

ATTACHMENT J

Geotechnical Data Report for VRE Alexandria Station

Addendum No. 8



October 8, 2015

Geotechnical Data Report

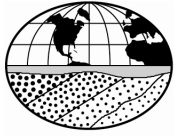
**VRE Alexandria Station
Pedestrian Tunnel
110 Callahan Drive
Alexandria, Virginia**



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October 8, 2015

Mr. Sean Rousseau, P.E.
AECOM
2101 Wilson Boulevard
Arlington, Virginia 22201

**Subject: Geotechnical Data Report, VRE Alexandria Station
Pedestrian Tunnel, 110 Callahan Drive, Alexandria,
Virginia (GeoConcepts Project No. 12170)**

Dear Mr. Rousseau:

GeoConcepts Engineering, Inc. (GeoConcepts) is pleased to present the following geotechnical data report prepared for the proposed VRE Alexandria Station Pedestrian Tunnel in Alexandria, Virginia.

We appreciate the opportunity to serve as your geotechnical consultant on this project. Please do not hesitate to contact me if you have any questions or want to meet to discuss the findings contained in the report.

Sincerely,

GEOCONCEPTS ENGINEERING, INC.

Paul Burkart, PE
Principal
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Figure 1: Site Vicinity Map

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1.0 Introduction

The proposed Alexandria Station Pedestrian Tunnel project is located at 110 Callahan Drive in Alexandria, Virginia. A site vicinity map is presented in Figure 1 at the end of this report. The proposed tunnel will connect the existing Virginia Railway Express (VRE) Alexandria Station and the existing Washington Metropolitan Area Transit Authority (WMATA) King Street Station.

2.0 Subsurface Conditions

Subsurface conditions were investigated by drilling a total of three test borings in the proposed tunnel alignment area. Test boring logs are presented in Appendix A of this report.

2.1 Ground Penetrating Radar (GPR) Survey

A Ground Penetrating Radar (GPR) survey was performed on the train platforms at boring locations GZ-7 and GZ-8 to scan for subsurface utilities and reinforcement bar within the platform slabs. The GPR Survey used a SIR-3000 GPR unit with an antenna frequency of 400 MHz to locate utilities and other anomalies at the site. Additionally, a radio detection RD-7000 device was used to locate live power lines subsurface. The GPR Survey was performed as a series of linear transects. Anomalies were spray-painted directly on the ground surface. A copy of the GPR field report is presented in Appendix A.



2.2 Geology

The site is located within the Coastal Plain Physiographic Province of Virginia. The Coastal Plain consists of a seaward thickening wedge of unconsolidated to semi-consolidated sedimentary deposits from the Cretaceous Geologic Period to the Holocene Geologic Epoch. These deposits represent marginal-marine to marine sediments consisting of interbedded sands and clays. The Coastal Plain is bordered to the east by the Atlantic Ocean and to the west by the Piedmont Physiographic Province. The dividing line between the Coastal Plain and the Piedmont is locally referred to as the "Fall Line". This name comes from the waterfalls that form as a result of the differential erosion that occurs as streams cross the Piedmont/Coastal Plain contact.

Specifically, according to local geologic maps, the site is mapped in low-level fluvial and estuarine deposits of the Pleistocene and Cretaceous geologic periods. Based on our subsurface investigation, the sediments and strata correspond favorably to the geologic publications.

The existing fill soils of Stratum A are believed to be related to previous site grading. The natural soils assigned to Stratum B are believed to be terrace deposits, and soils assigned to Stratum C are believed to be the Potomac Formation sediments. The Potomac Formation is the oldest sedimentary deposits in the Washington, DC area. These soils are known to be highly over-consolidated as a result of the weight of a substantial thickness of overlying soils that have since been eroded away. As a result of over-consolidation, Potomac Formation soils have been pre-loaded and are capable of supporting substantial loads.

2.3 Stratification

The subsurface materials encountered have been stratified for purposes of our discussions herein. These stratum designations do not imply that the materials encountered are continuous across the site. Stratum designations have been established to characterize similar subsurface conditions based on material gradations and parent geology. The generalized subsurface materials encountered in the test borings completed at the site have been assigned to the following strata:

Stratum A (Existing Fill)	generally medium dense or stiff, clayey SAND (SC), FAT CLAY (CH), sandy LEAN CLAY (CL), and sandy SILTY CLAY (CL-ML), moist, brown, black, yellowish brown, light olive brown.
Stratum B (Terrace Deposits)	dense or stiff, clayey SAND (SC) with gravel, clayey GRAVEL with sand (GC), LEAN CLAY (CL) with sand, moist, brown and light brown.
Stratum C (Potomac Formation)	Very stiff to hard, FAT CLAY (CH), moist, brown and gray.

The two letter designations included in the strata descriptions presented above and on the test boring logs represent the Unified Soil Classification System (USCS) group symbol and group name for the samples based on laboratory testing per ASTM D-2487 and visual classifications per ASTM D-2488. It should be noted that visual classifications per ASTM D-2488 may not match classifications determined by laboratory testing per ASTM D-2487.

2.4 Groundwater

Groundwater level observations were made in the field during drilling and up to 24 hours after the completion of the test borings. Longer-term groundwater level readings were obtained in temporary observation wells installed in test borings GZ-7 and GZ-9. A summary of the water level readings to the nearest 0.1 feet elevation is presented in the table below.

Test Boring No.	Depth to Groundwater (ft)	Groundwater Elevation (ft)
GZ-7	16.2	16.0
GZ-8	10.0	22.7
GZ-9	18.4	13.7

The groundwater observations presented herein are considered to be an indication of the groundwater levels at the dates and times indicated. Where more impervious silt and clay soils are encountered, the amount of water seepage into the borings is limited, and it is generally not possible to establish the location of the groundwater table through short term water level observations. Accordingly, the groundwater information presented herein should be used with caution. Also, fluctuations in groundwater levels should be expected with seasons of the year, construction activity, changes to surface grades, precipitation, or other similar factors.

2.5 Soil Laboratory Test Results

Selected soil samples obtained from the field investigation were tested for grain size distribution, Atterberg limits, natural moisture content, specific gravity, unit weight, organic content, expansion index, swell pressure, permeability, and shear strength. Summaries of soil laboratory test results are presented in the tables below, and the test results are presented in Appendix B.

Classification Test Results

Test Boring No.	Sample Depth (ft)	Sample Type	Stratum	Description of Soil Specimen	Sieve Results		Atterberg Limits			Natural Moisture Content (%)
					Percent Retained #4 Sieve	Percent Passing #200 Sieve	LL	PL	PI	
GZ-7	9.0-11.0	Shelby Tube	A	Yellowish brown sandy LEAN CLAY with gravel (CL)	15.1	65.0	49	17	32	24.8
	11.0-13.0	Shelby Tube	A	Brown LEAN CLAY (CL)	0.0	97.3	44	18	26	27.0
	15.0-17.0	Shelby Tube	A	Yellowish brown SANDY LEAN CLAY (CL)	1.0	56.4	34	16	18	20.6
	17.0-19.0	Shelby Tube	A	Grayish brown LEAN CLAY with sand (CL)	0.5	83.0	49	14	35	21.4
	19.0-21.0	Split Spoon	B	Brown/light brown clayey GRAVEL with sand (GC)	60.7	15.7	89	23	66	8.1
	23.0-25.0	Shelby Tube	C	Light yellowish brown FAT CLAY (CH)	0.1	97.8	69	23	46	30.0
GZ-8	15.0-17.0	Shelby Tube	A	Yellowish brown LEAN CLAY with sand (CL)	0.2	77.1	33	22	11	16.8
	17.0-19.0	Shelby Tube	A	Light olive brown LEAN CLAY (CL)	0.4	95.7	34	21	13	23.4
	22.0-24.0	Shelby Tube	C	Brown FAT CLAY (CH)	0.0	99.8	90	33	57	32.8
GZ-9	4.0-6.0	Shelby Tube	A	Yellowish brown LEAN CLAY with sand (CL)	1.0	73.9	38	16	22	28.1
	8.0-10.0	Shelby Tube	A	Brown SANDY SILTY CLAY (CL-ML)	2.3	66.2	23	19	4	20.5
	16.0-18.0	Shelby Tube	A	Dark yellowish brown SANDY SILTY CLAY (CL-ML)	8.9	66.8	29	22	7	21.1
	18.0-20.0	Shelby Tube	A	Yellowish brown LEAN CLAY (CL)	0.2	86.5	27	17	10	23.5
	20.4-21.7	Split Spoon	B	Light brown clayey SAND with gravel (SC)	22.9	44.3	106	29	77	5.0
	24.0-26.0	Shelby Tube	C	N/T	N/T	N/T	75	25	50	N/T

Notes:

1. Soil tests are in accordance with applicable ASTM standards
2. Soil classification symbols are in accordance with Unified Soil Classification System
3. Visual identification of samples is in accordance with ASTM D-2488
4. Key to abbreviations: LL = liquid limit; PL = plastic limit; PI = plasticity index; NP = nonplastic; N/T = not tested

Miscellaneous Test Results

Test Boring No.	Sample Depth (ft)	Specific Gravity	Unit Weight, Dry / Wet (lb/ft ³)	Organic Content (%)	Expansion Index	Constant Volume One-Dimensional Swell, Applied Pressure (tsf) / Swell Pressure (tsf)	Coefficient of Permeability (cm/s)
GZ-7	9.0-11.0	2.722	N/T	1.63	N/T	N/T	N/T
	17.0-19.0	2.707	102.7 / 124.7	N/T	N/T	N/T	7.0x10 ⁻⁷
	23.0-25.0	2.710	93.9 / 122.1	N/T	N/T	N/T	N/T
GZ-8	9.0-11.0	N/T	N/T	N/T	246	N/T	N/T
	15.0-17.0	2.725	104.4 / 121.9	N/T	N/T	N/T	2.9x10 ⁻⁷
	17.0-19.0	2.733	102.3 / 126.2	N/T	N/T	N/T	2.4x10 ⁻⁷
	19.0-19.7	N/T	N/T	3.1	N/T	N/T	N/T
	22.0-24.0	2.747	N/T	N/T	N/T	N/T	2.3x10 ⁻⁷
	24.0-25.2	N/T	86.9 / 115.42	N/T	N/T	N/T	N/T
GZ-9	4.0-6.0	2.815	N/T	N/T	N/T	N/T	N/T
	8.0-10.0	2.690	100.0 / 120.5	2.7	N/T	N/T	N/T
	16.0-18.0	N/T	N/T	N/T	N/T	1.35 / 1.4	N/T
	18.0-20.0	2.699	99.5 / 122.9	N/T	N/T	N/T	N/T

Notes:

- Key to abbreviations; N/T = not tested

Consolidated Undrained (CU) Triaxial Test Results

Test Boring No.	Sample Depth (ft) (Test Load)	Effective Strength Parameters	
		Angle of Internal Friction (degrees)	Cohesion (psf)
GZ-7	11.0-13.0(1520 psf)	24.4*	0*
	11.0-13.0 (3040 psf)	17.6*	0*
	15.0-17.0	25.9	204
	23.0-25.0	23.2	105
GZ-8	15.0-17.0	28.5	490
	17.0-19.0	30.9	0
	22.0-24.0	19.1	380
GZ-9	8.0-10.0 (1140 psf)	27.0*	0*
	8.0-10.0 (2280 psf)	20.9*	0*
	18.0-20.0	25.9	26.4

* Laboratory reported unconventional shear test results due to micro-fractured soil structure. Therefore, values are shown separately for each undrained shear strength test performed for a sample, instead of a combined plot for all tests performed on a sample.

2.6 Pressuremeter Test Results

Pressuremeter tests were performed in test borings GZ-7, GZ-8, and GZ-9 to evaluate the shear strength and compressibility of the in-situ soils. The pressuremeter test results are presented in Appendix A, and a summary of the pressuremeter test results is presented in the following table:

Test Boring No.	Sample Depth (ft)	Estimated Pressuremeter Modulus (bar)	Estimated Limit Pressure (bar)
GZ-7	15.0	84	5.2
GZ-8	16.5	113	7.7
GZ-9	10.2	31	3.1
GZ-9	14.0	251	19.2

2.7 Slug Tests

A series of rising head slug tests were conducted on wells in test borings GZ-7 and GZ-9. A data logger was used to record the rise in the water level in the wells after a slug (solid weighted PVC tube) was removed. Data was recorded using a Levellogger Gold Model 3001 data logger, connected to a laptop computer with Solinst Levellogger Data Analysis Software 3.4.1 installed. The hydraulic conductivity (K) values were calculated using AQTESOLV software and the Bouwer-Rice Solution Method. Data from the slug tests is presented in Appendix A.

Transmissivity is defined as the amount of water that may be transmitted horizontally by the fully saturated thickness of the aquifer under a hydraulic gradient of 1. The transmissivity (T) is the product of the hydraulic conductivity (K) and the saturated thickness of the aquifer (b), thus $T = bK$. Since the aquifer was located exclusively in the overburden, the thickness of the aquifer was based on the elevation difference from the static water level to the bottom of the boring. A summary of the slug test results is presented in the following table:

Summary of Aquifer Parameters

Test Boring No.	Hydraulic Conductivity (ft/day)	Transmissivity (ft ² /day)
GZ-7	444	2976
GZ-9	306	2661

Based on accepted values, the aquifer encountered in the test borings fall into the lower half of the pervious range of hydraulic conductivity (100 – 1,000 ft/day), including well-sorted sand and/or sand and gravel mixtures. Based on our subsurface investigation, the site stratification is man-made fill overlying Pleistocene age terrace deposits, which overlie very stiff clay of the Early Cretaceous age Potomac Formation. The aquifer which this study characterized was seated in the bottom few feet of the terrace deposits overlying the Potomac Formation sediments. Referencing a 2007 study of the Anacostia River Basin (Matheson, et al. 1994) the hydraulic conductivity of the surficial (terrace) aquifers of the Washington DC area occur in two ranges, 5 to 10 ft/day in general for the sands and gravelly sands, and 150 to 700 ft/day for cohesionless, single size (poorly graded) sands. Thus, the hydraulic conductivity falls near the middle of the range for cohesionless, single-sized sands.

Aquifer Testing References:

1. Bouwer, Herman, 1989, The Bouwer and Rice Slug Test – An Update, Groundwater Vol. 27, No. 3, pp 304-309.

2. Matheson, G. M., Schneider, J., Zmijewski, D., and A Farshad, 1994, Definition of Groundwater Flow in the Water Table Aquifer of the Southern Anacostia River Basin, DC Water Research Center Report No. 147.

2.8 Metal Corrosion/Concrete Attack Test Results

In addition to standard geotechnical soil laboratory testing, three samples were submitted to an analytical laboratory for metal corrosion and concrete attack testing. Corrosion testing consisted of analysis for moisture content (ASTM D-2216), pH (CA643), resistivity (ASTM G187), sulfides (water soluble EPA 376.2), and reduction-oxidation potential (Electrode). The test results are presented in the table below.

Metal Corrosion Test Results

Test Boring No.	Sample Depth (ft)	Moisture Content (%)	pH	Resistivity (ohm – cm)	Sulfides (ppm)	Redox Potential (mV)	Point Total
GZ-7	13.0-15.0	20.0	5.2	6900	< 1.2	+ 196	3
GZ-8	15.0-17.0	24.0	4.0	4600	< 1.2	+ 331	6
GZ-9	10.0-12.0	22.0	4.9	11000	< 1.2	+ 165	4

For each test presented above, points are assigned based on the range of the test results. If the total points from the five tests completed for a particular sample are 10 or more, the soil is considered to be corrosive. The methods described herein are based on information from the "Cast Iron Pipe Research Association Handbook". Using the methods described herein, the point total for the samples tested averaged 4.3. Accordingly, the site soils are considered non-corrosive and special provisions relating to corrosion protection are not considered necessary for the project.

Sulfate (water soluble CA417) tests were performed on selected soil samples to determine the severity of sulfate attack on concrete structures. The test results are presented in the table below.

Sulfate Test Results

Test Boring No.	Sample Depth (ft)	Sulfate Concentration (ppm)
GZ-7	13.0-15.0	36.0
GZ-8	15.0-17.0	< 5.0
GZ-9	10.0-12.0	9.7

Based on correlations between sulfate concentrations and severity of sulfate attack as presented in American Concrete Institute (ACI) 318, the above sulfate concentrations are considered to pose a negligible threat of sulfate attack on concrete.

2.9 Mineralogical Content

Three samples were submitted to an analytical laboratory for mineralogical content. X-ray diffraction (XRD) analysis was performed on bulk and clay components of the samples. The complete results of the mineralogical content tests are presented in Appendix B.

3.0 Environmental Soil Screening and Lab Testing

Environmental subsurface conditions were investigated by screening the test borings with a Photoionization Detector (PID) to detect the presence of Volatile Organic Compounds (VOCs). Soil samples were placed in plastic Ziploc bags and allowed to volatilize for approximately 15 minutes. A PID measurement was collected by inserting the tip of the PID into the headspace of the Ziploc bag. The PID readings are indicated on the test boring logs in Appendix A.

Additionally, jar samples were collected from each boring at multiple depths and a total of six soil samples were sent for chemical laboratory analysis. Soil samples were immediately placed in 4-ounce glass sampling jars with minimal headspace. Each sampling jar was labeled with the project name, the project number, the date, the boring number, the testing parameters, and the depth from which the sample was collected. Three of the six jar samples were placed in a cooler on ice and remained chilled until transported to the chemical laboratory under chain-of-custody procedures for analysis. The remaining three samples were extracted and immediately placed in 4-ounce glass sampling jars with minimal headspace from the sealed Shelby tube samples due to the continuous sampling method within the tunnel zone. This method was used to ensure a representative sample of the borehole was obtained and tested. The samples were then transported to the chemical laboratory under chain-of-custody procedures for analysis.

Jar soil samples obtained during the field investigation were submitted for chemical analysis of Total Petroleum Hydrocarbons-Diesel Range Organics (TPH-DRO), Total Petroleum Hydrocarbons-Gasoline Range Organics (TPH-GRO), Priority Pollutant metals testing (13), Volatile Organic Compounds (VOCs), and polychlorinated biphenyl (PCBs). A summary of laboratory test results is presented in the table below. A copy of the chemical laboratory test results including a chain-of-custody form is presented in Appendix B.

Chemical Laboratory Test Results

Test Boring No.	Sample Depth (ft)	**TPH-DRO (mg/kg)	**TPH-GRO (mg/kg)	*BTEX (ug/kg)	Priority Pollutant metals 13 (mg/kg)					VOCs (ug/kg)	PCBs (ug/kg)
					Cr	Cu	Pb	Ni	Zn		
*GZ-7	13.0-15.0	< 10	< 0.50	< 5.0	12.0	3.8	5.5	3.6	11.0	< 5.0	< 80
GZ-7	19.0-21.0	< 10	< 0.50	< 5.0	12.0	11.0	5.9	3.9	15.0	< 5.0	< 80
*GZ-8	13.0-15.0	< 10	< 0.50	< 5.0	11.0	9.8	5.7	9.0	320	< 5.0	< 80
GZ-8	28.0-30.0	46	< 0.50	< 5.0	15.0	15.0	4.7	17	22.0	< 5.0	< 80
GZ-9	8.0-10.0	< 10	< 0.50	< 5.0	12.0	16.0	13	6.0	20.0	< 5.0	< 80
*GZ-9	14.0-16.0	< 10	< 0.50	< 5.0	13.0	11.0	6.0	8.6	64.0	< 5.0	< 80

* Samples collected from Shelby tubes.

** Virginia Environmental Laboratory Accreditation Program (VELAP)

Additionally, three composite samples from the drilling spoils were submitted for analysis of toxicity characteristic leaching procedure (TCLP) Metals, TOX, and TPH 1664. A summary of soil laboratory test results is presented in the table below. A copy of the chemical laboratory test results including a chain-of-custody form is presented in Appendix B.

Chemical Laboratory Test Results – Composite Samples

Test Boring No.	Sample Depth (ft)	*TCLP (mg/L)	TOX (mg/kg)	TPH-Oil & Grease (mg/kg)
GZ-7	Composite	0.39 (Barium)	< 10	< 10
GZ-8	Composite	0.43 (Barium)	< 10	< 10
GZ-9	Composite	0.30 (Barium)	< 10	< 10

*All tests were non-detect except for Barium

Along with the soil samples, we collected two groundwater samples for analysis of TPH-DRO, TPH-GRO, and VOCs testing. The water sample pH and CO₂ levels were tested in the field. A summary of the water laboratory test results is presented in the table below. A copy of the chemical laboratory test results including a chain-of-custody form is presented in Appendix B.

Groundwater Laboratory Test Results

Test Boring No.	TPH-DRO (mg/L)	TPH-GRO (ug/L)	VOCs (ug/L)	pH	SO ₄ (mg/L)	CO ₂ (mg/L)	Mg (ug/L)	Na (ug/L)	Cl (mg/L)
GZ-7	0.12	< 100	Non-detect	6.0	52	30	45000	140000	320
GZ-9	< 0.10	< 100	Non-detect	10.6	20	30	55000	68000	180

4.0 General Limitations

Recommendations contained in this report are based upon the data obtained from the relatively limited number of test borings. This report does not reflect conditions that may occur between the points investigated, or between sampling intervals in test borings. The nature and extent of variations between test borings and sampling intervals may not become evident until the course of construction. Therefore, it is essential that on-site observations of subgrade conditions be performed during the construction period to determine if re-evaluation of the recommendations in this report must be made.

This report has been prepared to aid in the evaluation of the site and to assist your office and the design professionals in the design of this project. It is intended for use with regard to the specific project as described herein. Changes in proposed construction, grading plans, etc. should be brought to our attention so that we may determine any effect on the data presented herein.

This report should be made available to bidders prior to submitting their proposals to supply them with facts relative to the subsurface conditions revealed by our investigation and the results of analyses and studies that have been performed for this project. In addition, this report should be given to the successful contractor and subcontractors for their information only.

We recommend the project specifications contain the following statement: "A geotechnical data report has been prepared for this project by GeoConcepts Engineering, Inc. This report is for informational purposes only and should not be considered part of the contract documents. The opinions expressed in this report are those of the geotechnical engineer and represent their interpretation of the subsoil conditions, tests and results of analyses that they performed. Should the data contained in this report not be adequate for the contractor's purposes, the contractor may make their own investigations, tests and analyses prior to bidding."

This report was prepared in accordance with generally accepted geotechnical engineering practices. No warranties, expressed or implied, are made as to the professional services included in this report.

We appreciate the opportunity to be of service for this project. Please contact the undersigned if you require clarification of any aspect of this report.

Sincerely,

GEOCONCEPTS ENGINEERING, INC.



Chris Lynch, EIT
Project Engineer

Paul Burkart, PE
Principal



JA/CL/PB/clm

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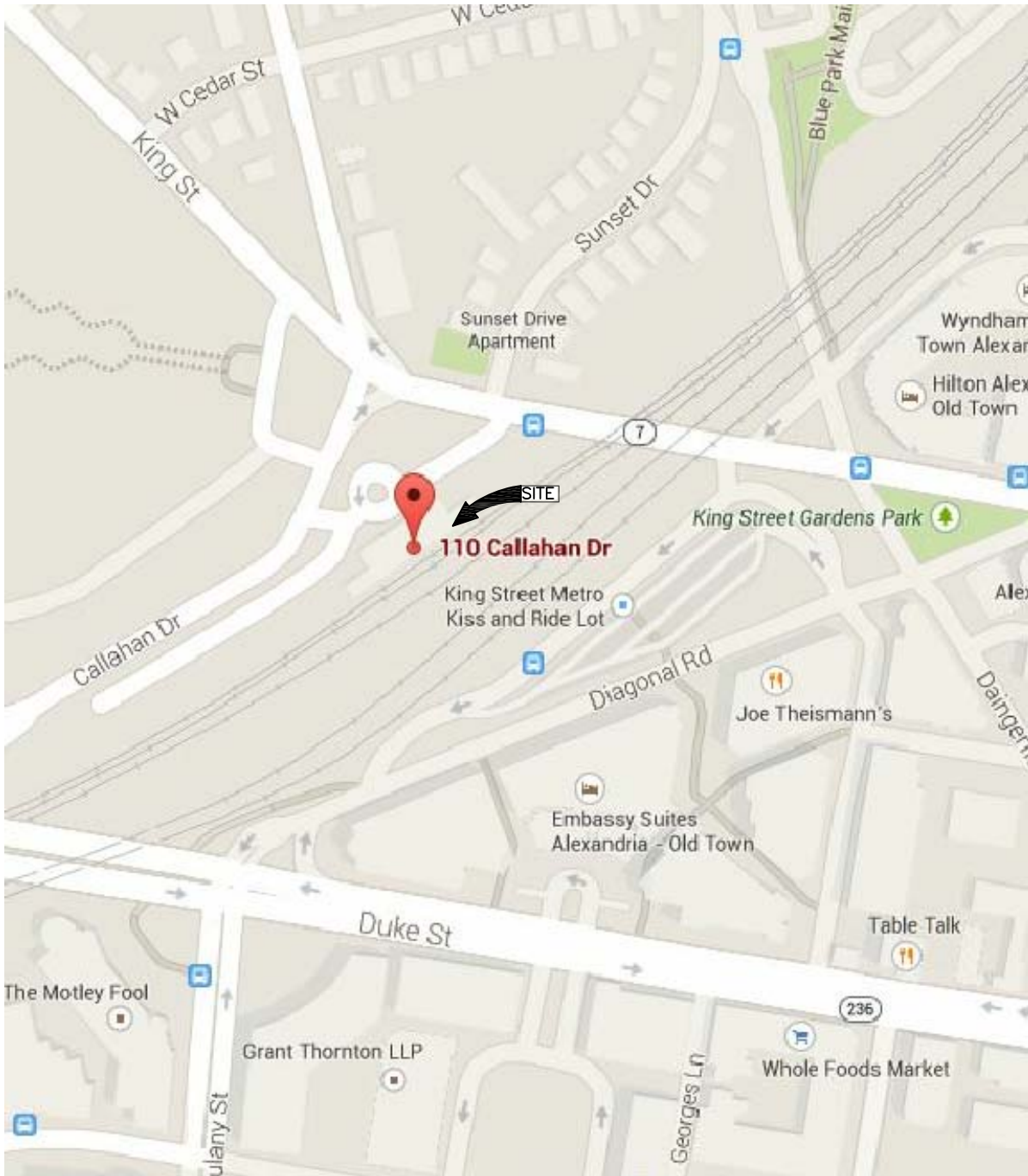


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VRE ALEXANDRIA STATION
110 CALLAHAN DRIVE, ALEXANDRIA, VIRGINIA

SITE
VICINITY MAP

Scale:
N.T.S.

Fig.

Date:
OCT. 2015

Drawn By:
J.A.

Checked By:
P.E.B.

Project No.:
12170

1

Appendix A

Subsurface Investigation

Subsurface Investigation Procedures (1 page)

Identification of Soil (1 page)

Test Boring Notes (1 page)

Pressuremeter Test (PMT) Procedures (1 page)

Ground Penetrating Radar Field Report (7 pages)

Test Boring Logs (3 pages)

Slug Test Results (5 pages)

Pressuremeter Test Results (11 pages)

Boring Location Plan, Figure 2 (1 page)

Subsurface Investigation Procedures

1. Test Borings – Hollow Stem Augers

The borings are advanced by turning an auger with a center opening of 3-¼ inches. A plug device blocks off the center opening while augers are advanced. 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, after removal of the plug. Usually, no water is introduced into the boring using this procedure.

2. Standard Penetration Tests

Standard penetration tests are performed by driving a 2 inch O.D., 1-¾ inch I.D. sampling spoon with a 140-pound hammer falling 30 inches, according to ASTM D-1586. After an initial 6 inches penetration to assure the sampling spoon is in undisturbed material, the number of blows required to drive the sampler an additional 12 inches is generally taken as the N value. In the event 30 or more blows are required to drive the sampling spoon the initial 6 inch interval, the sampling spoon is driven to a total penetration resistance of 100 blows or 18 inches, whichever occurs first.

3. Undisturbed Tube Samples

Undisturbed tube sampling is accomplished by inserting 3 inch I.D. thin walled steel tubes into the soil through the hollow stem of the augers with hydraulically actuated rams.

4. Groundwater Monitoring Wells

Groundwater monitoring wells were installed in test borings GZ-7 and GZ-9. The wells were installed by inserting a 2-inch diameter plastic screened pipe through the 3-¼ inch diameter center opening of the auger and backfilling with pea gravel filter pack material as the auger was withdrawn. The pipe was capped for protection from rainfall, runoff, and foreign objects. Readings were taken as shown on the test boring logs.

5. Test Boring Stakeout

The test boring stakeout was provided by the project civil engineer.

Identification of Soil

I. DEFINITION OF SOIL GROUP NAMES

ASTM D-2487

Symbol

Group Name

Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	<i>GW</i>	WELL GRADED GRAVEL
			<i>GP</i>	POORLY GRADED GRAVEL
		Gravels with Fines More than 12% fines	<i>GM</i>	silty GRAVEL
			<i>GC</i>	clayey GRAVEL
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	<i>SW</i>	WELL GRADED SAND
			<i>SP</i>	POORLY GRADED SAND
		Sands with fines More than 12% fines	<i>SM</i>	silty SAND
			<i>SC</i>	clayey SAND
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	Inorganic	<i>CL</i>	LEAN CLAY
			<i>ML</i>	SILT
		Organic	<i>OL</i>	ORGANIC CLAY
				ORGANIC SILT
	Silts and Clays Liquid Limit 50 or more	Inorganic	<i>CH</i>	FAT CLAY
			<i>MH</i>	ELASTIC SILT
		Organic	<i>OH</i>	ORGANIC CLAY
				ORGANIC SILT
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor		<i>PT</i>	PEAT

II. DEFINITION OF MINOR COMPONENT PROPORTIONS

Minor Component

Gravelly, Sandy (adjective)

Sand, Gravel

Silt, Clay

Approximate Percentage of Fraction by Weight

30% or more coarse grained

15% to 29% coarse grained

5% to 12% fine grained

III. GLOSSARY OF MISCELLANEOUS TERMS

SYMBOLS

Unified Soil Classification Symbols are shown above as group symbols. Use "A" Line Chart for laboratory identification. Dual symbols are used for borderline classification.

BOULDERS & COBBLES

Boulders are considered pieces of rock larger than 12 inches, while cobbles range from 3 to 12 inches.

WEATHERED ROCK

Residual rock material with a standard penetration test (SPT) resistance of at least 60 blows per foot.

ROCK/SPOON REFUSAL

Rock material with a standard penetration test (SPT) resistance of 50 blows for 1 inch.

ROCK FRAGMENTS

Angular pieces of rock which have separated from original vein or strata and are present in a soil matrix. Only used in residual soils

QUARTZ

A hard silicate mineral often found in residual soils. Only used when describing residual soils.

CEMENTED SAND

Usually localized rock-like deposits within a soil stratum composed of sand grains cemented by calcium carbonate, iron oxide, or other minerals. Commonly encountered in Coastal Plain sediments, primarily in the Potomac Group sands (Kps).

MICACEOUS

A term used to describe soil that "glitters" or is shiny. Most commonly encountered in fine-grained soils.

ORGANIC MATERIALS

Topsoil - Surface soils that support plant life and contain organic matter.

(Excluding Peat)

Lignite - Hard, brittle decomposed organic matter with low fixed carbon content (a low grade of coal).

FILL

Man-made deposit containing soil, rock, and other foreign matter.

CONTAINS

This is used when a fill deposit contains a secondary component that does not apply to a USCS classification. Only used for fill deposits

WITH

This is used when a residual soil contains a secondary component that does not contribute to its USCS classification. Only used for natural soils.

PROBABLE FILL

Soils which contain no visually detected foreign matter but which are suspect with regard to origin.

LAYERS

1/2 to 12 inch seam of minor soil component.

COLOR

Two most predominant colors present should be described.

MOISTURE CONDITIONS

Wet, moist, or dry to indicate visual appearance of specimen.

f-m-c

Fine-medium-coarse

Test Boring Notes

1. Classification of soil is by visual inspection and is in accordance with the Unified Soil Classification System.
2. Estimated groundwater levels are indicated on the logs. These are only estimates from available data and may vary with precipitation, porosity of soil, site topography, etc.
3. Sampling data presents standard penetrations for 6-inch intervals or as indicated with graphic representations adjacent to the sampling data. Where undisturbed tube samples are taken, they are designated "Shelby Tube" on the test boring log.
4. The logs and related information depict subsurface conditions at the specific locations and at the particular time when drilled. Soil conditions at other locations may differ from conditions occurring at the test locations. Also, the passage of time may result in a change in the subsurface conditions at the test locations.
5. The stratification lines represent the approximate boundary between soil types as determined in the sampling operation. Some variation may be expected vertically between samples taken. The soil profile, groundwater level observations and penetration resistances presented on the logs have been made with reasonable care and accuracy and must be considered only an approximate representation of subsurface conditions to be encountered at the particular location.
6. The information presented in the PID column are the results of photoionization detector (PID) screening of the soil samples obtained in the test borings. The PID is used to provide a qualitative indication of the presence of volatile organic compounds (VOC's). However, in order to obtain a quantitative indication of VOC's, chemical analytical testing is required.

Pressuremeter Test (PMT) Procedures

1. **Brief Description of the Pressuremeter Test:** The test is performed in a borehole by a NX size short cylindrical probe covered with rubber membranes. The probe is inflated by water under pressure from a surface control apparatus. Pressure is increased in steps and deformations are recorded, and thus the procedure represents a load test on the walls of the borehole.
2. **Results of Pressuremeter Tests:** The test furnishes information as to the undrained strength and deformation characteristics of the material. Results provide a basis to predict bearing capacity, settlement of foundations, and other soil mechanics problems.
3. The basic result of the test is the pressuremeter curve, which indicates volume increase of the probe versus the pressure applied, considering readings at the end of each loading step. This curve also represents the deformation of the soil under lateral radial stresses. The initial portion represents the adjustments of the probe to the borehole and further the restoration of the original horizontal pressures. The straight line portion of the curve, which follows, is the elastic deformation of the subsoil and can be measured by the slope of the line, resulting in the pressuremeter modulus E_p . This modulus is evaluated for each test and shown in the units of bars. The pressuremeter modulus is similar to the modulus of elasticity, except it is measured in the horizontal direction. Corrections for anisotropy are necessary in most soils to obtain elasticity in the vertical direction. After the straight line portion, the pressuremeter curve shows an increased rate of deformation, and the curve approaches a limit pressure where no further loading will be necessary to cause continuous volume change. Limit pressures are presented in the units of bars.



April 8, 2015

Josh April

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Subject: Ground Penetrating Radar (GPR) scanning @ 110 Callahan Dr. Alexandria, VA 22301

Lead Technician: Bryan Vickers
Regional Manager of the Washington D.C. Area
Ground Penetrating Radar Systems, Inc.
Virginia-703-728-7333
Bryan.vickers@gp-radar.com

Table of Contents

1. Overview of GPR
2. Equipment & Capabilities
3. Site Description
4. Inspection Methods
5. Findings
6. Qualifications
7. Closing

1. Overview of GPR

Ground Penetrating Radar (GPR) is a non-destructive testing technology that sends a series of radar pulses into the surface which reflect back off of anomalies below. As the radar pulses through the ground, the waves bend slightly when encountering a material with differing physical properties, particularly density and conductivity. Thousands of pulses are sent and received in a small area, and the received signals are combined to form a real-time image of what is in the ground. The various places where the radar waves bend are displayed as anomalies which can be interpreted as utilities, steel pipes, PVC conduits, underground storage tanks, voids, foundations, etc. One of the many advantages of the technology is the ability to locate metal and non-metallic objects as well as determining depth to the object. GPR data acquisition is very fast and results are available immediately, allowing any discovered anomalies to be marked directly in the field. Although confused with X-Ray, GPR uses less than 1% of your cell phones radiation emissions and is safe to work with human presence in close proximity.

2. Equipment and Capabilities

Ground Penetrating Radar (GPR)

- **GSSI SIR-3000**

-GPRS uses a Geophysical Survey Systems Inc. (GSSI) SIR-3000 radar unit. This is the most advanced GPR available. It allows for on-site interpretation, as well as stored data for later processing. This equipment is self-calibrating, allowing more precise depth and location measurements.

-GSSI is the world's leading GPR designer and manufacturer. Information can be found at www.geophysical.com.

- **400 MHZ GSSI Antenna**

-For utility locating, we use a 400MHz antenna with the SIR-3000 GPR head unit. This antenna allows data collection to a maximum depth of approximately twelve feet, depending on soil conditions.

3. Site Description

At this site our primary objective was to scan the two different proposed boring locations selected by the onsite contact. The majority of the GPR scans were performed on concrete platform areas. This was an active train station.

4. Inspection Methods

Since the surface was outside concrete locations and the scans were performed every foot our 400MHz antenna was utilized. When scanning the concerned locations, we performed North-South and East-West scans to ensure the locations of any conduits were identified and marked appropriately directly on the surface. There were a total of 2 soil borings selected to GPR.

5. Findings

When using the 400MHz antenna on the concrete locations the reinforcing steel in the concrete restricted the GPR to penetrate to its “normal depth”. It was almost like looking through a foggy glass. We were not getting the beautiful anomalies we normally get on soil locations. The 400MHz antenna’s normal penetration depth in the DC/NoVA area is approximately 5’-7’, but due to the reinforcing steel we were only seeing 3’-4’ subsurface. We then used the RD-7000 to pick up any live power within the locations. Below are some photographs taken on site.







6. Qualifications

Ground Penetrating Radar Systems, Inc. (GPRS) was founded in October 2001 by Matt Aston, who engrained a philosophy of client service and data accuracy. Matt's primary intent in starting the business was to give contractors a reliable way to scan into concrete and foundational slabs in order to avoid cutting embedded electrical conduits and critical reinforcing steel. These are immensely important services in the construction business as it helps to maintain structural integrity and avoid major human error leading to increasing costs and man hours. Obviously, in a field with such dramatic implications, reliability and credibility are the cornerstones. While GPRS performs this type work on a regular basis, there are many other applications in which our services can be deployed and as we have grown over the past decade, we have become industry leaders in the nuances of GPR in specific circumstances, including the scanning of cemeteries and burial plots.

Since our inception, GPRS has grown to a nationwide enterprise and has completed over six thousand projects. This success is due to our high level of customer service coupled with our unique market position. Unlike many other companies that provide GPR services, GPRS offers no ancillary services and therefore our field operators are able to dedicate 100% of their time and effort in perfecting this particular tradecraft. Indicative of our dedication to this function is the fact that we are the only national GPR Company specializing solely in this service. We perform GPR services every day in a variety of complex and often unique environments. This gives us familiarity with environments and in situations that other firms would find foreign. Further, this is not something we do once in a while; our technicians are in the field every day. We are very proud of this dedication to our craft and of our performance record. Additionally, in our twelve years in business we have maintained a record of zero recordables (essentially remaining incident free). To statistically quantify our reliability, we have had a reported incident of error on less than one percent of the projects we have completed. Our customers have expressed a high level of satisfaction, as evidenced by the fact that in 2012 nearly 80% of our business was either repeat clients or referred by our customers. To demonstrate our environmental experience, GPRS has been involved in projects ranging from small residential jobs to major construction projects with values in excess of \$4 Billion.

Every one of our technicians is required to undergo over five months of both classroom and apprentice training to ensure that they are highly proficient in the scanning process and in the interpretation of results. Each member of our team is intensely scrutinized prior to independent field deployment and those individuals who do not meet our standards are not permitted to operate our equipment nor analyze field results. Additionally, we include an internal audit process involving other analysts when dealing with a particularly sensitive job. This is to maintain our high level of standards and ensure the continuing credibility of our services.

7. Closing

Thank you for the opportunity to serve you on this project. I hope this report has answered all the questions you had regarding this survey. However if there is anything you have questions about or feel was omitted, please do not hesitate to contact me.

Thank you,

Bryan Vickers

Regional Manager of the Washington D.C. Area

Ground Penetrating Radar Systems, Inc.

Virginia- 703-728-7333

Bryan.vickers@gp-radar.com



VRE Alexandria Station Pedestrian Tunnel					LOGGED BY: L. Bartz		BORING NUMBER: GZ-7	
LOCATION: 110 Callahan Drive, Alexandria, Virginia					DRILLING CONTRACTOR: Connelly & Associates Inc.			
OWNER/CLIENT: AECOM					DRILLER: T. Redman		DATES DRILLED: 4/18/15 - 4/19/15	
PROJECT NUMBER: 12170		GROUND SURFACE ELEVATION (ft): 32.2			DRILLING METHOD: Automatic hammer 3.25"		OFFSET NOTES:	

ELEV. (ft)	DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC	MATERIAL DESCRIPTION	PID (ppm)	WELL CONSTRUCTION	SOIL			
								SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80	MC (%)
32.2					Concrete = 0.5ft. Auger down to 5.0 ft.		Grout				
31.7							BENTONITE CLAY				
27.2	5				No recovery			0+0+0+1	0		
25.2								0+1+0+1	18		
24.2					Fill, brown, f-c, clayey SAND, very loose, moist, SC	11.7					
23.2					Fill, brown, FAT CLAY, very soft, moist, CH						
21.2	10		A		Fill, yellowish brown, sandy LEAN CLAY with gravel, moist, CL						
					Fill, brown, LEAN CLAY, moist, CL						
17.2	15				Fill, yellowish brown, sandy LEAN CLAY, moist, CL						
15.2					Fill, grayish brown, LEAN CLAY with sand, moist, CL						
13.2	20		B		Terrace deposit, brown and light brown, clayey GRAVEL with sand, medium dense, moist, GC	23.6	2-INCH DIA. SLOTTED SCREEN W/ PEA GRAVEL FILTER PACK	7+13+14+37	12		24.8
11.2					Potomac formation, light yellowish brown, FAT CLAY, very stiff, moist, CH	11.0		3+7+15+50/5	23		27.0
	25								14		
								10+20+41+50/5	23		
	30		C					10+50/5	11		>>
								10+45+50/3	15		>>
	35							14+29+36+38	24		
								6+18+35+48	24		
-2.8					Bottom of Boring at 35.0 ft	19.2					

GROUND WATER LEVELS:				SAMPLE TYPES:	
NOT ENCOUNTERED DURING DRILLING				Split Spoon Shelby Tube	
NOT ENCOUNTERED UPON COMPLETION					
4/20/2015					
16.2 ft ELEV. 16.0					
REMARKS:					



VRE Alexandria Station Pedestrian Tunnel				LOGGED BY: L. Bartz		BORING NUMBER: GZ-8	
LOCATION: 110 Callahan Drive, Alexandria, Virginia				DRILLING CONTRACTOR: Connelly & Associates Inc.			
OWNER/CLIENT: AECOM				DRILLER: J. Leatherman		DATES DRILLED: 4/19/15 - 4/19/15	
PROJECT NUMBER: 12170		GROUND SURFACE ELEVATION (ft): 32.7		DRILLING METHOD: Automatic hammer 3.25"		OFFSET NOTES:	

ELEV. (ft)	DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC	MATERIAL DESCRIPTION	PID (ppm)	SOIL					
							SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF)		MC (%)	
									20	40		60
32.7	32.2				Concrete = 0.58ft. Auger down to 5.0 ft.							
27.7	5				No recovery							
25.7					Fill, brown, FAT CLAY, moist, CH		0+0+0+0	0				
21.7	10		A		Fill, brown, FAT CLAY with gravel, wet, CH			11				
17.7	15				Fill, Yellowish brown, LEAN CLAY with sand, moist, CL			13				
15.7					Fill, light olive brown, LEAN CLAY, CL			15				
13.0	20				Terrace deposit, No recovery			24				16.8
10.7			B		Potomac formation, brown, FAT CLAY, very stiff, moist, CH		22+35+29+50/4	0				23.4
	25							23				32.8
	30		C				0.0	4+5+12+15	24			
	35						19.7	4+7+13+17	24			
							188	8+12+16+23	24			
							24.7	11+11+18+25	24			
								5+11+18+32	24			
-3.3					Bottom of Boring at 36.0 ft							

GROUND WATER LEVELS:		SAMPLE TYPES:	
ENCOUNTERED:	<u>10.0</u> ft ELEV. <u>22.7</u>		Split Spoon
NOT ENCOUNTERED UPON COMPLETION			Shelby Tube

REMARKS:

THE STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES. THE TRANSITION MAY BE GRADUAL.



