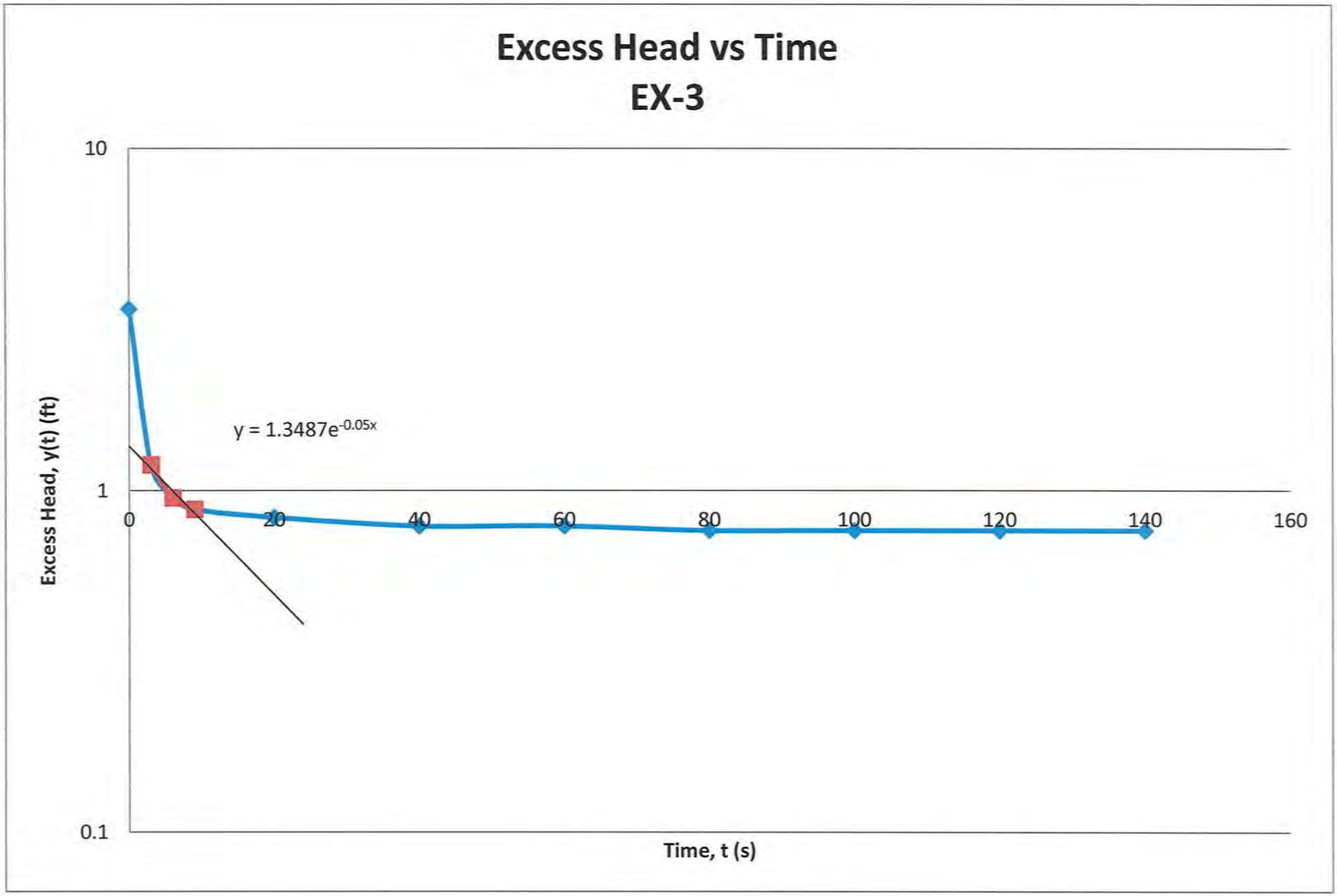
Rising Head Data - EX-1

#	Time	Pressure Transducer at Bottom (Hz)	Reading	Calculated Pressure (Poly)	Time after start (s)	Excess Head (ft)	(1/t)ln(yo/yt)
60	8/20/2014 8:40	2952.8999	8719.618	6.59	0	2.762624	#DIV/0!
151	8/20/2014 8:40	2951.1001	8708.992	6.77	3	2.334688	0.056100969
242	8/20/2014 8:40	2950.69995	8706.63	6.81	6	2.239583	0.034981926
333	8/20/2014 8:40	2950.3999	8704.86	6.84	9	2.168277	0.026916461
61	8/20/2014 8:41	2949.5	8699.55	6.94	20	1.954465	0.017303238
62	8/20/2014 8:41	2948.19995	8691.883	7.07	40	1.6457	0.012950384
63	8/20/2014 8:41	2947.19995	8685.988	7.17	60	1.408294	0.011230029
64	8/20/2014 8:42	2946.5	8681.862	7.25	80	1.242172	0.00999149
65	8/20/2014 8:42	2945.8999	8678.326	7.31	100	1.099782	0.009210691
66	8/20/2014 8:42	2945.3999	8675.381	7.36	120	0.981166	0.008626624
67	8/20/2014 8:43	2945.1001	8673.615	7.39	140	0.910053	0.00793167
68	8/20/2014 8:43	2944.80005	8671.847	7.42	160	0.838889	0.007449111
69	8/20/2014 8:43	2944.6001	8670.67	7.44	180	0.79147	0.006944689
70	8/20/2014 8:44	2944.3999	8669.491	7.46	200	0.743997	0.006559498
71	8/20/2014 8:44	2944.30005	8668.903	7.47	220	0.720319	0.006110189
72	8/20/2014 8:44	2944.19995	8668.313	7.48	240	0.696585	0.005740612
73	8/20/2014 8:45	2944.19995	8668.313	7.48	260	0.696585	0.005299027
74	8/20/2014 8:45	2944.1001	8667.725	7.49	280	0.672909	0.005044022
75	8/20/2014 8:45	2944.1001	8667.725	7.49	300	0.672909	0.004707754
76	8/20/2014 8:46	2944	8667.136	7.50	320	0.649176	0.004525726
77	8/20/2014 8:46	2944	8667.136	7.50	340	0.649176	0.004259507
78	8/20/2014 8:46	2944	8667.136	7.50	360	0.649176	0.004022868
79	8/20/2014 8:47	2944	8667.136	7.50	380	0.649176	0.003811138
80	8/20/2014 8:47	2944	8667.136	7.50	400	0.649176	0.003620581
81	8/20/2014 8:47	2944	8667.136	7.50	420	0.649176	0.003448172
82	8/20/2014 8:48	2943.8999	8666.547	7.51	440	0.625444	0.003376079
83	8/20/2014 8:48	2943.8999	8666.547	7.51	460	0.625444	0.003229293
84	8/20/2014 8:48	2943.8999	8666.547	7.51	480	0.625444	0.003094739
85	8/20/2014 8:49	2943.8999	8666.547	7.51	500	0.625444	0.002970949
86	8/20/2014 8:49	2944	8667.136	7.50	520	0.649176	0.002785062
87	8/20/2014 8:49	2944	8667.136	7.50	540	0.649176	0.002681912
88	8/20/2014 8:50	2943.8999	8666.547	7.51	560	0.625444	0.002652633
89	8/20/2014 8:50	2944	8667.136	7.50	580	0.649176	0.002496952
90	8/20/2014 8:50	2944	8667.136	7.50	600	0.649176	0.002413721
91	8/20/2014 8:51	2944	8667.136	7.50	620	0.649176	0.002335859


Excess Head vs. Time
EX-1
Excess Head, y(t) (ft)
1
0.1
0
50
100
150
200
250
300
350
400
450
y = 2.2984e-0.007x
Time, t (s)

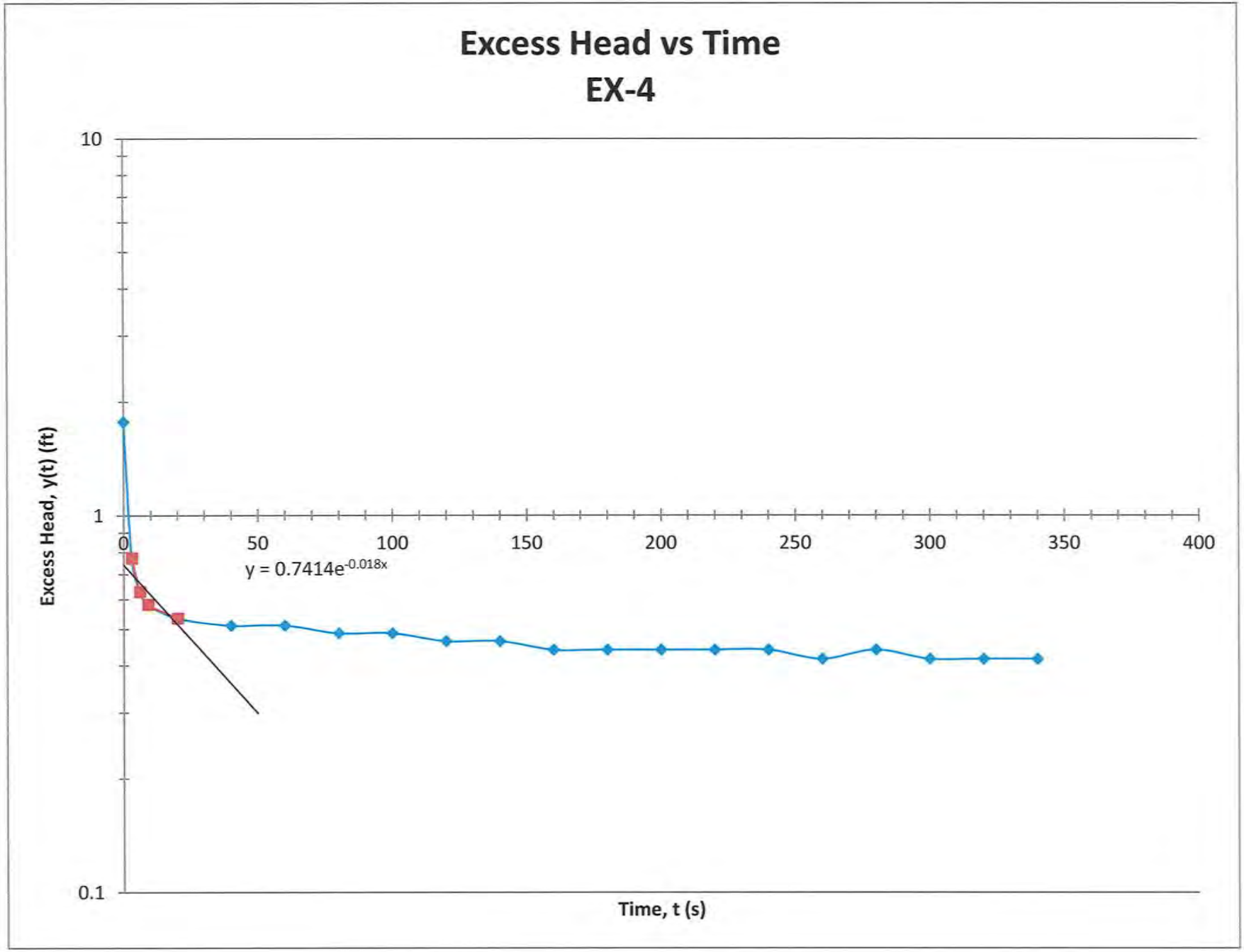
Rising Head Data - EX-3

#	Time	Pressure Transducer at Bottom (Hz)	Reading	Calculated Pressure (Poly)	Time after start (s)	Excess Head (ft)	(1/t)ln(yo/yt)
74	8/20/2014 11:52	2952	8714.304	6.68	0	3.396938	#DIV/0!
212	8/20/2014 11:52	2942.69995	8659.483	7.64	3	1.189331	0.349828
350	8/20/2014 11:52	2941.69995	8653.599	7.74	6	0.95239	0.211943
488	8/20/2014 11:52	2941.3999	8651.833	7.77	9	0.881312	0.149913
75	8/20/2014 11:52	2941.19995	8650.657	7.79	20	0.833951	0.070223
76	8/20/2014 11:52	2941	8649.481	7.81	40	0.786593	0.036573
77	8/20/2014 11:53	2941	8649.481	7.81	60	0.786593	0.024382
78	8/20/2014 11:53	2940.8999	8648.892	7.82	80	0.762886	0.018669
79	8/20/2014 11:53	2940.8999	8648.892	7.82	100	0.762886	0.014935
80	8/20/2014 11:54	2940.8999	8648.892	7.82	120	0.762886	0.012446
81	8/20/2014 11:54	2940.8999	8648.892	7.82	140	0.762886	0.010668
82	8/20/2014 11:54	2940.8999	8648.892	7.82	160	0.762886	0.009335
83	8/20/2014 11:55	2940.80005	8648.305	7.83	180	0.739238	0.008472
84	8/20/2014 11:55	2940.80005	8648.305	7.83	200	0.739238	0.007625
85	8/20/2014 11:55	2940.80005	8648.305	7.83	220	0.739238	0.006932
86	8/20/2014 11:56	2940.80005	8648.305	7.83	240	0.739238	0.006354
87	8/20/2014 11:56	2940.80005	8648.305	7.83	260	0.739238	0.005865
88	8/20/2014 11:56	2940.80005	8648.305	7.83	280	0.739238	0.005446
89	8/20/2014 11:57	2940.80005	8648.305	7.83	300	0.739238	0.005083
90	8/20/2014 11:57	2940.80005	8648.305	7.83	320	0.739238	0.004766
91	8/20/2014 11:57	2940.69995	8647.716	7.84	340	0.715533	0.004581
92	8/20/2014 11:58	2940.69995	8647.716	7.84	360	0.715533	0.004327
93	8/20/2014 11:58	2940.69995	8647.716	7.84	380	0.715533	0.004099
94	8/20/2014 11:58	2940.69995	8647.716	7.84	400	0.715533	0.003894
95	8/20/2014 11:59	2940.69995	8647.716	7.84	420	0.715533	0.003709
96	8/20/2014 11:59	2940.69995	8647.716	7.84	440	0.715533	0.00354


Excess Head vs Time
EX-3
10
1
0.1
0
20
40
60
80
100
120
140
160
y = 1.3487e-0.05x
Excess Head, y(t) (ft)
Time, t (s)