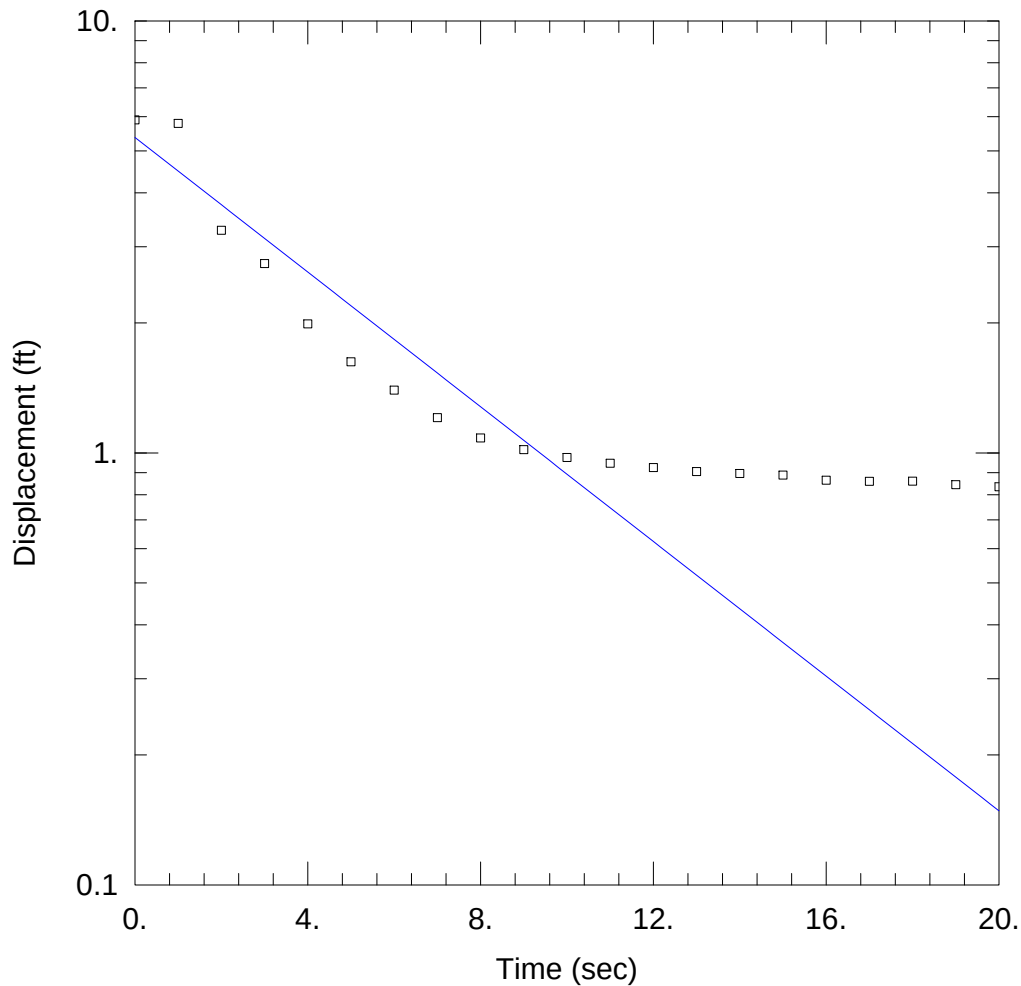
VRE Alexandria Station Pedestrian Tunnel					LOGGED BY: K. Fordney		BORING NUMBER: GZ-9	
LOCATION: 110 Callahan Drive, Alexandria, Virginia					DRILLING CONTRACTOR: Connelly & Associates Inc.			
OWNER/CLIENT: AECOM					DRILLER: J. Leatherman		DATES DRILLED: 4/11/15 - 4/11/15	
PROJECT NUMBER: 12170			GROUND SURFACE ELEVATION (ft): 32.1		DRILLING METHOD: Automatic hammer 4.25"		OFFSET NOTES:	

ELEV. (ft)	DEPTH (ft)	SAMPLE TYPE	STRATUM	GRAPHIC	MATERIAL DESCRIPTION	PID (ppm)	WELL CONSTRUCTION	SOIL			
								SPT BLOW COUNTS	REC (in)	STANDARD PENETRATION TEST RESISTANCE (BPF) 20 40 60 80	MC (%)
32.1					Topsoil = 0.17ft.	8.8	Grout	3+5+9+11	15		
31.9					Fill, brown and black, f-c , clayey	2.2	BENTONITE CLAY	7+7+8+7	10		
30.1					SAND with gravel, medium dense, moist, SC						
	5				Fill, yellowish brown, LEAN CLAY with sand, stiff, moist, CL						
			A								28.1
24.1					Fill, brown, sandy silty CLAY, moist, CL-ML	165					
	10										20.5
	15					5.5					
					Fill, yellowish brown, LEAN CLAY, moist, CL						
	20				Terrace deposit, light brown, CLAYEY SAND with gravel, medium dense, moist, SC						
			B								21.1
14.1											
12.1											
	25				Potomac formation, blue brown and gray, FAT CLAY, very stiff, moist, CH	15.5	2-INCH DIA. SLOTTED SCREEN W/ PEA GRAVEL FILTER PACK	2+6+11+17	24		
						26.8		3+7+10+14	24		
	30					18.5		4+8+14+18	24		
			C			17.1		3+6+13+13	24		
	35					20.4		4+7+12+14	24		
-4.0					Bottom of Boring at 36.0 ft						

GROUND WATER LEVELS: ▽ ENCOUNTERED: <u>18.0</u> ft ELEV. <u>14.1</u> NOT ENCOUNTERED UPON COMPLETION ▽ 4/19/2015 <u>18.4</u> ft ELEV. <u>13.7</u>	SAMPLE TYPES: Split Spoon Shelby Tube

REMARKS:

THE STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES. THE TRANSITION MAY BE GRADUAL.



WELL TEST ANALYSIS

Data Set: N:\PROJECTS\Active 12 Projects\12170, VRE Alexandria Station\Calcs and Excel\GZ-7.aqt
 Date: 07/27/15 Time: 13:57:34

PROJECT INFORMATION

Company: GeoConcepts Engineering Inc.
 Project: 12170
 Location: VRE Alexandria Station
 Test Well: GZ-7
 Test Date: April 25, 2015

AQUIFER DATA

Saturated Thickness: 6.7 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GZ-7)

Initial Displacement: 5.9 ft Static Water Column Height: 16.7 ft
 Total Well Penetration Depth: 35. ft Screen Length: 30. ft
 Casing Radius: 0.9 ft Well Radius: 1.625 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 444.2 ft/day y0 = 5.374 ft

Data Set: N:\PROJECTS\Active 12 Projects\12170, VRE Alexandria Station\Calcs and Excel\GZ-7.aqt
Date: 07/27/15
Time: 13:57:08

PROJECT INFORMATION

Company: GeoConcepts Engineering Inc.
Project: 12170
Location: VRE Alexandria Station
Test Date: April 25, 2015
Test Well: GZ-7

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: GZ-7

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 5.9 ft
Static Water Column Height: 16.7 ft
Casing Radius: 0.9 ft
Well Radius: 1.625 ft
Well Skin Radius: 2. ft
Screen Length: 30. ft
Total Well Penetration Depth: 35. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.4576 ft
Gravel Pack Porosity: 0.

No. of Observations: 20

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.	5.79	11.	0.9464
2.	3.276	12.	0.9252
3.	2.745	13.	0.9055
4.	1.989	14.	0.8964
5.	1.625	15.	0.8884
6.	1.398	16.	0.865
7.	1.207	17.	0.8598
8.	1.083	18.	0.8606
9.	1.017	19.	0.844
10.	0.9759	20.	0.8348

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 2.244

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	444.2	ft/day
y0	5.374	ft

$K = 0.1567$ cm/sec
 $T = K \cdot b = 2976.4$ ft²/day (32. sq. cm/sec)

AUTOMATIC ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	<u>Std. Error</u>	<u>Approx. C.I.</u>	<u>t-Ratio</u>	
K	444.2	64.55	+/- 135.6	6.882	ft/day
y0	5.374	0.5947	+/- 1.249	9.037	ft

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

K = 0.1567 cm/sec

T = K*b = 2976.4 ft²/day (32. sq. cm/sec)

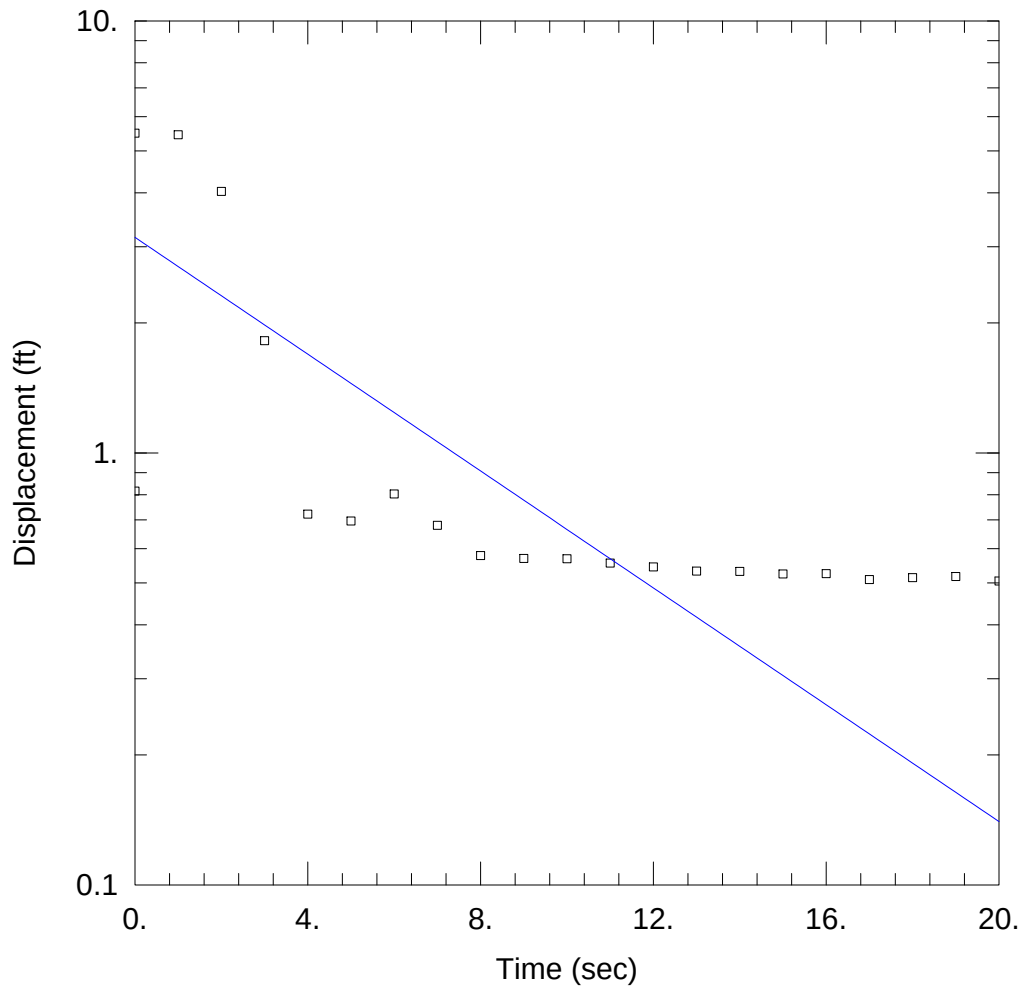
Parameter Correlations

	K	y0
K	1.00	0.77
y0	0.77	1.00

Residual Statistics

for weighted residuals

Sum of Squares 5.909 ft²
Variance 0.3283 ft²
Std. Deviation 0.573 ft
Mean 0.1672 ft
No. of Residuals 20
No. of Estimates 2



WELL TEST ANALYSIS

Data Set: N:\PROJECTS\Active 12 Projects\12170, VRE Alexandria Station\Calcs and Excel\GZ-9.aqt
 Date: 07/27/15 Time: 13:56:34

PROJECT INFORMATION

Company: GeoConcepts Engineering Inc.
 Project: 12170
 Location: VRE Alexandria Station
 Test Well: GZ-9
 Test Date: April 25, 2015

AQUIFER DATA

Saturated Thickness: 8.7 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (GZ-9)

Initial Displacement: 5.5 ft Static Water Column Height: 18.7 ft
 Total Well Penetration Depth: 35. ft Screen Length: 30. ft
 Casing Radius: 0.9 ft Well Radius: 1.625 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 305.9 ft/day y0 = 3.155 ft

Data Set: N:\PROJECTS\Active 12 Projects\12170, VRE Alexandria Station\Calcs and Excel\GZ-9.aqt
Date: 07/27/15
Time: 13:55:59

PROJECT INFORMATION

Company: GeoConcepts Engineering Inc.
Project: 12170
Location: VRE Alexandria Station
Test Date: April 25, 2015
Test Well: GZ-9

AQUIFER DATA

Saturated Thickness: 8.7 ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: GZ-9

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 5.5 ft
Static Water Column Height: 18.7 ft
Casing Radius: 0.9 ft
Well Radius: 1.625 ft
Well Skin Radius: 2. ft
Screen Length: 30. ft
Total Well Penetration Depth: 35. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.4576 ft
Gravel Pack Porosity: 0.

No. of Observations: 21

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
0.	0.8163	11.	0.556
1.	5.45	12.	0.5447
2.	4.031	13.	0.5329
3.	1.818	14.	0.5318
4.	0.7218	15.	0.5248
5.	0.6955	16.	0.5253
6.	0.8036	17.	0.5092
7.	0.6799	18.	0.5143
8.	0.5785	19.	0.5176
9.	0.5697	20.	0.5051
10.	0.5689		

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 2.244

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	305.9	ft/day
y0	3.155	ft

K = 0.1079 cm/sec
T = K*b = 2661.5 ft²/day (28.62 sq. cm/sec)

PRESSUREMETER TEST REPORT

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel
 LOCATION: Alexandria, Virginia
 IN-SITU SOIL TESTING, L.C.
 ENGINEER: Roger Failmezger, P.E., F. ASCE

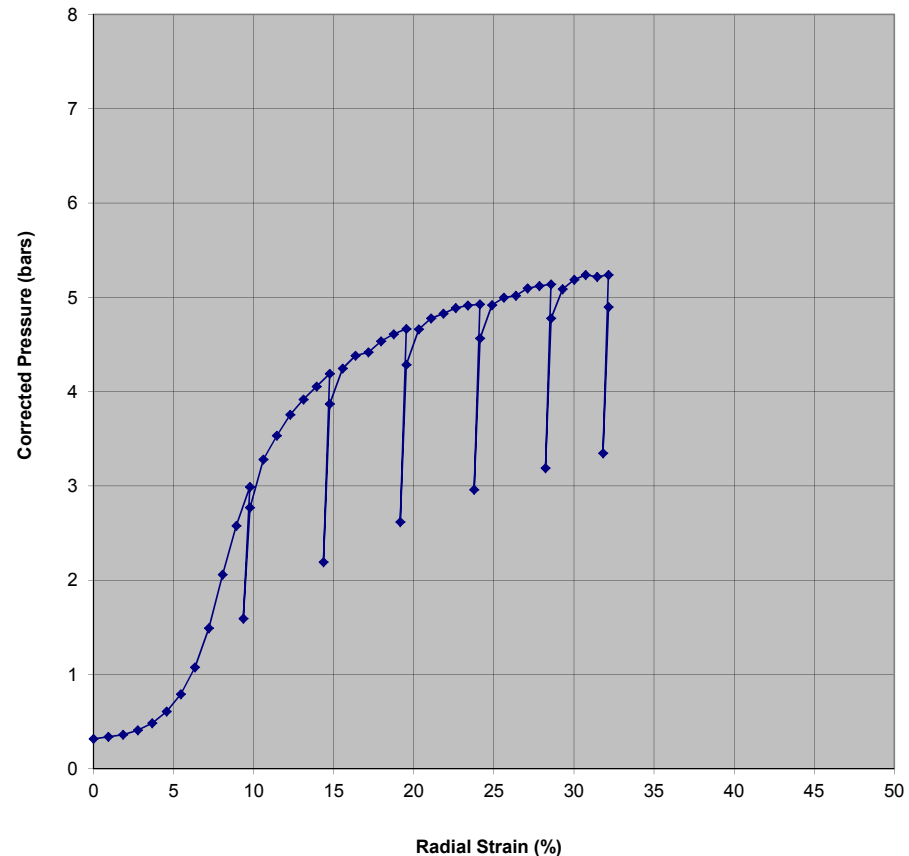
BORING: GZ-7
 TEST #: 1
 DEPTH: 15.0 ft
 TEST DATE: 4/18/2015

Pressure Bar	Volume cm ³	$\Delta R/R_0$ %	Selected
0.32	0	0.00	E0a
0.34	40	0.93	
0.36	80	1.85	
0.41	120	2.77	
0.48	160	3.67	
0.61	200	4.57	
0.79	240	5.45	
1.08	279	6.33	
1.49	319	7.20	
2.06	359	8.06	
2.58	398	8.92	E0b
2.99	438	9.76	
1.59	419	9.35	E1b
2.77	438	9.77	
3.28	478	10.61	
3.53	518	11.45	E2a
3.76	558	12.28	
3.92	597	13.11	
4.05	637	13.93	
4.19	677	14.75	
2.19	658	14.36	
3.87	677	14.75	
4.25	717	15.56	
4.38	757	16.36	
4.42	797	17.16	
4.53	837	17.96	E2b
4.61	877	18.74	
4.67	917	19.53	
2.62	898	19.16	E2c
4.29	917	19.53	
4.66	957	20.31	E3a
4.78	997	21.08	
4.83	1037	21.85	
4.89	1077	22.61	
4.91	1117	23.37	
4.93	1157	24.13	
2.96	1138	23.77	
4.57	1157	24.13	
4.92	1197	24.88	
5.00	1237	25.63	
5.02	1277	26.37	E3b
5.10	1317	27.11	
5.12	1357	27.84	
5.14	1397	28.57	
3.19	1378	28.22	
4.78	1397	28.57	
5.09	1437	29.29	
5.19	1477	30.01	
5.24	1516	30.73	
5.22	1557	31.44	
5.24	1596	32.15	E3c
3.35	1577	31.82	
4.90	1597	32.16	
			E4a
			E4b
			E4c
			E5a
			E5b
			E5c
			E6a
			E6b
			E6c

Interpreted Pressuremeter Parameters		
P_o	0.5	bar
P_L	5.7	bar
P_L^*	5.2	bar
E_o	84	bar
E_o/P_L^*	16.2	bar

Loop #	Unload Modulus	Reload Modulus	
1	494	413	bar
2	785	652	bar
3	875	703	bar
4	904	729	bar
5	960	773	bar
6	983	797	bar

Corrected Pressuremeter Test Results



Pressuremeter Creep Test

Project: VRE Alexandria Station -- Pedestrian Tunnel

Sounding No.: GZ-7

Test Depth: 15.0 feet

Holding Gauge Pressure = 3.12 bars

Corrected Pressure = 3.28 bars

Initial Probe Radius = 3.69 cm

Initial Probe Length = 50 cm

Initial Volume of Probe = 2139 cm³

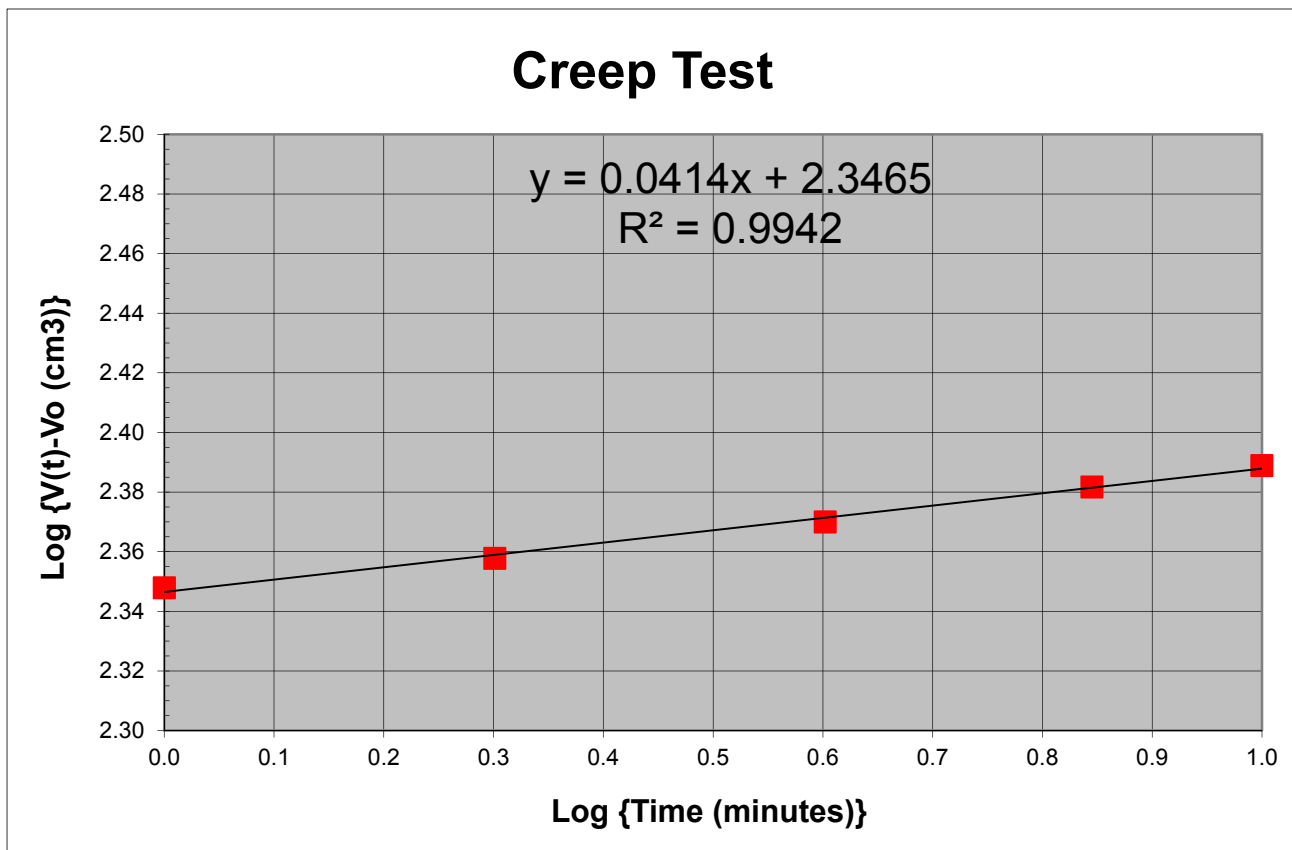
Probe Radius Contacting Borehole = 3.91 cm

Initial Borehole Volume, V₀ = 2403 cm³

Time (minutes)	Log (Time) (minutes)	Volume Increase (cm ³)	Total Probe Volume (cm ³)	V(t)-V ₀ (cm ³)	Log [V(t)-V ₀] (cm ³)
1	0.000	487.12	2625.93	222.76	2.348
2	0.301	492.25	2631.06	227.89	2.358
4	0.602	498.75	2637.56	234.39	2.370
7	0.845	505.19	2644.00	240.83	2.382
10	1.000	509.20	2648.01	244.84	2.389

$$E_0(t)/E_0(t=1 \text{ min}) = \{t/1\}^{-n}$$

$$n = 0.0414$$

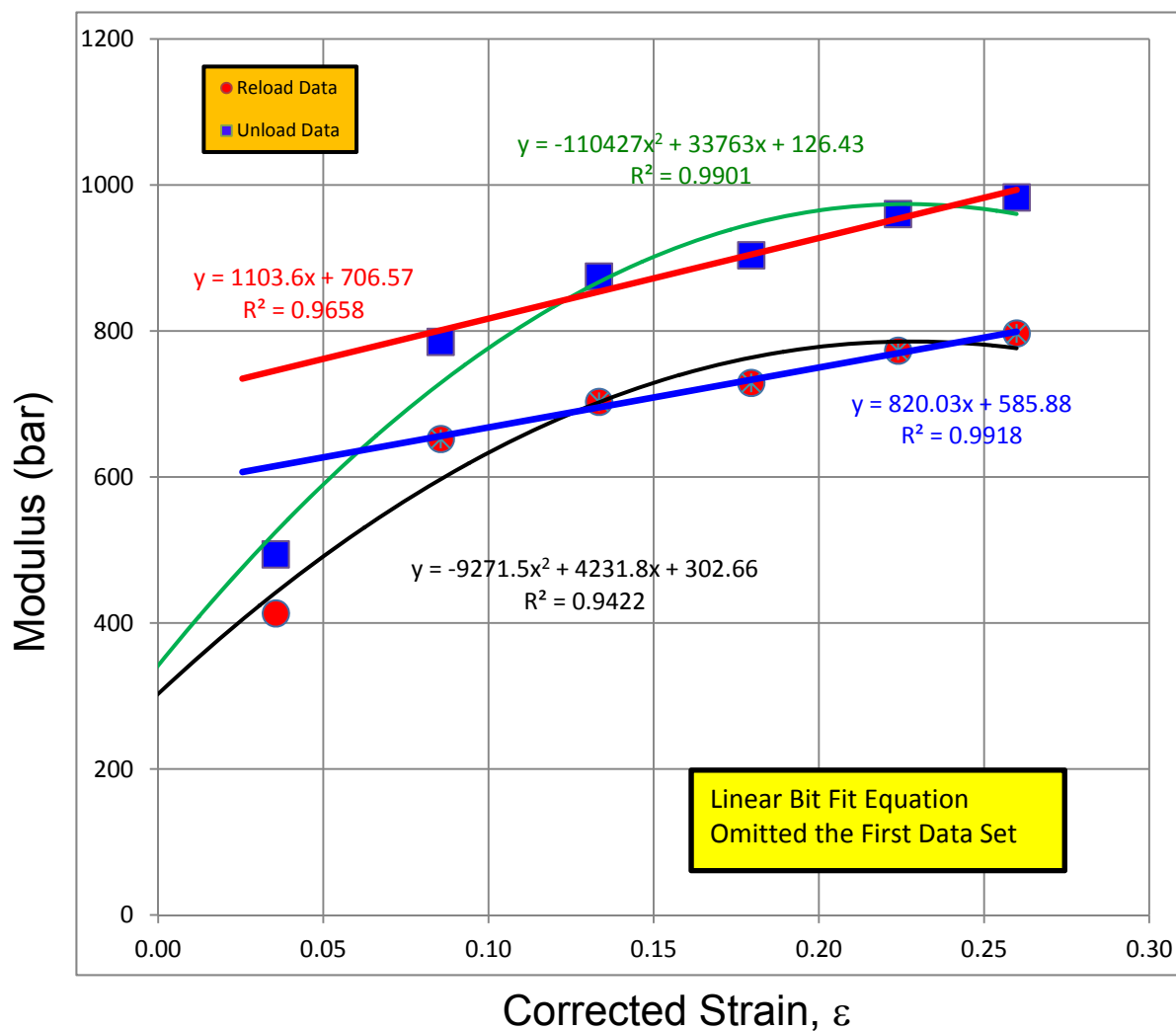


RELOAD/UNLOAD MODULUS ANALYSES

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel	BORING: GZ-7
LOCATION: Alexandria, Virginia	TEST #: 1
IN-SITU SOIL TESTING, L.C.	DEPTH: 15.0 ft
ENGINEER: Roger Failmezger, P.E., F. ASCE	TEST DATE: 4/18/2015

Strain to contact borehole = 0.06

Average Strain	Corrected Strain	Reload Modulus	Average Strain	Corrected Strain	Unload Modulus
0.0956	0.0356	413	0.0956	0.0356	494
0.1455	0.0855	652	0.1455	0.0855	785
0.1934	0.1334	703	0.1934	0.1334	875
0.2395	0.1795	729	0.2395	0.1795	904
0.2840	0.2240	773	0.2839	0.2239	960
0.3199	0.2599	797	0.3198	0.2598	983



PRESSUREMETER TEST REPORT

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel
 LOCATION: Alexandria, Virginia
 IN-SITU SOIL TESTING, L.C.
 ENGINEER: Roger Failmezger, P.E., F. ASCE

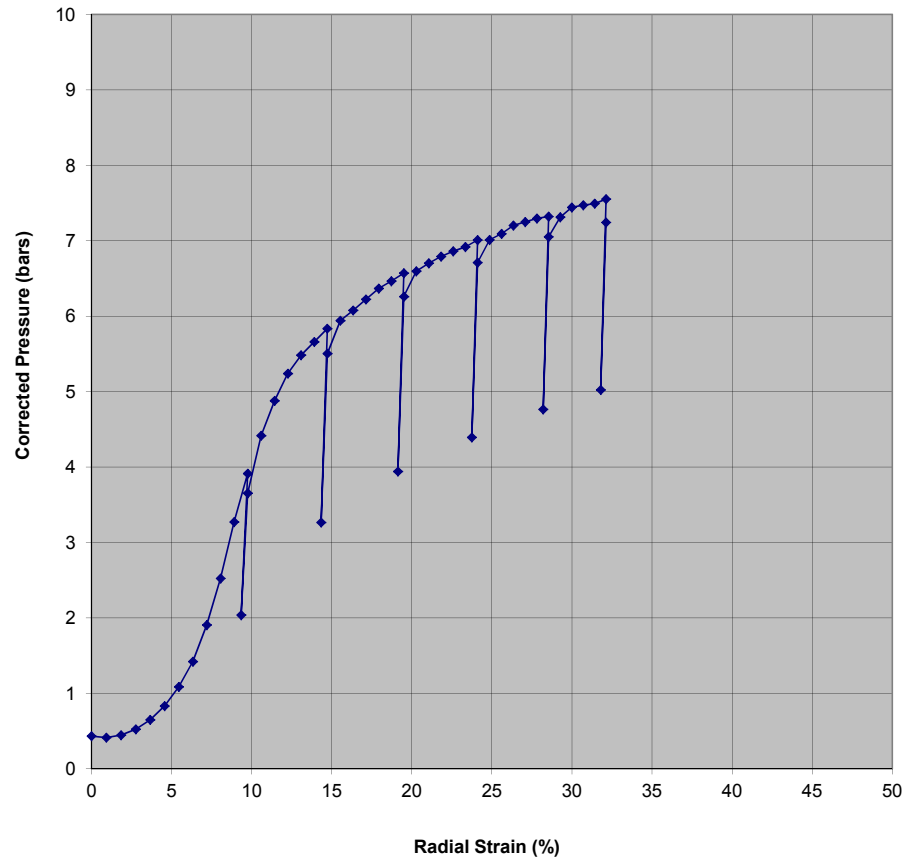
BORING: GZ-8
 TEST #: 1
 DEPTH: 16.5 ft
 TEST DATE: 4/18/2015

Pressure Bar	Volume cm ³	$\Delta R/R_0$ %	Selected
0.43	0	0.00	E0a
0.41	40	0.93	
0.45	80	1.85	
0.52	120	2.76	
0.65	160	3.67	
0.83	200	4.56	
1.09	239	5.45	
1.42	279	6.33	
1.91	319	7.20	
2.52	358	8.06	
3.27	398	8.91	E0b
3.91	437	9.75	
2.04	418	9.35	
3.65	438	9.76	E1b
4.42	477	10.59	
4.88	517	11.43	
5.24	557	12.26	E1c
5.48	596	13.09	
5.66	636	13.91	
5.83	676	14.72	E2a
3.27	657	14.34	
5.50	676	14.73	
5.94	716	15.53	E2b
6.08	756	16.34	
6.22	796	17.14	
6.37	836	17.93	E2c
6.46	876	18.72	
6.57	916	19.50	
3.94	897	19.14	E3a
6.26	916	19.51	
6.60	956	20.28	
6.70	996	21.06	E3b
6.79	1035	21.83	
6.86	1075	22.59	
6.92	1115	23.35	E3c
7.01	1155	24.10	
4.39	1137	23.75	
6.71	1156	24.11	E4a
7.01	1195	24.85	
7.09	1235	25.60	
7.20	1275	26.34	E4b
7.25	1315	27.08	
7.30	1355	27.81	
7.32	1395	28.54	E4c
4.76	1376	28.20	
7.05	1395	28.54	
7.31	1435	29.27	E5a
7.44	1475	29.99	
7.47	1515	30.70	
7.49	1555	31.42	E5b
7.55	1595	32.13	
5.02	1576	31.79	
7.24	1595	32.13	E5c
			E6a
			E6b
			E6c

Interpreted Pressuremeter Parameters		
P_o	0.5	bar
P_L	8.2	bar
P_L^*	7.7	bar
E_o	113	bar
E_o/P_L^*	14.7	bar

Loop #	Unload Modulus	Reload Modulus	
1	672	574	bar
2	1024	882	bar
3	1139	994	bar
4	1223	1071	bar
5	1281	1135	bar
6	1338	1161	bar

Corrected Pressuremeter Test Results



Pressuremeter Creep Test

Project: VRE Alexandria Station -- Pedestrian Tunnel

Sounding No.: GZ-8

Test Depth: 16.5 feet

Holding Gauge Pressure = 4.21 bars

Corrected Pressure = 4.42 bars

Initial Probe Radius = 3.69 cm

Initial Probe Length = 50 cm

Initial Volume of Probe = 2139 cm³

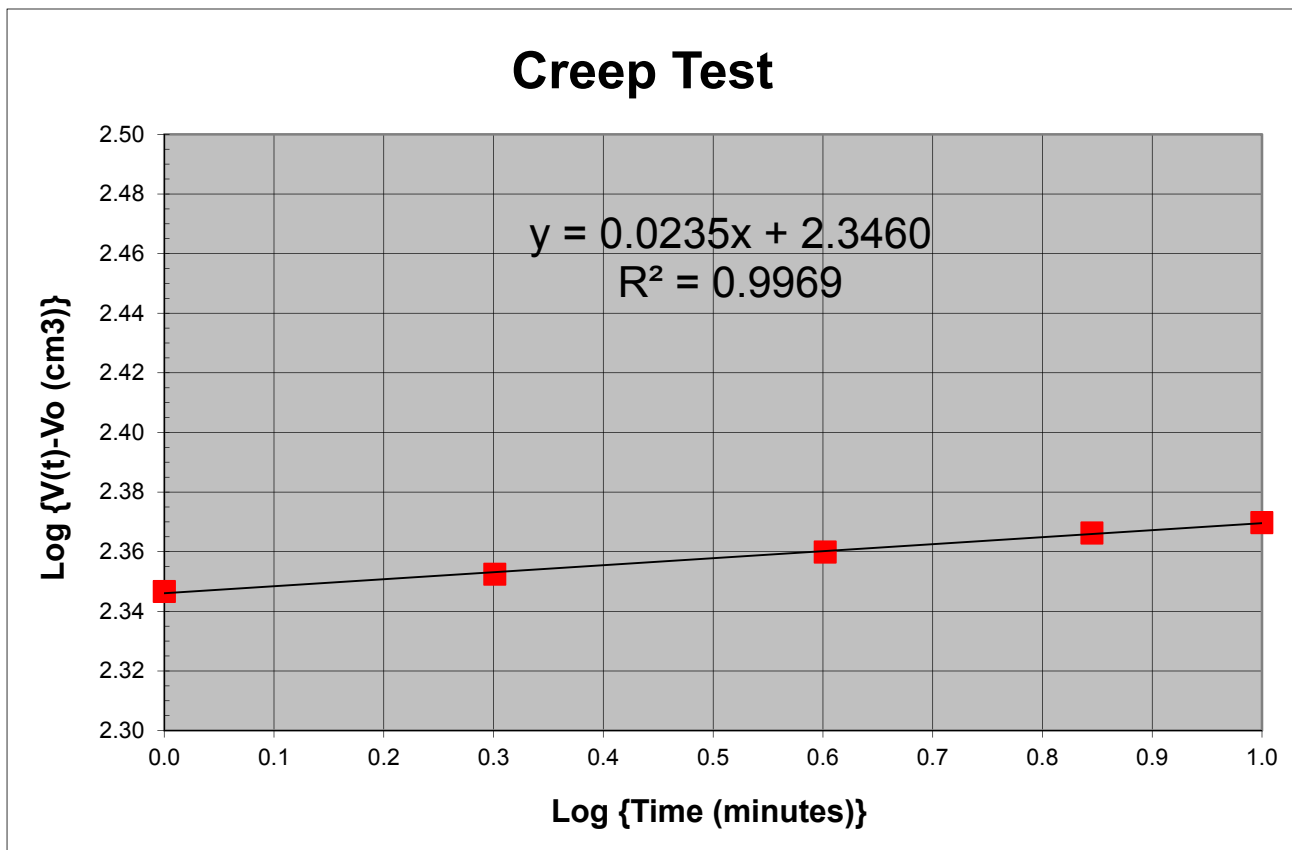
Probe Radius Contacting Borehole = 3.91 cm

Initial Borehole Volume, V₀ = 2403 cm³

Time (minutes)	Log (Time) (minutes)	Volume Increase (cm ³)	Total Probe Volume (cm ³)	V(t)-V ₀ (cm ³)	Log [V(t)-V ₀] (cm ³)
1	0.000	486.50	2625.31	222.14	2.347
2	0.301	489.47	2628.28	225.11	2.352
4	0.602	493.38	2632.19	229.02	2.360
7	0.845	496.78	2635.59	232.42	2.366
10	1.000	498.63	2637.44	234.27	2.370

$$E_0(t)/E_0(t=1 \text{ min}) = \{t/1\}^{-n}$$

$$n = 0.0235$$



RELOAD/UNLOAD MODULUS ANALYSES

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel

BORING: GZ-8

LOCATION: Alexandria, Virginia

TEST #: 1

IN-SITU SOIL TESTING, L.C.