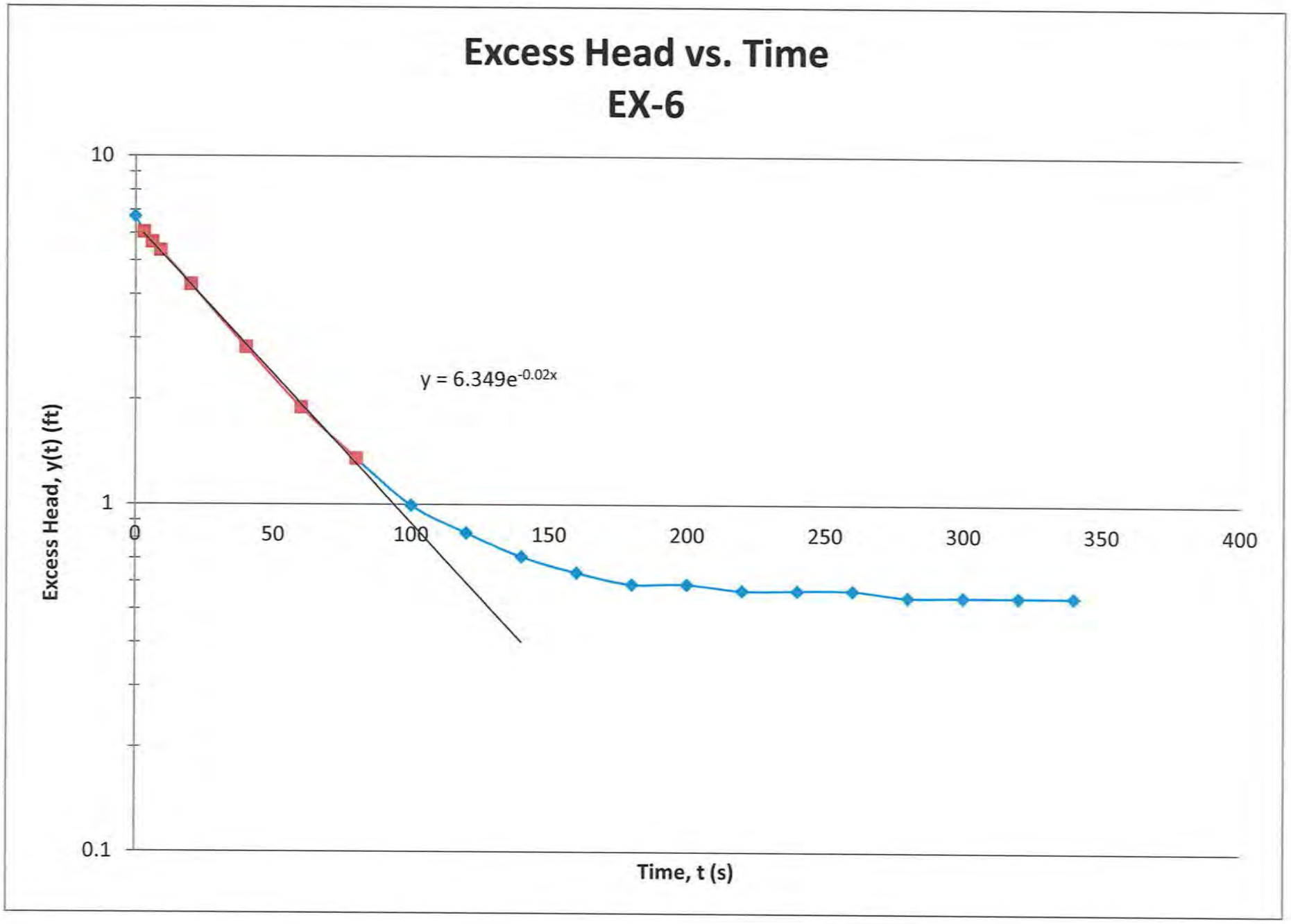
Rising Head Data - EX-4

#	Time	Pressure Transducer at Bottom (Hz)	Reading	Calculated Pressure (Poly)	Time after start (s)	Excess Head (ft)	(1/t)ln(yo/yt)
60	8/20/2014 9:52	2951.30005	8710.172	6.75	0	1.769746	#DIV/0!
204	8/20/2014 9:52	2947.1001	8685.399	7.18	3	0.772123	0.276482523
348	8/20/2014 9:52	2946.5	8681.862	7.25	6	0.629702	0.172224112
492	8/20/2014 9:52	2946.30005	8680.684	7.27	9	0.582254	0.123520417
61	8/20/2014 9:52	2946.1001	8679.506	7.29	20	0.53481	0.059833959
62	8/20/2014 9:52	2946	8678.916	7.30	40	0.51106	0.031052586
63	8/20/2014 9:53	2946	8678.916	7.30	60	0.51106	0.020701724
64	8/20/2014 9:53	2945.8999	8678.326	7.31	80	0.487311	0.016121099
65	8/20/2014 9:53	2945.8999	8678.326	7.31	100	0.487311	0.012896879
66	8/20/2014 9:54	2945.80005	8677.738	7.32	120	0.463621	0.011162692
67	8/20/2014 9:54	2945.80005	8677.738	7.32	140	0.463621	0.009568022
68	8/20/2014 9:54	2945.69995	8677.148	7.33	160	0.439874	0.008700643
69	8/20/2014 9:55	2945.69995	8677.148	7.33	180	0.439874	0.007733905
70	8/20/2014 9:55	2945.69995	8677.148	7.33	200	0.439874	0.006960514
71	8/20/2014 9:55	2945.69995	8677.148	7.33	220	0.439874	0.00632774
72	8/20/2014 9:56	2945.69995	8677.148	7.33	240	0.439874	0.005800429
73	8/20/2014 9:56	2945.6001	8676.56	7.34	260	0.416186	0.005567153
74	8/20/2014 9:56	2945.69995	8677.148	7.33	280	0.439874	0.004971796
75	8/20/2014 9:57	2945.6001	8676.56	7.34	300	0.416186	0.004824866
76	8/20/2014 9:57	2945.6001	8676.56	7.34	320	0.416186	0.004523312
77	8/20/2014 9:57	2945.6001	8676.56	7.34	340	0.416186	0.004257235
78	8/20/2014 9:58	2945.6001	8676.56	7.34	360	0.416186	0.004020722
79	8/20/2014 9:58	2945.6001	8676.56	7.34	380	0.416186	0.003809105
80	8/20/2014 9:58	2945.6001	8676.56	7.34	400	0.416186	0.00361865
81	8/20/2014 9:59	2945.6001	8676.56	7.34	420	0.416186	0.003446333
82	8/20/2014 9:59	2945.6001	8676.56	7.34	440	0.416186	0.003289681
83	8/20/2014 9:59	2945.6001	8676.56	7.34	460	0.416186	0.003146652
84	8/20/2014 10:00	2945.6001	8676.56	7.34	480	0.416186	0.003015541
85	8/20/2014 10:00	2945.5	8675.97	7.35	500	0.39244	0.003012415
86	8/20/2014 10:00	2945.5	8675.97	7.35	520	0.39244	0.002896553


Excess Head vs Time
EX-4
10
1
0.1
0
50
100
150
200
250
300
350
400
y = 0.7414e-0.018x
Excess Head, y(t) (ft)
Time, t (s)