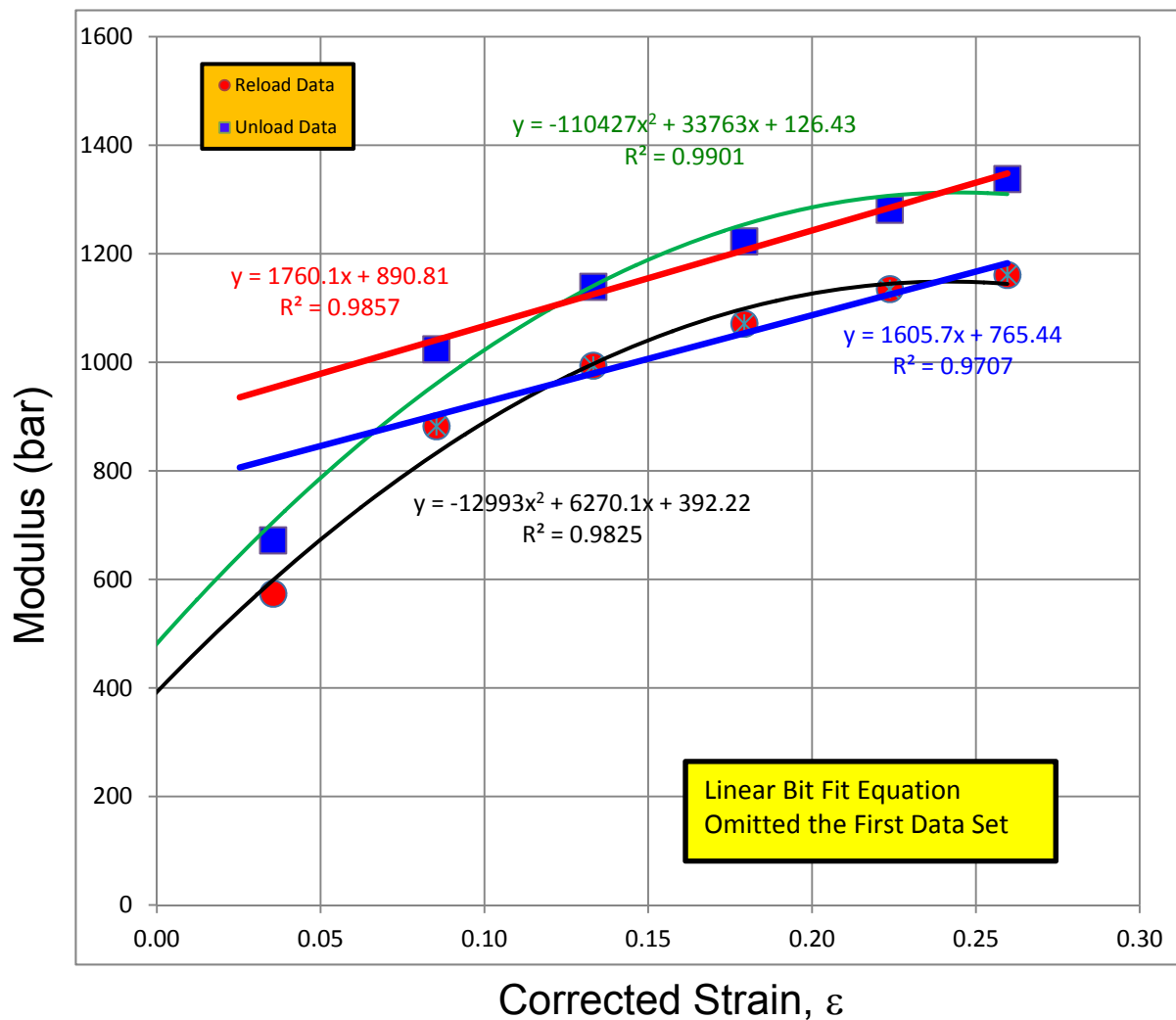
DEPTH: 16.5 ft

ENGINEER: Roger Failmezger, P.E., F. ASCE

TEST DATE: 4/18/2015

Strain to contact borehole = 0.06

Average Strain	Corrected Strain	Reload Modulus	Average Strain	Corrected Strain	Unload Modulus
0.0955	0.0355	574	0.0955	0.0355	672
0.1453	0.0853	882	0.1453	0.0853	1024
0.1932	0.1332	994	0.1932	0.1332	1139
0.2393	0.1793	1071	0.2393	0.1793	1223
0.2837	0.2237	1135	0.2837	0.2237	1281
0.3196	0.2596	1161	0.3196	0.2596	1338



PRESSUREMETER TEST REPORT

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel
 LOCATION: Alexandria, Virginia
 IN-SITU SOIL TESTING, L.C.
 ENGINEER: Roger Failmezger, P.E., F. ASCE

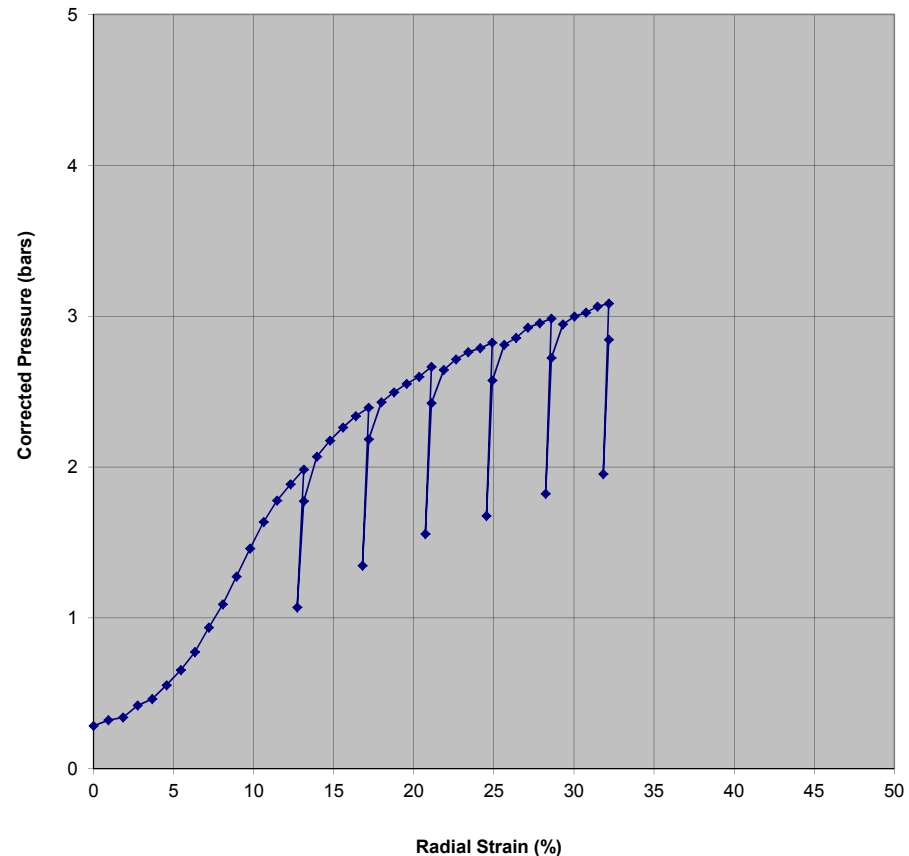
BORING: GZ-9
 TEST #: 1
 DEPTH: 10.2 ft
 TEST DATE: 4/10/2015

Pressure Bar	Volume cm ³	$\Delta R/R_0$ %	Selected
0.28	0	0.00	
0.32	40	0.93	
0.34	80	1.85	
0.42	120	2.76	
0.46	160	3.67	
0.55	200	4.56	
0.65	240	5.45	E0a
0.77	279	6.33	
0.94	319	7.20	
1.09	359	8.07	
1.27	399	8.93	
1.46	439	9.78	E0b
1.64	479	10.63	
1.78	519	11.47	E1a E1b E1c
1.89	558	12.30	
1.98	598	13.13	
1.07	579	12.72	
1.77	599	13.13	
2.07	638	13.95	
2.18	678	14.77	E2a E2b E2c
2.26	718	15.58	
2.34	758	16.38	
2.39	798	17.18	
1.35	779	16.79	
2.18	798	17.18	
2.43	838	17.98	E3a E3b E3c
2.50	878	18.76	
2.55	918	19.55	
2.60	958	20.33	
2.66	998	21.10	
1.56	978	20.72	
2.42	998	21.10	E4a E4b E4c
2.64	1038	21.87	
2.71	1078	22.63	
2.76	1118	23.39	
2.79	1158	24.15	
2.82	1198	24.90	
1.68	1178	24.54	E5a E5b E5c
2.57	1198	24.90	
2.81	1238	25.65	
2.86	1278	26.39	
2.92	1318	27.12	
2.95	1358	27.86	
2.98	1398	28.59	E6a E6b E6c
1.82	1378	28.23	
2.72	1398	28.59	
2.95	1438	29.31	
3.00	1478	30.03	
3.02	1518	30.75	
3.06	1557	31.46	
3.08	1597	32.17	
1.95	1578	31.83	
2.84	1598	32.17	

Interpreted Pressuremeter Parameters		
P_o	0.4	bar
P_L	3.5	bar
P_L^*	3.1	bar
E_o	31	bar
E_o/P_L^*	10.0	bar

Loop #	Unload Modulus	Reload Modulus	
1	340	259	bar
2	419	333	bar
3	474	368	bar
4	524	405	bar
5	561	431	bar
6	577	450	bar

Corrected Pressuremeter Test Results

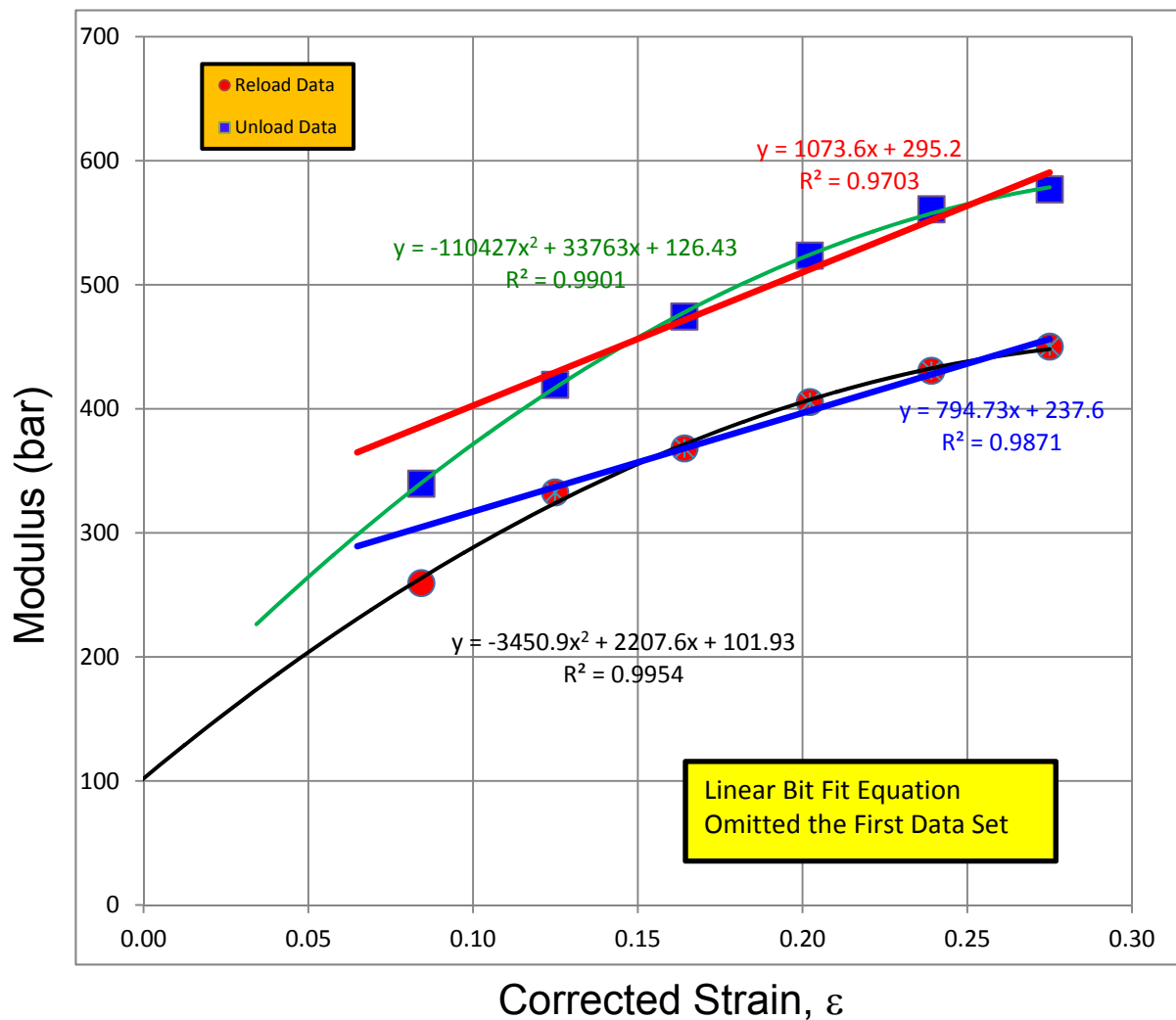


RELOAD/UNLOAD MODULUS ANALYSES

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel	BORING: GZ-9
LOCATION: Alexandria, Virginia	TEST #: 1
IN-SITU SOIL TESTING, L.C.	DEPTH: 10.2 ft
ENGINEER: Roger Failmezger, P.E., F. ASCE	TEST DATE: 4/10/2015

Strain to contact borehole = 0.045

Average Strain	Corrected Strain	Reload Modulus	Average Strain	Corrected Strain	Unload Modulus
0.1293	0.0843	259	0.1292	0.0842	340
0.1699	0.1249	333	0.1699	0.1249	419
0.2091	0.1641	368	0.2091	0.1641	474
0.2472	0.2022	405	0.2472	0.2022	524
0.2841	0.2391	431	0.2841	0.2391	561
0.3200	0.2750	450	0.3200	0.2750	577



PRESSUREMETER TEST REPORT

PROJECT: VRE Aexandria Station -- Pedestrian Tunnel
LOCATION: Alexandria, Virginia
IN-SITU SOIL TESTING, L.C.
ENGINEER: Roger Failmezger, P.E., F. ASCE

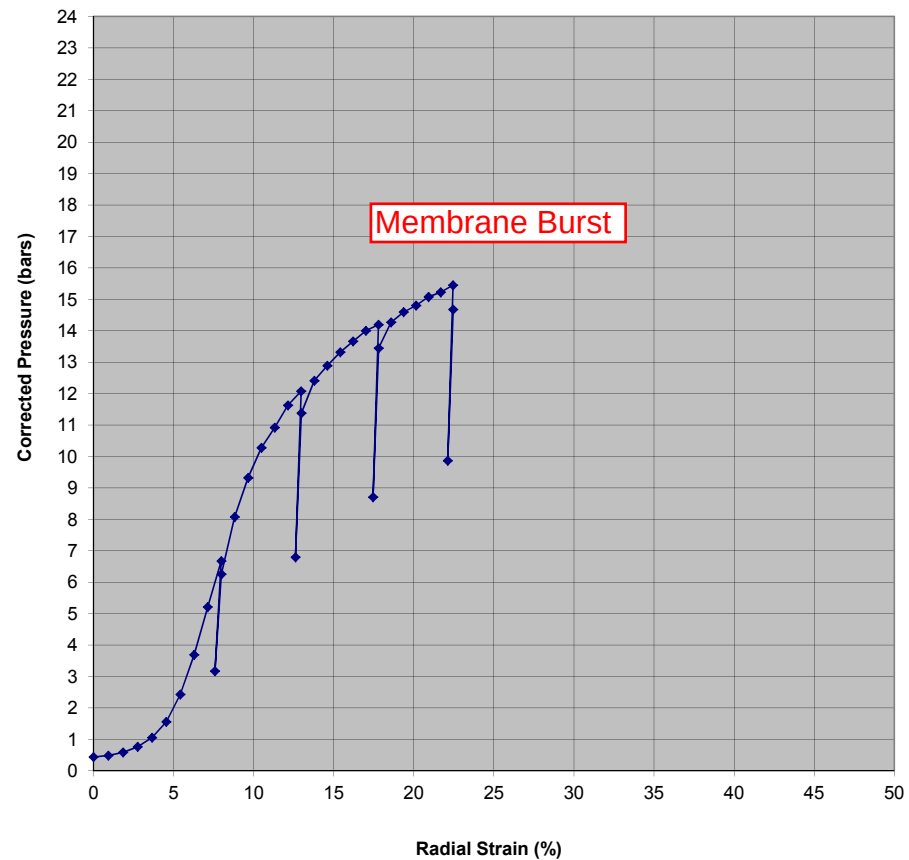
BORING:	GZ-9
TEST #:	2
DEPTH:	14.0 ft
TEST DATE:	4/10/2015

[illegible]

Interpreted Pressuremeter Parameters		
P_o	0.8	bar
P_L	20.0	bar
P_L^*	19.2	bar
E_o	251	bar
E_o/P_L^*	13.1	bar

Loop #	Unload Modulus	Reload Modulus	
1	1273	1100	ba
2	2215	1863	ba
3	2517	2102	ba
4	2774	2310	ba
5	#DIV/0!	#DIV/0!	ba
6	#DIV/0!	#DIV/0!	ba

Corrected Pressuremeter Test Results



Pressuremeter Creep Test

Project: VRE Alexandria Station -- Pedestrian Tunnel

Sounding No.: GZ-9

Test Depth: 14.0 feet

Holding Gauge Pressure = 8.02 bars

Corrected Pressure = 8.08 bars

Initial Probe Radius = 3.69 cm

Initial Probe Length = 50 cm

Initial Volume of Probe = 2139 cm³

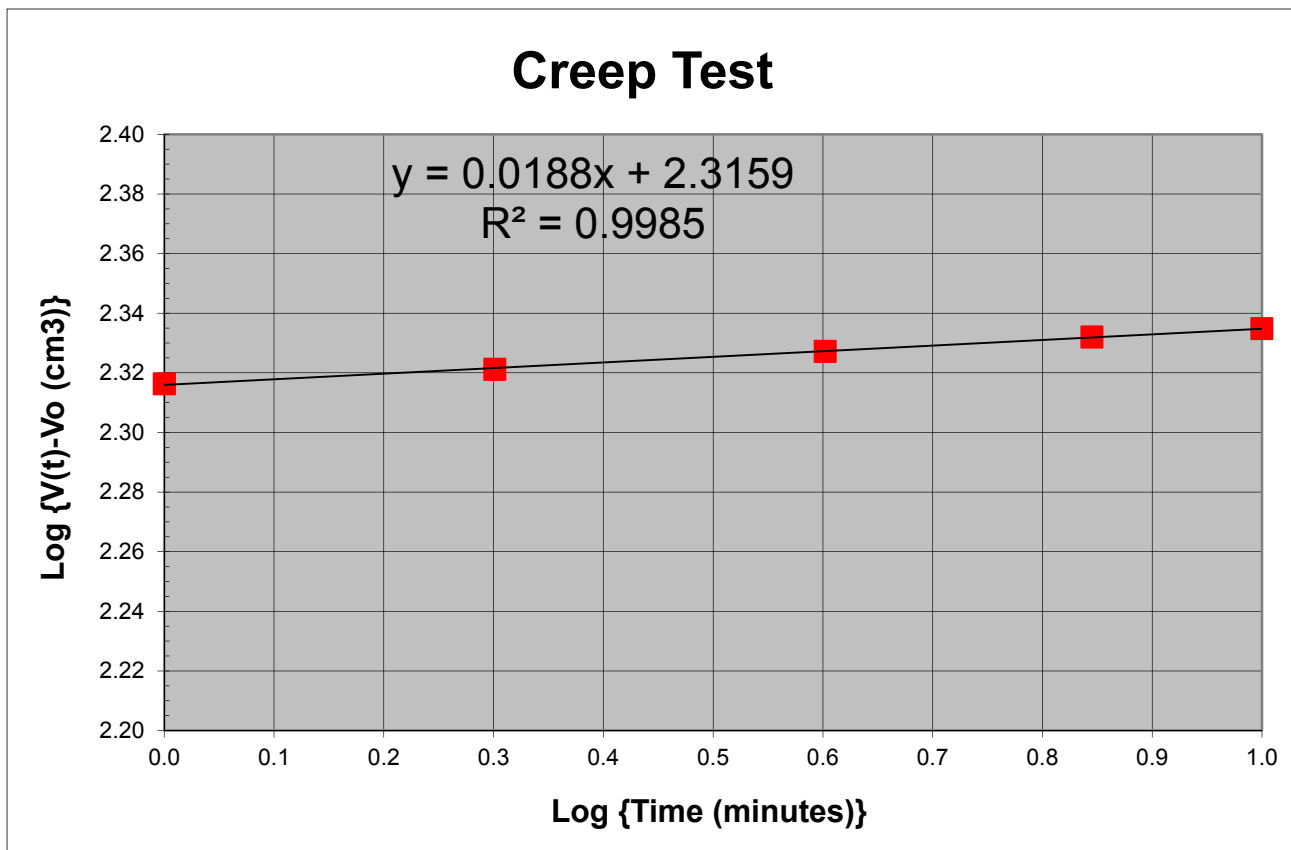
Probe Radius Contacting Borehole = 3.86 cm

Initial Borehole Volume, V₀ = 2336 cm³

Time (minutes)	Log (Time) (minutes)	Volume Increase (cm ³)	Total Probe Volume (cm ³)	V(t)-V ₀ (cm ³)	Log [V(t)-V ₀] (cm ³)
1	0.000	403.97	2542.78	207.15	2.316
2	0.301	406.32	2545.13	209.50	2.321
4	0.602	409.24	2548.05	212.42	2.327
7	0.845	411.62	2550.43	214.80	2.332
10	1.000	413.02	2551.83	216.20	2.335

$$E_0(t)/E_0(t=1 \text{ min}) = \{t/1\}^{-n}$$

$$n = 0.0191$$



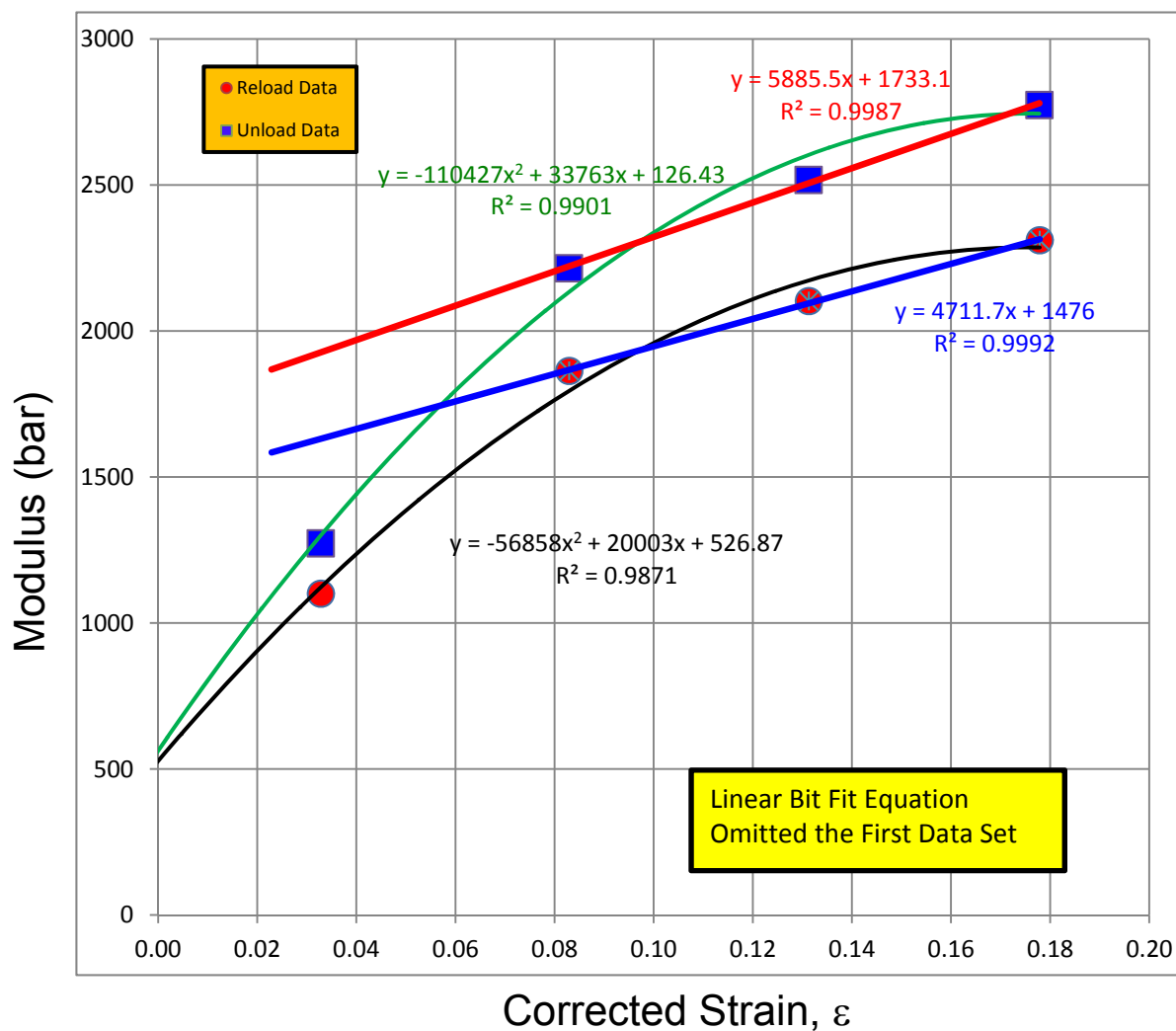
RELOAD/UNLOAD MODULUS ANALYSES

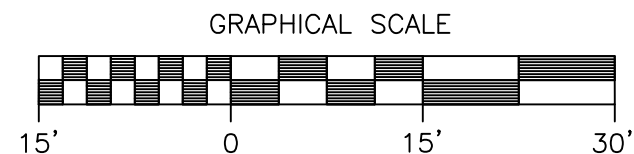
PROJECT: VRE Aexandria Station -- Pedestrian Tunnel
 LOCATION: Alexandria, Virginia
 IN-SITU SOIL TESTING, L.C.
 ENGINEER: Roger Failmezger, P.E., F. ASCE

BORING: GZ-9
 TEST #: 2
 DEPTH: 14.0 ft
 TEST DATE: 4/10/2015

Strain to contact borehole = 0.045

Average Strain	Corrected Strain	Reload Modulus	Average Strain	Corrected Strain	Unload Modulus
0.0778	0.0328	1100	0.0778	0.0328	1273
0.1279	0.0829	1863	0.1279	0.0829	2215
0.1763	0.1313	2102	0.1762	0.1312	2517
0.2229	0.1779	2310	0.2228	0.1778	2774
	-0.0450	#DIV/0!		-0.0450	#DIV/0!
	-0.0450	#DIV/0!		-0.0450	#DIV/0!





**GeoConcepts
Engineering, Inc.**

VRE ALEXANDRIA STATION 110 CALLAHAN DRIVE, ALEXANDRIA, VIRGINIA				
BORING LOCATION PLAN			Scale: AS SHOWN	Fig. 2
Date: OCT. 2015	Drawn By: C.M.L.	Checked By: P.E.B.	Project No.: 12170	

Appendix B

Laboratory Test Results

Grain Size Analysis Test Data (12 pages)

Liquid and Plastic Limits Test Data (3 pages)

Unit Weight Test Data (5 pages)

Permeability Test Data (2 pages)

Specific Gravity and Organic Content Test Data (6 pages)

Expansion Index and Constant Volume Swell Test Data (37 pages)

Consolidated Undrained (CU) Triaxial Test Data (104 pages)

Metal Corrosion Potential Test Data (3 pages)

Mineralogical Content Test Data (12 pages)

Soil Chemical Laboratory Test Results (59 pages)

Groundwater Chemical Laboratory Test Results (43 pages)



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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

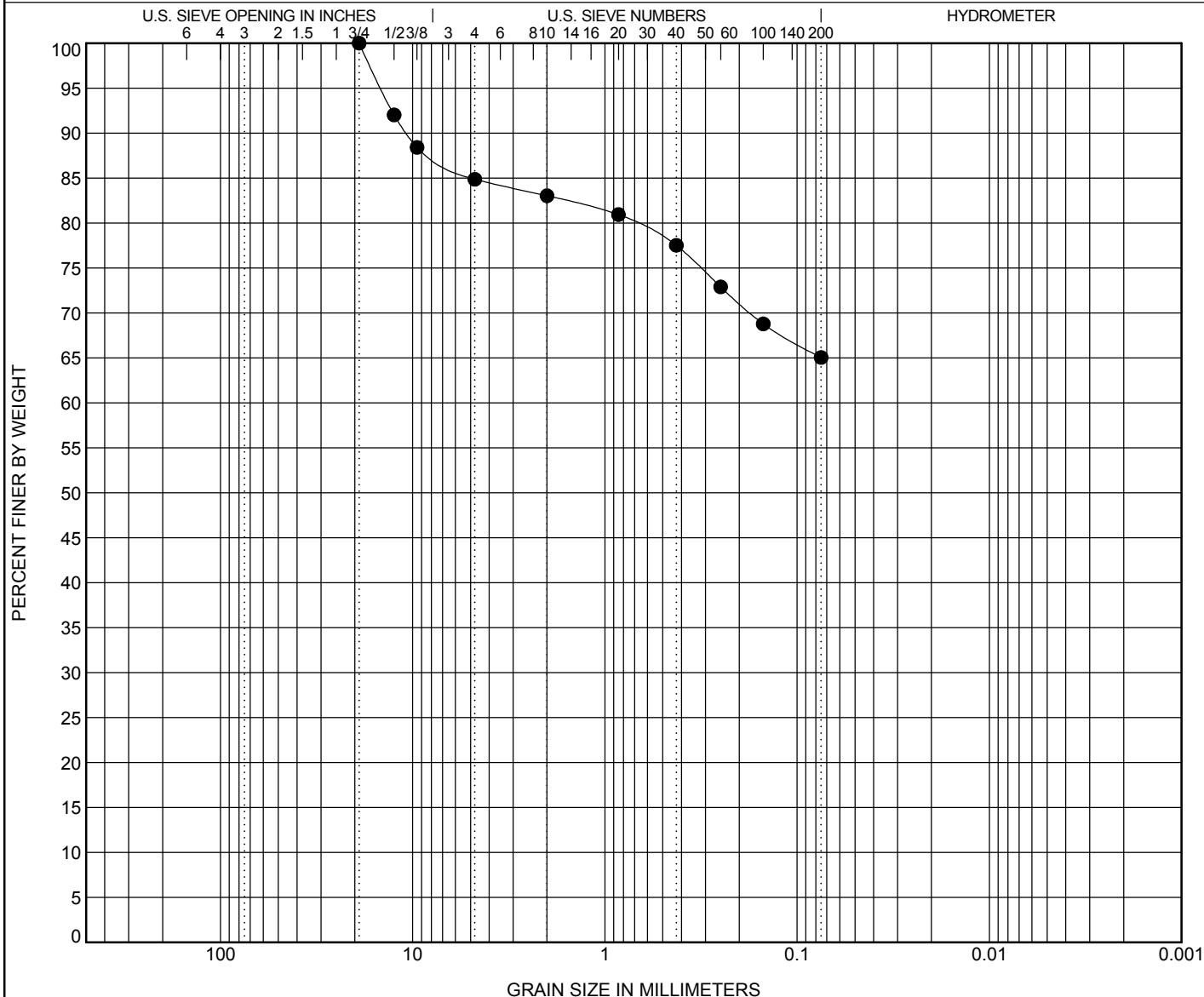
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/2/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification						LL	PL	PI	Cc	Cu
●	GZ-7, T-1 @ 9.0' - 11.0',	Yellowish Brown SANDY LEAN CLAY with GRAVEL(CL)						49	17	32		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay			
●	GZ-7, T-1 @ 9.0' - 11.0',	19				15.1	19.8	65.0				

GRAIN SIZE 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE.GDT 7/22/15



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TEST METHOD ASTM D422

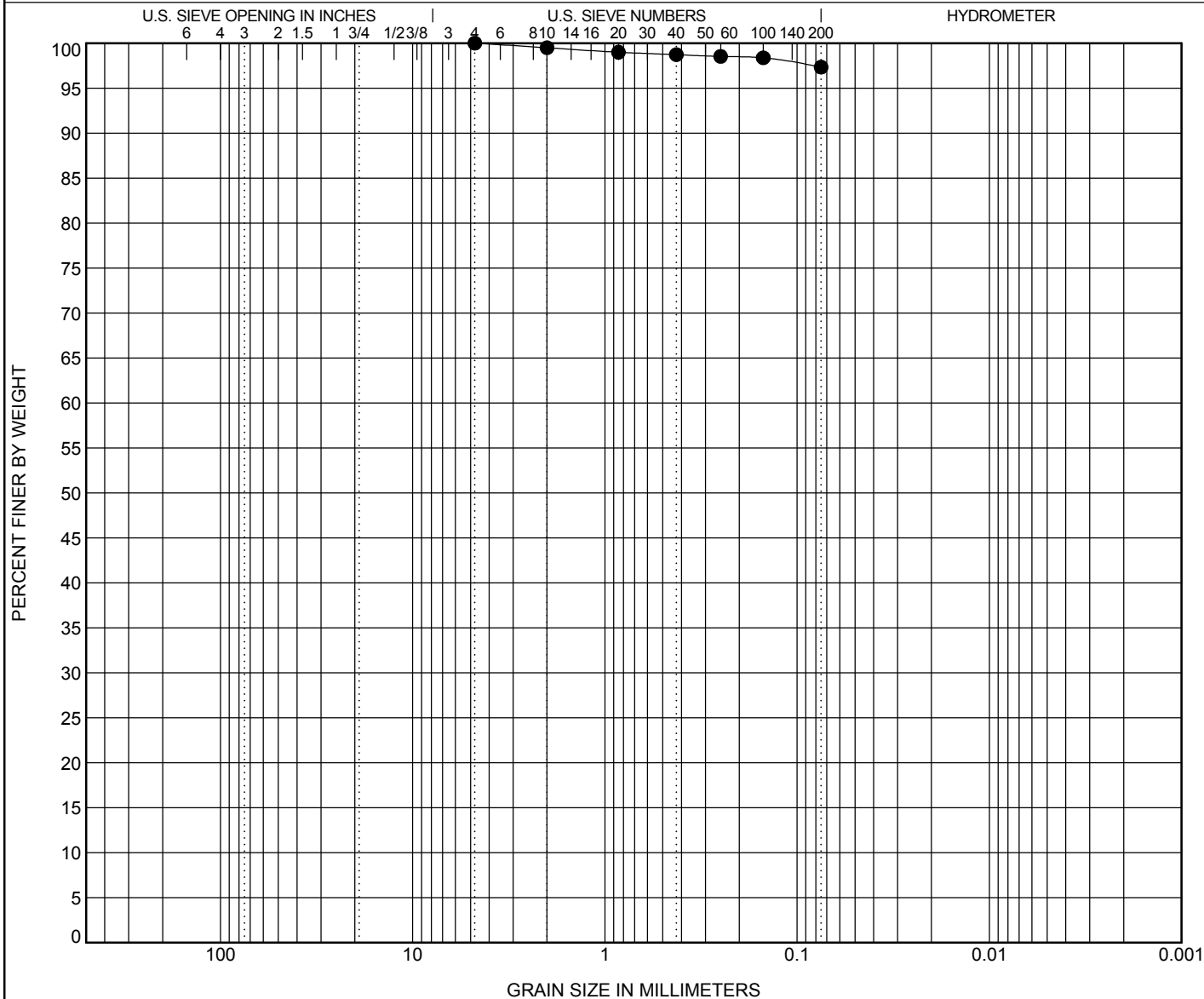
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/2/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
● GZ-7, T-2 @ 11.0' - 13.0',		Brown LEAN CLAY(CL)					44	18	26		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● GZ-7, T-2 @ 11.0' - 13.0',		4.75				0.0	2.7	97.3			

GRAIN SIZE 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE.GDT 7/22/15



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TEST METHOD ASTM D422

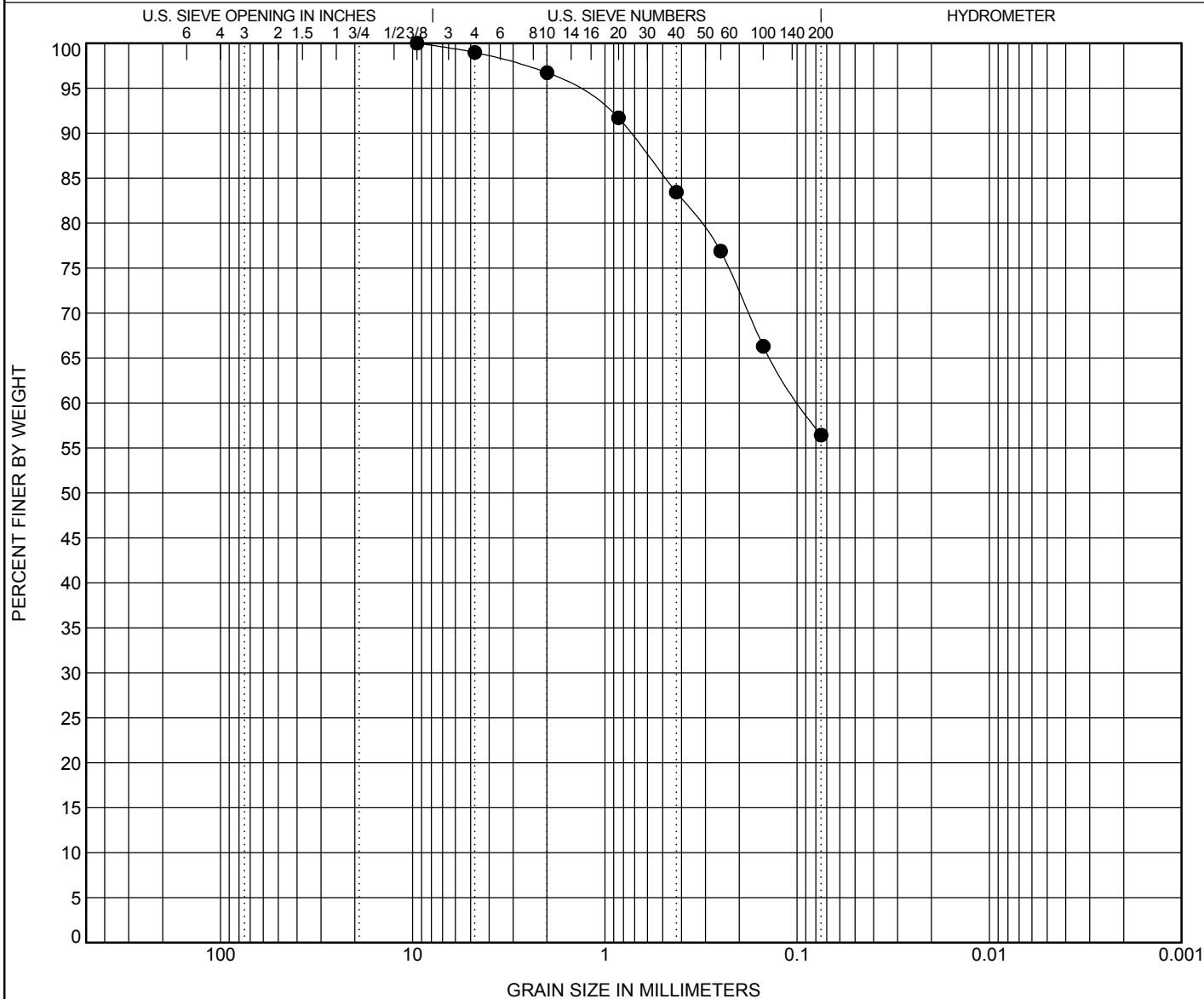
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/2/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
● GZ-7, T-3 @ 15.0' - 17.0',		Yellowish Brown SANDY LEAN CLAY(CL)					34	16	18		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● GZ-7, T-3 @ 15.0' - 17.0',		9.5	0.096			1.0	42.5	56.4			

GRAIN SIZE 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE.GDT 7/22/15



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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

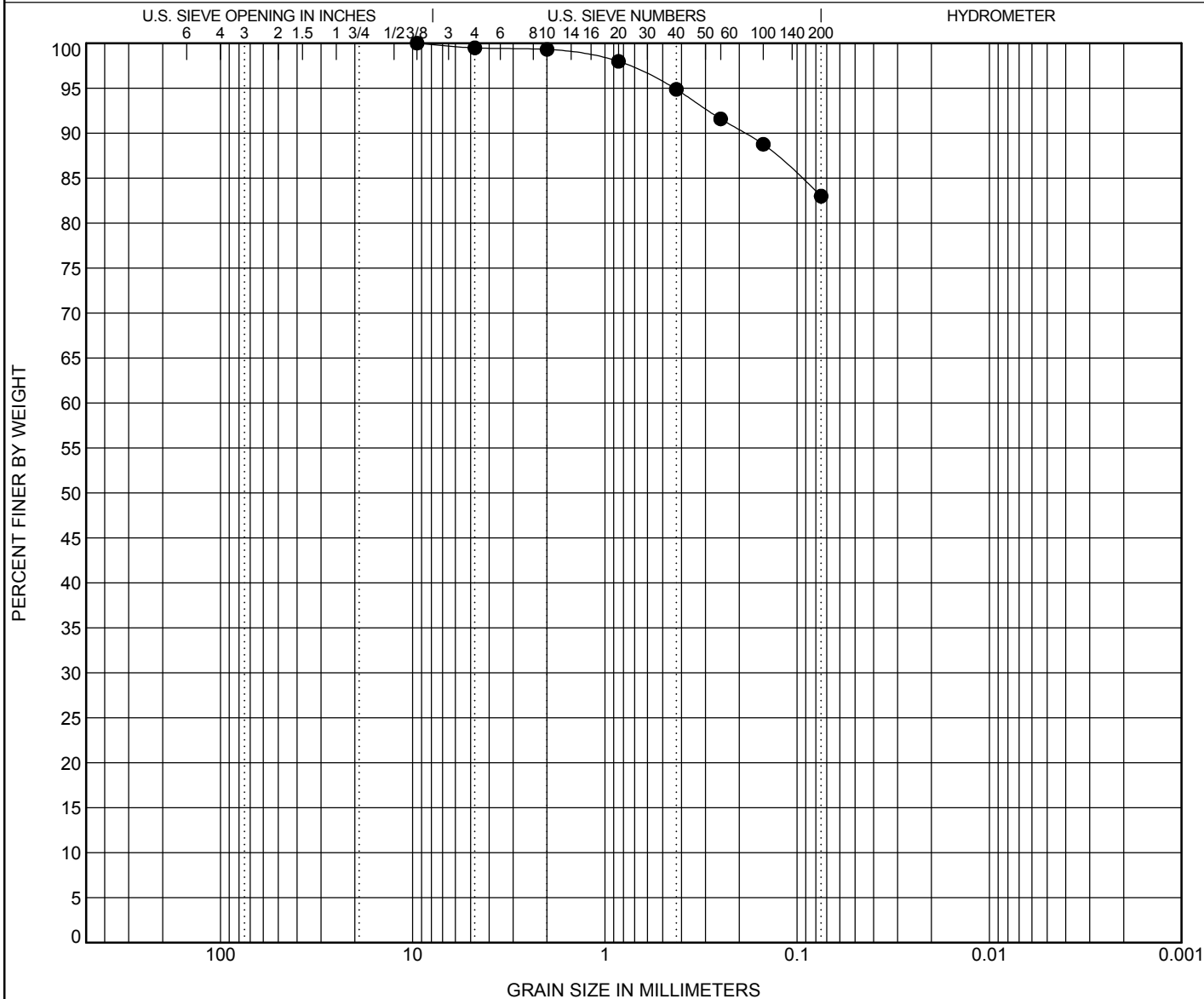
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/10/2015





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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

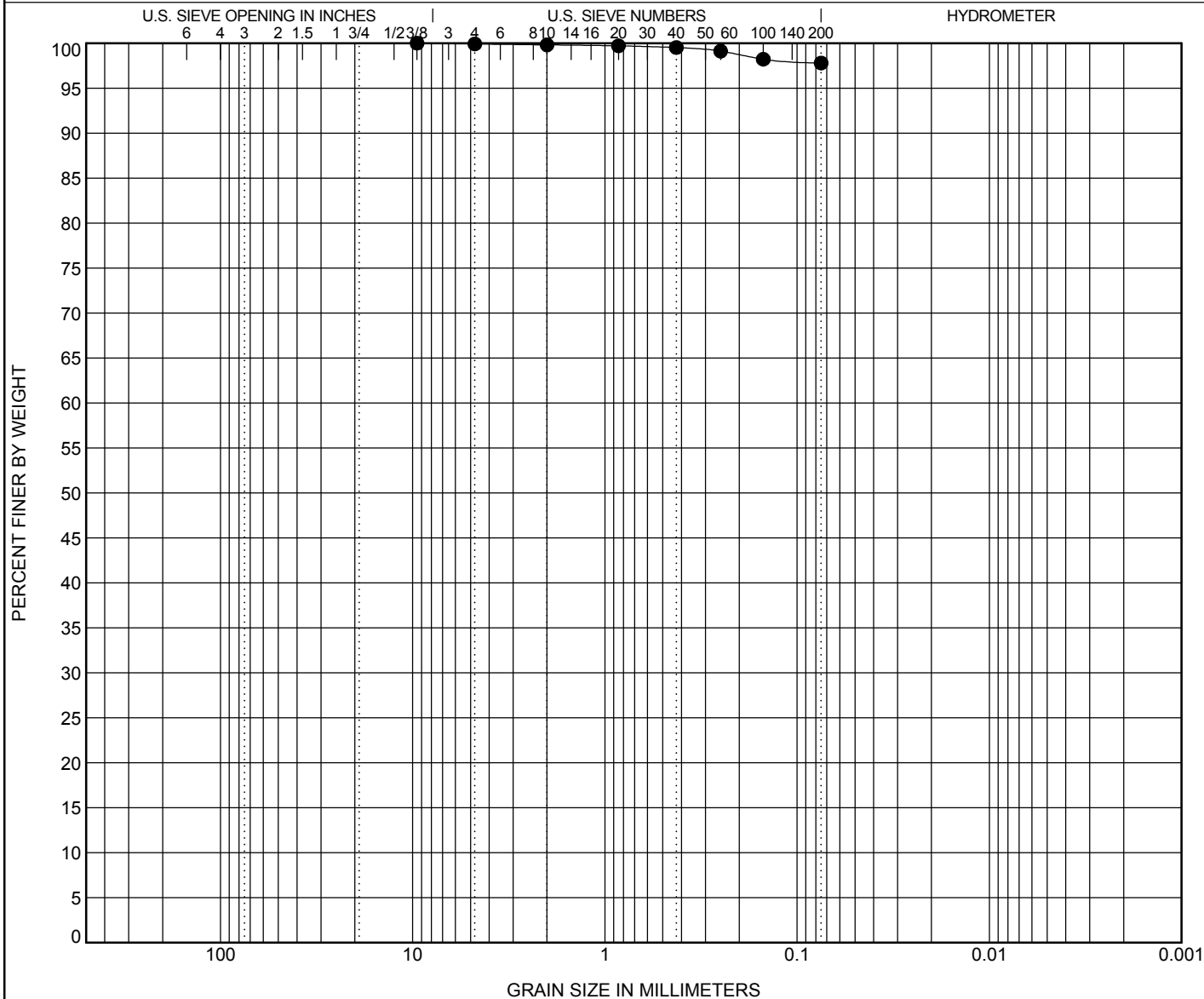
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/10/2015



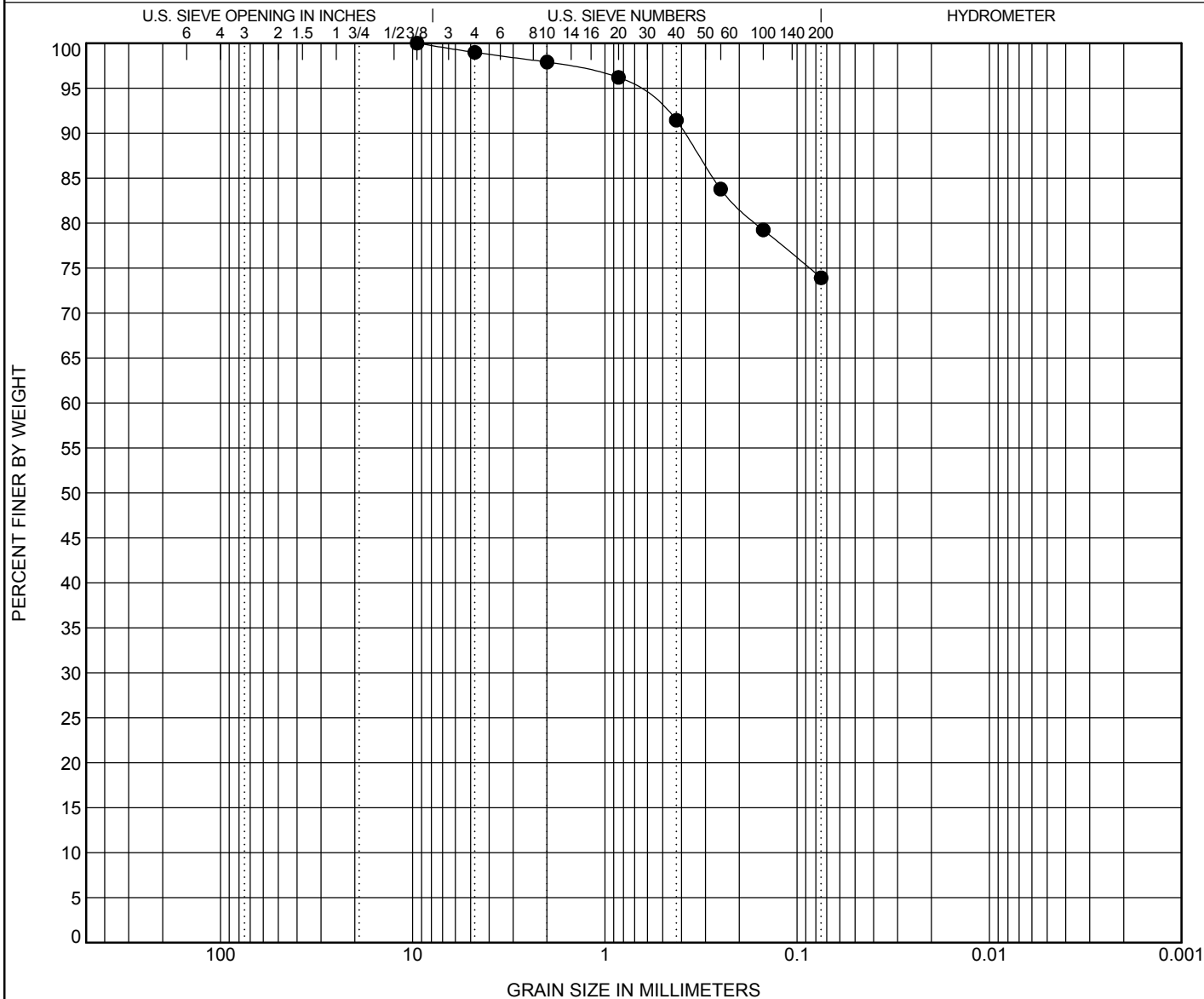
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 6/15/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

[illegible]



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Geotechnical and Environmental Engineers
Materials and Construction Inspection and Testing
Telephone No. (410) 363-1555
www.balterco.com

GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

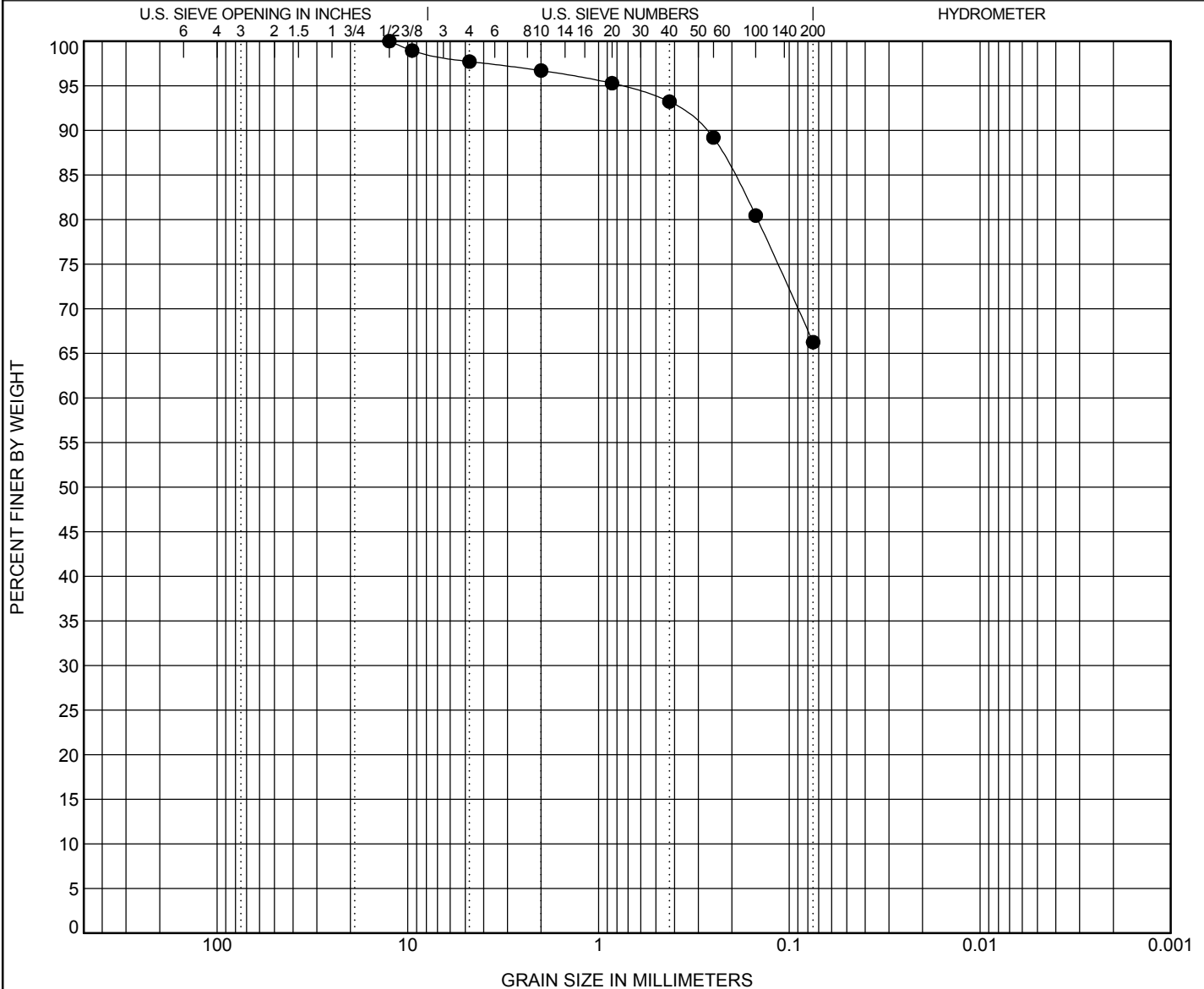
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 6/15/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
● GZ-9, T-2 @ 8.0' - 10.0',		Brown SANDY SILTY CLAY(CL-ML)					23	19	4		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● GZ-9, T-2 @ 8.0' - 10.0',		12.5				2.3	31.5	66.2			

GRAIN SIZE 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE.GDT 7/22/15



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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

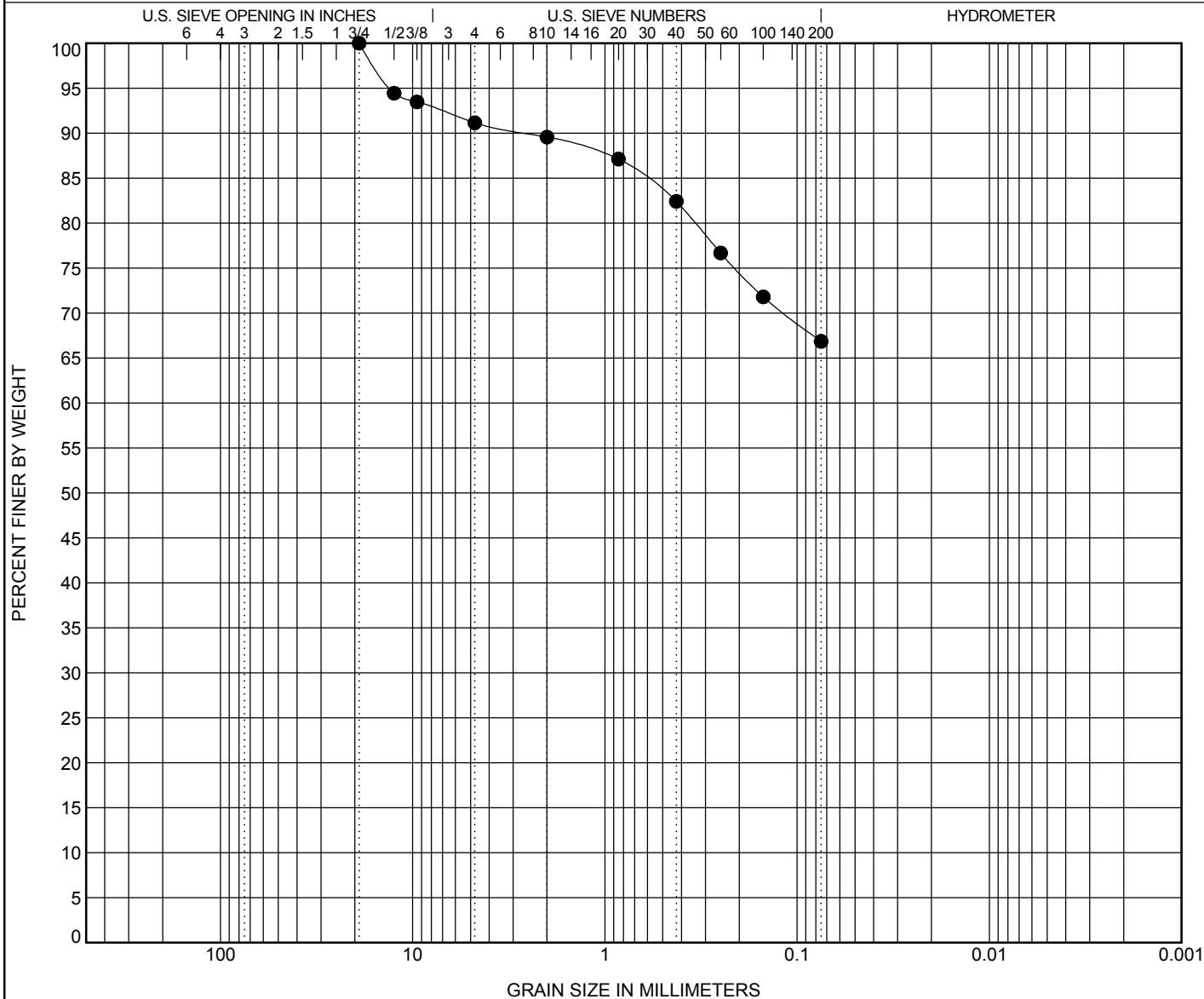
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 6/17/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
● GZ-9 @ 16.0' - 18.0',		Dark Yellowish Brown SANDY SILTY CLAY(CL-ML)					29	22	7		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt		%Clay	
● GZ-9 @ 16.0' - 18.0',		19				8.9	24.3	66.8			

GRAIN SIZE 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE.GDT 7/22/15



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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

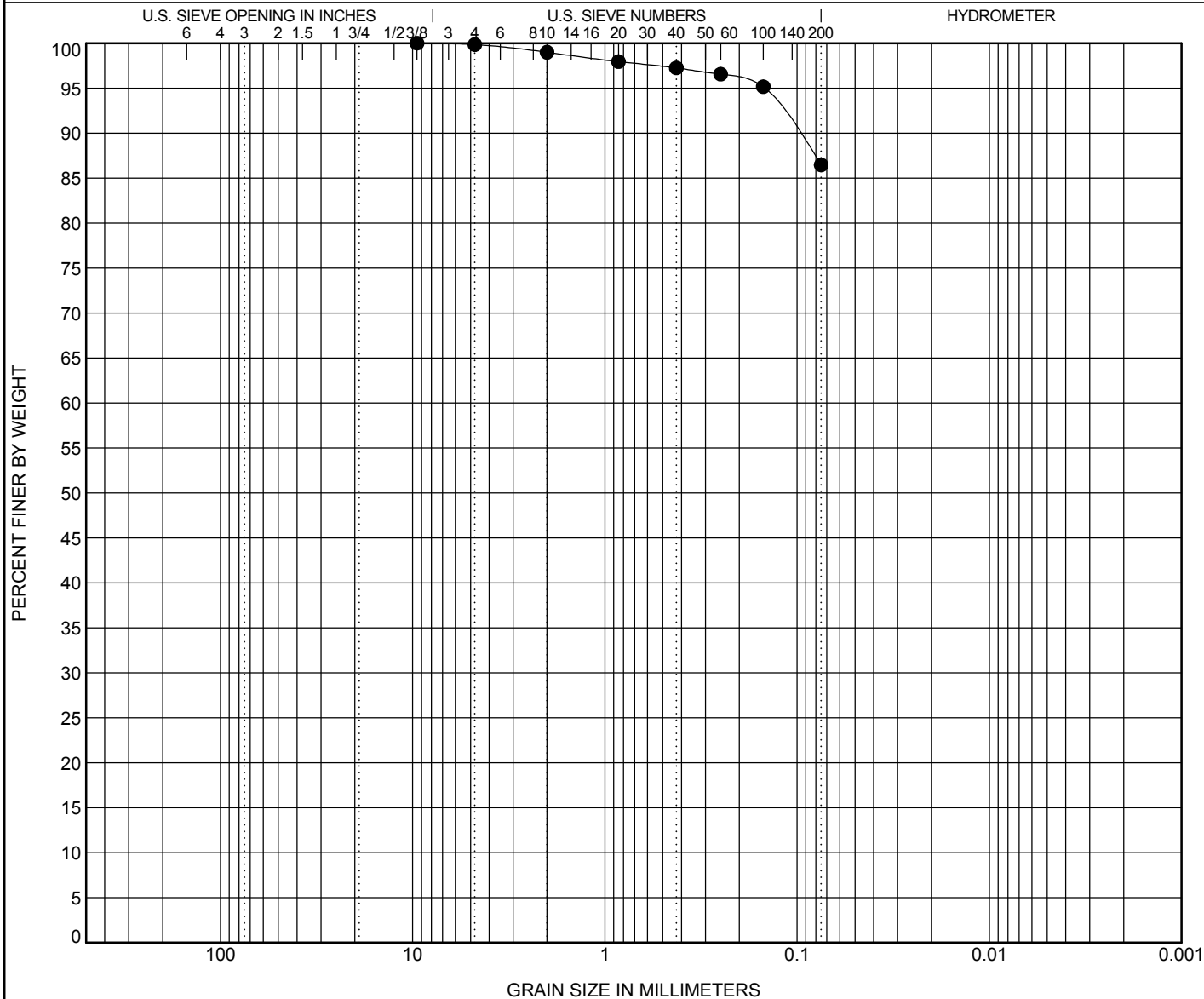
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

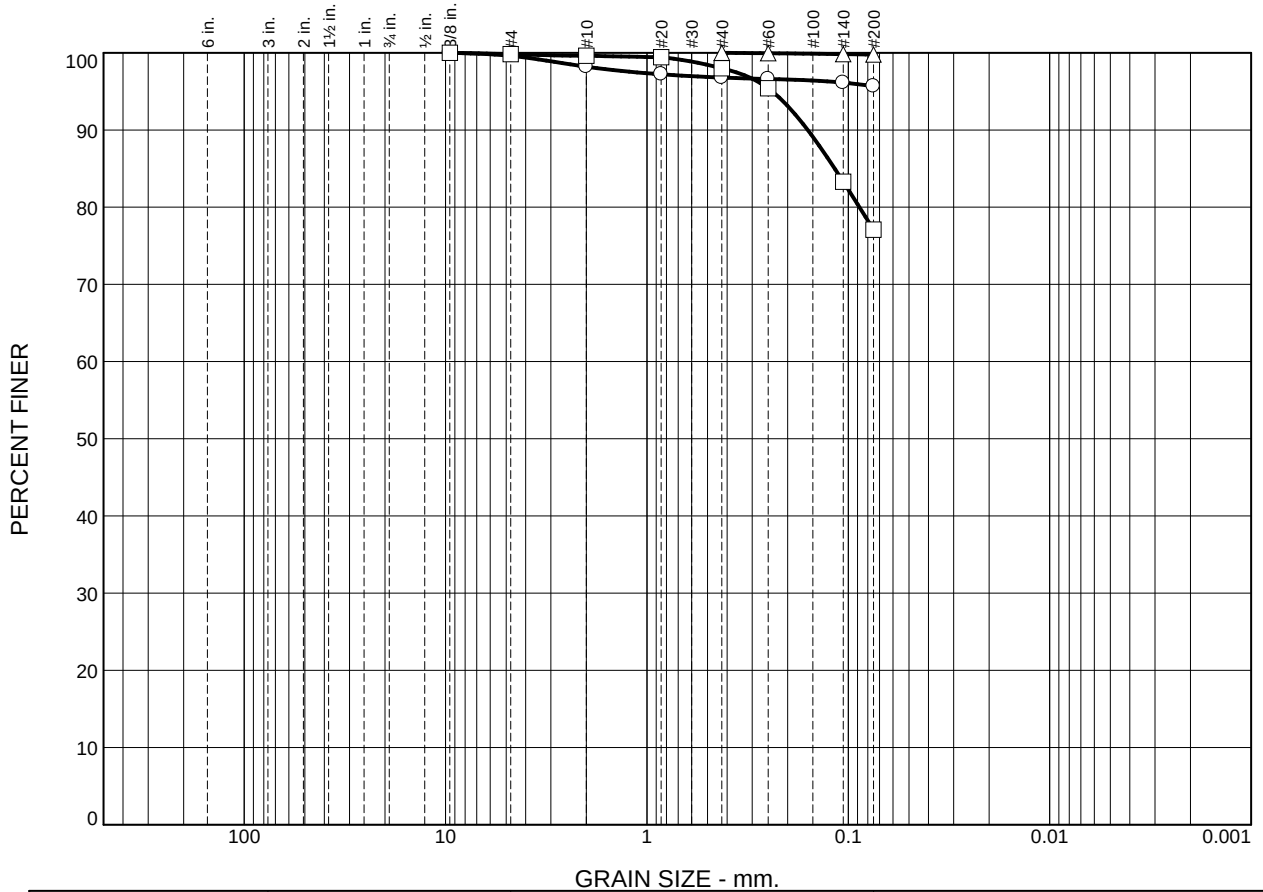
PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 6/17/2015



Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.4	1.4	1.4	1.1	95.7	
□	0.0	0.0	0.2	0.2	1.6	20.9	77.1	
△	0.0	0.0	0.0	0.0	0.0	0.2	99.8	

SOIL DATA					
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	GZ-8		17'-19'	Light olive brown lean CLAY	CL
□	GZ-8		15'-17'	Yellowish brown lean CLAY with sand	CL
△	GZ-8		22'-24'	Brown fat CLAY	CH

BURGESS AND NIPLE, INC.

Chantilly, VA

Client: GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

Project No.: 33088-087

Figure



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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

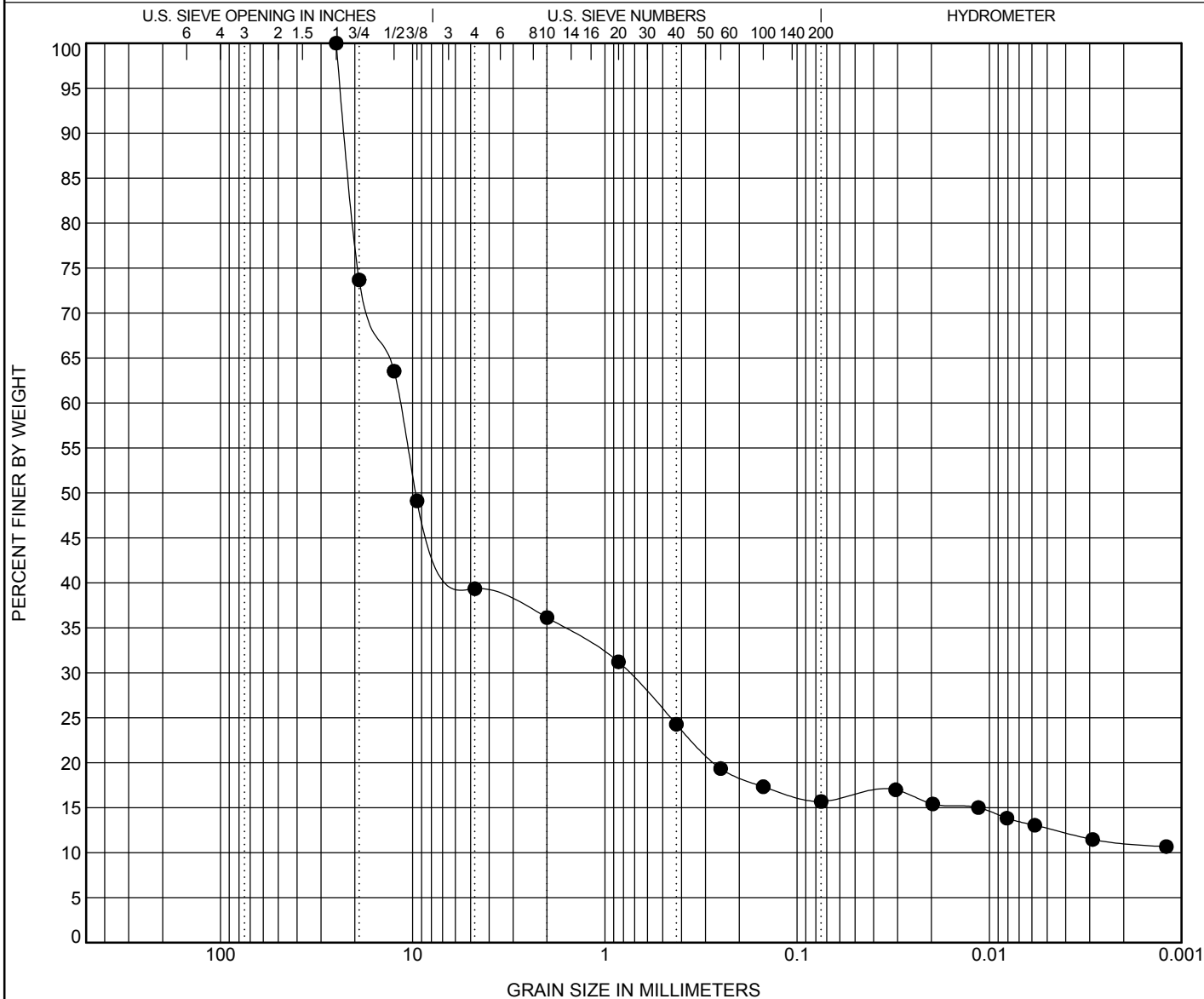
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/29/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
● GZ-7 @ 19.0' - 21.0',		Brown/Light Brown CLAYEY GRAVEL with SAND(GC)					89	23	66		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
● GZ-7 @ 19.0' - 21.0',		25	11.688	0.753		60.7	23.7	3.0	12.7		

GRAIN SIZE 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE.GDT 7/31/15



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GRAIN SIZE DISTRIBUTION

TEST METHOD ASTM D422

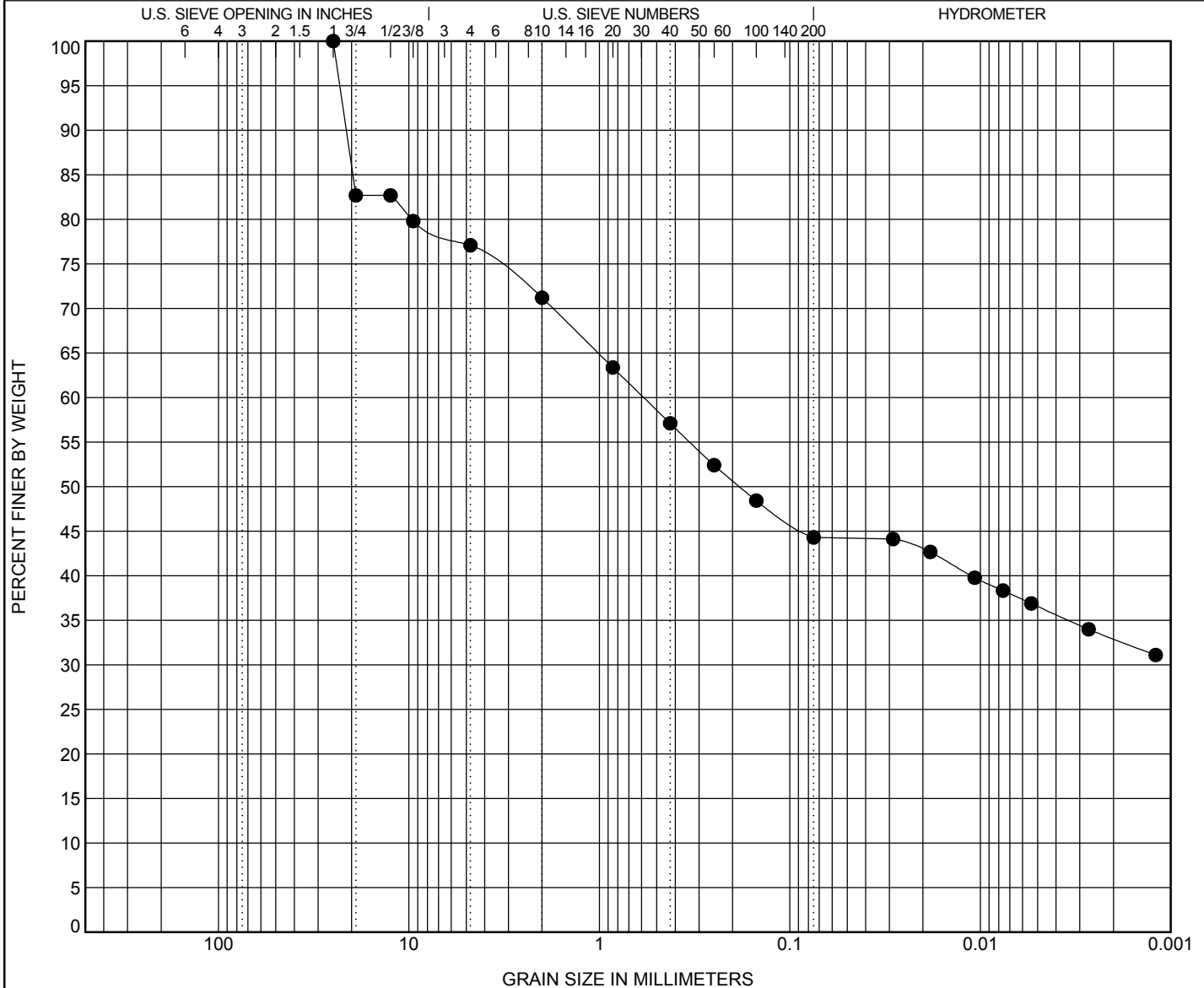
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

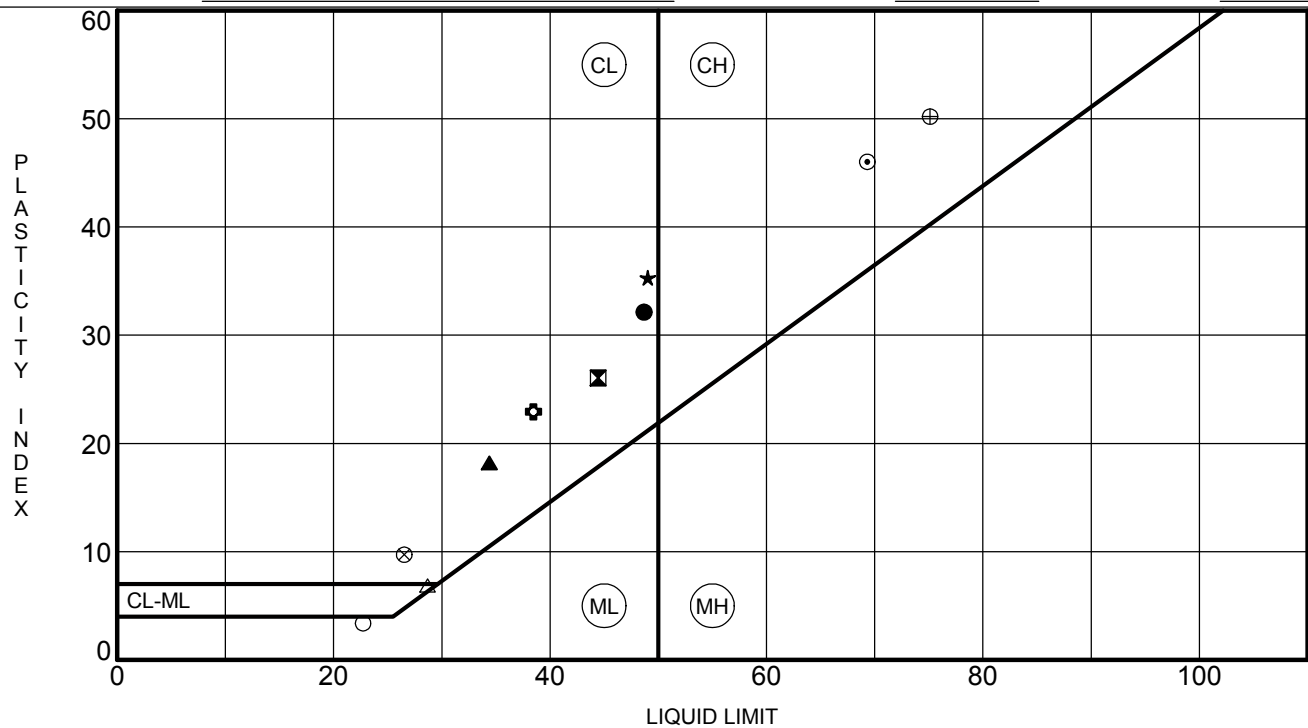
PROJECT NUMBER 16679-0 VA

DATE TESTED 7/29/2015



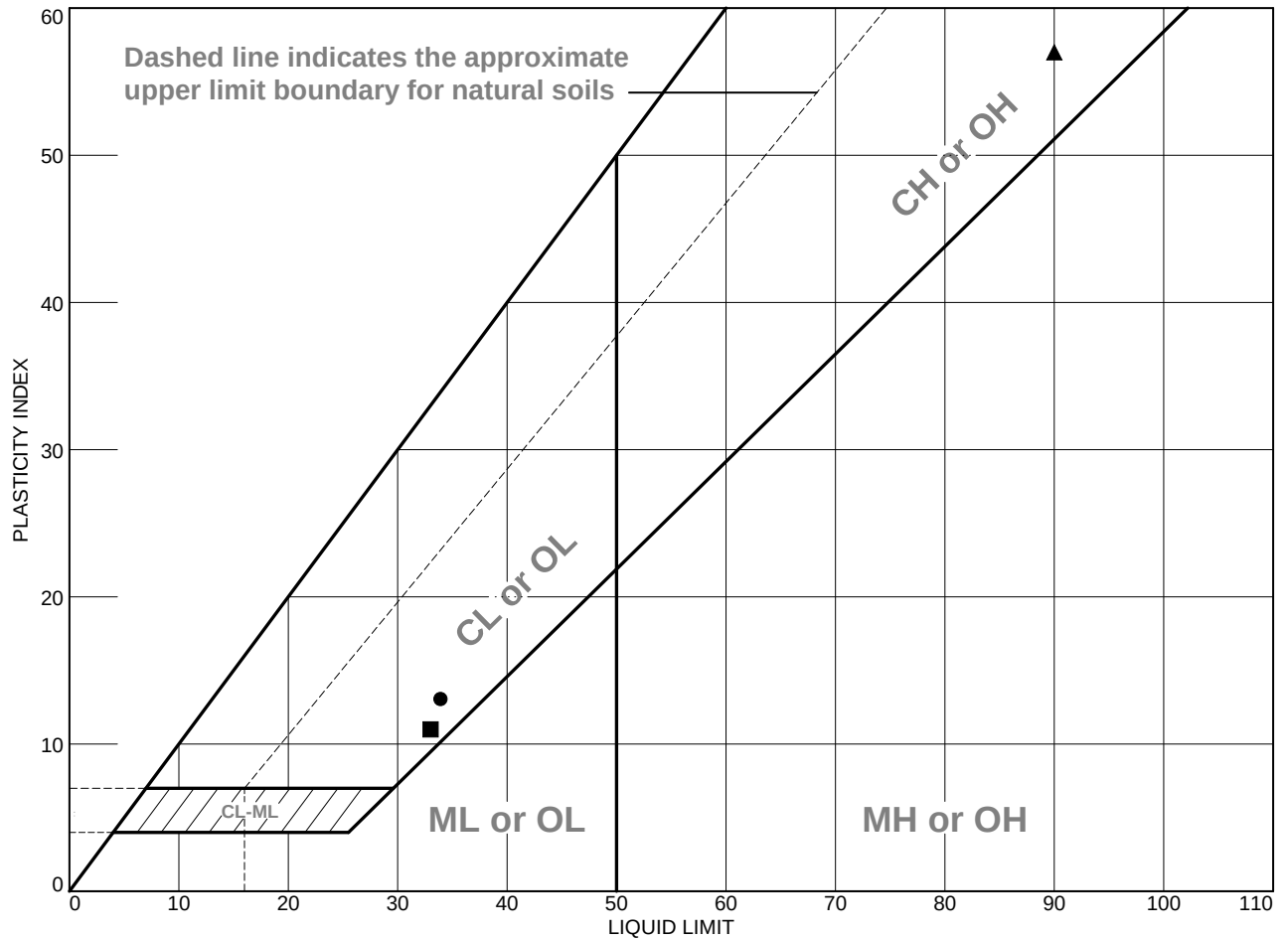


CLIENT Geoconcepts Inc. **PROJECT NAME** VRE Alexandria Station
PROJECT LOCATION Alexandria, VA **PROJECT NUMBER** 16679-0 VA **DATE TESTED** _____

[illegible]

ATTERBERG LIMITS 16679-0 VRE-ALEXANDRIA.GPJ MTA REDLINE GDT 7/22/15

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light olive brown lean CLAY	34	21	13	96.8	95.7	CL
■	Yellowish brown lean CLAY with sand	33	22	11	98.0	77.1	CL
▲	Brown fat CLAY	90	33	57	100.0	99.8	CH

Project No. 33088-087 **Client:** GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

● **Source of Sample:** GZ-8 **Depth:** 17'-19'

■ **Source of Sample:** GZ-8 **Depth:** 15'-17'

▲ **Source of Sample:** GZ-8 **Depth:** 22'-24'

BURGESS AND NIPLE, INC.

Chantilly, VA

Remarks:

Figure

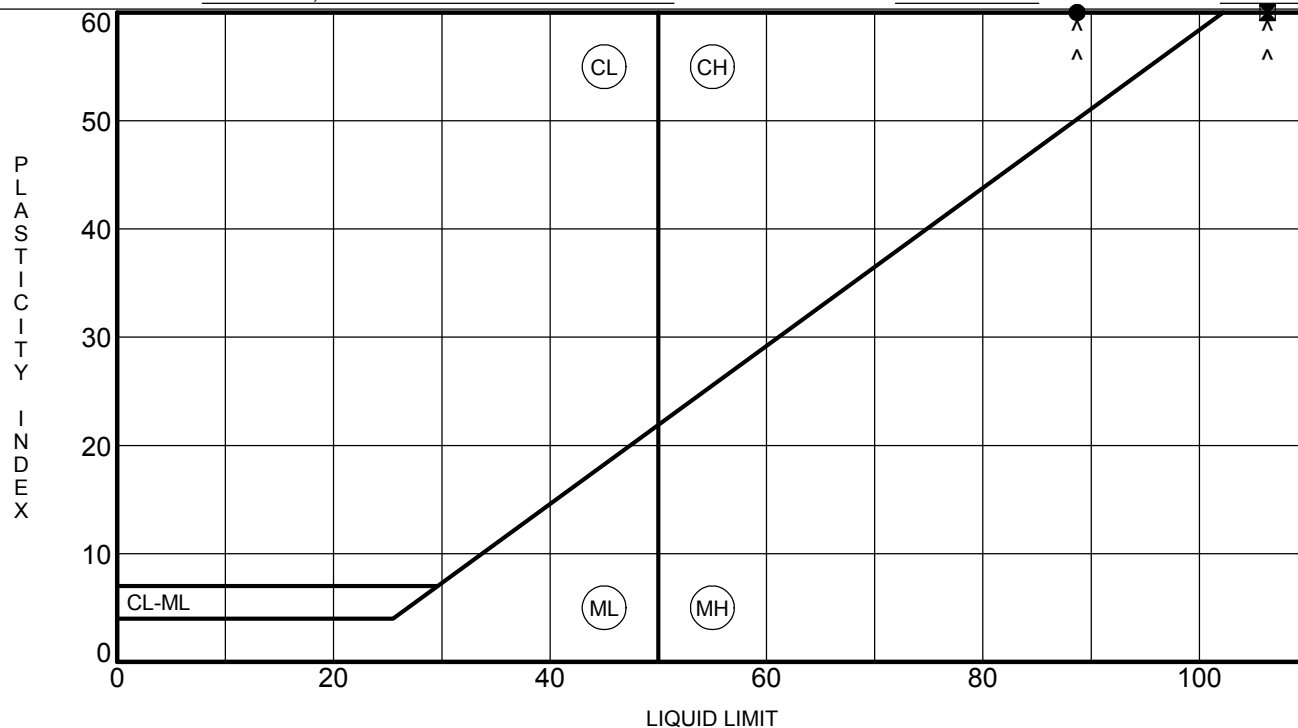
CLIENT Geoconcepts Inc.

PROJECT NAME VRE Alexandria Station

PROJECT LOCATION Alexandria, VA

PROJECT NUMBER 16679-0 VA

DATE TESTED 7/29/2015

[illegible]



THE ROBERT B. BALTER COMPANY.

*Geotechnical Engineering, Subsurface Exploration
Construction Inspection and Materials Testing*

Unit Weight of Soil

Project: VRE Alexandria Station

Client: GeoConcepts Engineering, Inc.

Contract No.: 16679-0 VA

Date: July 7, 2015

Boring No.: GZ-07

Sample No.: T-4

Depth: 17.0' – 19.0'

Material Description: Grayish Brown Lean CLAY with Sand (CL)

LL: 49

PL: 14

PI: 35

Initial Weight: 1211.62 gms.

Average Diameter: 2.850"

Average Height: 5.799"

Natural Moisture: 21.4 %

Wet Unit Weight: 124.7 PCF

Dry Unit Weight: 102.7 PCF

Alberto R. Bartolome

Alberto R. Bartolome, PG
Laboratory Supervisor





THE ROBERT B. BALTER COMPANY.

*Geotechnical Engineering, Subsurface Exploration
Construction Inspection and Materials Testing*

Unit Weight of Soil

Project: VRE Alexandria Station

Client: GeoConcepts Engineering, Inc.

Contract No.: 16679-0 VA

Date: July 7, 2015

Boring No.: GZ-07

Sample No.: T-5

Depth: 23.0' – 25.0'

Material Description: Light Yellowish Brown Fat CLAY (CH)

LL: 69

PL: 23

PI: 46

Initial Weight: 1194.94 gms.

Average Diameter: 2.852"

Average Height: 5.832"

Natural Moisture: 30.0 %

Wet Unit Weight: 122.1 PCF

Dry Unit Weight: 93.9 PCF

Alberto R. Bartolome

Alberto R. Bartolome, PG
Laboratory Supervisor



Laboratory Determination of Unit Weight of Soil Specimens

ASTM D 7263

Client Name: GeoConcepts Engineering, Inc.
Project Name: GZ8 VRE Alexandria Station
Project Number: 33088
Report Date: 7/20/2015

Sample ID	Depth (ft)	Type	Sample Diameter (in)	Sample Length (in)	Wet Unit Weight (lb/ft ³)	Moisture Content (%)	Dry Unit Weight (lb/ft ³)
GZ-8	15-17	UD	2.867	4.605	121.87	16.78	104.35
GZ-8	17-19	UD	2.869	3.181	126.19	23.41	102.25
GZ-8	24-25.2	UD	2.873	6.518	115.42	32.82	86.90

Reviewed by: _____



THE ROBERT B. BALTER COMPANY.

*Geotechnical Engineering, Subsurface Exploration
Construction Inspection and Materials Testing*

Unit Weight of Soil

Project: VRE Alexandria Station

Client: GeoConcepts Engineering, Inc.

Contract No.: 16679-0 VA

Date: July 7, 2015

Boring No.: GZ-09

Sample No.: T-2

Depth: 8.0' – 10.0'

Material Description: Brown Sandy Silty CLAY (CL-ML)

LL: 23

PL: 19

PI: 4

Initial Weight: 1139.88 gms.

Average Diameter: 2.860"

Average Height: 5.608"

Natural Moisture: 20.5 %

Wet Unit Weight: 120.5 PCF

Dry Unit Weight: 100.0 PCF

Alberto R. Bartolome

Alberto R. Bartolome, PG
Laboratory Supervisor





THE ROBERT B. BALTER COMPANY.

*Geotechnical Engineering, Subsurface Exploration
Construction Inspection and Materials Testing*

Unit Weight of Soil

Project: VRE Alexandria Station

Client: GeoConcepts Engineering, Inc.

Contract No.: 16679-0 VA

Date: July 7, 2015

Boring No.: GZ-09

Sample No.: T-8

Depth: 18.0' – 20.0'

Material Description: Yellowish Brown Lean CLAY (CL)

LL: 27

PL: 17

PI: 10

Initial Weight: 1178.24gms.