Rising Head Data - EX-6

#	Time	Pressure Transducer at Bottom (Hz)	Reading	Calculated Pressure (Poly)	Time after start (s)	Excess Head (ft)	(1/t)ln(yo/yt)
33	8/20/2014 10:57	2970	8820.9	4.82	0	6.712108	#DIV/0!
95	8/20/2014 10:57	2967.199951	8804.276	5.11	3	6.042419	0.035036229
157	8/20/2014 10:57	2965.600098	8794.784	5.27	6	5.660078	0.028412556
218	8/20/2014 10:57	2964.300049	8787.075	5.41	9	5.349546	0.025211268
34	8/20/2014 10:57	2959.800049	8760.416	5.87	20	4.275768	0.022547462
35	8/20/2014 10:57	2953.699951	8724.343	6.50	40	2.822911	0.021653612
36	8/20/2014 10:58	2949.800049	8701.32	6.91	60	1.89572	0.021071909
37	8/20/2014 10:58	2947.5	8687.756	7.14	80	1.349491	0.020052318
38	8/20/2014 10:58	2946	8678.916	7.30	100	0.993503	0.019104308
39	8/20/2014 10:59	2945.300049	8674.792	7.37	120	0.827452	0.017444306
40	8/20/2014 10:59	2944.800049	8671.847	7.42	140	0.708862	0.016057201
41	8/20/2014 10:59	2944.5	8670.08	7.45	160	0.637706	0.014711198
42	8/20/2014 11:00	2944.300049	8668.903	7.47	180	0.590292	0.013505841
43	8/20/2014 11:00	2944.300049	8668.903	7.47	200	0.590292	0.012155257
44	8/20/2014 11:00	2944.199951	8668.313	7.48	220	0.566557	0.011236774
45	8/20/2014 11:01	2944.199951	8668.313	7.48	240	0.566557	0.010300377
46	8/20/2014 11:01	2944.199951	8668.313	7.48	260	0.566557	0.00950804
47	8/20/2014 11:01	2944.100098	8667.725	7.49	280	0.542881	0.008981348
48	8/20/2014 11:02	2944.100098	8667.725	7.49	300	0.542881	0.008382591
49	8/20/2014 11:02	2944.100098	8667.725	7.49	320	0.542881	0.007858679
50	8/20/2014 11:02	2944.100098	8667.725	7.49	340	0.542881	0.007396404
51	8/20/2014 11:03	2944.100098	8667.725	7.49	360	0.542881	0.006985493
52	8/20/2014 11:03	2944.100098	8667.725	7.49	380	0.542881	0.006617835
53	8/20/2014 11:03	2944.100098	8667.725	7.49	400	0.542881	0.006286943
54	8/20/2014 11:04	2944.100098	8667.725	7.49	420	0.542881	0.005987565
55	8/20/2014 11:04	2944.100098	8667.725	7.49	440	0.542881	0.005715403
56	8/20/2014 11:04	2944.100098	8667.725	7.49	460	0.542881	0.005466907
57	8/20/2014 11:05	2944.100098	8667.725	7.49	480	0.542881	0.00523912


Excess Head vs. Time
EX-6
10
1
0.1
0
50
100
150
200
250
300
350
400
y = 6.349e-0.02x
Excess Head, y(t) (ft)
Time, t (s)

APPENDIX F

Design Memorandum

D.W. KOZERA, INC.

PROFESSIONAL ENGINEERS & GEOLOGISTS

October 17, 2014

Vienna Development Associates, LLC
c/o Hekemian & Co., Inc.
505 Main Street
Annapolis, MD 21403

Attn: Mr. Christopher P. Bell, Senior Vice President
(cbell@hekemian.com)

Subject: Design Memorandum, 444 Maple Avenue West, Vienna, Virginia (DWK Contract Number 14107.D)

Dear Mr. Bell,

Based on the following information, we have estimated the groundwater inflow into the subdrainage system of the proposed building to be located at 444 Maple Avenue in Vienna, Virginia:

Building Lower Floor Elevation	EL 363
Groundwater Table Elevation	EL 381
Basement Plan Dimensions	380 ft. x 190 ft.

In order to estimate groundwater inflow, an estimate of the hydraulic conductivity of the soil surrounding and located below the building has to be made. We have made our estimate of hydraulic conductivity based on rising head slug tests performed in wells installed on site. Table 1 presents the hydraulic conductivity determined in each well from the tests.

Table 1: Hydraulic Conductivity Determined

Well	Hydraulic Conductivity (gpd/ft^2)
EX-1	4.0
EX-2	16.9
EX-3	6.4
EX-4	11.5

The analysis method used was to approximate the basement as a trench and to utilize a conventional formula for flow from the water table to a drainage trench. In addition, the contribution of flow from beneath the building was calculated by approximating the basement as two wells and using a conventional well formula. The calculations using these methods are attached. Note that the flow rate predicted by this analysis is for a steady state condition, and it is assumed that the steady state condition will be reached during construction, as construction dewatering will be required. The predicted inflow rates at the steady state condition range from 120 gpm to 445 gpm.

In order to better estimate the inflow rates, it is recommended that an inline flowmeter be installed on the subdrainage discharge line at your Northgate project in Falls Church, Virginia. This project is located in similar geology and the lower level elevation is beneath the water table, and a comparison of predicted flow rates vs. actual rates can be performed. Discharge measured from this building will provide data for comparison. Once rates are established from Northgate, correlations may be

1408 Bare Hills Road Suite 200
Baltimore, MD 21209 Phone: 410.823.1060 Fax: 410.823.1062

flow rate at the Maple Avenue project. Literature on an inline flow meter has been enclosed with this letter.

We appreciate the opportunity to be of service to you on this project. Please contact us with any questions.

Very truly yours,
D.W. KOZERA, INC.

Andrew P. MacLeod, P.E.
Geotechnical Engineer

David W. Kozera, P.E.
Commonwealth of Virginia No. 011857
Expiration: 06-30-2015

COMMONWEALTH OF VIRGINIA
DAVID W. KOZERA
NO. 011857
PROFESSIONAL ENGINEER

Enclosures: Calculations (2)
Inline Flow Meter Literature (8)

D. W. KOZERA, INC.
PROFESSIONAL ENGINEERS & GEOLOGISTS

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Phone: 410.823.1060 Fax: 410.823.1062

444 MAPLE AVE
WATER FLOW INTO SUBDRAINAGE
AM 1/2

WATER TABLE FLOW FROM A LINE SOURCE TO A DRAINAGE TRENCH:

$\frac{Q}{x} = \frac{K(H^2 - h^2)}{2880L}$

Q = flow (gpm)
x = unit length of trench
K = Hydraulic conductivity (gpd/ft²)
H = height from GWT to impervious layer (A)
h = height from subgrade (A)
L = length of influence

$L = \frac{1}{2}R_0 \Rightarrow R_0 = 3000(H-h)\sqrt{K}$, where (H-h) is in feet and K is in m/sec

$R_0 = 3000(18)\sqrt{10^{-6}}$

$R_0 = 54$ ft

$L = \frac{1}{2}R_0 = \frac{54}{2} = 27$ ft

ASSUME IMPERVIOUS LAYER AT EL 325
ASSUME GWT @ EL 381
FF @ EL 363

$H = 381 - 325 = 56$
$h = 363 - 325 = 38$

FOOT PRINT OF BLDG = ± 380' x 190'
X = 1140 LF of basement wall

$\frac{Q}{x} = \frac{K(56^2 - 38^2)}{(2880)(27)} = 0.022K$

$Q = (0.022)(1140)K$, K varies from 4.0 to 16.9 gpd/ft²

$Q = 25.08K \Rightarrow$ Q varies from ±100 to 425 gpm

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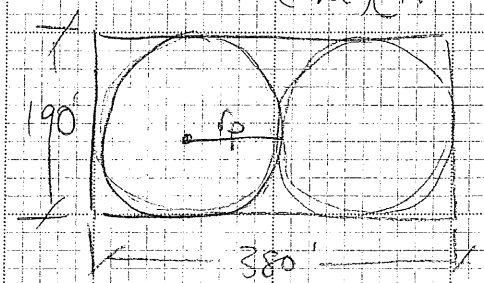
444 Maple Ave

AM 2/2

CALCULATE FLOW FROM BENEATH FLOOR

$Q = 4 r_p \left(\frac{K}{m}\right)(H-h)$



Q = Flow (m^3/sec)

r_p = radius of well (w) = 95' = 29m

M = ratio of vertical to horizontal conductivity

Assume m = 1

(H-h) = 18' = 5.5m

K = hydraulic conductivity (m/sec)

$Q = 4(29)(10^{-6})(5.5) \times 2 \text{ wells}$

$Q = 1.28 \times 10^{-3} m^3/sec$

$\frac{1.28 \times 10^{-3} m^3}{5 sec} \times \frac{60 sec}{1 min} \times \frac{264 gallons}{1 m^3} = 20 gpm$

TOTAL FLOW INTO SUBDRAINAGE SYSTEM

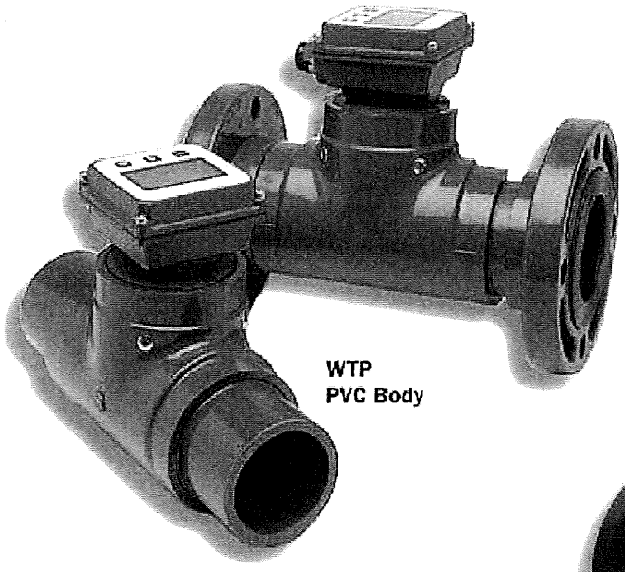
100 + 20 to 425 + 20

120 – 445 gpm

WT-Series

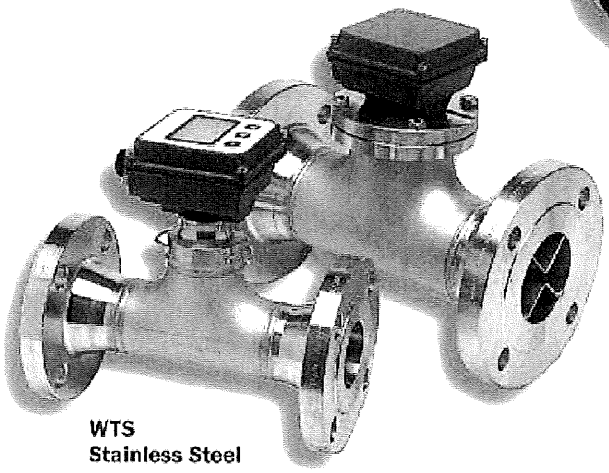
Seametrics

INLINE TURBINE METER INSTRUCTIONS



WTP
PVC Body

WTC
Carbon Steel



WTS
Stainless Steel

ISO 9001:2008 CERTIFIED COMPANY

WT-SERIES INLINE TURBINE METER INSTRUCTIONS

GENERAL INFORMATION and SPECIFICATIONS

GENERAL INFORMATION

This unique system of 2" to 8" turbine meters uses just one moving part, a precision helical rotor. Rotation of the rotor is electronically detected and processed. The high-quality jewel bearings and shafts minimize friction while providing long wear life in non-lubricating fluids. The entire rotor assembly can be easily removed for field service without removing the meter from the pipe.

WTP bodies are fabricated from Schedule 80 PVC fittings, WTC bodies from carbon steel tubing, and WTS bodies from stainless steel tubing. The turbine insert on WTC and WTS meters is machined from a stainless steel casting. The WTP turbine insert is machined from a solid piece of PVC. Turbine rotors on all models are Kynar (PVDF).

WT meters can be ordered with various output options. The basic model (100) comes with pulse output only. An electronic display (Seametrics FT420) is mounted on the 101 model to display flow rate and total (resettable or non-resettable), and provide a programmable pulse or 4-20 mA output. Other electronics options include a blind 4-20 mA transmitter (A055) on the 102 model and a battery-powered (FT415) rate/totalizer plus pulse output for applications that lack power (104 model). All of these controls/displays can be mounted on the meter or remotely mounted on a wall or panel up to 2,000 feet away. WT-Series meters are compatible for use with most other remote-mount Seametrics displays and controls as well.

SPECIFICATIONS*

		WTP				WTC					WTS				
Pipe Sizes		2", 3", 4", 6"				2", 3", 4", 6", 8"					2", 3", 4", 6", 8"				
Materials	**Meter Body**	PVC Schedule 80 fittings				Painted carbon steel					304 Stainless steel (316 SS optional)				
	Turbine Insert	PVC				CF8M cast stainless					CF8M cast stainless				
	Rotor	Kynar (PVDF)				Kynar (PVDF)					Kynar (PVDF)				
	Shaft	Zirconia ceramic 3"-6"				Zirconia ceramic 3"-8"					Zirconia ceramic 3"-8"				
	Shaft	Tungsten Carbide 2"				Tungsten Carbide 2"					Tungsten Carbide 2"				
	Bearings	Sapphire journal, ruby endstone				Sapphire journal, ruby endstone					Sapphire journal, ruby endstone				
Cable		#22 AWG, 2000' max				#22 AWG, 2000' max					#22 AWG, 2000' max				
Flanges		Optional (See Dimensions)				150 lb. drilling (3-8" only)					150 lb. drilling (3-8" only)				
Maximum Pressure		150 psi @ 75° F (10 bar @ 24° C) (see chart)				200 psi (14 bar)					200 psi (14 bar)				
Maximum Temperature		120° F (50° C) (see chart)				200° F (93° C)					200° F (93° C)				
Accuracy	**3"-8"**	+/- 1% of full scale				+/- 1% of full scale					+/- 1% of full scale				
	2"	+/- 2.5% of full scale				+/- 2.5% of full scale					+/- 2.5% of full scale				
Flow Range (GPM)		**2"**	**3"**	**4"**	**6"**	**2"**	**3"**	**4"**	**6"**	**8"**	**2"**	**3"**	**4"**	**6"**	**8"**
	Minimum	2	3	6	12	2	3	6	12	30	2	3	6	12	30
	Maximum	150	400	600	1200	150	400	600	1200	3000	150	400	600	1200	3000

Electronic Options Specifications*

WT100 (Pulse Output Only)	
Power	6-24 Vdc
Pulse Output	0-160 pulse/second current sinking

WT101 (Powered Rate/Totalizer) (e.g. FT420)	
Power	12-32 Vdc (for 4 mA DC min); 24-32 Vdc (for accuracy of 4-20 mA loop)
Rate	6-digit autorange
Total	8-digit
Memory	Non-volatile (no battery needed)
Pulse Output	0.1 second open collector (scaled); 0-75 pulse/second passthrough (unscaled); High alarm or low alarm
Analog Output	4-20 mA loop (24-32 Vdc required)

WT102 (Blind 4-20 Transmitter) (e.g. A055)	
Power	24 - 36 Vdc (isolated)
Analog Output	4-20 mA loop
Response Time	2-60 seconds, 90% of full scale (depends on input averaging)

WT104 (Battery-powered Rate/Totalizer) (e.g. FT415)	
Power	3.6 Vdc Lithium battery replaceable, 3-5 year life
Rate	6-digit auto range
Total	8-digit
Pulse Output	0.1 second open collector (scaled); 0-75 pulse/second passthrough (unscaled); High alarm or low alarm

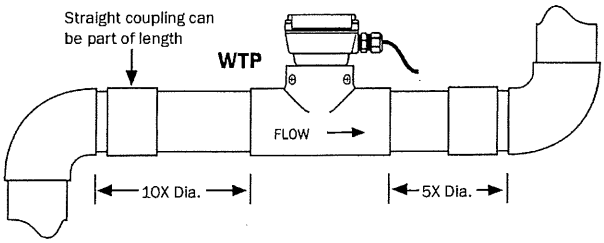
Specifications subject to change • Please consult our website for current data (www.seametrics.com).