Average Diameter: 2.850"

Average Height: 5.721"

Natural Moisture: 23.5 %

Wet Unit Weight: 122.9 PCF

Dry Unit Weight: 99.5 PCF

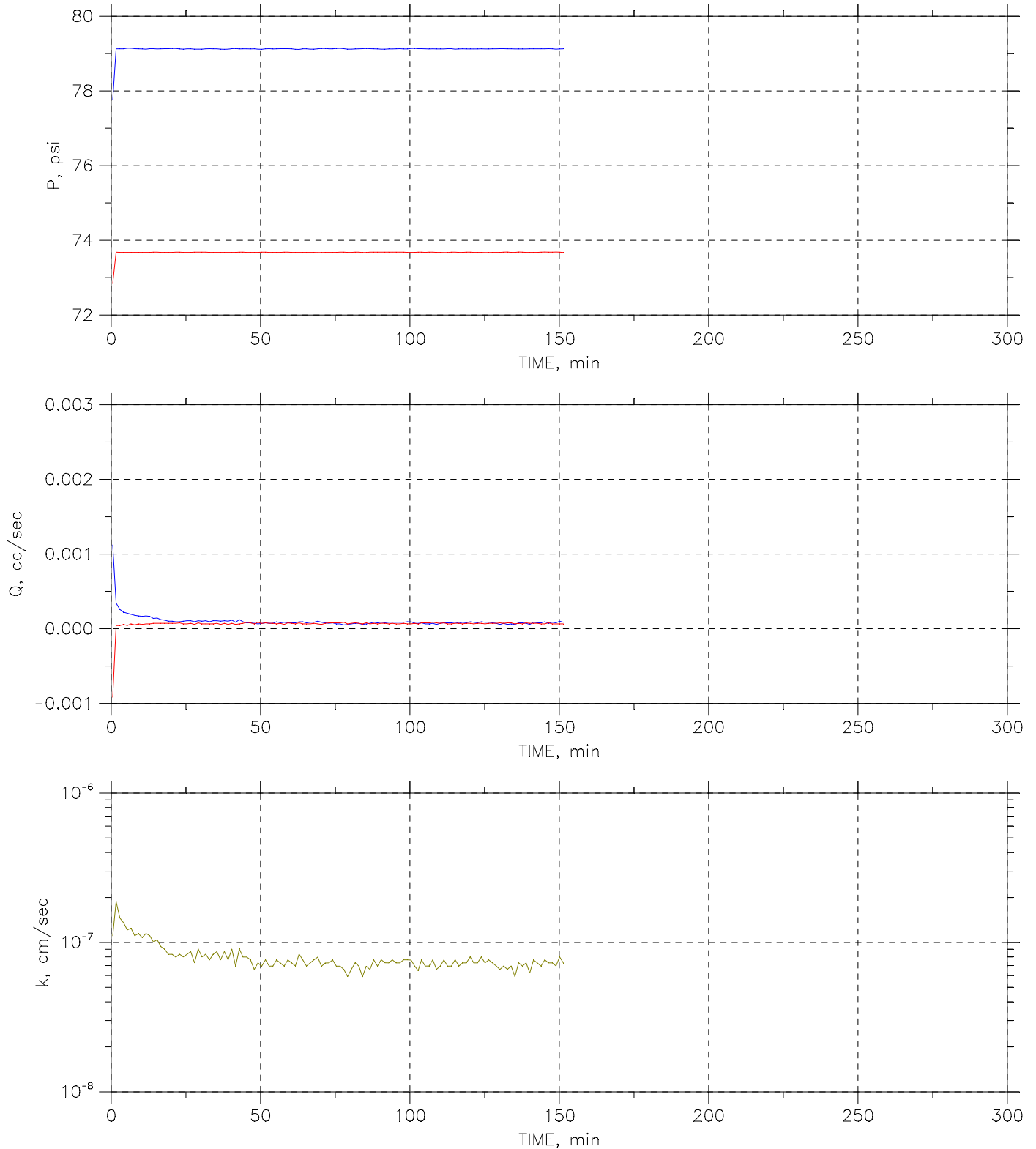
Alberto R. Bartolome

Alberto R. Bartolome, PG
Laboratory Supervisor



PERMEABILITY TEST DATA

Step: 8 of 8



Project: VRE Alexandria	Location:	Project No.: 16679-0
Boring No.: GZ-7	Tested By: Jason	Checked By: Bert
Sample No.: 17'-19'	Test Date: 07-06-2015	Depth: 17'-19'
Test No.: 1	Sample Type: Undisturbed	Elevation:
Description: Grayish Brown Lean CLAY with Sand (CL)		
Remarks: ASTM D5084, Method A. Specimen was inundated with distilled water during testing.		



Burgess & Niple, Inc.
4160 Pleasant Valley Road
Chantilly, Virginia 20151

PROJECT NAME: GZ8 VRE Alexandria Station

PROJECT NUMBER: 33088

DATE: 7/25/2015 (updated)

Sample I.D.	Sample Depth (ft.)	Dry Density (pcf)	Initial Moisture (%)	Length (cm)	Diameter (cm)	Gs Solids	Head (cm)	Quantity (cu. cm)	Elapsed Time (sec)	Temperature (C)
GZ-8	15-17	106.5	19.6	14.75	7.27	2.725	211.02	47.0	259,217	22.6
GZ-8	17-19	101.8	23.8	14.78	7.28	2.733	211.02	13.1	86,454	22.2
GZ-8	22-24	83.6	36.0	14.75	7.26	2.747	211.02	37.4	259,200	22.9

Sample Number	Sample Depth (in.)	Area (sq. cm)	Hydraulic Gradient	Void Ratio (e)	Initial Saturation (%)	Correction Factor	Coefficient of Permeability k cm/sec
GZ-8	15-17	41.5	14.3	0.597	89.5	0.941	2.9E-07
GZ-8	17-19	41.6	14.3	0.675	96.4	0.951	2.4E-07
GZ-8	22-24	41.4	14.3	1.050	94.2	0.933	2.3E-07

NOTES: Permeability Test in Accordance with ASTM D 5084 or ASTM D 2434

MC, % by ASTM D 2216

N/A = Not Available



The Robert B. Balter Company
Geotechnical Engineers

**ORGANIC CONTENT (ASTM D2974)
SPECIFIC GRAVITY (ASTM D 854)**

PROJECT: **VRE Alexandria Station**
DATE: **July 7, 2015**
CLIENT: **GeoConcepts Engineering, Inc.**
Contract No.: **16679-0 VA**

Boring No.		GZ-07	GZ-07	GZ-07
Sample No.				
Depth		17.0' - 19.0'	9.0' - 11.0'	23.0'- 25.0'
Organic Content (%)			1.63	
Specific Gravity		2.707	2.722	2.710



Burgess & Niple, Inc.
4160 Pleasant Valley Road
Chantilly, Virginia 20151

Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer

ASTM D 854

Project Name: GZ8 VRE Alexandria Station
Project Number: 33088-087
Date Tested: 7/21/2015
Sample Number: GZ-8
Sample Location: 15.0'-17.0'

Average Calibrated Mass of dry Pycnometer, g (A)	171.05
Average Calibrated Volume of the Pycnometer, ml (B)	499.25
Density of Water at Test Temperature, g/ml ©	0.99780
Mass of Oven Dry Soil Solids, g (D)	44.06
Mass of Pycnometer, Water, and Soil Solids at test temperature, g (E)	695.65
Temperature, °C (F)	21.9

Mass of Pycnometer and Water at Test, g (G)	667.76
Specific Gravity of Soil Solids at Test Temperature	2.725

CALCULATIONS

Mass of Pycnometer and Water at Test, g (G)	A+(B*C)
Specific Gravity of Soil Solids at Test Temperature	D/(G-(E-D))

Reviewed by: _____



Burgess & Niple, Inc.
4160 Pleasant Valley Road
Chantilly, Virginia 20151

Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
ASTM D 854

Project Name: GZ8 VRE Alexandria Station
Project Number: 33088-087
Date Tested: 7/21/2015
Sample Number: GZ-8
Sample Location: 17.0'-19.0'

Average Calibrated Mass of dry Pycnometer, g (A)	169.65
Average Calibrated Volume of the Pycnometer, ml (B)	499.43
Density of Water at Test Temperature, g/ml ©	0.99780
Mass of Oven Dry Soil Solids, g (D)	47.12
Mass of Pycnometer, Water, and Soil Solids at test temperature, g (E)	697.86
Temperature, °C (F)	21.9

Mass of Pycnometer and Water at Test, g (G)	667.98
Specific Gravity of Soil Solids at Test Temperature	2.733

CALCULATIONS	
Mass of Pycnometer and Water at Test, g (G)	A+(B*C)
Specific Gravity of Soil Solids at Test Temperature	D/(G-(E-D))

Reviewed by: _____



Burgess & Niple, Inc.
4160 Pleasant Valley Road
Chantilly, Virginia 20151

ORGANIC CONTENT

Project: GZ8 VRE Alexandria Station
Project No.: 33088-087
Date: 7/23/2015

Sample ID	Sample Depth (ft)	Moisture Content (%)	Organic Content (%)
GZ-8	19.0-19.7	N/A	3.1

Reviewed by: TB



Burgess & Niple, Inc.
4160 Pleasant Valley Road
Chantilly, Virginia 20151

Standard Test Methods for Specific Gravity of Soil Solids by Water Pycnometer
ASTM D 854

Project Name: GZ8 VRE Alexandria Station
Project Number: 33088-087
Date Tested: 7/21/2015
Sample Number: GZ-8
Sample Location: 22.0'-24.0'

Average Calibrated Mass of dry Pycnometer, g (A)	160.48
Average Calibrated Volume of the Pycnometer, ml (B)	499.41
Density of Water at Test Temperature, g/ml ©	0.99780
Mass of Oven Dry Soil Solids, g (D)	45.74
Mass of Pycnometer, Water, and Soil Solids at test temperature, g (E)	687.88
Temperature, °C (F)	21.9

Mass of Pycnometer and Water at Test, g (G)	658.79
Specific Gravity of Soil Solids at Test Temperature	2.747

CALCULATIONS	
Mass of Pycnometer and Water at Test, g (G)	A+(B*C)
Specific Gravity of Soil Solids at Test Temperature	D/(G-(E-D))

Reviewed by: _____



The Robert B. Balter Company
Geotechnical Engineers

**ORGANIC CONTENT (ASTM D2974)
SPECIFIC GRAVITY (ASTM D 854)**

PROJECT: **VRE Alexandria Station**
DATE: **July 7, 2015**
CLIENT: **GeoConcepts Engineering, Inc.**
Contract No.: **16679-0 VA**

Boring No.		GZ-09	GZ-09	GZ-09
Sample No.		T-1	T-3	T-8
Depth		4.0' - 6.0'	8.0' - 10.0'	18.0' - 20.0'
Organic Content (%)			2.7%	
Specific Gravity		2.815	2.690	2.699



BURGESS AND NIPLE, INC.
4160 Pleasant Valley Road
Chantilly, Virginia 20151
(703) 631 9630

EXPANSION INDEX OF SOILS

ASTM D 4829

Client Name: GeoConcepts Engineering, Inc.
Project Name: GZ8 VRE Alexandria Station
Project Number: 33088
Report Date: 7/19/2015

Sample Number	GZ-8				
Depth (ft)	9' - 11'				
Initial Height of Sample (in)	1.003				
Initial Moisture Content (%)	15.28				
Final Moisture Content (%)	30.97				
Initial Dry Unit Weight (lbf/ft³)	92.8				
Initial Degree of Saturation	0.51				
Initial Dial Reading (in)	0.0000				
Final Dial Reading (in)	0.2461				
Expansion Index	246				

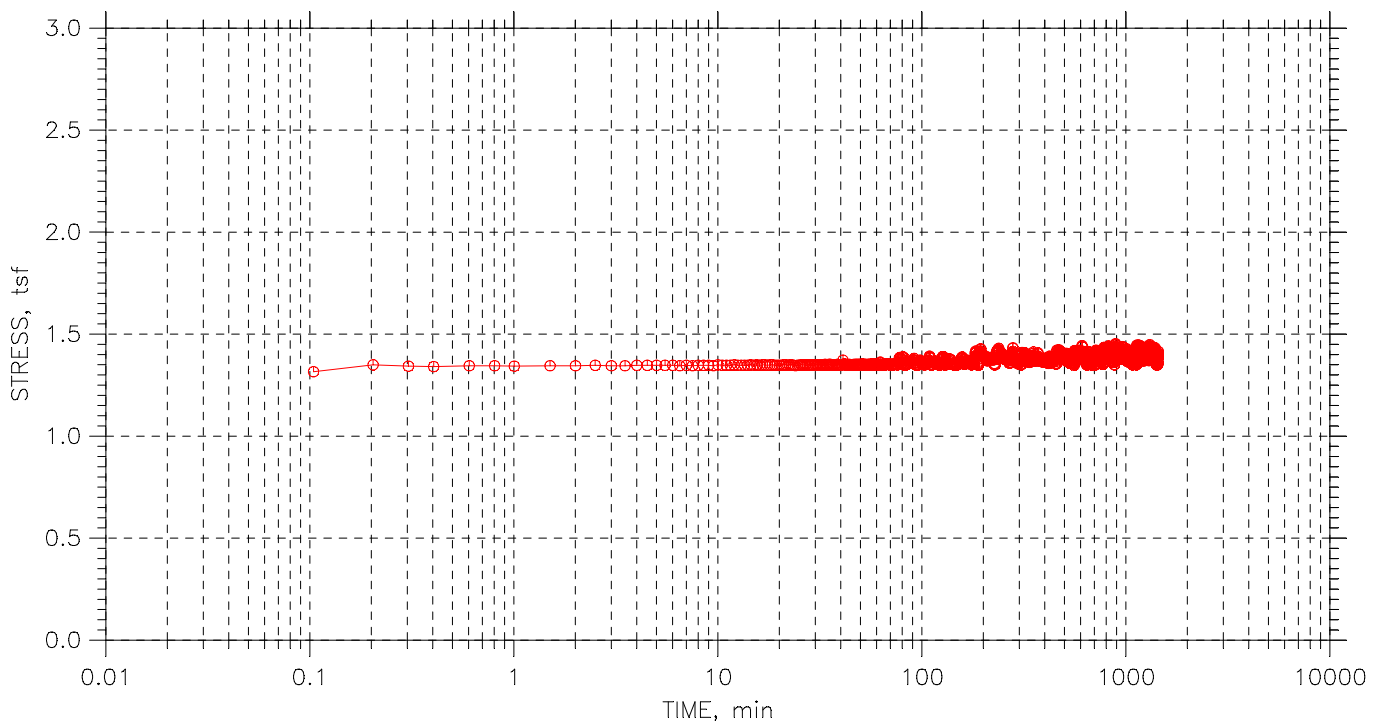
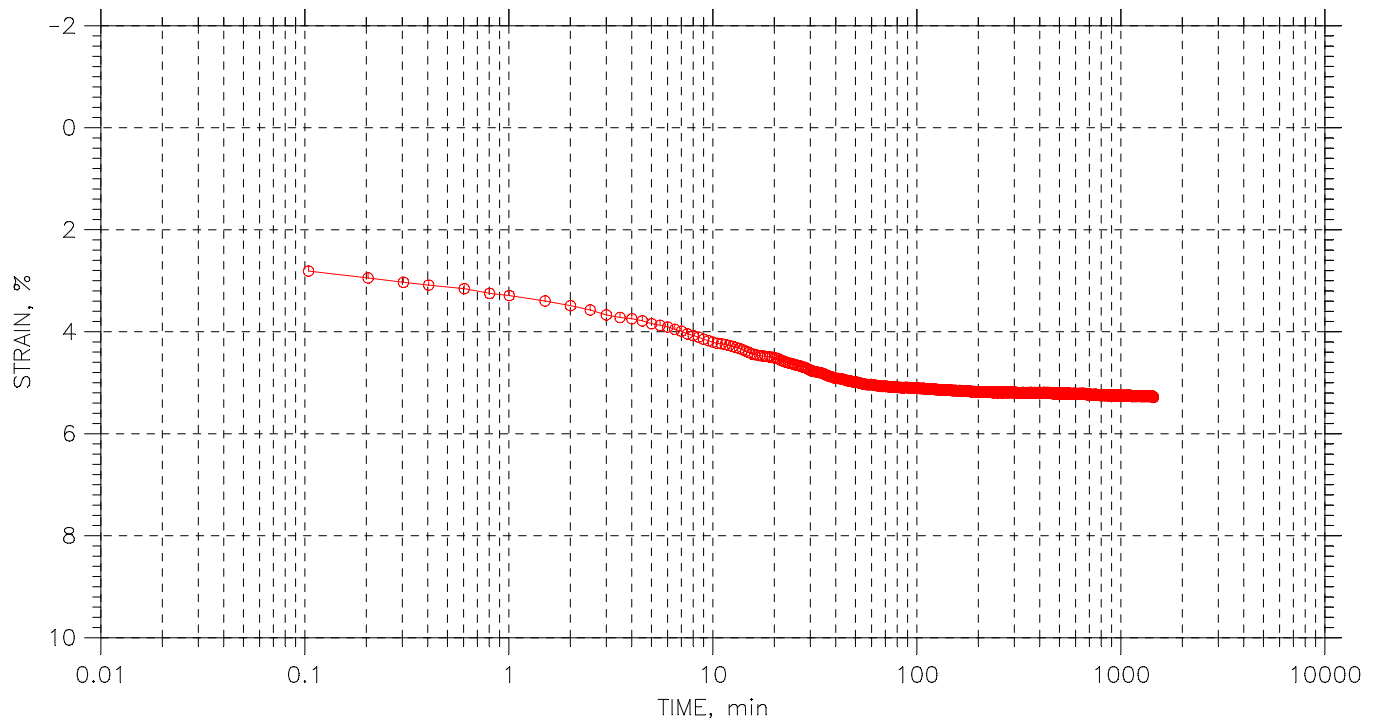
Reviewed by: _____

CONSOLIDATION TEST DATA

TIME CURVES

Constant Volume Step: 1 of 1

Stress: 1.35 tsf



	Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
	Boring No.: GZ-9	Tested By: Bert	Checked By: Bert
	Sample No.: U-1	Test Date: 7/8/2015	Depth: 16' - 18'
	Test No.: 2	Sample Type: Shelby Tube	Elevation:
	Description: Dark Yellowish Brown Sandy Silty CLAY (CL-ML)		
	Remarks: ASTM D4546. GZ-09 16.0' - 18.0' Flexwall Permeabilty		

CONSOLIDATION TEST DATA

Project: VRE Alexandria
 Boring No.: GZ-9
 Sample No.: U-1
 Test No.: 2

Location: Alexandria, VA
 Tested By: Bert
 Test Date: 7/8/2015
 Sample Type: Shelby Tube

Project No.: 16679-0
 Checked By: Bert
 Depth: 16' - 18'
 Elevation:

Soil Description: Dark Yellowish Brown Sandy Silty CLAY (CL-ML)
 Remarks: ASTM D4546. GZ-09 16.0' - 18.0' Flexwall Permeabilty

Estimated Specific Gravity: 2.70
 Initial Void Ratio: 0.60
 Final Void Ratio: 0.52

Liquid Limit: 29
 Plastic Limit: 22
 Plasticity Index: 7

Initial Height: 1.00 in
 Specimen Diameter: 2.50 in

Container ID	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
	17	RING		
Wt. Container + Wet Soil, gm	208.02	275.53	274.09	274.09
Wt. Container + Dry Soil, gm	173.6	247.17	247.17	247.17
Wt. Container, gm	10.35	111.49	111.49	111.49
Wt. Dry Soil, gm	163.25	135.68	135.68	135.68
Water Content, %	21.08	20.90	19.84	19.84
Void Ratio	---	0.60	0.52	---
Degree of Saturation, %	---	93.94	103.79	---
Dry Unit Weight, pcf	---	105.3	111.18	---

CONSOLIDATION TEST DATA

Project: VRE Alexandria
 Boring No.: GZ-9
 Sample No.: U-1
 Test No.: 2

Location: Alexandria, VA
 Tested By: Bert
 Test Date: 7/8/2015
 Sample Type: Shelby Tube

Project No.: 16679-0
 Checked By: Bert
 Depth: 16' - 18'
 Elevation:

Soil Description: Dark Yellowish Brown Sandy Silty CLAY (CL-ML)
 Remarks: ASTM D4546. GZ-09 16.0' - 18.0' Flexwall Permeabilty

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	T50 Fitting Sq.Rt. min	Log min	Coefficient of Consolidation		
							Sq.Rt. ft^2/sec	Log ft^2/sec	Ave. ft^2/sec
1	1.35	0.05286	0.516	5.29	29.9	0.0	1.81e-007	0.00e+000	1.81e-007

CONSOLIDATION TEST DATA

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: U-1
Test No.: 2

Location: Alexandria, VA
Tested By: Bert
Test Date: 7/8/2015
Sample Type: Shelby Tube

Project No.: 16679-0
Checked By: Bert
Depth: 16' - 18'
Elevation:

Soil Description: Dark Yellowish Brown Sandy Silty CLAY (CL-ML)
Remarks: ASTM D4546. GZ-09 16.0' - 18.0' Flexwall Permeability

Constant Volume Step: 1 of 1
Seating Stress: 1.35 tsf

	Elapsed Time min	Sq.Rt. of Time min	Stress tsf	Displacement in	Strain %	Void Ratio
1	0.00	0.00	0.0112	-0.003679	-0.37	0.607
2	0.10	0.32	1.32	0.02812	2.81	0.556
3	0.20	0.45	1.35	0.02947	2.95	0.554
4	0.30	0.55	1.34	0.0303	3.03	0.552
5	0.40	0.64	1.34	0.03086	3.09	0.551
6	0.60	0.78	1.35	0.03155	3.16	0.550
7	0.80	0.90	1.35	0.03248	3.25	0.549
8	1.00	1.00	1.34	0.0329	3.29	0.548
9	1.50	1.23	1.35	0.03397	3.40	0.546
10	2.00	1.42	1.35	0.0349	3.49	0.545
11	2.50	1.58	1.35	0.03573	3.57	0.544
12	3.00	1.73	1.35	0.03671	3.67	0.542
13	3.50	1.87	1.35	0.03722	3.72	0.541
14	4.00	2.00	1.35	0.03745	3.74	0.541
15	4.50	2.12	1.35	0.03787	3.79	0.540
16	5.00	2.24	1.35	0.03842	3.84	0.539
17	5.50	2.35	1.35	0.03875	3.87	0.539
18	6.00	2.45	1.35	0.03907	3.91	0.538
19	6.50	2.55	1.35	0.03954	3.95	0.537
20	7.00	2.65	1.35	0.03991	3.99	0.537
21	7.50	2.74	1.35	0.04042	4.04	0.536
22	8.00	2.83	1.35	0.04075	4.07	0.536
23	8.50	2.92	1.35	0.04107	4.11	0.535
24	9.00	3.00	1.35	0.04149	4.15	0.534
25	9.50	3.08	1.35	0.04177	4.18	0.534
26	10.00	3.16	1.35	0.04204	4.20	0.533
27	10.50	3.24	1.35	0.04228	4.23	0.533
28	11.00	3.32	1.35	0.04237	4.24	0.533
29	11.50	3.39	1.35	0.04251	4.25	0.533
30	12.00	3.46	1.35	0.04269	4.27	0.532
31	12.50	3.54	1.35	0.04288	4.29	0.532
32	13.00	3.61	1.35	0.04311	4.31	0.532
33	13.50	3.67	1.35	0.0433	4.33	0.531
34	14.00	3.74	1.35	0.04353	4.35	0.531
35	14.50	3.81	1.35	0.04381	4.38	0.531
36	15.00	3.87	1.35	0.04404	4.40	0.530
37	15.50	3.94	1.35	0.04432	4.43	0.530
38	16.00	4.00	1.35	0.04446	4.45	0.530
39	16.50	4.06	1.35	0.0446	4.46	0.529
40	17.00	4.12	1.35	0.04469	4.47	0.529
41	17.50	4.18	1.35	0.04474	4.47	0.529
42	18.00	4.24	1.35	0.04483	4.48	0.529
43	18.50	4.30	1.35	0.04488	4.49	0.529
44	19.00	4.36	1.35	0.04492	4.49	0.529
45	19.50	4.42	1.35	0.04502	4.50	0.529
46	20.00	4.47	1.35	0.04511	4.51	0.529
47	20.50	4.53	1.35	0.0452	4.52	0.528
48	21.00	4.58	1.35	0.04534	4.53	0.528
49	21.50	4.64	1.35	0.04557	4.56	0.528
50	22.00	4.69	1.35	0.04571	4.57	0.528
51	22.50	4.74	1.35	0.0459	4.59	0.527
52	23.00	4.80	1.35	0.04599	4.60	0.527
53	23.50	4.85	1.35	0.04613	4.61	0.527
54	24.00	4.90	1.35	0.04622	4.62	0.527
55	24.50	4.95	1.35	0.04632	4.63	0.527
56	25.00	5.00	1.35	0.04641	4.64	0.526
57	25.50	5.05	1.35	0.04655	4.65	0.526
58	26.00	5.10	1.35	0.04659	4.66	0.526
59	26.50	5.15	1.35	0.04664	4.66	0.526
60	27.00	5.20	1.35	0.04678	4.68	0.526
61	27.50	5.24	1.35	0.04692	4.69	0.526
62	28.00	5.29	1.35	0.04697	4.70	0.526
63	28.50	5.34	1.35	0.04706	4.71	0.525
64	29.00	5.39	1.35	0.04724	4.72	0.525
65	29.50	5.43	1.35	0.04738	4.74	0.525
66	30.00	5.48	1.35	0.04757	4.76	0.525
67	30.50	5.52	1.35	0.04766	4.77	0.524
68	31.00	5.57	1.35	0.04775	4.78	0.524
69	31.50	5.61	1.35	0.0478	4.78	0.524
70	32.00	5.66	1.35	0.04785	4.78	0.524
71	32.50	5.70	1.35	0.04794	4.79	0.524
72	33.00	5.74	1.35	0.04799	4.80	0.524

73	33.50	5.79	1.35	0.04803	4.80	0.524
74	34.00	5.83	1.35	0.04808	4.81	0.524
75	34.50	5.87	1.35	0.04817	4.82	0.524
76	35.00	5.92	1.35	0.04827	4.83	0.523
77	35.50	5.96	1.35	0.0484	4.84	0.523
78	36.00	6.00	1.35	0.0485	4.85	0.523
79	36.50	6.04	1.35	0.04859	4.86	0.523
80	37.00	6.08	1.35	0.04873	4.87	0.523
81	37.50	6.12	1.35	0.04878	4.88	0.523
82	38.00	6.16	1.35	0.04882	4.88	0.523
83	38.50	6.20	1.35	0.04892	4.89	0.522
84	39.00	6.25	1.35	0.04901	4.90	0.522
85	39.50	6.28	1.35	0.04905	4.91	0.522
86	40.00	6.32	1.35	0.04915	4.91	0.522
87	40.50	6.36	1.35	0.04915	4.91	0.522
88	41.00	6.40	1.37	0.04915	4.91	0.522
89	41.50	6.44	1.35	0.04919	4.92	0.522
90	42.00	6.48	1.35	0.04919	4.92	0.522
91	42.50	6.52	1.35	0.04924	4.92	0.522
92	43.00	6.56	1.35	0.04929	4.93	0.522
93	43.50	6.60	1.35	0.04933	4.93	0.522
94	44.00	6.63	1.35	0.04938	4.94	0.522
95	44.50	6.67	1.35	0.04947	4.95	0.522
96	45.00	6.71	1.35	0.04952	4.95	0.521
97	45.50	6.75	1.35	0.04956	4.96	0.521
98	46.00	6.78	1.35	0.04966	4.97	0.521
99	46.50	6.82	1.35	0.04961	4.96	0.521
100	47.00	6.86	1.35	0.0497	4.97	0.521
101	47.50	6.89	1.35	0.0497	4.97	0.521
102	48.00	6.93	1.35	0.04975	4.98	0.521
103	48.50	6.96	1.35	0.04984	4.98	0.521
104	49.00	7.00	1.35	0.04984	4.98	0.521
105	49.50	7.04	1.35	0.0498	4.98	0.521
106	50.00	7.07	1.35	0.04984	4.98	0.521
107	50.50	7.11	1.35	0.04989	4.99	0.521
108	51.00	7.14	1.35	0.04994	4.99	0.521
109	51.50	7.18	1.35	0.04998	5.00	0.521
110	52.00	7.21	1.35	0.05003	5.00	0.521
111	52.50	7.25	1.35	0.05003	5.00	0.521
112	53.00	7.28	1.35	0.05012	5.01	0.521
113	53.50	7.31	1.35	0.05017	5.02	0.520
114	54.00	7.35	1.35	0.05021	5.02	0.520
115	54.50	7.38	1.35	0.05026	5.03	0.520
116	55.00	7.42	1.35	0.05026	5.03	0.520
117	55.50	7.45	1.35	0.05031	5.03	0.520
118	56.00	7.48	1.35	0.05031	5.03	0.520
119	56.50	7.52	1.35	0.05035	5.04	0.520
120	57.00	7.55	1.35	0.0504	5.04	0.520
121	57.50	7.58	1.35	0.0504	5.04	0.520
122	58.00	7.62	1.35	0.0504	5.04	0.520
123	58.50	7.65	1.35	0.05035	5.04	0.520
124	59.00	7.68	1.35	0.05035	5.04	0.520
125	59.50	7.71	1.35	0.0504	5.04	0.520
126	60.00	7.75	1.35	0.0504	5.04	0.520
127	60.50	7.78	1.35	0.0504	5.04	0.520
128	61.00	7.81	1.35	0.0504	5.04	0.520
129	61.50	7.84	1.35	0.05045	5.04	0.520
130	62.00	7.87	1.35	0.05049	5.05	0.520
131	62.50	7.91	1.36	0.05054	5.05	0.520
132	63.00	7.94	1.35	0.05054	5.05	0.520
133	63.50	7.97	1.35	0.05054	5.05	0.520
134	64.00	8.00	1.35	0.05059	5.06	0.520
135	64.50	8.03	1.35	0.05059	5.06	0.520
136	65.00	8.06	1.35	0.05063	5.06	0.520
137	65.50	8.09	1.35	0.05068	5.07	0.520
138	66.00	8.12	1.35	0.05068	5.07	0.520
139	66.50	8.15	1.35	0.05073	5.07	0.520
140	67.00	8.19	1.35	0.05073	5.07	0.520
141	67.50	8.22	1.35	0.05073	5.07	0.520
142	68.00	8.25	1.35	0.05073	5.07	0.520
143	68.50	8.28	1.35	0.05073	5.07	0.520
144	69.00	8.31	1.35	0.05068	5.07	0.520
145	69.50	8.34	1.35	0.05068	5.07	0.520
146	70.00	8.37	1.35	0.05068	5.07	0.520
147	70.50	8.40	1.35	0.05068	5.07	0.520
148	71.00	8.43	1.35	0.05073	5.07	0.520
149	71.50	8.46	1.35	0.05073	5.07	0.520
150	72.00	8.49	1.35	0.05077	5.08	0.519
151	72.50	8.51	1.35	0.05077	5.08	0.519
152	73.00	8.54	1.35	0.05082	5.08	0.519
153	73.50	8.57	1.35	0.05082	5.08	0.519
154	74.00	8.60	1.35	0.05082	5.08	0.519
155	74.50	8.63	1.35	0.05077	5.08	0.519
156	75.00	8.66	1.35	0.05082	5.08	0.519
157	75.50	8.69	1.35	0.05082	5.08	0.519
158	76.00	8.72	1.35	0.05082	5.08	0.519
159	76.50	8.75	1.36	0.05082	5.08	0.519
160	77.00	8.78	1.36	0.05086	5.09	0.519
161	77.50	8.80	1.38	0.05082	5.08	0.519

162	78.00	8.83	1.39	0.05086	5.09	0.519
163	78.50	8.86	1.38	0.05082	5.08	0.519
164	79.00	8.89	1.38	0.05086	5.09	0.519
165	79.50	8.92	1.38	0.05086	5.09	0.519
166	80.00	8.94	1.39	0.05091	5.09	0.519
167	80.50	8.97	1.39	0.05091	5.09	0.519
168	81.00	9.00	1.39	0.05091	5.09	0.519
169	81.50	9.03	1.36	0.05091	5.09	0.519
170	82.00	9.06	1.35	0.05096	5.10	0.519
171	82.50	9.08	1.35	0.05091	5.09	0.519
172	83.00	9.11	1.35	0.05096	5.10	0.519
173	83.50	9.14	1.35	0.05096	5.10	0.519
174	84.00	9.17	1.35	0.05096	5.10	0.519
175	84.50	9.19	1.35	0.051	5.10	0.519
176	85.00	9.22	1.35	0.05096	5.10	0.519
177	85.50	9.25	1.35	0.051	5.10	0.519
178	86.00	9.27	1.36	0.051	5.10	0.519
179	86.50	9.30	1.36	0.05096	5.10	0.519
180	87.00	9.33	1.36	0.05096	5.10	0.519
181	87.50	9.35	1.37	0.05096	5.10	0.519
182	88.00	9.38	1.37	0.05096	5.10	0.519
183	88.50	9.41	1.37	0.05091	5.09	0.519
184	89.00	9.43	1.37	0.05091	5.09	0.519
185	89.50	9.46	1.37	0.05096	5.10	0.519
186	90.00	9.49	1.37	0.05096	5.10	0.519
187	90.50	9.51	1.37	0.05096	5.10	0.519
188	91.00	9.54	1.37	0.05096	5.10	0.519
189	91.50	9.57	1.38	0.051	5.10	0.519
190	92.00	9.59	1.37	0.05105	5.11	0.519
191	92.50	9.62	1.36	0.051	5.10	0.519
192	93.00	9.64	1.35	0.051	5.10	0.519
193	93.50	9.67	1.35	0.051	5.10	0.519
194	94.00	9.70	1.35	0.05105	5.11	0.519
195	94.50	9.72	1.35	0.05105	5.11	0.519
196	95.00	9.75	1.35	0.051	5.10	0.519
197	95.50	9.77	1.35	0.05105	5.11	0.519
198	96.00	9.80	1.35	0.05105	5.11	0.519
199	96.50	9.82	1.35	0.05105	5.11	0.519
200	97.00	9.85	1.36	0.051	5.10	0.519
201	97.50	9.87	1.37	0.05105	5.11	0.519
202	98.00	9.90	1.37	0.05105	5.11	0.519
203	98.50	9.92	1.37	0.05105	5.11	0.519
204	99.00	9.95	1.36	0.051	5.10	0.519
205	99.50	9.97	1.36	0.05105	5.11	0.519
206	100.00	10.00	1.36	0.051	5.10	0.519
207	100.50	10.02	1.36	0.0511	5.11	0.519
208	101.00	10.05	1.36	0.0511	5.11	0.519
209	101.50	10.07	1.36	0.0511	5.11	0.519
210	102.00	10.10	1.36	0.0511	5.11	0.519
211	102.50	10.12	1.35	0.05114	5.11	0.519
212	103.00	10.15	1.35	0.0511	5.11	0.519
213	103.50	10.17	1.35	0.0511	5.11	0.519
214	104.00	10.20	1.35	0.05114	5.11	0.519
215	104.50	10.22	1.36	0.05114	5.11	0.519
216	105.00	10.25	1.35	0.05114	5.11	0.519
217	105.50	10.27	1.35	0.05114	5.11	0.519
218	106.00	10.30	1.35	0.05114	5.11	0.519
219	106.50	10.32	1.36	0.05114	5.11	0.519
220	107.00	10.34	1.36	0.0511	5.11	0.519
221	107.50	10.37	1.37	0.0511	5.11	0.519
222	108.00	10.39	1.37	0.0511	5.11	0.519
223	108.50	10.42	1.39	0.05114	5.11	0.519
224	109.00	10.44	1.39	0.05119	5.12	0.519
225	109.50	10.46	1.39	0.05119	5.12	0.519
226	110.00	10.49	1.38	0.05119	5.12	0.519
227	110.50	10.51	1.35	0.05124	5.12	0.519
228	111.00	10.54	1.35	0.05124	5.12	0.519
229	111.50	10.56	1.35	0.05124	5.12	0.519
230	112.00	10.58	1.35	0.05124	5.12	0.519
231	112.50	10.61	1.35	0.05124	5.12	0.519
232	113.00	10.63	1.36	0.05128	5.13	0.519
233	113.50	10.65	1.36	0.05124	5.12	0.519
234	114.00	10.68	1.37	0.05128	5.13	0.519
235	114.50	10.70	1.37	0.05128	5.13	0.519
236	115.00	10.72	1.37	0.05128	5.13	0.519
237	115.50	10.75	1.36	0.05128	5.13	0.519
238	116.00	10.77	1.36	0.05124	5.12	0.519
239	116.50	10.79	1.36	0.05124	5.12	0.519
240	117.00	10.82	1.35	0.05124	5.12	0.519
241	117.50	10.84	1.35	0.05124	5.12	0.519
242	118.00	10.86	1.35	0.05124	5.12	0.519
243	118.50	10.89	1.36	0.05124	5.12	0.519
244	119.00	10.91	1.36	0.05128	5.13	0.519
245	119.50	10.93	1.37	0.05128	5.13	0.519
246	120.00	10.95	1.36	0.05128	5.13	0.519
247	120.50	10.98	1.35	0.05128	5.13	0.519
248	121.00	11.00	1.35	0.05128	5.13	0.519
249	121.50	11.02	1.35	0.05133	5.13	0.519
250	122.00	11.05	1.35	0.05133	5.13	0.519

251	122.50	11.07	1.35	0.05128	5.13	0.519
252	123.00	11.09	1.35	0.05128	5.13	0.519
253	123.50	11.11	1.35	0.05133	5.13	0.519
254	124.00	11.14	1.38	0.05138	5.14	0.518
255	124.50	11.16	1.38	0.05133	5.13	0.519
256	125.00	11.18	1.38	0.05133	5.13	0.519
257	125.50	11.20	1.38	0.05133	5.13	0.519
258	126.00	11.23	1.38	0.05133	5.13	0.519
259	126.50	11.25	1.39	0.05138	5.14	0.518
260	127.00	11.27	1.39	0.05138	5.14	0.518
261	127.50	11.29	1.38	0.05138	5.14	0.518
262	128.00	11.31	1.38	0.05138	5.14	0.518
263	128.50	11.34	1.35	0.05142	5.14	0.518
264	129.00	11.36	1.35	0.05138	5.14	0.518
265	129.50	11.38	1.35	0.05138	5.14	0.518
266	130.00	11.40	1.35	0.05142	5.14	0.518
267	130.50	11.42	1.35	0.05138	5.14	0.518
268	131.00	11.45	1.35	0.05142	5.14	0.518
269	131.50	11.47	1.36	0.05138	5.14	0.518
270	132.00	11.49	1.36	0.05142	5.14	0.518
271	132.50	11.51	1.37	0.05147	5.15	0.518
272	133.00	11.53	1.36	0.05147	5.15	0.518
273	133.50	11.55	1.36	0.05147	5.15	0.518
274	134.00	11.58	1.36	0.05147	5.15	0.518
275	134.50	11.60	1.36	0.05147	5.15	0.518
276	135.00	11.62	1.37	0.05142	5.14	0.518
277	135.50	11.64	1.38	0.05147	5.15	0.518
278	136.00	11.66	1.38	0.05147	5.15	0.518
279	136.50	11.68	1.38	0.05147	5.15	0.518
280	137.00	11.70	1.37	0.05147	5.15	0.518
281	137.50	11.73	1.37	0.05147	5.15	0.518
282	138.00	11.75	1.38	0.05151	5.15	0.518
283	138.50	11.77	1.36	0.05147	5.15	0.518
284	139.00	11.79	1.35	0.05147	5.15	0.518
285	139.50	11.81	1.35	0.05147	5.15	0.518
286	140.00	11.83	1.35	0.05142	5.14	0.518
287	140.50	11.85	1.35	0.05147	5.15	0.518
288	141.00	11.87	1.35	0.05147	5.15	0.518
289	141.50	11.90	1.35	0.05147	5.15	0.518
290	142.00	11.92	1.35	0.05142	5.14	0.518
291	142.50	11.94	1.35	0.05147	5.15	0.518
292	143.00	11.96	1.35	0.05142	5.14	0.518
293	143.50	11.98	1.35	0.05147	5.15	0.518
294	144.00	12.00	1.35	0.05142	5.14	0.518
295	144.50	12.02	1.35	0.05142	5.14	0.518
296	145.00	12.04	1.35	0.05147	5.15	0.518
297	145.50	12.06	1.35	0.05147	5.15	0.518
298	146.00	12.08	1.35	0.05142	5.14	0.518
299	146.50	12.10	1.36	0.05147	5.15	0.518
300	147.00	12.12	1.35	0.05147	5.15	0.518
301	147.50	12.14	1.35	0.05151	5.15	0.518
302	148.00	12.17	1.35	0.05156	5.16	0.518
303	148.50	12.19	1.35	0.05151	5.15	0.518
304	149.00	12.21	1.35	0.05151	5.15	0.518
305	149.50	12.23	1.35	0.05151	5.15	0.518
306	150.00	12.25	1.35	0.05151	5.15	0.518
307	150.50	12.27	1.36	0.05156	5.16	0.518
308	151.00	12.29	1.37	0.05156	5.16	0.518
309	151.50	12.31	1.36	0.05156	5.16	0.518
310	152.00	12.33	1.36	0.05156	5.16	0.518
311	152.50	12.35	1.36	0.05156	5.16	0.518
312	153.00	12.37	1.36	0.05156	5.16	0.518
313	153.50	12.39	1.36	0.05151	5.15	0.518
314	154.00	12.41	1.36	0.05151	5.15	0.518
315	154.50	12.43	1.36	0.05151	5.15	0.518
316	155.00	12.45	1.37	0.05156	5.16	0.518
317	155.50	12.47	1.38	0.05156	5.16	0.518
318	156.00	12.49	1.38	0.05156	5.16	0.518
319	156.50	12.51	1.38	0.05156	5.16	0.518
320	157.00	12.53	1.39	0.05156	5.16	0.518
321	157.50	12.55	1.39	0.05156	5.16	0.518
322	158.00	12.57	1.38	0.05161	5.16	0.518
323	158.50	12.59	1.38	0.05156	5.16	0.518
324	159.00	12.61	1.37	0.05156	5.16	0.518
325	159.50	12.63	1.36	0.05156	5.16	0.518
326	160.00	12.65	1.36	0.05156	5.16	0.518
327	160.50	12.67	1.35	0.05156	5.16	0.518
328	161.00	12.69	1.36	0.05156	5.16	0.518
329	161.50	12.71	1.35	0.05156	5.16	0.518
330	162.00	12.73	1.35	0.05151	5.15	0.518
331	162.50	12.75	1.35	0.05156	5.16	0.518
332	163.00	12.77	1.35	0.05161	5.16	0.518
333	163.50	12.79	1.35	0.05161	5.16	0.518
334	164.00	12.81	1.36	0.05161	5.16	0.518
335	164.50	12.83	1.36	0.05161	5.16	0.518
336	165.00	12.85	1.36	0.05165	5.17	0.518
337	165.50	12.86	1.36	0.05165	5.17	0.518
338	166.00	12.88	1.37	0.05165	5.17	0.518
339	166.50	12.90	1.37	0.05165	5.17	0.518