INSTALLATION, CONNECTIONS, MAINTENANCE and REPAIR

INSTALLATION

CAUTION: These water meters are not recommended for installation downstream of the boiler feedwater pump where installation fault may expose the meter to boiler pressure and temperature. Maximum recommended temperature is 120˚ (PVC) or 200˚ (Metal).

Piping Conditions. Installing the meter with 10 diameters of straight pipe upstream and 5 downstream is recommended.

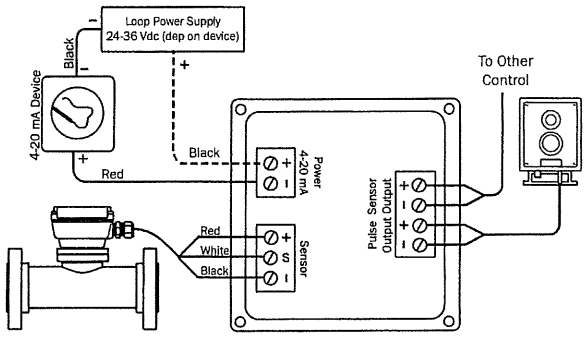


Flanges. For 3-8" WTC and WTS meters, standard flanges are 150 lb. ANSI drilling. 2" WTC or WTS meters and all PVC meters can be installed with optional flanges according to pipe manufacturer's recommendations. For PVC a bolt torque of 10-20 ft-lbs. for 2" flanges, 20-30 ft-lbs. for 3" and 4" flanges, and 35-50 ft-lbs. for 6" flanges is recommended.

Either partial or full-face gaskets can be used. Tighten the bolts evenly. Use care to prevent a misaligned gasket from entering the flow stream.

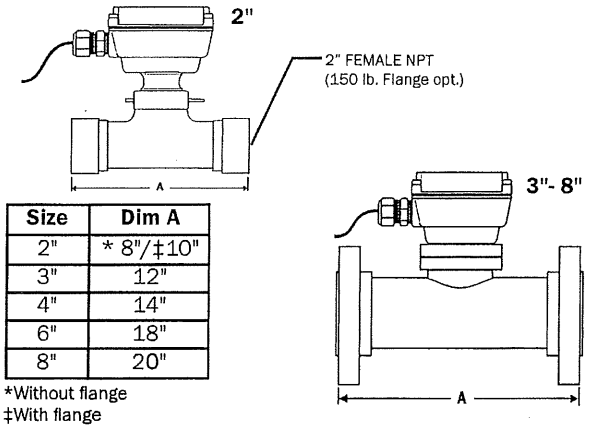
Position. The WT-Series are all-position meters, operable in a vertical or horizontal position, with the meter insert in any radial position. A horizontal position is preferred if there is a risk of air becoming trapped due to constant low flows. Operating the meter in partially-filled pipe will result in inaccuracies.

CONNECTIONS



For operating instructions for the various electronic modules, consult the manual for the specific module, included with the meter at purchase.

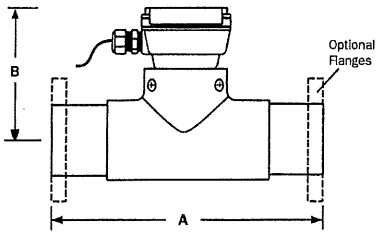
WTC and WTS Meters



Size	Dim A
2"	* 8"/‡10"
3"	12"
4"	14"
6"	18"
8"	20"

*Without flange
‡With flange

WTP Meter



Size	A	B
2"	10"	7.5"
3"	12"	6.5"
4"	14"	7.0"
6"	18"	8.5"

MAINTENANCE and REPAIR

Recalibration. If it is necessary to recalibrate the meter for any reason, this can be done by any Seametrics-authorized facility. Call your supplier for information.

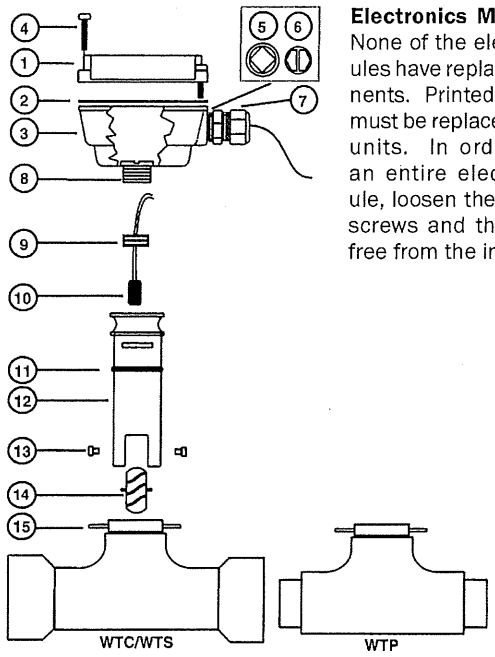
Turbine Insert Removal and Installation. CAUTION: *First remove all pressure from the line.* Then remove the screws or bolts that hold the insert in place (or the U-clip in the 2" meters) and tug gently until the insert comes free. A twisting motion can help to loosen the O-ring seal. Reverse the procedure to reinstall, after coating the O-ring with lubricant (plastic compatible in the WTP). *Do not overtighten.*

Rotor and Shaft Replacement. Examine the rotor to determine if bearings or shaft are damaged or excessively worn. The rotor should spin smoothly and freely, with no visible wobble. Back and forth play should be very minor, less than 1/64". If it is necessary to replace the rotor or shafts, first back out both shafts with a small blade screwdriver. The rotor will come free as soon as the shaft ends come free of the rotor bearings. Reverse the procedure to reinstall. **Note:** *Do not overtighten the shaft screws.* Check to be sure that a small amount of free play between the shaft ends and the bearings remains.

Sensor Replacement. This is rarely necessary. However, certain electrical conditions can damage the sensor. To replace it, first remove the electronics module. Disconnect the sensor leads from the electronics module terminals and remove the threaded plug over the sensor. Finally, remove the sensor by pulling on the sensor leads. A gentle tug should be sufficient. Reverse the process to replace the sensor.

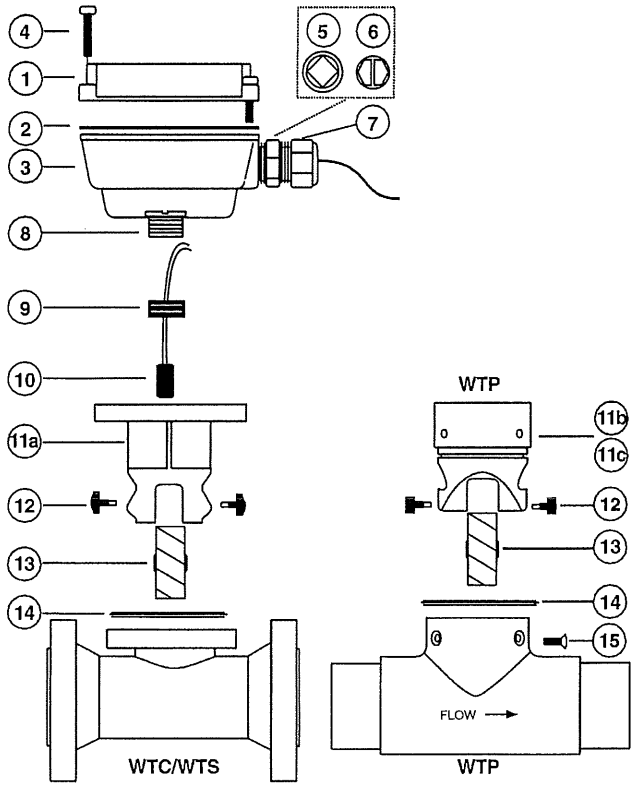
REPLACEMENT PARTS

2" METERS		
1-6	Housing	see 3 - 8"
7	Strain relief	101850
8	Square housing adapter	Not Available
9	Pickup retaining screw	100298
10	Pickup, Micropower (for WT104)	100508
	Pickup, Standard (for WT101)	100419
11	O-ring, EPDM	100264
12	Insert	Contact Factory
13/14	Rotor Repair Kit, Polypro/Tungsten Carbide	101912 After 1-1-2011
14	Rotor Assembly, Polypro/Tungsten Carbide	101862 After 1-1-2011
15	U-clip, stainless	100154



Electronics Module Repair. None of the electronics modules have replaceable components. Printed circuit boards must be replaced as complete units. In order to replace an entire electronics module, loosen the four retaining screws and the unit will lift free from the insert housing.