340	167.00	12.92	1.37	0.05165	5.17	0.518
341	167.50	12.94	1.36	0.05165	5.17	0.518
342	168.00	12.96	1.37	0.05165	5.17	0.518
343	168.50	12.98	1.36	0.05156	5.16	0.518
344	169.00	13.00	1.36	0.05156	5.16	0.518
345	169.50	13.02	1.36	0.05161	5.16	0.518
346	170.00	13.04	1.36	0.05156	5.16	0.518
347	170.50	13.06	1.36	0.05161	5.16	0.518
348	171.00	13.08	1.36	0.05156	5.16	0.518
349	171.50	13.10	1.36	0.05161	5.16	0.518
350	172.00	13.11	1.36	0.05165	5.17	0.518
351	172.50	13.13	1.36	0.05165	5.17	0.518
352	173.00	13.15	1.36	0.05165	5.17	0.518
353	173.50	13.17	1.35	0.05165	5.17	0.518
354	174.00	13.19	1.35	0.05165	5.17	0.518
355	174.50	13.21	1.35	0.05165	5.17	0.518
356	175.00	13.23	1.35	0.05165	5.17	0.518
357	175.50	13.25	1.35	0.05161	5.16	0.518
358	176.00	13.27	1.37	0.05165	5.17	0.518
359	176.50	13.29	1.36	0.0517	5.17	0.518
360	177.00	13.30	1.36	0.05161	5.16	0.518
361	177.50	13.32	1.36	0.05161	5.16	0.518
362	178.00	13.34	1.36	0.05161	5.16	0.518
363	178.50	13.36	1.36	0.05161	5.16	0.518
364	179.00	13.38	1.36	0.05161	5.16	0.518
365	179.50	13.40	1.36	0.05161	5.16	0.518
366	180.00	13.42	1.36	0.05165	5.17	0.518
367	180.50	13.44	1.35	0.05165	5.17	0.518
368	181.00	13.45	1.35	0.05165	5.17	0.518
369	181.50	13.47	1.35	0.05165	5.17	0.518
370	182.00	13.49	1.39	0.05165	5.17	0.518
371	182.50	13.51	1.41	0.05165	5.17	0.518
372	183.00	13.53	1.41	0.05165	5.17	0.518
373	183.50	13.55	1.42	0.0517	5.17	0.518
374	184.00	13.56	1.41	0.05175	5.17	0.518
375	184.50	13.58	1.41	0.05179	5.18	0.518
376	185.00	13.60	1.4	0.05175	5.17	0.518
377	185.50	13.62	1.39	0.05175	5.17	0.518
378	186.00	13.64	1.38	0.05175	5.17	0.518
379	186.50	13.66	1.36	0.05175	5.17	0.518
380	187.00	13.67	1.35	0.05175	5.17	0.518
381	187.50	13.69	1.35	0.05175	5.17	0.518
382	188.00	13.71	1.35	0.05175	5.17	0.518
383	188.50	13.73	1.35	0.05175	5.17	0.518
384	189.00	13.75	1.35	0.05175	5.17	0.518
385	189.50	13.77	1.35	0.05175	5.17	0.518
386	190.00	13.78	1.38	0.0517	5.17	0.518
387	190.50	13.80	1.4	0.05175	5.17	0.518
388	191.00	13.82	1.41	0.05175	5.17	0.518
389	191.50	13.84	1.41	0.05179	5.18	0.518
390	192.00	13.86	1.41	0.05175	5.17	0.518
391	192.50	13.87	1.42	0.05175	5.17	0.518
392	193.00	13.89	1.41	0.05179	5.18	0.518
393	193.50	13.91	1.43	0.05179	5.18	0.518
394	194.00	13.93	1.43	0.05179	5.18	0.518
395	194.50	13.95	1.43	0.05184	5.18	0.518
396	195.00	13.96	1.4	0.05184	5.18	0.518
397	195.50	13.98	1.4	0.05184	5.18	0.518
398	196.00	14.00	1.4	0.05184	5.18	0.518
399	196.50	14.02	1.4	0.05184	5.18	0.518
400	197.00	14.04	1.4	0.05184	5.18	0.518
401	197.50	14.05	1.39	0.05179	5.18	0.518
402	198.00	14.07	1.39	0.05179	5.18	0.518
403	198.50	14.09	1.39	0.05175	5.17	0.518
404	199.00	14.11	1.39	0.05179	5.18	0.518
405	199.50	14.12	1.39	0.05179	5.18	0.518
406	200.00	14.14	1.39	0.05179	5.18	0.518
407	200.50	14.16	1.39	0.05179	5.18	0.518
408	201.00	14.18	1.4	0.05179	5.18	0.518
409	201.50	14.20	1.39	0.05184	5.18	0.518
410	202.00	14.21	1.39	0.05184	5.18	0.518
411	202.50	14.23	1.39	0.05184	5.18	0.518
412	203.00	14.25	1.39	0.05184	5.18	0.518
413	203.50	14.27	1.39	0.05184	5.18	0.518
414	204.00	14.28	1.39	0.05184	5.18	0.518
415	204.50	14.30	1.39	0.05184	5.18	0.518
416	205.00	14.32	1.39	0.05184	5.18	0.518
417	205.50	14.34	1.39	0.05184	5.18	0.518
418	206.00	14.35	1.38	0.05184	5.18	0.518
419	206.50	14.37	1.37	0.05179	5.18	0.518
420	207.00	14.39	1.37	0.05179	5.18	0.518
421	207.50	14.40	1.37	0.05175	5.17	0.518
422	208.00	14.42	1.37	0.05175	5.17	0.518
423	208.50	14.44	1.37	0.05175	5.17	0.518
424	209.00	14.46	1.37	0.05175	5.17	0.518
425	209.50	14.47	1.37	0.05175	5.17	0.518
426	210.00	14.49	1.37	0.05175	5.17	0.518
427	210.50	14.51	1.37	0.05175	5.17	0.518
428	211.00	14.53	1.37	0.05175	5.17	0.518

429	211.50	14.54	1.37	0.05175	5.17	0.518
430	212.00	14.56	1.37	0.05184	5.18	0.518
431	212.50	14.58	1.38	0.05184	5.18	0.518
432	213.00	14.59	1.38	0.05184	5.18	0.518
433	213.50	14.61	1.37	0.05184	5.18	0.518
434	214.00	14.63	1.37	0.05184	5.18	0.518
435	214.50	14.65	1.37	0.05184	5.18	0.518
436	215.00	14.66	1.38	0.05184	5.18	0.518
437	215.50	14.68	1.38	0.05184	5.18	0.518
438	216.00	14.70	1.39	0.05184	5.18	0.518
439	216.50	14.71	1.38	0.05184	5.18	0.518
440	217.00	14.73	1.38	0.05184	5.18	0.518
441	217.50	14.75	1.38	0.05184	5.18	0.518
442	218.00	14.76	1.38	0.05184	5.18	0.518
443	218.50	14.78	1.38	0.05179	5.18	0.518
444	219.00	14.80	1.38	0.05179	5.18	0.518
445	219.50	14.82	1.38	0.05179	5.18	0.518
446	220.00	14.83	1.38	0.05179	5.18	0.518
447	220.50	14.85	1.37	0.05179	5.18	0.518
448	221.00	14.87	1.38	0.05179	5.18	0.518
449	221.50	14.88	1.37	0.05179	5.18	0.518
450	222.00	14.90	1.37	0.05179	5.18	0.518
451	222.50	14.92	1.37	0.05179	5.18	0.518
452	223.00	14.93	1.37	0.05184	5.18	0.518
453	223.50	14.95	1.38	0.05184	5.18	0.518
454	224.00	14.97	1.38	0.05184	5.18	0.518
455	224.50	14.98	1.38	0.05184	5.18	0.518
456	225.00	15.00	1.38	0.05184	5.18	0.518
457	225.50	15.02	1.38	0.05184	5.18	0.518
458	226.00	15.03	1.38	0.05184	5.18	0.518
459	226.50	15.05	1.36	0.05184	5.18	0.518
460	227.00	15.07	1.35	0.05184	5.18	0.518
461	227.50	15.08	1.35	0.05184	5.18	0.518
462	228.00	15.10	1.35	0.05184	5.18	0.518
463	228.50	15.12	1.35	0.05189	5.19	0.518
464	229.00	15.13	1.35	0.05184	5.18	0.518
465	229.50	15.15	1.38	0.05184	5.18	0.518
466	230.00	15.17	1.38	0.05184	5.18	0.518
467	230.50	15.18	1.38	0.05189	5.19	0.518
468	231.00	15.20	1.39	0.05189	5.19	0.518
469	231.50	15.22	1.39	0.05184	5.18	0.518
470	232.00	15.23	1.41	0.05184	5.18	0.518
471	232.50	15.25	1.41	0.05184	5.18	0.518
472	233.00	15.26	1.41	0.05189	5.19	0.518
473	233.50	15.28	1.41	0.05189	5.19	0.518
474	234.00	15.30	1.41	0.05193	5.19	0.518
475	234.50	15.31	1.42	0.05193	5.19	0.518
476	235.00	15.33	1.42	0.05193	5.19	0.518
477	235.50	15.35	1.42	0.05193	5.19	0.518
478	236.00	15.36	1.42	0.05193	5.19	0.518
479	236.50	15.38	1.42	0.05193	5.19	0.518
480	237.00	15.39	1.42	0.05193	5.19	0.518
481	237.50	15.41	1.42	0.05193	5.19	0.518
482	238.00	15.43	1.43	0.05193	5.19	0.518
483	238.50	15.44	1.42	0.05198	5.20	0.518
484	239.00	15.46	1.41	0.05193	5.19	0.518
485	239.50	15.48	1.41	0.05193	5.19	0.518
486	240.00	15.49	1.39	0.05193	5.19	0.518
487	240.50	15.51	1.39	0.05189	5.19	0.518
488	241.00	15.52	1.39	0.05189	5.19	0.518
489	241.50	15.54	1.39	0.05184	5.18	0.518
490	242.00	15.56	1.39	0.05184	5.18	0.518
491	242.50	15.57	1.39	0.05184	5.18	0.518
492	243.00	15.59	1.39	0.05184	5.18	0.518
493	243.50	15.60	1.4	0.05184	5.18	0.518
494	244.00	15.62	1.4	0.05184	5.18	0.518
495	244.50	15.64	1.4	0.05184	5.18	0.518
496	245.00	15.65	1.4	0.05189	5.19	0.518
497	245.50	15.67	1.4	0.05193	5.19	0.518
498	246.00	15.68	1.4	0.05193	5.19	0.518
499	246.50	15.70	1.41	0.05193	5.19	0.518
500	247.00	15.72	1.4	0.05193	5.19	0.518
501	247.50	15.73	1.4	0.05193	5.19	0.518
502	248.00	15.75	1.39	0.05198	5.20	0.518
503	248.50	15.76	1.38	0.05193	5.19	0.518
504	249.00	15.78	1.38	0.05189	5.19	0.518
505	249.50	15.80	1.38	0.05193	5.19	0.518
506	250.00	15.81	1.38	0.05189	5.19	0.518
507	250.50	15.83	1.38	0.05184	5.18	0.518
508	251.00	15.84	1.38	0.05189	5.19	0.518
509	251.50	15.86	1.38	0.05189	5.19	0.518
510	252.00	15.87	1.38	0.05189	5.19	0.518
511	252.50	15.89	1.38	0.05189	5.19	0.518
512	253.00	15.91	1.38	0.05189	5.19	0.518
513	253.50	15.92	1.38	0.05193	5.19	0.518
514	254.00	15.94	1.38	0.05193	5.19	0.518
515	254.50	15.95	1.38	0.05193	5.19	0.518
516	255.00	15.97	1.38	0.05193	5.19	0.518
517	255.50	15.98	1.38	0.05193	5.19	0.518

518	256.00	16.00	1.38	0.05193	5.19	0.518
519	256.50	16.02	1.38	0.05189	5.19	0.518
520	257.00	16.03	1.38	0.05193	5.19	0.518
521	257.50	16.05	1.38	0.05193	5.19	0.518
522	258.00	16.06	1.38	0.05193	5.19	0.518
523	258.50	16.08	1.38	0.05193	5.19	0.518
524	259.00	16.09	1.38	0.05193	5.19	0.518
525	259.50	16.11	1.38	0.05189	5.19	0.518
526	260.00	16.12	1.38	0.05189	5.19	0.518
527	260.50	16.14	1.38	0.05189	5.19	0.518
528	261.00	16.16	1.38	0.05189	5.19	0.518
529	261.50	16.17	1.38	0.05189	5.19	0.518
530	262.00	16.19	1.38	0.05189	5.19	0.518
531	262.50	16.20	1.38	0.05189	5.19	0.518
532	263.00	16.22	1.38	0.05198	5.20	0.518
533	263.50	16.23	1.38	0.05193	5.19	0.518
534	264.00	16.25	1.38	0.05193	5.19	0.518
535	264.50	16.26	1.38	0.05193	5.19	0.518
536	265.00	16.28	1.37	0.05193	5.19	0.518
537	265.50	16.29	1.37	0.05193	5.19	0.518
538	266.00	16.31	1.37	0.05193	5.19	0.518
539	266.50	16.32	1.37	0.05193	5.19	0.518
540	267.00	16.34	1.37	0.05193	5.19	0.518
541	267.50	16.36	1.36	0.05189	5.19	0.518
542	268.00	16.37	1.36	0.05189	5.19	0.518
543	268.50	16.39	1.36	0.05193	5.19	0.518
544	269.00	16.40	1.36	0.05184	5.18	0.518
545	269.50	16.42	1.36	0.05184	5.18	0.518
546	270.00	16.43	1.36	0.05184	5.18	0.518
547	270.50	16.45	1.36	0.05184	5.18	0.518
548	271.00	16.46	1.36	0.05184	5.18	0.518
549	271.50	16.48	1.36	0.05184	5.18	0.518
550	272.00	16.49	1.37	0.05184	5.18	0.518
551	272.50	16.51	1.38	0.05193	5.19	0.518
552	273.00	16.52	1.39	0.05193	5.19	0.518
553	273.50	16.54	1.39	0.05193	5.19	0.518
554	274.00	16.55	1.39	0.05193	5.19	0.518
555	274.50	16.57	1.4	0.05193	5.19	0.518
556	275.00	16.58	1.39	0.05193	5.19	0.518
557	275.50	16.60	1.39	0.05193	5.19	0.518
558	276.00	16.61	1.39	0.05193	5.19	0.518
559	276.50	16.63	1.4	0.05193	5.19	0.518
560	277.00	16.64	1.4	0.05193	5.19	0.518
561	277.50	16.66	1.41	0.05193	5.19	0.518
562	278.00	16.67	1.41	0.05193	5.19	0.518
563	278.50	16.69	1.41	0.05189	5.19	0.518
564	279.00	16.70	1.43	0.05189	5.19	0.518
565	279.50	16.72	1.43	0.05193	5.19	0.518
566	280.00	16.73	1.4	0.05193	5.19	0.518
567	280.50	16.75	1.39	0.05193	5.19	0.518
568	281.00	16.76	1.39	0.05193	5.19	0.518
569	281.50	16.78	1.39	0.05193	5.19	0.518
570	282.00	16.79	1.37	0.05193	5.19	0.518
571	282.50	16.81	1.37	0.05193	5.19	0.518
572	283.00	16.82	1.37	0.05193	5.19	0.518
573	283.50	16.84	1.37	0.05193	5.19	0.518
574	284.00	16.85	1.37	0.05189	5.19	0.518
575	284.50	16.87	1.37	0.05193	5.19	0.518
576	285.00	16.88	1.37	0.05193	5.19	0.518
577	285.50	16.90	1.37	0.05193	5.19	0.518
578	286.00	16.91	1.37	0.05189	5.19	0.518
579	286.50	16.93	1.37	0.05193	5.19	0.518
580	287.00	16.94	1.37	0.05189	5.19	0.518
581	287.50	16.96	1.37	0.05184	5.18	0.518
582	288.00	16.97	1.37	0.05189	5.19	0.518
583	288.50	16.99	1.37	0.05189	5.19	0.518
584	289.00	17.00	1.37	0.05189	5.19	0.518
585	289.50	17.01	1.37	0.05189	5.19	0.518
586	290.00	17.03	1.37	0.05189	5.19	0.518
587	290.50	17.04	1.37	0.05193	5.19	0.518
588	291.00	17.06	1.37	0.05193	5.19	0.518
589	291.50	17.07	1.37	0.05193	5.19	0.518
590	292.00	17.09	1.37	0.05193	5.19	0.518
591	292.50	17.10	1.37	0.05193	5.19	0.518
592	293.00	17.12	1.36	0.05193	5.19	0.518
593	293.50	17.13	1.37	0.05193	5.19	0.518
594	294.00	17.15	1.36	0.05193	5.19	0.518
595	294.50	17.16	1.36	0.05189	5.19	0.518
596	295.00	17.18	1.36	0.05189	5.19	0.518
597	295.50	17.19	1.35	0.05189	5.19	0.518
598	296.00	17.20	1.36	0.05184	5.18	0.518
599	296.50	17.22	1.36	0.05184	5.18	0.518
600	297.00	17.23	1.36	0.05184	5.18	0.518
601	297.50	17.25	1.36	0.05184	5.18	0.518
602	298.00	17.26	1.36	0.05189	5.19	0.518
603	298.50	17.28	1.36	0.05189	5.19	0.518
604	299.00	17.29	1.36	0.05189	5.19	0.518
605	299.50	17.31	1.36	0.05189	5.19	0.518
606	300.00	17.32	1.37	0.05189	5.19	0.518

607	300.50	17.33	1.37	0.05193	5.19	0.518
608	301.00	17.35	1.37	0.05198	5.20	0.518
609	301.50	17.36	1.37	0.05193	5.19	0.518
610	302.00	17.38	1.37	0.05193	5.19	0.518
611	302.50	17.39	1.37	0.05193	5.19	0.518
612	303.00	17.41	1.37	0.05193	5.19	0.518
613	303.50	17.42	1.37	0.05193	5.19	0.518
614	304.00	17.44	1.37	0.05193	5.19	0.518
615	304.50	17.45	1.36	0.05193	5.19	0.518
616	305.00	17.46	1.37	0.05193	5.19	0.518
617	305.50	17.48	1.35	0.05193	5.19	0.518
618	306.00	17.49	1.35	0.05193	5.19	0.518
619	306.50	17.51	1.35	0.05193	5.19	0.518
620	307.00	17.52	1.35	0.05193	5.19	0.518
621	307.50	17.54	1.39	0.05193	5.19	0.518
622	308.00	17.55	1.4	0.05198	5.20	0.518
623	308.50	17.56	1.41	0.05198	5.20	0.518
624	309.00	17.58	1.4	0.05203	5.20	0.517
625	309.50	17.59	1.41	0.05203	5.20	0.517
626	310.00	17.61	1.41	0.05203	5.20	0.517
627	310.50	17.62	1.41	0.05203	5.20	0.517
628	311.00	17.64	1.41	0.05203	5.20	0.517
629	311.50	17.65	1.38	0.05203	5.20	0.517
630	312.00	17.66	1.38	0.05203	5.20	0.517
631	312.50	17.68	1.38	0.05198	5.20	0.518
632	313.00	17.69	1.38	0.05203	5.20	0.517
633	313.50	17.71	1.38	0.05203	5.20	0.517
634	314.00	17.72	1.38	0.05203	5.20	0.517
635	314.50	17.73	1.38	0.05203	5.20	0.517
636	315.00	17.75	1.38	0.05198	5.20	0.518
637	315.50	17.76	1.38	0.05198	5.20	0.518
638	316.00	17.78	1.38	0.05203	5.20	0.517
639	316.50	17.79	1.38	0.05203	5.20	0.517
640	317.00	17.80	1.38	0.05203	5.20	0.517
641	317.50	17.82	1.38	0.05203	5.20	0.517
642	318.00	17.83	1.39	0.05203	5.20	0.517
643	318.50	17.85	1.39	0.05203	5.20	0.517
644	319.00	17.86	1.39	0.05207	5.21	0.517
645	319.50	17.87	1.39	0.05203	5.20	0.517
646	320.00	17.89	1.4	0.05203	5.20	0.517
647	320.50	17.90	1.41	0.05203	5.20	0.517
648	321.00	17.92	1.4	0.05203	5.20	0.517
649	321.50	17.93	1.4	0.05203	5.20	0.517
650	322.00	17.94	1.4	0.05203	5.20	0.517
651	322.50	17.96	1.4	0.05203	5.20	0.517
652	323.00	17.97	1.37	0.05203	5.20	0.517
653	323.50	17.99	1.37	0.05203	5.20	0.517
654	324.00	18.00	1.37	0.05203	5.20	0.517
655	324.50	18.01	1.37	0.05203	5.20	0.517
656	325.00	18.03	1.37	0.05203	5.20	0.517
657	325.50	18.04	1.37	0.05203	5.20	0.517
658	326.00	18.06	1.37	0.05203	5.20	0.517
659	326.50	18.07	1.37	0.05198	5.20	0.518
660	327.00	18.08	1.37	0.05203	5.20	0.517
661	327.50	18.10	1.37	0.05203	5.20	0.517
662	328.00	18.11	1.37	0.05203	5.20	0.517
663	328.50	18.12	1.37	0.05203	5.20	0.517
664	329.00	18.14	1.37	0.05203	5.20	0.517
665	329.50	18.15	1.37	0.05203	5.20	0.517
666	330.00	18.17	1.38	0.05193	5.19	0.518
667	330.50	18.18	1.38	0.05193	5.19	0.518
668	331.00	18.19	1.39	0.05193	5.19	0.518
669	331.50	18.21	1.39	0.05193	5.19	0.518
670	332.00	18.22	1.4	0.05193	5.19	0.518
671	332.50	18.23	1.4	0.05203	5.20	0.517
672	333.00	18.25	1.4	0.05203	5.20	0.517
673	333.50	18.26	1.38	0.05203	5.20	0.517
674	334.00	18.28	1.38	0.05203	5.20	0.517
675	334.50	18.29	1.36	0.05203	5.20	0.517
676	335.00	18.30	1.36	0.05203	5.20	0.517
677	335.50	18.32	1.36	0.05203	5.20	0.517
678	336.00	18.33	1.37	0.05203	5.20	0.517
679	336.50	18.34	1.36	0.05203	5.20	0.517
680	337.00	18.36	1.36	0.05203	5.20	0.517
681	337.50	18.37	1.37	0.05198	5.20	0.518
682	338.00	18.38	1.37	0.05203	5.20	0.517
683	338.50	18.40	1.36	0.05203	5.20	0.517
684	339.00	18.41	1.37	0.05203	5.20	0.517
685	339.50	18.43	1.37	0.05203	5.20	0.517
686	340.00	18.44	1.37	0.05198	5.20	0.518
687	340.50	18.45	1.37	0.05198	5.20	0.518
688	341.00	18.47	1.37	0.05198	5.20	0.518
689	341.50	18.48	1.37	0.05198	5.20	0.518
690	342.00	18.49	1.37	0.05203	5.20	0.517
691	342.50	18.51	1.37	0.05198	5.20	0.518
692	343.00	18.52	1.37	0.05203	5.20	0.517
693	343.50	18.53	1.37	0.05203	5.20	0.517
694	344.00	18.55	1.37	0.05203	5.20	0.517
695	344.50	18.56	1.37	0.05203	5.20	0.517

696	345.00	18.57	1.37	0.05198	5.20	0.518
697	345.50	18.59	1.37	0.05203	5.20	0.517
698	346.00	18.60	1.37	0.05203	5.20	0.517
699	346.50	18.61	1.37	0.05203	5.20	0.517
700	347.00	18.63	1.37	0.05203	5.20	0.517
701	347.50	18.64	1.37	0.05203	5.20	0.517
702	348.00	18.65	1.38	0.05203	5.20	0.517
703	348.50	18.67	1.38	0.05203	5.20	0.517
704	349.00	18.68	1.38	0.05203	5.20	0.517
705	349.50	18.69	1.38	0.05193	5.19	0.518
706	350.00	18.71	1.39	0.05198	5.20	0.518
707	350.50	18.72	1.39	0.05198	5.20	0.518
708	351.00	18.74	1.4	0.05198	5.20	0.518
709	351.50	18.75	1.41	0.05203	5.20	0.517
710	352.00	18.76	1.41	0.05203	5.20	0.517
711	352.50	18.77	1.38	0.05203	5.20	0.517
712	353.00	18.79	1.37	0.05203	5.20	0.517
713	353.50	18.80	1.37	0.05203	5.20	0.517
714	354.00	18.81	1.37	0.05203	5.20	0.517
715	354.50	18.83	1.37	0.05203	5.20	0.517
716	355.00	18.84	1.37	0.05203	5.20	0.517
717	355.50	18.85	1.37	0.05203	5.20	0.517
718	356.00	18.87	1.37	0.05203	5.20	0.517
719	356.50	18.88	1.37	0.05203	5.20	0.517
720	357.00	18.89	1.37	0.05203	5.20	0.517
721	357.50	18.91	1.37	0.05203	5.20	0.517
722	358.00	18.92	1.37	0.05198	5.20	0.518
723	358.50	18.93	1.37	0.05198	5.20	0.518
724	359.00	18.95	1.37	0.05193	5.19	0.518
725	359.50	18.96	1.37	0.05193	5.19	0.518
726	360.00	18.97	1.37	0.05193	5.19	0.518
727	360.50	18.99	1.38	0.05193	5.19	0.518
728	361.00	19.00	1.38	0.05193	5.19	0.518
729	361.50	19.01	1.38	0.05193	5.19	0.518
730	362.00	19.03	1.38	0.05203	5.20	0.517
731	362.50	19.04	1.38	0.05203	5.20	0.517
732	363.00	19.05	1.38	0.05203	5.20	0.517
733	363.50	19.07	1.38	0.05203	5.20	0.517
734	364.00	19.08	1.38	0.05203	5.20	0.517
735	364.50	19.09	1.38	0.05203	5.20	0.517
736	365.00	19.11	1.38	0.05203	5.20	0.517
737	365.50	19.12	1.38	0.05203	5.20	0.517
738	366.00	19.13	1.38	0.05203	5.20	0.517
739	366.50	19.14	1.38	0.05203	5.20	0.517
740	367.00	19.16	1.38	0.05203	5.20	0.517
741	367.50	19.17	1.38	0.05203	5.20	0.517
742	368.00	19.18	1.38	0.05193	5.19	0.518
743	368.50	19.20	1.39	0.05198	5.20	0.518
744	369.00	19.21	1.39	0.05198	5.20	0.518
745	369.50	19.22	1.39	0.05198	5.20	0.518
746	370.00	19.24	1.39	0.05198	5.20	0.518
747	370.50	19.25	1.4	0.05203	5.20	0.517
748	371.00	19.26	1.41	0.05203	5.20	0.517
749	371.50	19.27	1.37	0.05203	5.20	0.517
750	372.00	19.29	1.38	0.05203	5.20	0.517
751	372.50	19.30	1.38	0.05203	5.20	0.517
752	373.00	19.31	1.37	0.05203	5.20	0.517
753	373.50	19.33	1.37	0.05203	5.20	0.517
754	374.00	19.34	1.38	0.05203	5.20	0.517
755	374.50	19.35	1.38	0.05203	5.20	0.517
756	375.00	19.36	1.38	0.05203	5.20	0.517
757	375.50	19.38	1.38	0.05203	5.20	0.517
758	376.00	19.39	1.38	0.05203	5.20	0.517
759	376.50	19.40	1.38	0.05203	5.20	0.517
760	377.00	19.42	1.38	0.05203	5.20	0.517
761	377.50	19.43	1.37	0.05198	5.20	0.518
762	378.00	19.44	1.37	0.05198	5.20	0.518
763	378.50	19.46	1.37	0.05198	5.20	0.518
764	379.00	19.47	1.37	0.05198	5.20	0.518
765	379.50	19.48	1.37	0.05193	5.19	0.518
766	380.00	19.49	1.37	0.05198	5.20	0.518
767	380.50	19.51	1.37	0.05193	5.19	0.518
768	381.00	19.52	1.37	0.05198	5.20	0.518
769	381.50	19.53	1.37	0.05198	5.20	0.518
770	382.00	19.54	1.37	0.05198	5.20	0.518
771	382.50	19.56	1.37	0.05198	5.20	0.518
772	383.00	19.57	1.37	0.05203	5.20	0.517
773	383.50	19.58	1.37	0.05203	5.20	0.517
774	384.00	19.60	1.37	0.05203	5.20	0.517
775	384.50	19.61	1.37	0.05203	5.20	0.517
776	385.00	19.62	1.37	0.05203	5.20	0.517
777	385.50	19.63	1.37	0.05203	5.20	0.517
778	386.00	19.65	1.37	0.05203	5.20	0.517
779	386.50	19.66	1.37	0.05203	5.20	0.517
780	387.00	19.67	1.37	0.05203	5.20	0.517
781	387.50	19.69	1.37	0.05198	5.20	0.518
782	388.00	19.70	1.37	0.05198	5.20	0.518
783	388.50	19.71	1.37	0.05198	5.20	0.518
784	389.00	19.72	1.37	0.05198	5.20	0.518

785	389.50	19.74	1.37	0.05198	5.20	0.518
786	390.00	19.75	1.37	0.05198	5.20	0.518
787	390.50	19.76	1.38	0.05203	5.20	0.517
788	391.00	19.77	1.38	0.05198	5.20	0.518
789	391.50	19.79	1.38	0.05203	5.20	0.517
790	392.00	19.80	1.38	0.05203	5.20	0.517
791	392.50	19.81	1.37	0.05203	5.20	0.517
792	393.00	19.82	1.36	0.05203	5.20	0.517
793	393.50	19.84	1.36	0.05203	5.20	0.517
794	394.00	19.85	1.36	0.05203	5.20	0.517
795	394.50	19.86	1.36	0.05203	5.20	0.517
796	395.00	19.87	1.36	0.05198	5.20	0.518
797	395.50	19.89	1.37	0.05203	5.20	0.517
798	396.00	19.90	1.37	0.05198	5.20	0.518
799	396.50	19.91	1.37	0.05193	5.19	0.518
800	397.00	19.92	1.37	0.05193	5.19	0.518
801	397.50	19.94	1.37	0.05193	5.19	0.518
802	398.00	19.95	1.37	0.05193	5.19	0.518
803	398.50	19.96	1.38	0.05193	5.19	0.518
804	399.00	19.98	1.38	0.05198	5.20	0.518
805	399.50	19.99	1.38	0.05203	5.20	0.517
806	400.00	20.00	1.38	0.05203	5.20	0.517
807	400.50	20.01	1.38	0.05207	5.21	0.517
808	401.00	20.03	1.37	0.05203	5.20	0.517
809	401.50	20.04	1.37	0.05203	5.20	0.517
810	402.00	20.05	1.37	0.05203	5.20	0.517
811	402.50	20.06	1.37	0.05203	5.20	0.517
812	403.00	20.07	1.37	0.05203	5.20	0.517
813	403.50	20.09	1.37	0.05203	5.20	0.517
814	404.00	20.10	1.37	0.05203	5.20	0.517
815	404.50	20.11	1.37	0.05203	5.20	0.517
816	405.00	20.12	1.37	0.05203	5.20	0.517
817	405.50	20.14	1.37	0.05198	5.20	0.518
818	406.00	20.15	1.38	0.05198	5.20	0.518
819	406.50	20.16	1.37	0.05198	5.20	0.518
820	407.00	20.17	1.37	0.05198	5.20	0.518
821	407.50	20.19	1.37	0.05198	5.20	0.518
822	408.00	20.20	1.37	0.05193	5.19	0.518
823	408.50	20.21	1.37	0.05198	5.20	0.518
824	409.00	20.22	1.37	0.05198	5.20	0.518
825	409.50	20.24	1.38	0.05198	5.20	0.518
826	410.00	20.25	1.38	0.05203	5.20	0.517
827	410.50	20.26	1.38	0.05203	5.20	0.517
828	411.00	20.27	1.38	0.05203	5.20	0.517
829	411.50	20.29	1.38	0.05203	5.20	0.517
830	412.00	20.30	1.38	0.05203	5.20	0.517
831	412.50	20.31	1.38	0.05203	5.20	0.517
832	413.00	20.32	1.37	0.05203	5.20	0.517
833	413.50	20.33	1.36	0.05203	5.20	0.517
834	414.00	20.35	1.36	0.05203	5.20	0.517
835	414.50	20.36	1.36	0.05203	5.20	0.517
836	415.00	20.37	1.36	0.05203	5.20	0.517
837	415.50	20.38	1.36	0.05203	5.20	0.517
838	416.00	20.40	1.36	0.05203	5.20	0.517
839	416.50	20.41	1.36	0.05203	5.20	0.517
840	417.00	20.42	1.36	0.05198	5.20	0.518
841	417.50	20.43	1.36	0.05198	5.20	0.518
842	418.00	20.45	1.36	0.05198	5.20	0.518
843	418.50	20.46	1.36	0.05193	5.19	0.518
844	419.00	20.47	1.36	0.05193	5.19	0.518
845	419.50	20.48	1.36	0.05193	5.19	0.518
846	420.00	20.49	1.36	0.05193	5.19	0.518
847	420.50	20.51	1.37	0.05193	5.19	0.518
848	421.00	20.52	1.37	0.05193	5.19	0.518
849	421.50	20.53	1.38	0.05198	5.20	0.518
850	422.00	20.54	1.38	0.05203	5.20	0.517
851	422.50	20.55	1.39	0.05203	5.20	0.517
852	423.00	20.57	1.39	0.05203	5.20	0.517
853	423.50	20.58	1.39	0.05203	5.20	0.517
854	424.00	20.59	1.39	0.05203	5.20	0.517
855	424.50	20.60	1.38	0.05203	5.20	0.517
856	425.00	20.62	1.38	0.05203	5.20	0.517
857	425.50	20.63	1.38	0.05203	5.20	0.517
858	426.00	20.64	1.38	0.05203	5.20	0.517
859	426.50	20.65	1.38	0.05207	5.21	0.517
860	427.00	20.66	1.38	0.05203	5.20	0.517
861	427.50	20.68	1.38	0.05203	5.20	0.517
862	428.00	20.69	1.38	0.05198	5.20	0.518
863	428.50	20.70	1.38	0.05193	5.19	0.518
864	429.00	20.71	1.38	0.05198	5.20	0.518
865	429.50	20.72	1.38	0.05193	5.19	0.518
866	430.00	20.74	1.38	0.05198	5.20	0.518
867	430.50	20.75	1.38	0.05198	5.20	0.518
868	431.00	20.76	1.38	0.05203	5.20	0.517
869	431.50	20.77	1.36	0.05203	5.20	0.517
870	432.00	20.78	1.36	0.05203	5.20	0.517
871	432.50	20.80	1.36	0.05203	5.20	0.517
872	433.00	20.81	1.36	0.05203	5.20	0.517
873	433.50	20.82	1.36	0.05203	5.20	0.517

874	434.00	20.83	1.37	0.05203	5.20	0.517
875	434.50	20.84	1.36	0.05203	5.20	0.517
876	435.00	20.86	1.36	0.05203	5.20	0.517
877	435.50	20.87	1.36	0.05203	5.20	0.517
878	436.00	20.88	1.36	0.05203	5.20	0.517
879	436.50	20.89	1.37	0.05203	5.20	0.517
880	437.00	20.90	1.36	0.05198	5.20	0.518
881	437.50	20.92	1.37	0.05193	5.19	0.518
882	438.00	20.93	1.37	0.05193	5.19	0.518
883	438.50	20.94	1.37	0.05193	5.19	0.518
884	439.00	20.95	1.37	0.05193	5.19	0.518
885	439.50	20.96	1.37	0.05198	5.20	0.518
886	440.00	20.98	1.37	0.05198	5.20	0.518
887	440.50	20.99	1.37	0.05203	5.20	0.517
888	441.00	21.00	1.37	0.05203	5.20	0.517
889	441.50	21.01	1.37	0.05203	5.20	0.517
890	442.00	21.02	1.37	0.05198	5.20	0.518
891	442.50	21.04	1.37	0.05203	5.20	0.517
892	443.00	21.05	1.37	0.05203	5.20	0.517
893	443.50	21.06	1.37	0.05198	5.20	0.518
894	444.00	21.07	1.37	0.05203	5.20	0.517
895	444.50	21.08	1.37	0.05203	5.20	0.517
896	445.00	21.10	1.38	0.05203	5.20	0.517
897	445.50	21.11	1.38	0.05203	5.20	0.517
898	446.00	21.12	1.38	0.05203	5.20	0.517
899	446.50	21.13	1.38	0.05203	5.20	0.517
900	447.00	21.14	1.38	0.05198	5.20	0.518
901	447.50	21.15	1.38	0.05198	5.20	0.518
902	448.00	21.17	1.38	0.05198	5.20	0.518
903	448.50	21.18	1.38	0.05193	5.19	0.518
904	449.00	21.19	1.38	0.05198	5.20	0.518
905	449.50	21.20	1.38	0.05198	5.20	0.518
906	450.00	21.21	1.39	0.05203	5.20	0.517
907	450.50	21.23	1.39	0.05203	5.20	0.517
908	451.00	21.24	1.38	0.05207	5.21	0.517
909	451.50	21.25	1.37	0.05203	5.20	0.517
910	452.00	21.26	1.37	0.05203	5.20	0.517
911	452.50	21.27	1.36	0.05203	5.20	0.517
912	453.00	21.28	1.35	0.05203	5.20	0.517
913	453.50	21.30	1.35	0.05203	5.20	0.517
914	454.00	21.31	1.36	0.05203	5.20	0.517
915	454.50	21.32	1.35	0.05203	5.20	0.517
916	455.00	21.33	1.35	0.05203	5.20	0.517
917	455.50	21.34	1.35	0.05203	5.20	0.517
918	456.00	21.35	1.35	0.05203	5.20	0.517
919	456.50	21.37	1.39	0.05203	5.20	0.517
920	457.00	21.38	1.39	0.05207	5.21	0.517
921	457.50	21.39	1.4	0.05207	5.21	0.517
922	458.00	21.40	1.4	0.05212	5.21	0.517
923	458.50	21.41	1.41	0.05207	5.21	0.517
924	459.00	21.42	1.42	0.05212	5.21	0.517
925	459.50	21.44	1.42	0.05212	5.21	0.517
926	460.00	21.45	1.4	0.05212	5.21	0.517
927	460.50	21.46	1.4	0.05212	5.21	0.517
928	461.00	21.47	1.4	0.05212	5.21	0.517
929	461.50	21.48	1.4	0.05212	5.21	0.517
930	462.00	21.49	1.4	0.05207	5.21	0.517
931	462.50	21.51	1.4	0.05207	5.21	0.517
932	463.00	21.52	1.4	0.05207	5.21	0.517
933	463.50	21.53	1.39	0.05207	5.21	0.517
934	464.00	21.54	1.4	0.05207	5.21	0.517
935	464.50	21.55	1.4	0.05207	5.21	0.517
936	465.00	21.56	1.4	0.05207	5.21	0.517
937	465.50	21.58	1.4	0.05207	5.21	0.517
938	466.00	21.59	1.4	0.05203	5.20	0.517
939	466.50	21.60	1.41	0.05203	5.20	0.517
940	467.00	21.61	1.41	0.05203	5.20	0.517
941	467.50	21.62	1.41	0.05207	5.21	0.517
942	468.00	21.63	1.42	0.05207	5.21	0.517
943	468.50	21.64	1.42	0.05212	5.21	0.517
944	469.00	21.66	1.42	0.05212	5.21	0.517
945	469.50	21.67	1.41	0.05216	5.22	0.517
946	470.00	21.68	1.4	0.05212	5.21	0.517
947	470.50	21.69	1.41	0.05212	5.21	0.517
948	471.00	21.70	1.41	0.05212	5.21	0.517
949	471.50	21.71	1.4	0.05212	5.21	0.517
950	472.00	21.73	1.4	0.05212	5.21	0.517
951	472.50	21.74	1.4	0.05212	5.21	0.517
952	473.00	21.75	1.4	0.05212	5.21	0.517
953	473.50	21.76	1.4	0.05212	5.21	0.517
954	474.00	21.77	1.4	0.05212	5.21	0.517
955	474.50	21.78	1.4	0.05212	5.21	0.517
956	475.00	21.79	1.4	0.05212	5.21	0.517
957	475.50	21.81	1.4	0.05212	5.21	0.517
958	476.00	21.82	1.39	0.05207	5.21	0.517
959	476.50	21.83	1.4	0.05203	5.20	0.517
960	477.00	21.84	1.4	0.05207	5.21	0.517
961	477.50	21.85	1.4	0.05203	5.20	0.517
962	478.00	21.86	1.4	0.05203	5.20	0.517

963	478.50	21.87	1.4	0.05207	5.21	0.517
964	479.00	21.89	1.41	0.05207	5.21	0.517
965	479.50	21.90	1.41	0.05207	5.21	0.517
966	480.00	21.91	1.41	0.05216	5.22	0.517
967	480.50	21.92	1.4	0.05212	5.21	0.517
968	481.00	21.93	1.4	0.05212	5.21	0.517
969	481.50	21.94	1.39	0.05212	5.21	0.517
970	482.00	21.95	1.39	0.05212	5.21	0.517
971	482.50	21.97	1.39	0.05212	5.21	0.517
972	483.00	21.98	1.39	0.05212	5.21	0.517
973	483.50	21.99	1.39	0.05212	5.21	0.517
974	484.00	22.00	1.39	0.05212	5.21	0.517
975	484.50	22.01	1.38	0.05212	5.21	0.517
976	485.00	22.02	1.38	0.05212	5.21	0.517
977	485.50	22.03	1.38	0.05207	5.21	0.517
978	486.00	22.05	1.38	0.05207	5.21	0.517
979	486.50	22.06	1.37	0.05212	5.21	0.517
980	487.00	22.07	1.38	0.05212	5.21	0.517
981	487.50	22.08	1.38	0.05207	5.21	0.517
982	488.00	22.09	1.38	0.05207	5.21	0.517
983	488.50	22.10	1.38	0.05207	5.21	0.517
984	489.00	22.11	1.39	0.05207	5.21	0.517
985	489.50	22.12	1.39	0.05207	5.21	0.517
986	490.00	22.14	1.4	0.05212	5.21	0.517
987	490.50	22.15	1.4	0.05207	5.21	0.517
988	491.00	22.16	1.4	0.05212	5.21	0.517
989	491.50	22.17	1.4	0.05216	5.22	0.517
990	492.00	22.18	1.39	0.05212	5.21	0.517
991	492.50	22.19	1.39	0.05212	5.21	0.517
992	493.00	22.20	1.39	0.05212	5.21	0.517
993	493.50	22.21	1.39	0.05212	5.21	0.517
994	494.00	22.23	1.39	0.05212	5.21	0.517
995	494.50	22.24	1.39	0.05212	5.21	0.517
996	495.00	22.25	1.39	0.05212	5.21	0.517
997	495.50	22.26	1.39	0.05212	5.21	0.517
998	496.00	22.27	1.39	0.05212	5.21	0.517
999	496.50	22.28	1.39	0.05212	5.21	0.517
1000	497.00	22.29	1.39	0.05212	5.21	0.517
1001	497.50	22.30	1.39	0.05212	5.21	0.517
1002	498.00	22.32	1.39	0.05207	5.21	0.517
1003	498.50	22.33	1.4	0.05207	5.21	0.517
1004	499.00	22.34	1.4	0.05207	5.21	0.517
1005	499.50	22.35	1.4	0.05207	5.21	0.517
1006	500.00	22.36	1.4	0.05207	5.21	0.517
1007	500.50	22.37	1.4	0.05207	5.21	0.517
1008	501.00	22.38	1.4	0.05207	5.21	0.517
1009	501.50	22.39	1.39	0.05216	5.22	0.517
1010	502.00	22.41	1.38	0.05212	5.21	0.517
1011	502.50	22.42	1.38	0.05207	5.21	0.517
1012	503.00	22.43	1.38	0.05212	5.21	0.517
1013	503.50	22.44	1.38	0.05212	5.21	0.517
1014	504.00	22.45	1.38	0.05207	5.21	0.517
1015	504.50	22.46	1.38	0.05212	5.21	0.517
1016	505.00	22.47	1.38	0.05212	5.21	0.517
1017	505.50	22.48	1.38	0.05207	5.21	0.517
1018	506.00	22.49	1.39	0.05212	5.21	0.517
1019	506.50	22.51	1.39	0.05212	5.21	0.517
1020	507.00	22.52	1.39	0.05212	5.21	0.517
1021	507.50	22.53	1.39	0.05212	5.21	0.517
1022	508.00	22.54	1.39	0.05207	5.21	0.517
1023	508.50	22.55	1.4	0.05207	5.21	0.517
1024	509.00	22.56	1.4	0.05207	5.21	0.517
1025	509.50	22.57	1.41	0.05212	5.21	0.517
1026	510.00	22.58	1.41	0.05212	5.21	0.517
1027	510.50	22.59	1.4	0.05212	5.21	0.517
1028	511.00	22.61	1.4	0.05207	5.21	0.517
1029	511.50	22.62	1.4	0.05212	5.21	0.517
1030	512.00	22.63	1.4	0.05212	5.21	0.517
1031	512.50	22.64	1.4	0.05212	5.21	0.517
1032	513.00	22.65	1.4	0.05212	5.21	0.517
1033	513.50	22.66	1.4	0.05212	5.21	0.517
1034	514.00	22.67	1.4	0.05212	5.21	0.517
1035	514.50	22.68	1.39	0.05212	5.21	0.517
1036	515.00	22.69	1.38	0.05212	5.21	0.517
1037	515.50	22.70	1.38	0.05212	5.21	0.517
1038	516.00	22.72	1.38	0.05212	5.21	0.517
1039	516.50	22.73	1.38	0.05212	5.21	0.517
1040	517.00	22.74	1.37	0.05212	5.21	0.517
1041	517.50	22.75	1.37	0.05207	5.21	0.517
1042	518.00	22.76	1.37	0.05203	5.20	0.517
1043	518.50	22.77	1.37	0.05203	5.20	0.517
1044	519.00	22.78	1.37	0.05203	5.20	0.517
1045	519.50	22.79	1.37	0.05203	5.20	0.517
1046	520.00	22.80	1.38	0.05203	5.20	0.517
1047	520.50	22.81	1.38	0.05203	5.20	0.517
1048	521.00	22.83	1.39	0.05212	5.21	0.517
1049	521.50	22.84	1.39	0.05212	5.21	0.517
1050	522.00	22.85	1.39	0.05212	5.21	0.517
1051	522.50	22.86	1.39	0.05212	5.21	0.517

1052	523.00	22.87	1.39	0.05212	5.21	0.517
1053	523.50	22.88	1.39	0.05212	5.21	0.517
1054	524.00	22.89	1.39	0.05212	5.21	0.517
1055	524.50	22.90	1.39	0.05207	5.21	0.517
1056	525.00	22.91	1.39	0.05212	5.21	0.517
1057	525.50	22.92	1.39	0.05212	5.21	0.517
1058	526.00	22.93	1.39	0.05212	5.21	0.517
1059	526.50	22.95	1.39	0.05216	5.22	0.517
1060	527.00	22.96	1.39	0.05212	5.21	0.517
1061	527.50	22.97	1.39	0.05212	5.21	0.517
1062	528.00	22.98	1.39	0.05212	5.21	0.517
1063	528.50	22.99	1.39	0.05207	5.21	0.517
1064	529.00	23.00	1.39	0.05207	5.21	0.517
1065	529.50	23.01	1.39	0.05207	5.21	0.517
1066	530.00	23.02	1.39	0.05207	5.21	0.517
1067	530.50	23.03	1.39	0.05207	5.21	0.517
1068	531.00	23.04	1.39	0.05207	5.21	0.517
1069	531.50	23.05	1.39	0.05207	5.21	0.517
1070	532.00	23.07	1.38	0.05212	5.21	0.517
1071	532.50	23.08	1.36	0.05212	5.21	0.517
1072	533.00	23.09	1.36	0.05207	5.21	0.517
1073	533.50	23.10	1.36	0.05212	5.21	0.517
1074	534.00	23.11	1.36	0.05212	5.21	0.517
1075	534.50	23.12	1.36	0.05212	5.21	0.517
1076	535.00	23.13	1.36	0.05212	5.21	0.517
1077	535.50	23.14	1.36	0.05212	5.21	0.517
1078	536.00	23.15	1.36	0.05212	5.21	0.517
1079	536.50	23.16	1.36	0.05212	5.21	0.517
1080	537.00	23.17	1.36	0.05212	5.21	0.517
1081	537.50	23.18	1.36	0.05212	5.21	0.517
1082	538.00	23.19	1.36	0.05212	5.21	0.517
1083	538.50	23.21	1.36	0.05207	5.21	0.517
1084	539.00	23.22	1.36	0.05203	5.20	0.517
1085	539.50	23.23	1.36	0.05203	5.20	0.517
1086	540.00	23.24	1.37	0.05207	5.21	0.517
1087	540.50	23.25	1.37	0.05207	5.21	0.517
1088	541.00	23.26	1.37	0.05207	5.21	0.517
1089	541.50	23.27	1.38	0.05207	5.21	0.517
1090	542.00	23.28	1.38	0.05212	5.21	0.517
1091	542.50	23.29	1.38	0.05212	5.21	0.517
1092	543.00	23.30	1.37	0.05212	5.21	0.517
1093	543.50	23.31	1.38	0.05212	5.21	0.517
1094	544.00	23.32	1.38	0.05212	5.21	0.517
1095	544.50	23.33	1.37	0.05207	5.21	0.517
1096	545.00	23.35	1.37	0.05212	5.21	0.517
1097	545.50	23.36	1.38	0.05212	5.21	0.517
1098	546.00	23.37	1.37	0.05212	5.21	0.517
1099	546.50	23.38	1.38	0.05212	5.21	0.517
1100	547.00	23.39	1.38	0.05212	5.21	0.517
1101	547.50	23.40	1.38	0.05212	5.21	0.517
1102	548.00	23.41	1.38	0.05212	5.21	0.517
1103	548.50	23.42	1.38	0.05212	5.21	0.517
1104	549.00	23.43	1.38	0.05207	5.21	0.517
1105	549.50	23.44	1.38	0.05207	5.21	0.517
1106	550.00	23.45	1.38	0.05207	5.21	0.517
1107	550.50	23.46	1.38	0.05207	5.21	0.517
1108	551.00	23.47	1.39	0.05203	5.20	0.517
1109	551.50	23.48	1.38	0.05207	5.21	0.517
1110	552.00	23.49	1.39	0.05212	5.21	0.517
1111	552.50	23.51	1.39	0.05212	5.21	0.517
1112	553.00	23.52	1.38	0.05212	5.21	0.517
1113	553.50	23.53	1.37	0.05212	5.21	0.517
1114	554.00	23.54	1.37	0.05212	5.21	0.517
1115	554.50	23.55	1.36	0.05212	5.21	0.517
1116	555.00	23.56	1.36	0.05212	5.21	0.517
1117	555.50	23.57	1.36	0.05212	5.21	0.517
1118	556.00	23.58	1.36	0.05212	5.21	0.517
1119	556.50	23.59	1.36	0.05212	5.21	0.517
1120	557.00	23.60	1.36	0.05212	5.21	0.517
1121	557.50	23.61	1.35	0.05216	5.22	0.517
1122	558.00	23.62	1.35	0.05207	5.21	0.517
1123	558.50	23.63	1.39	0.05216	5.22	0.517
1124	559.00	23.64	1.4	0.05216	5.22	0.517
1125	559.50	23.65	1.4	0.05221	5.22	0.517
1126	560.00	23.66	1.41	0.05221	5.22	0.517
1127	560.50	23.67	1.42	0.05221	5.22	0.517
1128	561.00	23.69	1.42	0.05216	5.22	0.517
1129	561.50	23.70	1.42	0.05221	5.22	0.517
1130	562.00	23.71	1.41	0.05221	5.22	0.517
1131	562.50	23.72	1.41	0.05221	5.22	0.517
1132	563.00	23.73	1.41	0.05221	5.22	0.517
1133	563.50	23.74	1.41	0.05221	5.22	0.517
1134	564.00	23.75	1.41	0.05221	5.22	0.517
1135	564.50	23.76	1.4	0.05221	5.22	0.517
1136	565.00	23.77	1.41	0.05221	5.22	0.517
1137	565.50	23.78	1.4	0.05221	5.22	0.517
1138	566.00	23.79	1.41	0.05221	5.22	0.517
1139	566.50	23.80	1.41	0.05216	5.22	0.517
1140	567.00	23.81	1.41	0.05221	5.22	0.517

1141	567.50	23.82	1.4	0.05216	5.22	0.517
1142	568.00	23.83	1.4	0.05212	5.21	0.517
1143	568.50	23.84	1.4	0.05216	5.22	0.517
1144	569.00	23.85	1.41	0.05212	5.21	0.517
1145	569.50	23.86	1.41	0.05212	5.21	0.517
1146	570.00	23.87	1.41	0.05216	5.22	0.517
1147	570.50	23.89	1.41	0.05216	5.22	0.517
1148	571.00	23.90	1.42	0.05221	5.22	0.517
1149	571.50	23.91	1.41	0.05221	5.22	0.517
1150	572.00	23.92	1.41	0.05221	5.22	0.517
1151	572.50	23.93	1.41	0.05221	5.22	0.517
1152	573.00	23.94	1.41	0.05221	5.22	0.517
1153	573.50	23.95	1.41	0.05221	5.22	0.517
1154	574.00	23.96	1.41	0.05221	5.22	0.517
1155	574.50	23.97	1.41	0.05226	5.23	0.517
1156	575.00	23.98	1.41	0.05221	5.22	0.517
1157	575.50	23.99	1.41	0.05221	5.22	0.517
1158	576.00	24.00	1.41	0.05221	5.22	0.517
1159	576.50	24.01	1.4	0.05221	5.22	0.517
1160	577.00	24.02	1.4	0.05221	5.22	0.517
1161	577.50	24.03	1.4	0.05212	5.21	0.517
1162	578.00	24.04	1.39	0.05216	5.22	0.517
1163	578.50	24.05	1.39	0.05216	5.22	0.517
1164	579.00	24.06	1.39	0.05216	5.22	0.517
1165	579.50	24.07	1.39	0.05216	5.22	0.517
1166	580.00	24.08	1.39	0.05216	5.22	0.517
1167	580.50	24.09	1.39	0.05216	5.22	0.517
1168	581.00	24.10	1.39	0.05221	5.22	0.517
1169	581.50	24.11	1.37	0.05221	5.22	0.517
1170	582.00	24.12	1.37	0.05221	5.22	0.517
1171	582.50	24.14	1.37	0.05221	5.22	0.517
1172	583.00	24.15	1.37	0.05221	5.22	0.517
1173	583.50	24.16	1.37	0.05216	5.22	0.517
1174	584.00	24.17	1.37	0.05221	5.22	0.517
1175	584.50	24.18	1.37	0.05221	5.22	0.517
1176	585.00	24.19	1.38	0.05216	5.22	0.517
1177	585.50	24.20	1.38	0.05221	5.22	0.517
1178	586.00	24.21	1.38	0.05216	5.22	0.517
1179	586.50	24.22	1.38	0.05216	5.22	0.517
1180	587.00	24.23	1.38	0.05216	5.22	0.517
1181	587.50	24.24	1.38	0.05212	5.21	0.517
1182	588.00	24.25	1.39	0.05212	5.21	0.517
1183	588.50	24.26	1.39	0.05212	5.21	0.517
1184	589.00	24.27	1.4	0.05212	5.21	0.517
1185	589.50	24.28	1.41	0.05212	5.21	0.517
1186	590.00	24.29	1.41	0.05212	5.21	0.517
1187	590.50	24.30	1.41	0.05216	5.22	0.517
1188	591.00	24.31	1.42	0.05221	5.22	0.517
1189	591.50	24.32	1.42	0.05226	5.23	0.517
1190	592.00	24.33	1.41	0.05226	5.23	0.517
1191	592.50	24.34	1.41	0.05216	5.22	0.517
1192	593.00	24.35	1.4	0.05221	5.22	0.517
1193	593.50	24.36	1.4	0.05221	5.22	0.517
1194	594.00	24.37	1.4	0.05221	5.22	0.517
1195	594.50	24.38	1.4	0.05221	5.22	0.517
1196	595.00	24.39	1.41	0.05221	5.22	0.517
1197	595.50	24.40	1.4	0.05221	5.22	0.517
1198	596.00	24.41	1.4	0.05221	5.22	0.517
1199	596.50	24.42	1.4	0.05221	5.22	0.517
1200	597.00	24.43	1.39	0.05212	5.21	0.517
1201	597.50	24.44	1.39	0.05216	5.22	0.517
1202	598.00	24.45	1.39	0.05216	5.22	0.517
1203	598.50	24.46	1.39	0.05216	5.22	0.517
1204	599.00	24.47	1.39	0.05216	5.22	0.517
1205	599.50	24.48	1.39	0.05216	5.22	0.517
1206	600.00	24.49	1.39	0.05216	5.22	0.517
1207	600.50	24.51	1.39	0.05221	5.22	0.517
1208	601.00	24.52	1.39	0.05221	5.22	0.517
1209	601.50	24.53	1.39	0.05221	5.22	0.517
1210	602.00	24.54	1.39	0.05221	5.22	0.517
1211	602.50	24.55	1.39	0.05221	5.22	0.517
1212	603.00	24.56	1.39	0.05221	5.22	0.517
1213	603.50	24.57	1.39	0.05221	5.22	0.517
1214	604.00	24.58	1.39	0.05221	5.22	0.517
1215	604.50	24.59	1.39	0.05221	5.22	0.517
1216	605.00	24.60	1.39	0.05216	5.22	0.517
1217	605.50	24.61	1.39	0.05216	5.22	0.517
1218	606.00	24.62	1.39	0.05216	5.22	0.517
1219	606.50	24.63	1.39	0.05216	5.22	0.517
1220	607.00	24.64	1.39	0.05212	5.21	0.517
1221	607.50	24.65	1.39	0.05212	5.21	0.517
1222	608.00	24.66	1.41	0.05216	5.22	0.517
1223	608.50	24.67	1.42	0.05216	5.22	0.517
1224	609.00	24.68	1.44	0.05216	5.22	0.517
1225	609.50	24.69	1.44	0.05221	5.22	0.517
1226	610.00	24.70	1.44	0.05226	5.23	0.517
1227	610.50	24.71	1.41	0.05221	5.22	0.517
1228	611.00	24.72	1.41	0.05221	5.22	0.517
1229	611.50	24.73	1.41	0.05221	5.22	0.517

1230	612.00	24.74	1.41	0.05221	5.22	0.517
1231	612.50	24.75	1.4	0.05221	5.22	0.517
1232	613.00	24.76	1.4	0.05221	5.22	0.517
1233	613.50	24.77	1.41	0.05221	5.22	0.517
1234	614.00	24.78	1.41	0.05221	5.22	0.517
1235	614.50	24.79	1.4	0.05221	5.22	0.517
1236	615.00	24.80	1.4	0.05221	5.22	0.517
1237	615.50	24.81	1.4	0.05221	5.22	0.517
1238	616.00	24.82	1.4	0.05221	5.22	0.517
1239	616.50	24.83	1.4	0.05216	5.22	0.517
1240	617.00	24.84	1.41	0.05216	5.22	0.517
1241	617.50	24.85	1.41	0.05221	5.22	0.517
1242	618.00	24.86	1.41	0.05221	5.22	0.517
1243	618.50	24.87	1.41	0.05221	5.22	0.517
1244	619.00	24.88	1.41	0.05221	5.22	0.517
1245	619.50	24.89	1.41	0.05221	5.22	0.517
1246	620.00	24.90	1.4	0.05221	5.22	0.517
1247	620.50	24.91	1.37	0.05221	5.22	0.517
1248	621.00	24.92	1.37	0.05221	5.22	0.517
1249	621.50	24.93	1.37	0.05221	5.22	0.517
1250	622.00	24.94	1.37	0.05221	5.22	0.517
1251	622.50	24.95	1.37	0.05221	5.22	0.517
1252	623.00	24.96	1.37	0.05221	5.22	0.517
1253	623.50	24.97	1.37	0.05221	5.22	0.517
1254	624.00	24.98	1.37	0.05221	5.22	0.517
1255	624.50	24.99	1.37	0.05221	5.22	0.517
1256	625.00	25.00	1.37	0.05221	5.22	0.517
1257	625.50	25.01	1.37	0.05221	5.22	0.517
1258	626.00	25.02	1.37	0.05221	5.22	0.517
1259	626.50	25.03	1.37	0.05216	5.22	0.517
1260	627.00	25.04	1.37	0.05216	5.22	0.517
1261	627.50	25.05	1.38	0.05212	5.21	0.517
1262	628.00	25.06	1.38	0.05212	5.21	0.517
1263	628.50	25.07	1.38	0.05212	5.21	0.517
1264	629.00	25.08	1.39	0.05212	5.21	0.517
1265	629.50	25.09	1.4	0.05216	5.22	0.517
1266	630.00	25.10	1.41	0.05216	5.22	0.517
1267	630.50	25.11	1.41	0.05221	5.22	0.517
1268	631.00	25.12	1.41	0.05221	5.22	0.517
1269	631.50	25.13	1.39	0.05221	5.22	0.517
1270	632.00	25.14	1.39	0.05216	5.22	0.517
1271	632.50	25.15	1.39	0.05221	5.22	0.517
1272	633.00	25.16	1.39	0.05221	5.22	0.517
1273	633.50	25.17	1.39	0.05221	5.22	0.517
1274	634.00	25.18	1.39	0.05221	5.22	0.517
1275	634.50	25.19	1.39	0.05221	5.22	0.517
1276	635.00	25.20	1.39	0.05221	5.22	0.517
1277	635.50	25.21	1.39	0.05221	5.22	0.517
1278	636.00	25.22	1.39	0.05221	5.22	0.517
1279	636.50	25.23	1.39	0.05221	5.22	0.517
1280	637.00	25.24	1.39	0.05221	5.22	0.517
1281	637.50	25.25	1.37	0.05216	5.22	0.517
1282	638.00	25.26	1.37	0.05216	5.22	0.517
1283	638.50	25.27	1.38	0.05216	5.22	0.517
1284	639.00	25.28	1.38	0.05216	5.22	0.517
1285	639.50	25.29	1.37	0.05216	5.22	0.517
1286	640.00	25.30	1.38	0.05216	5.22	0.517
1287	640.50	25.31	1.37	0.05216	5.22	0.517
1288	641.00	25.32	1.37	0.05216	5.22	0.517
1289	641.50	25.33	1.38	0.05221	5.22	0.517
1290	642.00	25.34	1.35	0.05221	5.22	0.517
1291	642.50	25.35	1.35	0.05221	5.22	0.517
1292	643.00	25.36	1.35	0.05216	5.22	0.517
1293	643.50	25.37	1.35	0.05216	5.22	0.517
1294	644.00	25.38	1.35	0.05212	5.21	0.517
1295	644.50	25.39	1.35	0.05216	5.22	0.517
1296	645.00	25.40	1.35	0.05216	5.22	0.517
1297	645.50	25.41	1.35	0.05216	5.22	0.517
1298	646.00	25.42	1.35	0.05216	5.22	0.517
1299	646.50	25.43	1.35	0.05216	5.22	0.517
1300	647.00	25.44	1.35	0.05212	5.21	0.517
1301	647.50	25.45	1.35	0.05212	5.21	0.517
1302	648.00	25.46	1.35	0.05212	5.21	0.517
1303	648.50	25.47	1.35	0.05212	5.21	0.517
1304	649.00	25.48	1.35	0.05212	5.21	0.517
1305	649.50	25.49	1.35	0.05212	5.21	0.517
1306	650.00	25.50	1.36	0.05212	5.21	0.517
1307	650.50	25.50	1.39	0.05216	5.22	0.517
1308	651.00	25.51	1.4	0.05216	5.22	0.517
1309	651.50	25.52	1.41	0.05221	5.22	0.517
1310	652.00	25.53	1.41	0.05221	5.22	0.517
1311	652.50	25.54	1.41	0.05221	5.22	0.517
1312	653.00	25.55	1.41	0.05226	5.23	0.517
1313	653.50	25.56	1.41	0.05221	5.22	0.517
1314	654.00	25.57	1.38	0.05221	5.22	0.517
1315	654.50	25.58	1.38	0.05221	5.22	0.517
1316	655.00	25.59	1.38	0.05221	5.22	0.517
1317	655.50	25.60	1.38	0.05221	5.22	0.517
1318	656.00	25.61	1.38	0.05221	5.22	0.517

1319	656.50	25.62	1.38	0.05221	5.22	0.517
1320	657.00	25.63	1.38	0.05221	5.22	0.517
1321	657.50	25.64	1.37	0.05221	5.22	0.517
1322	658.00	25.65	1.36	0.05221	5.22	0.517
1323	658.50	25.66	1.36	0.05216	5.22	0.517
1324	659.00	25.67	1.35	0.05216	5.22	0.517
1325	659.50	25.68	1.36	0.05216	5.22	0.517
1326	660.00	25.69	1.35	0.05221	5.22	0.517
1327	660.50	25.70	1.35	0.05212	5.21	0.517
1328	661.00	25.71	1.36	0.05212	5.21	0.517
1329	661.50	25.72	1.36	0.05216	5.22	0.517
1330	662.00	25.73	1.36	0.05216	5.22	0.517
1331	662.50	25.74	1.36	0.05216	5.22	0.517
1332	663.00	25.75	1.36	0.05221	5.22	0.517
1333	663.50	25.76	1.36	0.05216	5.22	0.517
1334	664.00	25.77	1.36	0.05221	5.22	0.517
1335	664.50	25.78	1.36	0.05216	5.22	0.517
1336	665.00	25.79	1.36	0.05221	5.22	0.517
1337	665.50	25.80	1.36	0.05221	5.22	0.517
1338	666.00	25.81	1.36	0.05221	5.22	0.517
1339	666.50	25.82	1.37	0.05221	5.22	0.517
1340	667.00	25.83	1.37	0.05221	5.22	0.517
1341	667.50	25.84	1.37	0.05221	5.22	0.517
1342	668.00	25.85	1.36	0.05216	5.22	0.517
1343	668.50	25.86	1.36	0.05221	5.22	0.517
1344	669.00	25.87	1.37	0.05221	5.22	0.517
1345	669.50	25.87	1.38	0.05221	5.22	0.517
1346	670.00	25.88	1.38	0.05221	5.22	0.517
1347	670.50	25.89	1.38	0.05216	5.22	0.517
1348	671.00	25.90	1.38	0.05216	5.22	0.517
1349	671.50	25.91	1.38	0.05216	5.22	0.517
1350	672.00	25.92	1.38	0.05216	5.22	0.517
1351	672.50	25.93	1.39	0.05216	5.22	0.517
1352	673.00	25.94	1.4	0.05221	5.22	0.517
1353	673.50	25.95	1.4	0.05221	5.22	0.517
1354	674.00	25.96	1.37	0.05221	5.22	0.517
1355	674.50	25.97	1.37	0.05221	5.22	0.517
1356	675.00	25.98	1.37	0.05221	5.22	0.517
1357	675.50	25.99	1.37	0.05221	5.22	0.517
1358	676.00	26.00	1.37	0.05221	5.22	0.517
1359	676.50	26.01	1.37	0.05221	5.22	0.517
1360	677.00	26.02	1.37	0.05221	5.22	0.517
1361	677.50	26.03	1.37	0.05226	5.23	0.517
1362	678.00	26.04	1.36	0.05221	5.22	0.517
1363	678.50	26.05	1.36	0.05221	5.22	0.517
1364	679.00	26.06	1.35	0.05221	5.22	0.517
1365	679.50	26.07	1.35	0.05221	5.22	0.517
1366	680.00	26.08	1.35	0.05221	5.22	0.517
1367	680.50	26.09	1.38	0.05221	5.22	0.517
1368	681.00	26.10	1.38	0.05226	5.23	0.517
1369	681.50	26.11	1.38	0.05226	5.23	0.517
1370	682.00	26.12	1.38	0.05226	5.23	0.517
1371	682.50	26.12	1.39	0.0523	5.23	0.517
1372	683.00	26.13	1.39	0.05235	5.24	0.517
1373	683.50	26.14	1.39	0.05235	5.24	0.517
1374	684.00	26.15	1.37	0.0523	5.23	0.517
1375	684.50	26.16	1.37	0.0523	5.23	0.517
1376	685.00	26.17	1.37	0.0523	5.23	0.517
1377	685.50	26.18	1.36	0.0523	5.23	0.517
1378	686.00	26.19	1.37	0.0523	5.23	0.517
1379	686.50	26.20	1.36	0.0523	5.23	0.517
1380	687.00	26.21	1.36	0.0523	5.23	0.517
1381	687.50	26.22	1.36	0.0523	5.23	0.517
1382	688.00	26.23	1.36	0.0523	5.23	0.517
1383	688.50	26.24	1.36	0.05226	5.23	0.517
1384	689.00	26.25	1.36	0.0523	5.23	0.517
1385	689.50	26.26	1.36	0.0523	5.23	0.517
1386	690.00	26.27	1.36	0.0523	5.23	0.517
1387	690.50	26.28	1.36	0.05221	5.22	0.517
1388	691.00	26.29	1.36	0.05221	5.22	0.517
1389	691.50	26.30	1.37	0.05221	5.22	0.517
1390	692.00	26.31	1.37	0.05221	5.22	0.517
1391	692.50	26.32	1.38	0.05221	5.22	0.517
1392	693.00	26.32	1.38	0.05221	5.22	0.517
1393	693.50	26.33	1.38	0.05226	5.23	0.517
1394	694.00	26.34	1.39	0.05226	5.23	0.517
1395	694.50	26.35	1.39	0.0523	5.23	0.517
1396	695.00	26.36	1.39	0.0523	5.23	0.517
1397	695.50	26.37	1.39	0.0523	5.23	0.517
1398	696.00	26.38	1.39	0.0523	5.23	0.517
1399	696.50	26.39	1.39	0.0523	5.23	0.517
1400	697.00	26.40	1.38	0.0523	5.23	0.517
1401	697.50	26.41	1.38	0.0523	5.23	0.517
1402	698.00	26.42	1.38	0.0523	5.23	0.517
1403	698.50	26.43	1.38	0.0523	5.23	0.517
1404	699.00	26.44	1.38	0.0523	5.23	0.517
1405	699.50	26.45	1.37	0.05226	5.23	0.517
1406	700.00	26.46	1.37	0.05226	5.23	0.517
1407	700.50	26.47	1.38	0.0523	5.23	0.517

1408	701.00	26.48	1.37	0.0523	5.23	0.517
1409	701.50	26.49	1.37	0.0523	5.23	0.517
1410	702.00	26.50	1.38	0.0523	5.23	0.517
1411	702.50	26.50	1.38	0.05235	5.24	0.517
1412	703.00	26.51	1.35	0.0523	5.23	0.517
1413	703.50	26.52	1.35	0.0523	5.23	0.517
1414	704.00	26.53	1.35	0.0523	5.23	0.517
1415	704.50	26.54	1.35	0.0523	5.23	0.517
1416	705.00	26.55	1.35	0.0523	5.23	0.517
1417	705.50	26.56	1.35	0.0523	5.23	0.517
1418	706.00	26.57	1.35	0.0523	5.23	0.517
1419	706.50	26.58	1.35	0.05235	5.24	0.517
1420	707.00	26.59	1.35	0.0523	5.23	0.517
1421	707.50	26.60	1.35	0.0523	5.23	0.517
1422	708.00	26.61	1.35	0.0523	5.23	0.517
1423	708.50	26.62	1.36	0.0523	5.23	0.517
1424	709.00	26.63	1.39	0.0523	5.23	0.517
1425	709.50	26.64	1.4	0.05235	5.24	0.517
1426	710.00	26.65	1.4	0.05235	5.24	0.517
1427	710.50	26.66	1.41	0.05235	5.24	0.517
1428	711.00	26.66	1.41	0.0523	5.23	0.517
1429	711.50	26.67	1.41	0.05235	5.24	0.517
1430	712.00	26.68	1.41	0.0524	5.24	0.517
1431	712.50	26.69	1.41	0.0524	5.24	0.517
1432	713.00	26.70	1.41	0.0524	5.24	0.517
1433	713.50	26.71	1.42	0.0524	5.24	0.517
1434	714.00	26.72	1.42	0.0524	5.24	0.517
1435	714.50	26.73	1.42	0.0524	5.24	0.517
1436	715.00	26.74	1.42	0.0524	5.24	0.517
1437	715.50	26.75	1.42	0.0524	5.24	0.517
1438	716.00	26.76	1.42	0.0524	5.24	0.517
1439	716.50	26.77	1.41	0.0524	5.24	0.517
1440	717.00	26.78	1.41	0.0524	5.24	0.517
1441	717.50	26.79	1.41	0.0524	5.24	0.517
1442	718.00	26.80	1.41	0.05235	5.24	0.517
1443	718.50	26.80	1.41	0.05235	5.24	0.517
1444	719.00	26.81	1.41	0.05235	5.24	0.517
1445	719.50	26.82	1.42	0.0524	5.24	0.517
1446	720.00	26.83	1.42	0.0524	5.24	0.517
1447	720.50	26.84	1.41	0.0524	5.24	0.517
1448	721.00	26.85	1.41	0.05244	5.24	0.517
1449	721.50	26.86	1.39	0.05244	5.24	0.517
1450	722.00	26.87	1.39	0.0524	5.24	0.517
1451	722.50	26.88	1.39	0.0524	5.24	0.517
1452	723.00	26.89	1.39	0.0524	5.24	0.517
1453	723.50	26.90	1.39	0.0524	5.24	0.517
1454	724.00	26.91	1.38	0.0524	5.24	0.517
1455	724.50	26.92	1.38	0.0524	5.24	0.517
1456	725.00	26.93	1.37	0.0524	5.24	0.517
1457	725.50	26.94	1.37	0.0524	5.24	0.517
1458	726.00	26.94	1.37	0.0524	5.24	0.517
1459	726.50	26.95	1.37	0.0524	5.24	0.517
1460	727.00	26.96	1.37	0.0524	5.24	0.517
1461	727.50	26.97	1.37	0.0524	5.24	0.517
1462	728.00	26.98	1.37	0.0524	5.24	0.517
1463	728.50	26.99	1.37	0.05235	5.24	0.517
1464	729.00	27.00	1.37	0.05235	5.24	0.517
1465	729.50	27.01	1.37	0.05235	5.24	0.517
1466	730.00	27.02	1.37	0.05235	5.24	0.517
1467	730.50	27.03	1.37	0.05235	5.24	0.517
1468	731.00	27.04	1.38	0.0523	5.23	0.517
1469	731.50	27.05	1.37	0.0524	5.24	0.517
1470	732.00	27.06	1.37	0.0524	5.24	0.517
1471	732.50	27.06	1.37	0.0524	5.24	0.517
1472	733.00	27.07	1.37	0.0523	5.23	0.517
1473	733.50	27.08	1.38	0.05235	5.24	0.517
1474	734.00	27.09	1.39	0.05235	5.24	0.517
1475	734.50	27.10	1.39	0.05235	5.24	0.517
1476	735.00	27.11	1.4	0.05235	5.24	0.517
1477	735.50	27.12	1.39	0.05235	5.24	0.517
1478	736.00	27.13	1.39	0.05235	5.24	0.517
1479	736.50	27.14	1.39	0.05235	5.24	0.517
1480	737.00	27.15	1.39	0.05235	5.24	0.517
1481	737.50	27.16	1.4	0.05235	5.24	0.517
1482	738.00	27.17	1.41	0.05235	5.24	0.517
1483	738.50	27.18	1.41	0.05235	5.24	0.517
1484	739.00	27.18	1.41	0.05235	5.24	0.517
1485	739.50	27.19	1.41	0.05235	5.24	0.517
1486	740.00	27.20	1.41	0.05235	5.24	0.517
1487	740.50	27.21	1.42	0.05235	5.24	0.517
1488	741.00	27.22	1.42	0.05244	5.24	0.517
1489	741.50	27.23	1.41	0.0524	5.24	0.517
1490	742.00	27.24	1.41	0.0524	5.24	0.517
1491	742.50	27.25	1.41	0.0524	5.24	0.517
1492	743.00	27.26	1.39	0.0524	5.24	0.517
1493	743.50	27.27	1.39	0.0524	5.24	0.517
1494	744.00	27.28	1.39	0.0524	5.24	0.517
1495	744.50	27.29	1.39	0.0524	5.24	0.517
1496	745.00	27.29	1.38	0.0524	5.24	0.517

1497	745.50	27.30	1.38	0.0524	5.24	0.517
1498	746.00	27.31	1.38	0.0524	5.24	0.517
1499	746.50	27.32	1.37	0.0524	5.24	0.517
1500	747.00	27.33	1.37	0.0524	5.24	0.517
1501	747.50	27.34	1.37	0.0523	5.23	0.517
1502	748.00	27.35	1.37	0.05235	5.24	0.517
1503	748.50	27.36	1.37	0.0523	5.23	0.517
1504	749.00	27.37	1.37	0.05226	5.23	0.517
1505	749.50	27.38	1.37	0.0523	5.23	0.517
1506	750.00	27.39	1.37	0.0523	5.23	0.517
1507	750.50	27.40	1.37	0.0523	5.23	0.517
1508	751.00	27.40	1.37	0.05235	5.24	0.517
1509	751.50	27.41	1.37	0.05235	5.24	0.517
1510	752.00	27.42	1.37	0.05235	5.24	0.517
1511	752.50	27.43	1.38	0.05235	5.24	0.517
1512	753.00	27.44	1.38	0.0524	5.24	0.517
1513	753.50	27.45	1.37	0.0524	5.24	0.517
1514	754.00	27.46	1.37	0.0524	5.24	0.517
1515	754.50	27.47	1.37	0.0524	5.24	0.517
1516	755.00	27.48	1.37	0.05235	5.24	0.517
1517	755.50	27.49	1.37	0.05235	5.24	0.517
1518	756.00	27.50	1.36	0.05235	5.24	0.517
1519	756.50	27.50	1.36	0.05235	5.24	0.517
1520	757.00	27.51	1.37	0.05235	5.24	0.517
1521	757.50	27.52	1.37	0.05235	5.24	0.517
1522	758.00	27.53	1.37	0.05235	5.24	0.517
1523	758.50	27.54	1.37	0.05235	5.24	0.517
1524	759.00	27.55	1.37	0.05235	5.24	0.517
1525	759.50	27.56	1.37	0.05235	5.24	0.517
1526	760.00	27.57	1.37	0.05235	5.24	0.517
1527	760.50	27.58	1.37	0.05235	5.24	0.517
1528	761.00	27.59	1.37	0.05235	5.24	0.517
1529	761.50	27.60	1.37	0.05235	5.24	0.517
1530	762.00	27.60	1.37	0.05235	5.24	0.517
1531	762.50	27.61	1.37	0.05235	5.24	0.517
1532	763.00	27.62	1.37	0.05235	5.24	0.517
1533	763.50	27.63	1.38	0.0523	5.23	0.517
1534	764.00	27.64	1.38	0.05235	5.24	0.517
1535	764.50	27.65	1.39	0.05235	5.24	0.517
1536	765.00	27.66	1.39	0.0524	5.24	0.517
1537	765.50	27.67	1.39	0.0524	5.24	0.517
1538	766.00	27.68	1.4	0.0524	5.24	0.517
1539	766.50	27.69	1.4	0.05244	5.24	0.517
1540	767.00	27.69	1.39	0.0524	5.24	0.517
1541	767.50	27.70	1.39	0.0524	5.24	0.517
1542	768.00	27.71	1.35	0.0524	5.24	0.517
1543	768.50	27.72	1.35	0.0524	5.24	0.517
1544	769.00	27.73	1.35	0.0524	5.24	0.517
1545	769.50	27.74	1.35	0.0524	5.24	0.517
1546	770.00	27.75	1.35	0.0524	5.24	0.517
1547	770.50	27.76	1.35	0.0524	5.24	0.517
1548	771.00	27.77	1.35	0.05244	5.24	0.517
1549	771.50	27.78	1.35	0.0524	5.24	0.517
1550	772.00	27.78	1.35	0.05244	5.24	0.517
1551	772.50	27.79	1.35	0.0524	5.24	0.517
1552	773.00	27.80	1.36	0.0524	5.24	0.517
1553	773.50	27.81	1.36	0.0524	5.24	0.517
1554	774.00	27.82	1.36	0.0524	5.24	0.517
1555	774.50	27.83	1.36	0.0524	5.24	0.517
1556	775.00	27.84	1.37	0.05244	5.24	0.517
1557	775.50	27.85	1.37	0.05244	5.24	0.517
1558	776.00	27.86	1.38	0.05244	5.24	0.517
1559	776.50	27.87	1.38	0.05249	5.25	0.517
1560	777.00	27.87	1.38	0.0524	5.24	0.517
1561	777.50	27.88	1.39	0.0524	5.24	0.517
1562	778.00	27.89	1.4	0.05244	5.24	0.517
1563	778.50	27.90	1.41	0.05244	5.24	0.517
1564	779.00	27.91	1.41	0.0524	5.24	0.517
1565	779.50	27.92	1.41	0.0524	5.24	0.517
1566	780.00	27.93	1.41	0.0524	5.24	0.517
1567	780.50	27.94	1.42	0.05244	5.24	0.517
1568	781.00	27.95	1.43	0.05249	5.25	0.517
1569	781.50	27.96	1.43	0.05249	5.25	0.517
1570	782.00	27.96	1.43	0.05249	5.25	0.517
1571	782.50	27.97	1.43	0.05249	5.25	0.517
1572	783.00	27.98	1.42	0.05249	5.25	0.517
1573	783.50	27.99	1.42	0.05249	5.25	0.517
1574	784.00	28.00	1.41	0.05249	5.25	0.517
1575	784.50	28.01	1.41	0.05249	5.25	0.517
1576	785.00	28.02	1.41	0.05249	5.25	0.517
1577	785.50	28.03	1.41	0.05249	5.25	0.517
1578	786.00	28.04	1.4	0.05249	5.25	0.517
1579	786.50	28.04	1.4	0.05249	5.25	0.517
1580	787.00	28.05	1.4	0.05249	5.25	0.517
1581	787.50	28.06	1.4	0.05244	5.24	0.517
1582	788.00	28.07	1.4	0.05244	5.24	0.517
1583	788.50	28.08	1.4	0.0524	5.24	0.517
1584	789.00	28.09	1.4	0.0524	5.24	0.517
1585	789.50	28.10	1.4	0.05244	5.24	0.517

1586	790.00	28.11	1.41	0.05244	5.24	0.517
1587	790.50	28.12	1.41	0.05244	5.24	0.517
1588	791.00	28.12	1.41	0.05249	5.25	0.517
1589	791.50	28.13	1.41	0.05249	5.25	0.517
1590	792.00	28.14	1.41	0.05249	5.25	0.517
1591	792.50	28.15	1.41	0.05249	5.25	0.517
1592	793.00	28.16	1.4	0.05249	5.25	0.517
1593	793.50	28.17	1.41	0.05249	5.25	0.517
1594	794.00	28.18	1.4	0.05249	5.25	0.517
1595	794.50	28.19	1.4	0.05249	5.25	0.517
1596	795.00	28.20	1.4	0.05249	5.25	0.517
1597	795.50	28.20	1.4	0.05249	5.25	0.517
1598	796.00	28.21	1.39	0.05249	5.25	0.517
1599	796.50	28.22	1.39	0.05249	5.25	0.517
1600	797.00	28.23	1.39	0.05249	5.25	0.517
1601	797.50	28.24	1.39	0.05244	5.24	0.517
1602	798.00	28.25	1.39	0.05244	5.24	0.517
1603	798.50	28.26	1.39	0.0524	5.24	0.517
1604	799.00	28.27	1.39	0.0524	5.24	0.517
1605	799.50	28.28	1.4	0.0524	5.24	0.517
1606	800.00	28.28	1.4	0.0524	5.24	0.517
1607	800.50	28.29	1.4	0.0524	5.24	0.517
1608	801.00	28.30	1.41	0.0524	5.24	0.517
1609	801.50	28.31	1.41	0.05249	5.25	0.517
1610	802.00	28.32	1.42	0.05249	5.25	0.517
1611	802.50	28.33	1.42	0.05244	5.24	0.517
1612	803.00	28.34	1.43	0.05249	5.25	0.517
1613	803.50	28.35	1.43	0.05249	5.25	0.517
1614	804.00	28.35	1.43	0.05249	5.25	0.517
1615	804.50	28.36	1.43	0.05254	5.25	0.517
1616	805.00	28.37	1.43	0.05249	5.25	0.517
1617	805.50	28.38	1.43	0.05249	5.25	0.517
1618	806.00	28.39	1.43	0.05249	5.25	0.517
1619	806.50	28.40	1.43	0.05254	5.25	0.517
1620	807.00	28.41	1.4	0.05249	5.25	0.517
1621	807.50	28.42	1.4	0.05249	5.25	0.517
1622	808.00	28.43	1.4	0.05244	5.24	0.517
1623	808.50	28.43	1.4	0.05244	5.24	0.517
1624	809.00	28.44	1.4	0.05244	5.24	0.517
1625	809.50	28.45	1.4	0.05244	5.24	0.517
1626	810.00	28.46	1.4	0.05244	5.24	0.517
1627	810.50	28.47	1.4	0.05249	5.25	0.517
1628	811.00	28.48	1.39	0.05249	5.25	0.517
1629	811.50	28.49	1.39	0.05249	5.25	0.517
1630	812.00	28.50	1.39	0.05249	5.25	0.517
1631	812.50	28.50	1.39	0.05249	5.25	0.517
1632	813.00	28.51	1.38	0.05249	5.25	0.517
1633	813.50	28.52	1.39	0.05249	5.25	0.517
1634	814.00	28.53	1.38	0.05249	5.25	0.517
1635	814.50	28.54	1.38	0.05249	5.25	0.517
1636	815.00	28.55	1.39	0.05249	5.25	0.517
1637	815.50	28.56	1.38	0.05249	5.25	0.517
1638	816.00	28.57	1.39	0.05249	5.25	0.517
1639	816.50	28.57	1.38	0.05244	5.24	0.517
1640	817.00	28.58	1.39	0.0524	5.24	0.517
1641	817.50	28.59	1.38	0.05244	5.24	0.517
1642	818.00	28.60	1.39	0.05244	5.24	0.517
1643	818.50	28.61	1.39	0.0524	5.24	0.517
1644	819.00	28.62	1.4	0.0524	5.24	0.517
1645	819.50	28.63	1.41	0.05244	5.24	0.517
1646	820.00	28.64	1.41	0.05249	5.25	0.517
1647	820.50	28.64	1.41	0.05249	5.25	0.517
1648	821.00	28.65	1.42	0.05249	5.25	0.517
1649	821.50	28.66	1.42	0.05249	5.25	0.517
1650	822.00	28.67	1.44	0.05249	5.25	0.517
1651	822.50	28.68	1.44	0.05254	5.25	0.517
1652	823.00	28.69	1.44	0.05249	5.25	0.517
1653	823.50	28.70	1.43	0.05249	5.25	0.517
1654	824.00	28.71	1.43	0.05249	5.25	0.517
1655	824.50	28.71	1.42	0.05249	5.25	0.517
1656	825.00	28.72	1.42	0.05249	5.25	0.517
1657	825.50	28.73	1.42	0.05249	5.25	0.517
1658	826.00	28.74	1.42	0.05244	5.24	0.517
1659	826.50	28.75	1.42	0.05244	5.24	0.517
1660	827.00	28.76	1.41	0.05244	5.24	0.517
1661	827.50	28.77	1.41	0.05244	5.24	0.517
1662	828.00	28.78	1.41	0.05244	5.24	0.517
1663	828.50	28.78	1.42	0.05244	5.24	0.517
1664	829.00	28.79	1.42	0.05244	5.24	0.517
1665	829.50	28.80	1.42	0.05254	5.25	0.517
1666	830.00	28.81	1.39	0.05249	5.25	0.517
1667	830.50	28.82	1.39	0.05249	5.25	0.517
1668	831.00	28.83	1.39	0.05249	5.25	0.517
1669	831.50	28.84	1.39	0.05249	5.25	0.517
1670	832.00	28.84	1.39	0.05249	5.25	0.517
1671	832.50	28.85	1.38	0.05249	5.25	0.517
1672	833.00	28.86	1.39	0.05249	5.25	0.517
1673	833.50	28.87	1.39	0.05249	5.25	0.517
1674	834.00	28.88	1.38	0.05249	5.25	0.517