3" - 8" METERS		WTC	WTP	WTS
1	Upper blind housing assembly	100662	100662	100662
1	Powered rate/totalizer	100495	100495	100495
1	Blind 4-20 mA transmitter	100471	100471	100471
1	Battery-powered rate/totalizer	100469	100469	100469
2	Lower housing gasket	100411	100411	100411
3	Lower housing	100502	100502	100502
4	Upper housing screw assembly (4 req)	100414	100414	100414
5	Plug, steel	100360	100360	100360
6	Water seal assembly	100364	100364	100364
7	Strain relief	101850	100850	100850
8	Square housing adapter	Part Not Replaceable		
9	Pickup retaining screw	100298	100298	100298
10	Pickup, Micropower (for WT104)	100508	100508	100508
	Pickup, Standard (for WT101)	100419	100419	100419
11a	Insert, 3"-8" WTC and WTS	100440	100440	100440
11b	Insert, 3" PVC	N/A	100438	N/A
11c	Insert, 4"-6" PVC	N/A	100439	N/A
12	Shaft assembly, ceramic (2 req)	100227	100227	100227
13	Rotor (PVDF) /bearing assembly	100152	100333	100152
14	O-ring, EPDM	100270	100214	100270
15	Insert screw (4 req'd)	N/A	100023	N/A



Seametrics

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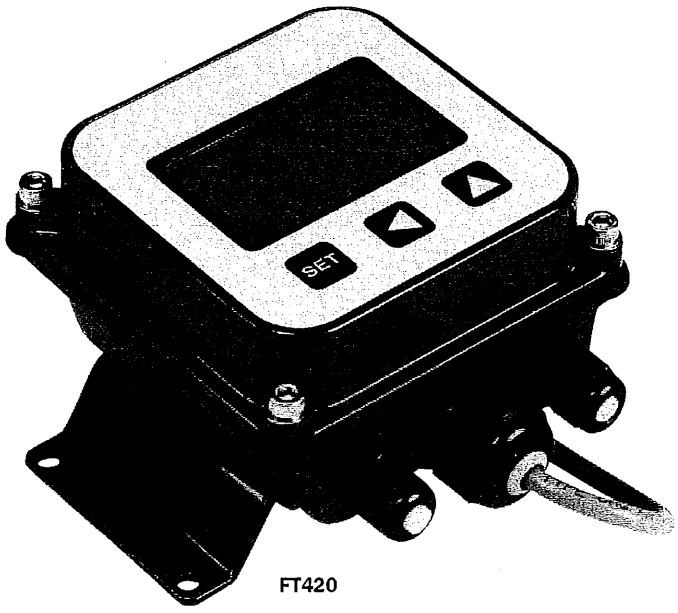
LT-65200056-052714
5/27/2014

Seametrics

FT400-SERIES
Rate/Total Indicator

ISO 9001:2008 CERTIFIED COMPANY



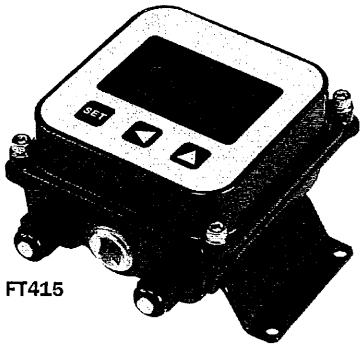
FT420

FEATURES

- Simple Setup
- Battery (FT415) or Loop Powered (FT420)
- Remote or Flow Sensor Mounted Indicator
- Rugged Metallic Housing
- Non-volatile Memory

APPLICATIONS

- Water Treatment
- Water Utility
- Industrial Chemical Handling



FT415

GENERAL INFORMATION

The FT400-Series flow computers are microcontroller-based indicator/transmitters that display flow rate and total and provide output signals. The FT415 is battery-powered and provides a scalable pulse output. The FT420 is powered by external DC voltage and has both pulse and 4-20 mA analog outputs. When the FT420 is being used in the 4-20 mA mode, it is a "two-wire" or "loop-powered" device, meaning that the 4-20 mA output signal doubles as its power supply.

The addition of a dual-relay output board (FT420 only) allows for certain applications requiring contact output isolation (e.g., certain metering pumps and water treatment controls). Dual solid state relays provide exactly the same pulse output as the standard unit, and each can signal one external device. A non-resettable total is also available. The FT420 can be ordered in a plastic enclosure with a 115 Vac power supply for use with mechanical meters, or with a built-in 115 Vac/12-24 Vdc dual power supply for magmeters.

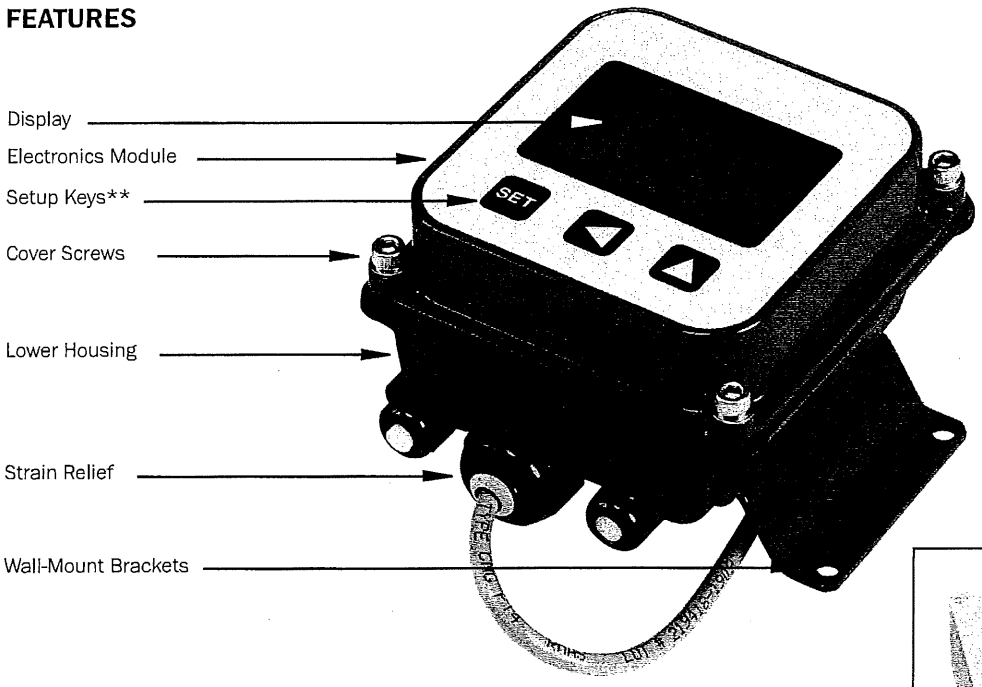
Both the FT415 and the FT420 can be factory-mounted on the meter or remotely wall mounted with the brackets provided. The FT420 is also available as a panel mount with an open back for easy installation in the user's own electrical enclosure. Most FT400's can be converted from wall-to-meter or meter-to-wall mount configurations after installation if needed.

Housings for the wall and meter-mounted models are rugged cast aluminum, potted and gasketed for maximum environmental protection. A membrane keypad allows settings to be changed without removing the cover. (Password protection, a standard feature on the FT420, can be used to prevent settings from being changed.)

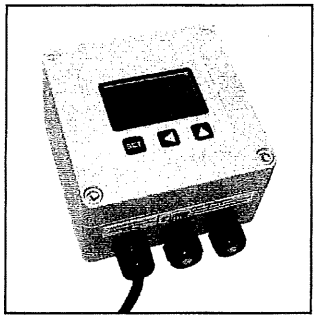
Seametrics

FT400-SERIES
Rate/Total Indicator

FEATURES



**The FT420 includes password protection for tamper prevention when needed



FT420 with -27 or -65 Option

SPECIFICATIONS*		FT415	FT420
Power		Lithium "C", 3.6 Vdc, replaceable. Estimated life is 3-5 years depending on usage.	12-30 Vdc, 4mA (4-20 mA when loop-powered)
Display	**Rate**	6-digit autorange, 1/2" character height	6-digit autorange, 1/2" character height
	Total	8-digit, 5/16" character height	8-digit, 5/16" character height
Outputs	**Current Sinking Pulse**	Scaled Pulse output (0.1 sec duration 6.1 Hz max) (or High Alarm output or Low Alarm output)	
		Sensor pass-through Pulse output (unscaled)	
	Analog	None	4-20 mA loop; 24-30 Vdc
Pulse Output Range		0.1 - 9999999.9 units/pulse	0.1 - 9999999.9 units/pulse
Input		Micropower GMR Sensor (square wave)	5V pulse or contact closure
Input Range		1.0 - 150 pulses/second	1.0 - 1,500 pulses/second
K-Factor Range		.001 - 99999.999	.001 - 99999.999
Flow Alarm Output Range		.01 - 999999.99	.01 - 999999.99
Operating Temperature		-30˚ to 65˚ C (-22˚ to 148˚ F)	-30˚ to 65˚ C (-22˚ to 148˚ F)
Environmental		NEMA 4X, IP66	NEMA 4X, IP66

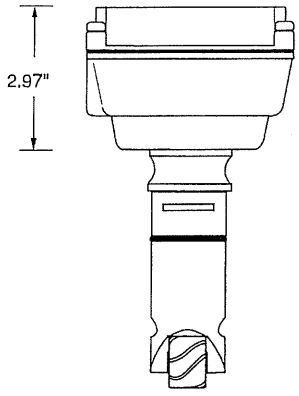
Specifications subject to change • Please consult our website for current data (www.seametrics.com).

Seametrics

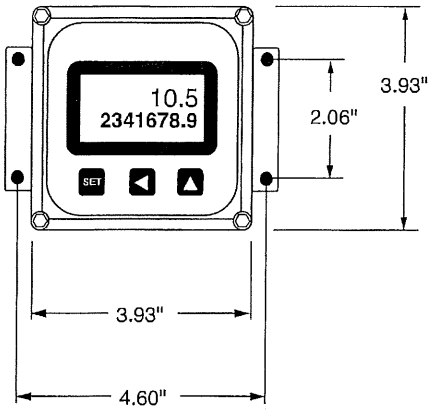
FT400-SERIES
Rate/Total Indicator

DIMENSIONS

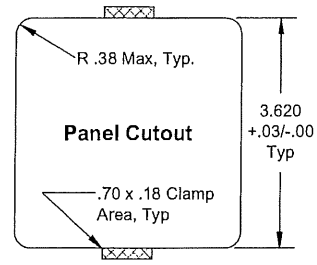
FT415/FT420 Sensor Mount

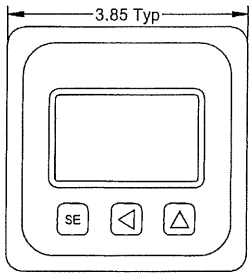


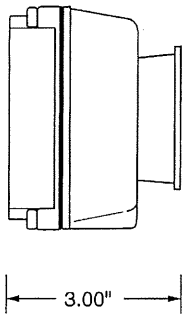
FT415/FT420 with Wall Mount Brackets

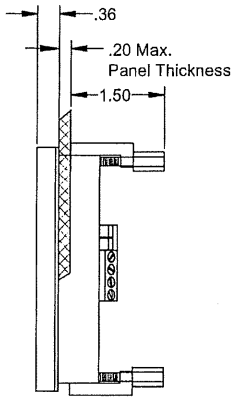


FT420 Panel Mount

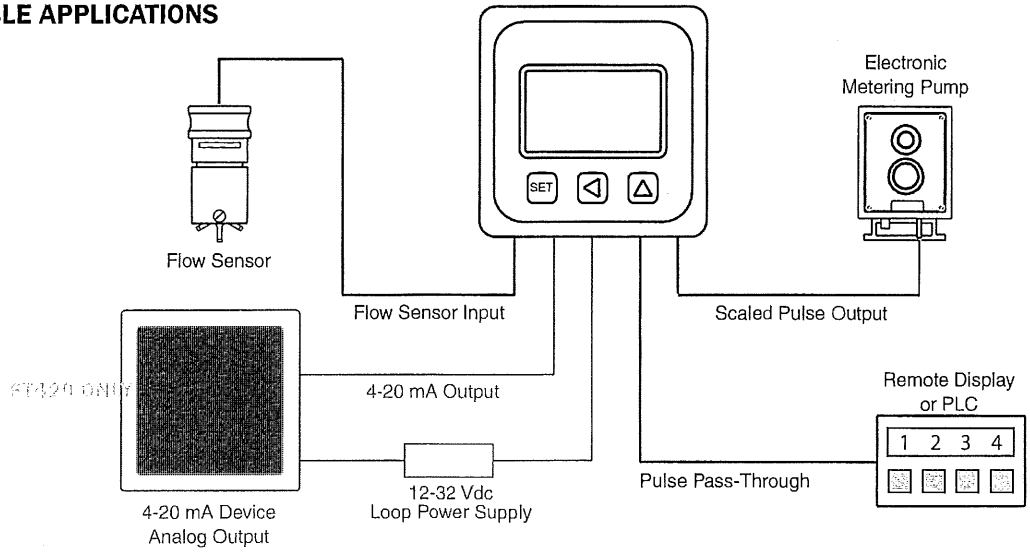








POSSIBLE APPLICATIONS



Seametrics

FT400-SERIES
Rate/Total Indicator

HOW TO ORDER

MODEL

Battery-powered indicator = **FT415**

Loop-powered indicator/transmitter = **FT420**

MOUNTING

Wall mount = **W**

Panel mount = **P**

Meter mount = **See appropriate meter specification to order meter mounted units.**

OPTIONS

Built-in 115 Vac/12-24 Vdc dual power supply (FT420W only, use with magmeters) = **-27**

Tamper-evident = **-32**

Non-resettable total = **-64**

Built-in 115 Vac power supply (FT420W only, use with mechanical meters) = **-65**

Dual relay output (FT420 only) = **-98**

ACCESSORIES

Data logger (wall mount) = **DL76W**

Power converter, plug-in, 115 Vac, 24 Vdc = **PC3**

Dual power supply, plug-in, 115 Vac, 12/24 Vdc = **PC42**

Protective cover, hinged = **101949**

Mounting kit, wall-to-meter conversion = **102632**

Mounting kit, meter-to-wall conversion = **102633**

LMI pump power cable = **100013**

LMI pulse out cable = **100039**

CONTACT YOUR SUPPLIER

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