1675	834.50	28.89	1.38	0.05249	5.25	0.517
1676	835.00	28.90	1.39	0.05249	5.25	0.517
1677	835.50	28.91	1.38	0.05249	5.25	0.517
1678	836.00	28.91	1.38	0.05249	5.25	0.517
1679	836.50	28.92	1.38	0.05249	5.25	0.517
1680	837.00	28.93	1.38	0.05249	5.25	0.517
1681	837.50	28.94	1.38	0.05244	5.24	0.517
1682	838.00	28.95	1.39	0.05244	5.24	0.517
1683	838.50	28.96	1.38	0.05244	5.24	0.517
1684	839.00	28.97	1.38	0.05244	5.24	0.517
1685	839.50	28.97	1.39	0.05244	5.24	0.517
1686	840.00	28.98	1.39	0.05244	5.24	0.517
1687	840.50	28.99	1.39	0.0524	5.24	0.517
1688	841.00	29.00	1.39	0.05249	5.25	0.517
1689	841.50	29.01	1.4	0.05249	5.25	0.517
1690	842.00	29.02	1.4	0.05249	5.25	0.517
1691	842.50	29.03	1.4	0.05249	5.25	0.517
1692	843.00	29.03	1.4	0.05254	5.25	0.517
1693	843.50	29.04	1.41	0.05249	5.25	0.517
1694	844.00	29.05	1.4	0.05249	5.25	0.517
1695	844.50	29.06	1.4	0.05249	5.25	0.517
1696	845.00	29.07	1.41	0.05249	5.25	0.517
1697	845.50	29.08	1.41	0.05249	5.25	0.517
1698	846.00	29.09	1.41	0.05249	5.25	0.517
1699	846.50	29.09	1.41	0.05249	5.25	0.517
1700	847.00	29.10	1.41	0.05249	5.25	0.517
1701	847.50	29.11	1.41	0.05249	5.25	0.517
1702	848.00	29.12	1.41	0.05249	5.25	0.517
1703	848.50	29.13	1.42	0.05249	5.25	0.517
1704	849.00	29.14	1.42	0.05249	5.25	0.517
1705	849.50	29.15	1.43	0.05249	5.25	0.517
1706	850.00	29.15	1.43	0.05254	5.25	0.517
1707	850.50	29.16	1.4	0.05249	5.25	0.517
1708	851.00	29.17	1.4	0.05249	5.25	0.517
1709	851.50	29.18	1.4	0.05249	5.25	0.517
1710	852.00	29.19	1.37	0.05249	5.25	0.517
1711	852.50	29.20	1.37	0.05249	5.25	0.517
1712	853.00	29.21	1.37	0.05249	5.25	0.517
1713	853.50	29.21	1.37	0.05249	5.25	0.517
1714	854.00	29.22	1.37	0.05249	5.25	0.517
1715	854.50	29.23	1.37	0.05249	5.25	0.517
1716	855.00	29.24	1.37	0.05244	5.24	0.517
1717	855.50	29.25	1.37	0.05249	5.25	0.517
1718	856.00	29.26	1.37	0.05249	5.25	0.517
1719	856.50	29.27	1.37	0.05249	5.25	0.517
1720	857.00	29.27	1.36	0.05249	5.25	0.517
1721	857.50	29.28	1.37	0.05249	5.25	0.517
1722	858.00	29.29	1.36	0.05249	5.25	0.517
1723	858.50	29.30	1.36	0.05244	5.24	0.517
1724	859.00	29.31	1.36	0.0524	5.24	0.517
1725	859.50	29.32	1.36	0.05244	5.24	0.517
1726	860.00	29.33	1.36	0.0524	5.24	0.517
1727	860.50	29.33	1.37	0.0524	5.24	0.517
1728	861.00	29.34	1.37	0.0524	5.24	0.517
1729	861.50	29.35	1.36	0.05244	5.24	0.517
1730	862.00	29.36	1.37	0.05244	5.24	0.517
1731	862.50	29.37	1.37	0.05244	5.24	0.517
1732	863.00	29.38	1.37	0.05244	5.24	0.517
1733	863.50	29.39	1.37	0.05244	5.24	0.517
1734	864.00	29.39	1.37	0.05244	5.24	0.517
1735	864.50	29.40	1.37	0.05244	5.24	0.517
1736	865.00	29.41	1.37	0.05244	5.24	0.517
1737	865.50	29.42	1.37	0.05244	5.24	0.517
1738	866.00	29.43	1.38	0.05244	5.24	0.517
1739	866.50	29.44	1.38	0.05244	5.24	0.517
1740	867.00	29.44	1.38	0.05244	5.24	0.517
1741	867.50	29.45	1.39	0.05249	5.25	0.517
1742	868.00	29.46	1.4	0.05249	5.25	0.517
1743	868.50	29.47	1.4	0.05244	5.24	0.517
1744	869.00	29.48	1.41	0.05244	5.24	0.517
1745	869.50	29.49	1.41	0.05249	5.25	0.517
1746	870.00	29.50	1.41	0.05249	5.25	0.517
1747	870.50	29.50	1.41	0.05249	5.25	0.517
1748	871.00	29.51	1.41	0.05249	5.25	0.517
1749	871.50	29.52	1.39	0.05249	5.25	0.517
1750	872.00	29.53	1.36	0.05249	5.25	0.517
1751	872.50	29.54	1.37	0.05249	5.25	0.517
1752	873.00	29.55	1.37	0.05249	5.25	0.517
1753	873.50	29.56	1.36	0.05249	5.25	0.517
1754	874.00	29.56	1.37	0.05249	5.25	0.517
1755	874.50	29.57	1.37	0.05249	5.25	0.517
1756	875.00	29.58	1.37	0.05249	5.25	0.517
1757	875.50	29.59	1.37	0.05249	5.25	0.517
1758	876.00	29.60	1.36	0.05249	5.25	0.517
1759	876.50	29.61	1.36	0.05254	5.25	0.517
1760	877.00	29.61	1.35	0.05249	5.25	0.517
1761	877.50	29.62	1.35	0.05249	5.25	0.517
1762	878.00	29.63	1.39	0.05249	5.25	0.517
1763	878.50	29.64	1.41	0.05249	5.25	0.517

1764	879.00	29.65	1.41	0.05249	5.25	0.517
1765	879.50	29.66	1.41	0.05254	5.25	0.517
1766	880.00	29.66	1.43	0.05258	5.26	0.517
1767	880.50	29.67	1.43	0.05263	5.26	0.516
1768	881.00	29.68	1.4	0.05254	5.25	0.517
1769	881.50	29.69	1.4	0.05254	5.25	0.517
1770	882.00	29.70	1.4	0.05258	5.26	0.517
1771	882.50	29.71	1.38	0.05249	5.25	0.517
1772	883.00	29.72	1.38	0.05254	5.25	0.517
1773	883.50	29.72	1.38	0.05249	5.25	0.517
1774	884.00	29.73	1.38	0.05244	5.24	0.517
1775	884.50	29.74	1.38	0.05244	5.24	0.517
1776	885.00	29.75	1.41	0.05258	5.26	0.517
1777	885.50	29.76	1.42	0.05258	5.26	0.517
1778	886.00	29.77	1.42	0.05254	5.25	0.517
1779	886.50	29.77	1.42	0.05254	5.25	0.517
1780	887.00	29.78	1.43	0.05249	5.25	0.517
1781	887.50	29.79	1.42	0.05249	5.25	0.517
1782	888.00	29.80	1.43	0.05249	5.25	0.517
1783	888.50	29.81	1.44	0.05258	5.26	0.517
1784	889.00	29.82	1.45	0.05254	5.25	0.517
1785	889.50	29.82	1.45	0.05254	5.25	0.517
1786	890.00	29.83	1.45	0.05258	5.26	0.517
1787	890.50	29.84	1.45	0.05263	5.26	0.516
1788	891.00	29.85	1.44	0.05258	5.26	0.517
1789	891.50	29.86	1.44	0.05258	5.26	0.517
1790	892.00	29.87	1.42	0.05258	5.26	0.517
1791	892.50	29.87	1.42	0.05258	5.26	0.517
1792	893.00	29.88	1.42	0.05258	5.26	0.517
1793	893.50	29.89	1.42	0.05258	5.26	0.517
1794	894.00	29.90	1.4	0.05258	5.26	0.517
1795	894.50	29.91	1.4	0.05254	5.25	0.517
1796	895.00	29.92	1.4	0.05258	5.26	0.517
1797	895.50	29.92	1.4	0.05254	5.25	0.517
1798	896.00	29.93	1.4	0.05254	5.25	0.517
1799	896.50	29.94	1.4	0.05249	5.25	0.517
1800	897.00	29.95	1.4	0.05254	5.25	0.517
1801	897.50	29.96	1.4	0.05249	5.25	0.517
1802	898.00	29.97	1.4	0.05249	5.25	0.517
1803	898.50	29.98	1.4	0.05249	5.25	0.517
1804	899.00	29.98	1.4	0.05249	5.25	0.517
1805	899.50	29.99	1.4	0.05249	5.25	0.517
1806	900.00	30.00	1.41	0.05254	5.25	0.517
1807	900.50	30.01	1.41	0.05254	5.25	0.517
1808	901.00	30.02	1.41	0.05258	5.26	0.517
1809	901.50	30.03	1.41	0.05263	5.26	0.516
1810	902.00	30.03	1.41	0.05254	5.25	0.517
1811	902.50	30.04	1.41	0.05258	5.26	0.517
1812	903.00	30.05	1.41	0.05258	5.26	0.517
1813	903.50	30.06	1.37	0.05258	5.26	0.517
1814	904.00	30.07	1.38	0.05249	5.25	0.517
1815	904.50	30.07	1.37	0.05254	5.25	0.517
1816	905.00	30.08	1.37	0.05249	5.25	0.517
1817	905.50	30.09	1.37	0.05244	5.24	0.517
1818	906.00	30.10	1.37	0.05249	5.25	0.517
1819	906.50	30.11	1.42	0.05249	5.25	0.517
1820	907.00	30.12	1.42	0.05249	5.25	0.517
1821	907.50	30.12	1.42	0.05249	5.25	0.517
1822	908.00	30.13	1.43	0.05254	5.25	0.517
1823	908.50	30.14	1.43	0.05254	5.25	0.517
1824	909.00	30.15	1.43	0.05254	5.25	0.517
1825	909.50	30.16	1.43	0.05258	5.26	0.517
1826	910.00	30.17	1.43	0.05263	5.26	0.516
1827	910.50	30.17	1.42	0.05258	5.26	0.517
1828	911.00	30.18	1.42	0.05258	5.26	0.517
1829	911.50	30.19	1.42	0.05258	5.26	0.517
1830	912.00	30.20	1.42	0.05258	5.26	0.517
1831	912.50	30.21	1.42	0.05258	5.26	0.517
1832	913.00	30.22	1.42	0.05258	5.26	0.517
1833	913.50	30.22	1.42	0.05258	5.26	0.517
1834	914.00	30.23	1.42	0.05258	5.26	0.517
1835	914.50	30.24	1.41	0.05258	5.26	0.517
1836	915.00	30.25	1.41	0.05258	5.26	0.517
1837	915.50	30.26	1.41	0.05258	5.26	0.517
1838	916.00	30.27	1.41	0.05254	5.25	0.517
1839	916.50	30.27	1.41	0.05254	5.25	0.517
1840	917.00	30.28	1.41	0.05254	5.25	0.517
1841	917.50	30.29	1.41	0.05254	5.25	0.517
1842	918.00	30.30	1.41	0.05258	5.26	0.517
1843	918.50	30.31	1.41	0.05263	5.26	0.516
1844	919.00	30.32	1.39	0.05258	5.26	0.517
1845	919.50	30.32	1.39	0.05258	5.26	0.517
1846	920.00	30.33	1.39	0.05258	5.26	0.517
1847	920.50	30.34	1.39	0.05258	5.26	0.517
1848	921.00	30.35	1.39	0.05258	5.26	0.517
1849	921.50	30.36	1.39	0.05258	5.26	0.517
1850	922.00	30.36	1.39	0.05258	5.26	0.517
1851	922.50	30.37	1.39	0.05258	5.26	0.517
1852	923.00	30.38	1.39	0.05258	5.26	0.517

1853	923.50	30.39	1.39	0.05258	5.26	0.517
1854	924.00	30.40	1.39	0.05254	5.25	0.517
1855	924.50	30.41	1.39	0.05249	5.25	0.517
1856	925.00	30.41	1.38	0.05249	5.25	0.517
1857	925.50	30.42	1.39	0.05249	5.25	0.517
1858	926.00	30.43	1.38	0.05254	5.25	0.517
1859	926.50	30.44	1.38	0.05249	5.25	0.517
1860	927.00	30.45	1.39	0.05249	5.25	0.517
1861	927.50	30.45	1.39	0.05249	5.25	0.517
1862	928.00	30.46	1.39	0.05249	5.25	0.517
1863	928.50	30.47	1.39	0.05254	5.25	0.517
1864	929.00	30.48	1.39	0.05254	5.25	0.517
1865	929.50	30.49	1.39	0.05254	5.25	0.517
1866	930.00	30.50	1.4	0.05254	5.25	0.517
1867	930.50	30.50	1.42	0.05258	5.26	0.517
1868	931.00	30.51	1.42	0.05258	5.26	0.517
1869	931.50	30.52	1.42	0.05258	5.26	0.517
1870	932.00	30.53	1.42	0.05258	5.26	0.517
1871	932.50	30.54	1.42	0.05263	5.26	0.516
1872	933.00	30.55	1.42	0.05258	5.26	0.517
1873	933.50	30.55	1.41	0.05258	5.26	0.517
1874	934.00	30.56	1.41	0.05258	5.26	0.517
1875	934.50	30.57	1.41	0.05258	5.26	0.517
1876	935.00	30.58	1.41	0.05258	5.26	0.517
1877	935.50	30.59	1.41	0.05258	5.26	0.517
1878	936.00	30.59	1.41	0.05258	5.26	0.517
1879	936.50	30.60	1.41	0.05254	5.25	0.517
1880	937.00	30.61	1.41	0.05254	5.25	0.517
1881	937.50	30.62	1.41	0.05254	5.25	0.517
1882	938.00	30.63	1.42	0.05254	5.25	0.517
1883	938.50	30.63	1.42	0.05254	5.25	0.517
1884	939.00	30.64	1.42	0.05258	5.26	0.517
1885	939.50	30.65	1.42	0.05258	5.26	0.517
1886	940.00	30.66	1.42	0.05258	5.26	0.517
1887	940.50	30.67	1.39	0.05263	5.26	0.516
1888	941.00	30.68	1.39	0.05258	5.26	0.517
1889	941.50	30.68	1.39	0.05258	5.26	0.517
1890	942.00	30.69	1.39	0.05258	5.26	0.517
1891	942.50	30.70	1.38	0.05258	5.26	0.517
1892	943.00	30.71	1.38	0.05258	5.26	0.517
1893	943.50	30.72	1.38	0.05258	5.26	0.517
1894	944.00	30.72	1.38	0.05258	5.26	0.517
1895	944.50	30.73	1.38	0.05258	5.26	0.517
1896	945.00	30.74	1.38	0.05258	5.26	0.517
1897	945.50	30.75	1.38	0.05254	5.25	0.517
1898	946.00	30.76	1.38	0.05249	5.25	0.517
1899	946.50	30.77	1.38	0.05254	5.25	0.517
1900	947.00	30.77	1.38	0.05254	5.25	0.517
1901	947.50	30.78	1.38	0.05254	5.25	0.517
1902	948.00	30.79	1.39	0.05249	5.25	0.517
1903	948.50	30.80	1.38	0.05249	5.25	0.517
1904	949.00	30.81	1.39	0.05249	5.25	0.517
1905	949.50	30.81	1.39	0.05249	5.25	0.517
1906	950.00	30.82	1.39	0.05249	5.25	0.517
1907	950.50	30.83	1.4	0.05254	5.25	0.517
1908	951.00	30.84	1.4	0.05258	5.26	0.517
1909	951.50	30.85	1.4	0.05258	5.26	0.517
1910	952.00	30.85	1.41	0.05258	5.26	0.517
1911	952.50	30.86	1.41	0.05258	5.26	0.517
1912	953.00	30.87	1.41	0.05258	5.26	0.517
1913	953.50	30.88	1.4	0.05258	5.26	0.517
1914	954.00	30.89	1.4	0.05258	5.26	0.517
1915	954.50	30.90	1.4	0.05258	5.26	0.517
1916	955.00	30.90	1.4	0.05258	5.26	0.517
1917	955.50	30.91	1.4	0.05258	5.26	0.517
1918	956.00	30.92	1.41	0.05254	5.25	0.517
1919	956.50	30.93	1.41	0.05254	5.25	0.517
1920	957.00	30.94	1.42	0.05258	5.26	0.517
1921	957.50	30.94	1.43	0.05254	5.25	0.517
1922	958.00	30.95	1.43	0.05254	5.25	0.517
1923	958.50	30.96	1.43	0.05254	5.25	0.517
1924	959.00	30.97	1.43	0.05254	5.25	0.517
1925	959.50	30.98	1.44	0.05258	5.26	0.517
1926	960.00	30.98	1.44	0.05258	5.26	0.517
1927	960.50	30.99	1.43	0.05258	5.26	0.517
1928	961.00	31.00	1.41	0.05258	5.26	0.517
1929	961.50	31.01	1.41	0.05258	5.26	0.517
1930	962.00	31.02	1.41	0.05263	5.26	0.516
1931	962.50	31.02	1.4	0.05258	5.26	0.517
1932	963.00	31.03	1.4	0.05258	5.26	0.517
1933	963.50	31.04	1.4	0.05258	5.26	0.517
1934	964.00	31.05	1.41	0.05258	5.26	0.517
1935	964.50	31.06	1.4	0.05258	5.26	0.517
1936	965.00	31.06	1.4	0.05258	5.26	0.517
1937	965.50	31.07	1.4	0.05258	5.26	0.517
1938	966.00	31.08	1.4	0.05263	5.26	0.516
1939	966.50	31.09	1.39	0.05254	5.25	0.517
1940	967.00	31.10	1.39	0.05254	5.25	0.517
1941	967.50	31.10	1.39	0.05254	5.25	0.517

1942	968.00	31.11	1.39	0.05249	5.25	0.517
1943	968.50	31.12	1.39	0.05254	5.25	0.517
1944	969.00	31.13	1.39	0.05249	5.25	0.517
1945	969.50	31.14	1.39	0.05249	5.25	0.517
1946	970.00	31.14	1.39	0.05249	5.25	0.517
1947	970.50	31.15	1.39	0.05258	5.26	0.517
1948	971.00	31.16	1.39	0.05254	5.25	0.517
1949	971.50	31.17	1.39	0.05258	5.26	0.517
1950	972.00	31.18	1.39	0.05258	5.26	0.517
1951	972.50	31.18	1.39	0.05258	5.26	0.517
1952	973.00	31.19	1.39	0.05258	5.26	0.517
1953	973.50	31.20	1.39	0.05258	5.26	0.517
1954	974.00	31.21	1.39	0.05258	5.26	0.517
1955	974.50	31.22	1.39	0.05258	5.26	0.517
1956	975.00	31.22	1.39	0.05258	5.26	0.517
1957	975.50	31.23	1.39	0.05258	5.26	0.517
1958	976.00	31.24	1.4	0.05258	5.26	0.517
1959	976.50	31.25	1.4	0.05258	5.26	0.517
1960	977.00	31.26	1.4	0.05258	5.26	0.517
1961	977.50	31.27	1.39	0.05258	5.26	0.517
1962	978.00	31.27	1.39	0.05258	5.26	0.517
1963	978.50	31.28	1.39	0.05249	5.25	0.517
1964	979.00	31.29	1.39	0.05254	5.25	0.517
1965	979.50	31.30	1.39	0.05249	5.25	0.517
1966	980.00	31.31	1.39	0.05249	5.25	0.517
1967	980.50	31.31	1.39	0.05249	5.25	0.517
1968	981.00	31.32	1.4	0.05249	5.25	0.517
1969	981.50	31.33	1.4	0.05258	5.26	0.517
1970	982.00	31.34	1.41	0.05254	5.25	0.517
1971	982.50	31.34	1.41	0.05258	5.26	0.517
1972	983.00	31.35	1.41	0.05258	5.26	0.517
1973	983.50	31.36	1.42	0.05258	5.26	0.517
1974	984.00	31.37	1.42	0.05258	5.26	0.517
1975	984.50	31.38	1.42	0.05258	5.26	0.517
1976	985.00	31.38	1.41	0.05258	5.26	0.517
1977	985.50	31.39	1.41	0.05258	5.26	0.517
1978	986.00	31.40	1.39	0.05258	5.26	0.517
1979	986.50	31.41	1.39	0.05258	5.26	0.517
1980	987.00	31.42	1.39	0.05258	5.26	0.517
1981	987.50	31.42	1.39	0.05258	5.26	0.517
1982	988.00	31.43	1.39	0.05249	5.25	0.517
1983	988.50	31.44	1.39	0.05254	5.25	0.517
1984	989.00	31.45	1.39	0.05254	5.25	0.517
1985	989.50	31.46	1.39	0.05254	5.25	0.517
1986	990.00	31.46	1.39	0.05254	5.25	0.517
1987	990.50	31.47	1.39	0.05254	5.25	0.517
1988	991.00	31.48	1.39	0.05258	5.26	0.517
1989	991.50	31.49	1.39	0.05258	5.26	0.517
1990	992.00	31.50	1.39	0.05258	5.26	0.517
1991	992.50	31.50	1.39	0.05263	5.26	0.516
1992	993.00	31.51	1.38	0.05258	5.26	0.517
1993	993.50	31.52	1.38	0.05258	5.26	0.517
1994	994.00	31.53	1.38	0.05258	5.26	0.517
1995	994.50	31.54	1.38	0.05258	5.26	0.517
1996	995.00	31.54	1.38	0.05258	5.26	0.517
1997	995.50	31.55	1.38	0.05258	5.26	0.517
1998	996.00	31.56	1.38	0.05258	5.26	0.517
1999	996.50	31.57	1.38	0.05258	5.26	0.517
2000	997.00	31.58	1.37	0.05249	5.25	0.517
2001	997.50	31.58	1.38	0.05249	5.25	0.517
2002	998.00	31.59	1.38	0.05254	5.25	0.517
2003	998.50	31.60	1.38	0.05254	5.25	0.517
2004	999.00	31.61	1.38	0.05254	5.25	0.517
2005	999.50	31.61	1.38	0.05254	5.25	0.517
2006	1000.00	31.62	1.38	0.05254	5.25	0.517
2007	1000.50	31.63	1.38	0.05258	5.26	0.517
2008	1001.00	31.64	1.37	0.05254	5.25	0.517
2009	1001.50	31.65	1.38	0.05254	5.25	0.517
2010	1002.00	31.65	1.38	0.05254	5.25	0.517
2011	1002.50	31.66	1.38	0.05254	5.25	0.517
2012	1003.00	31.67	1.38	0.05258	5.26	0.517
2013	1003.50	31.68	1.38	0.05254	5.25	0.517
2014	1004.00	31.69	1.38	0.05254	5.25	0.517
2015	1004.50	31.69	1.39	0.05254	5.25	0.517
2016	1005.00	31.70	1.39	0.05254	5.25	0.517
2017	1005.50	31.71	1.39	0.05254	5.25	0.517
2018	1006.00	31.72	1.4	0.05258	5.26	0.517
2019	1006.50	31.73	1.4	0.05258	5.26	0.517
2020	1007.00	31.73	1.4	0.05258	5.26	0.517
2021	1007.50	31.74	1.42	0.05258	5.26	0.517
2022	1008.00	31.75	1.42	0.05258	5.26	0.517
2023	1008.50	31.76	1.43	0.05258	5.26	0.517
2024	1009.00	31.76	1.42	0.05258	5.26	0.517
2025	1009.50	31.77	1.42	0.05258	5.26	0.517
2026	1010.00	31.78	1.41	0.05258	5.26	0.517
2027	1010.50	31.79	1.38	0.05258	5.26	0.517
2028	1011.00	31.80	1.38	0.05258	5.26	0.517
2029	1011.50	31.80	1.38	0.05258	5.26	0.517
2030	1012.00	31.81	1.38	0.05258	5.26	0.517

2031	1012.50	31.82	1.38	0.05258	5.26	0.517
2032	1013.00	31.83	1.38	0.05258	5.26	0.517
2033	1013.50	31.84	1.38	0.05258	5.26	0.517
2034	1014.00	31.84	1.37	0.05258	5.26	0.517
2035	1014.50	31.85	1.38	0.05258	5.26	0.517
2036	1015.00	31.86	1.37	0.05258	5.26	0.517
2037	1015.50	31.87	1.38	0.05258	5.26	0.517
2038	1016.00	31.87	1.37	0.05258	5.26	0.517
2039	1016.50	31.88	1.37	0.05258	5.26	0.517
2040	1017.00	31.89	1.37	0.05258	5.26	0.517
2041	1017.50	31.90	1.37	0.05254	5.25	0.517
2042	1018.00	31.91	1.37	0.05249	5.25	0.517
2043	1018.50	31.91	1.37	0.05249	5.25	0.517
2044	1019.00	31.92	1.37	0.05249	5.25	0.517
2045	1019.50	31.93	1.37	0.05249	5.25	0.517
2046	1020.00	31.94	1.37	0.05249	5.25	0.517
2047	1020.50	31.95	1.37	0.05258	5.26	0.517
2048	1021.00	31.95	1.37	0.05258	5.26	0.517
2049	1021.50	31.96	1.37	0.05258	5.26	0.517
2050	1022.00	31.97	1.37	0.05258	5.26	0.517
2051	1022.50	31.98	1.38	0.05258	5.26	0.517
2052	1023.00	31.98	1.38	0.05258	5.26	0.517
2053	1023.50	31.99	1.39	0.05258	5.26	0.517
2054	1024.00	32.00	1.39	0.05258	5.26	0.517
2055	1024.50	32.01	1.39	0.05258	5.26	0.517
2056	1025.00	32.02	1.39	0.05258	5.26	0.517
2057	1025.50	32.02	1.39	0.05258	5.26	0.517
2058	1026.00	32.03	1.39	0.05258	5.26	0.517
2059	1026.50	32.04	1.39	0.05254	5.25	0.517
2060	1027.00	32.05	1.4	0.05254	5.25	0.517
2061	1027.50	32.05	1.4	0.05254	5.25	0.517
2062	1028.00	32.06	1.4	0.05254	5.25	0.517
2063	1028.50	32.07	1.4	0.05254	5.25	0.517
2064	1029.00	32.08	1.41	0.05258	5.26	0.517
2065	1029.50	32.09	1.41	0.05258	5.26	0.517
2066	1030.00	32.09	1.4	0.05258	5.26	0.517
2067	1030.50	32.10	1.39	0.05258	5.26	0.517
2068	1031.00	32.11	1.39	0.05258	5.26	0.517
2069	1031.50	32.12	1.39	0.05258	5.26	0.517
2070	1032.00	32.12	1.39	0.05258	5.26	0.517
2071	1032.50	32.13	1.39	0.05258	5.26	0.517
2072	1033.00	32.14	1.39	0.05258	5.26	0.517
2073	1033.50	32.15	1.39	0.05258	5.26	0.517
2074	1034.00	32.16	1.4	0.05258	5.26	0.517
2075	1034.50	32.16	1.4	0.05258	5.26	0.517
2076	1035.00	32.17	1.38	0.05258	5.26	0.517
2077	1035.50	32.18	1.38	0.05258	5.26	0.517
2078	1036.00	32.19	1.38	0.05249	5.25	0.517
2079	1036.50	32.19	1.38	0.05254	5.25	0.517
2080	1037.00	32.20	1.38	0.05254	5.25	0.517
2081	1037.50	32.21	1.38	0.05254	5.25	0.517
2082	1038.00	32.22	1.38	0.05254	5.25	0.517
2083	1038.50	32.23	1.38	0.05254	5.25	0.517
2084	1039.00	32.23	1.38	0.05254	5.25	0.517
2085	1039.50	32.24	1.39	0.05254	5.25	0.517
2086	1040.00	32.25	1.39	0.05254	5.25	0.517
2087	1040.50	32.26	1.37	0.05258	5.26	0.517
2088	1041.00	32.26	1.36	0.05258	5.26	0.517
2089	1041.50	32.27	1.36	0.05258	5.26	0.517
2090	1042.00	32.28	1.37	0.05258	5.26	0.517
2091	1042.50	32.29	1.36	0.05258	5.26	0.517
2092	1043.00	32.30	1.36	0.05258	5.26	0.517
2093	1043.50	32.30	1.36	0.05254	5.25	0.517
2094	1044.00	32.31	1.36	0.05258	5.26	0.517
2095	1044.50	32.32	1.36	0.05254	5.25	0.517
2096	1045.00	32.33	1.36	0.05258	5.26	0.517
2097	1045.50	32.33	1.37	0.05258	5.26	0.517
2098	1046.00	32.34	1.36	0.05258	5.26	0.517
2099	1046.50	32.35	1.37	0.05254	5.25	0.517
2100	1047.00	32.36	1.36	0.05258	5.26	0.517
2101	1047.50	32.37	1.37	0.05258	5.26	0.517
2102	1048.00	32.37	1.37	0.05254	5.25	0.517
2103	1048.50	32.38	1.37	0.05249	5.25	0.517
2104	1049.00	32.39	1.37	0.05249	5.25	0.517
2105	1049.50	32.40	1.37	0.05249	5.25	0.517
2106	1050.00	32.40	1.38	0.05254	5.25	0.517
2107	1050.50	32.41	1.37	0.05254	5.25	0.517
2108	1051.00	32.42	1.38	0.05249	5.25	0.517
2109	1051.50	32.43	1.38	0.05254	5.25	0.517
2110	1052.00	32.43	1.38	0.05254	5.25	0.517
2111	1052.50	32.44	1.39	0.05258	5.26	0.517
2112	1053.00	32.45	1.39	0.05258	5.26	0.517
2113	1053.50	32.46	1.39	0.05258	5.26	0.517
2114	1054.00	32.47	1.4	0.05258	5.26	0.517
2115	1054.50	32.47	1.4	0.05258	5.26	0.517
2116	1055.00	32.48	1.4	0.05258	5.26	0.517
2117	1055.50	32.49	1.4	0.05258	5.26	0.517
2118	1056.00	32.50	1.4	0.05258	5.26	0.517
2119	1056.50	32.50	1.4	0.05258	5.26	0.517

2120	1057.00	32.51	1.4	0.05258	5.26	0.517
2121	1057.50	32.52	1.4	0.05258	5.26	0.517
2122	1058.00	32.53	1.4	0.05258	5.26	0.517
2123	1058.50	32.53	1.4	0.05258	5.26	0.517
2124	1059.00	32.54	1.4	0.05258	5.26	0.517
2125	1059.50	32.55	1.4	0.05258	5.26	0.517
2126	1060.00	32.56	1.4	0.05254	5.25	0.517
2127	1060.50	32.57	1.4	0.05254	5.25	0.517
2128	1061.00	32.57	1.4	0.05258	5.26	0.517
2129	1061.50	32.58	1.41	0.05258	5.26	0.517
2130	1062.00	32.59	1.41	0.05254	5.25	0.517
2131	1062.50	32.60	1.41	0.05258	5.26	0.517
2132	1063.00	32.60	1.41	0.05258	5.26	0.517
2133	1063.50	32.61	1.37	0.05258	5.26	0.517
2134	1064.00	32.62	1.37	0.05258	5.26	0.517
2135	1064.50	32.63	1.37	0.05258	5.26	0.517
2136	1065.00	32.63	1.37	0.05258	5.26	0.517
2137	1065.50	32.64	1.37	0.05258	5.26	0.517
2138	1066.00	32.65	1.37	0.05258	5.26	0.517
2139	1066.50	32.66	1.37	0.05258	5.26	0.517
2140	1067.00	32.66	1.37	0.05258	5.26	0.517
2141	1067.50	32.67	1.37	0.05258	5.26	0.517
2142	1068.00	32.68	1.37	0.05258	5.26	0.517
2143	1068.50	32.69	1.37	0.05258	5.26	0.517
2144	1069.00	32.70	1.37	0.05258	5.26	0.517
2145	1069.50	32.70	1.36	0.05254	5.25	0.517
2146	1070.00	32.71	1.36	0.05254	5.25	0.517
2147	1070.50	32.72	1.36	0.05254	5.25	0.517
2148	1071.00	32.73	1.36	0.05249	5.25	0.517
2149	1071.50	32.73	1.36	0.05249	5.25	0.517
2150	1072.00	32.74	1.35	0.05249	5.25	0.517
2151	1072.50	32.75	1.35	0.05254	5.25	0.517
2152	1073.00	32.76	1.35	0.05254	5.25	0.517
2153	1073.50	32.76	1.35	0.05254	5.25	0.517
2154	1074.00	32.77	1.35	0.05254	5.25	0.517
2155	1074.50	32.78	1.35	0.05254	5.25	0.517
2156	1075.00	32.79	1.35	0.05254	5.25	0.517
2157	1075.50	32.79	1.35	0.05254	5.25	0.517
2158	1076.00	32.80	1.35	0.05254	5.25	0.517
2159	1076.50	32.81	1.36	0.05254	5.25	0.517
2160	1077.00	32.82	1.35	0.05254	5.25	0.517
2161	1077.50	32.83	1.35	0.05249	5.25	0.517
2162	1078.00	32.83	1.35	0.05249	5.25	0.517
2163	1078.50	32.84	1.35	0.05254	5.25	0.517
2164	1079.00	32.85	1.39	0.05249	5.25	0.517
2165	1079.50	32.86	1.39	0.05254	5.25	0.517
2166	1080.00	32.86	1.4	0.05254	5.25	0.517
2167	1080.50	32.87	1.4	0.05249	5.25	0.517
2168	1081.00	32.88	1.4	0.05254	5.25	0.517
2169	1081.50	32.89	1.4	0.05254	5.25	0.517
2170	1082.00	32.89	1.4	0.05258	5.26	0.517
2171	1082.50	32.90	1.4	0.05258	5.26	0.517
2172	1083.00	32.91	1.4	0.05258	5.26	0.517
2173	1083.50	32.92	1.4	0.05258	5.26	0.517
2174	1084.00	32.92	1.4	0.05263	5.26	0.516
2175	1084.50	32.93	1.4	0.05263	5.26	0.516
2176	1085.00	32.94	1.38	0.05258	5.26	0.517
2177	1085.50	32.95	1.38	0.05258	5.26	0.517
2178	1086.00	32.95	1.38	0.05258	5.26	0.517
2179	1086.50	32.96	1.38	0.05258	5.26	0.517
2180	1087.00	32.97	1.37	0.05258	5.26	0.517
2181	1087.50	32.98	1.37	0.05258	5.26	0.517
2182	1088.00	32.98	1.37	0.05254	5.25	0.517
2183	1088.50	32.99	1.37	0.05254	5.25	0.517
2184	1089.00	33.00	1.37	0.05254	5.25	0.517
2185	1089.50	33.01	1.37	0.05249	5.25	0.517
2186	1090.00	33.02	1.37	0.05254	5.25	0.517
2187	1090.50	33.02	1.37	0.05254	5.25	0.517
2188	1091.00	33.03	1.37	0.05258	5.26	0.517
2189	1091.50	33.04	1.37	0.05258	5.26	0.517
2190	1092.00	33.05	1.37	0.05254	5.25	0.517
2191	1092.50	33.05	1.37	0.05258	5.26	0.517
2192	1093.00	33.06	1.37	0.05258	5.26	0.517
2193	1093.50	33.07	1.37	0.05258	5.26	0.517
2194	1094.00	33.08	1.37	0.05258	5.26	0.517
2195	1094.50	33.08	1.37	0.05258	5.26	0.517
2196	1095.00	33.09	1.37	0.05258	5.26	0.517
2197	1095.50	33.10	1.37	0.05258	5.26	0.517
2198	1096.00	33.11	1.37	0.05258	5.26	0.517
2199	1096.50	33.11	1.37	0.05258	5.26	0.517
2200	1097.00	33.12	1.36	0.05254	5.25	0.517
2201	1097.50	33.13	1.37	0.05249	5.25	0.517
2202	1098.00	33.14	1.37	0.05249	5.25	0.517
2203	1098.50	33.14	1.37	0.05249	5.25	0.517
2204	1099.00	33.15	1.37	0.05249	5.25	0.517
2205	1099.50	33.16	1.36	0.05249	5.25	0.517
2206	1100.00	33.17	1.36	0.05249	5.25	0.517
2207	1100.50	33.17	1.36	0.05254	5.25	0.517
2208	1101.00	33.18	1.37	0.05258	5.26	0.517

2209	1101.50	33.19	1.36	0.05258	5.26	0.517
2210	1102.00	33.20	1.36	0.05258	5.26	0.517
2211	1102.50	33.20	1.36	0.05258	5.26	0.517
2212	1103.00	33.21	1.36	0.05258	5.26	0.517
2213	1103.50	33.22	1.36	0.05258	5.26	0.517
2214	1104.00	33.23	1.36	0.05254	5.25	0.517
2215	1104.50	33.23	1.36	0.05254	5.25	0.517
2216	1105.00	33.24	1.36	0.05254	5.25	0.517
2217	1105.50	33.25	1.36	0.05254	5.25	0.517
2218	1106.00	33.26	1.36	0.05254	5.25	0.517
2219	1106.50	33.26	1.37	0.05254	5.25	0.517
2220	1107.00	33.27	1.37	0.05254	5.25	0.517
2221	1107.50	33.28	1.37	0.05254	5.25	0.517
2222	1108.00	33.29	1.37	0.05254	5.25	0.517
2223	1108.50	33.29	1.39	0.05249	5.25	0.517
2224	1109.00	33.30	1.39	0.05254	5.25	0.517
2225	1109.50	33.31	1.4	0.05258	5.26	0.517
2226	1110.00	33.32	1.41	0.05258	5.26	0.517
2227	1110.50	33.32	1.41	0.05258	5.26	0.517
2228	1111.00	33.33	1.4	0.05258	5.26	0.517
2229	1111.50	33.34	1.37	0.05258	5.26	0.517
2230	1112.00	33.35	1.37	0.05258	5.26	0.517
2231	1112.50	33.35	1.37	0.05258	5.26	0.517
2232	1113.00	33.36	1.36	0.05258	5.26	0.517
2233	1113.50	33.37	1.36	0.05258	5.26	0.517
2234	1114.00	33.38	1.36	0.05258	5.26	0.517
2235	1114.50	33.38	1.36	0.05258	5.26	0.517
2236	1115.00	33.39	1.36	0.05258	5.26	0.517
2237	1115.50	33.40	1.36	0.05258	5.26	0.517
2238	1116.00	33.41	1.36	0.05258	5.26	0.517
2239	1116.50	33.41	1.36	0.05258	5.26	0.517
2240	1117.00	33.42	1.36	0.05258	5.26	0.517
2241	1117.50	33.43	1.36	0.05258	5.26	0.517
2242	1118.00	33.44	1.36	0.05249	5.25	0.517
2243	1118.50	33.44	1.36	0.05254	5.25	0.517
2244	1119.00	33.45	1.36	0.05254	5.25	0.517
2245	1119.50	33.46	1.36	0.05254	5.25	0.517
2246	1120.00	33.47	1.36	0.05254	5.25	0.517
2247	1120.50	33.47	1.36	0.05254	5.25	0.517
2248	1121.00	33.48	1.36	0.05254	5.25	0.517
2249	1121.50	33.49	1.36	0.05258	5.26	0.517
2250	1122.00	33.50	1.36	0.05258	5.26	0.517
2251	1122.50	33.50	1.36	0.05258	5.26	0.517
2252	1123.00	33.51	1.35	0.05258	5.26	0.517
2253	1123.50	33.52	1.35	0.05258	5.26	0.517
2254	1124.00	33.53	1.35	0.05258	5.26	0.517
2255	1124.50	33.53	1.35	0.05263	5.26	0.516
2256	1125.00	33.54	1.35	0.05263	5.26	0.516
2257	1125.50	33.55	1.35	0.05258	5.26	0.517
2258	1126.00	33.56	1.35	0.05258	5.26	0.517
2259	1126.50	33.56	1.35	0.05258	5.26	0.517
2260	1127.00	33.57	1.35	0.05258	5.26	0.517
2261	1127.50	33.58	1.36	0.05258	5.26	0.517
2262	1128.00	33.59	1.37	0.05258	5.26	0.517
2263	1128.50	33.59	1.41	0.05258	5.26	0.517
2264	1129.00	33.60	1.42	0.05258	5.26	0.517
2265	1129.50	33.61	1.42	0.05258	5.26	0.517
2266	1130.00	33.62	1.42	0.05263	5.26	0.516
2267	1130.50	33.62	1.43	0.05258	5.26	0.517
2268	1131.00	33.63	1.44	0.05258	5.26	0.517
2269	1131.50	33.64	1.45	0.05268	5.27	0.516
2270	1132.00	33.65	1.44	0.05268	5.27	0.516
2271	1132.50	33.65	1.43	0.05268	5.27	0.516
2272	1133.00	33.66	1.43	0.05268	5.27	0.516
2273	1133.50	33.67	1.43	0.05268	5.27	0.516
2274	1134.00	33.67	1.43	0.05268	5.27	0.516
2275	1134.50	33.68	1.43	0.05272	5.27	0.516
2276	1135.00	33.69	1.43	0.05272	5.27	0.516
2277	1135.50	33.70	1.43	0.05268	5.27	0.516
2278	1136.00	33.70	1.43	0.05272	5.27	0.516
2279	1136.50	33.71	1.42	0.05268	5.27	0.516
2280	1137.00	33.72	1.42	0.05268	5.27	0.516
2281	1137.50	33.73	1.42	0.05258	5.26	0.517
2282	1138.00	33.73	1.42	0.05263	5.26	0.516
2283	1138.50	33.74	1.42	0.05263	5.26	0.516
2284	1139.00	33.75	1.42	0.05263	5.26	0.516
2285	1139.50	33.76	1.42	0.05268	5.27	0.516
2286	1140.00	33.76	1.42	0.05268	5.27	0.516
2287	1140.50	33.77	1.42	0.05268	5.27	0.516
2288	1141.00	33.78	1.42	0.05268	5.27	0.516
2289	1141.50	33.79	1.42	0.05268	5.27	0.516
2290	1142.00	33.79	1.42	0.05272	5.27	0.516
2291	1142.50	33.80	1.4	0.05268	5.27	0.516
2292	1143.00	33.81	1.4	0.05268	5.27	0.516
2293	1143.50	33.82	1.4	0.05268	5.27	0.516
2294	1144.00	33.82	1.4	0.05268	5.27	0.516
2295	1144.50	33.83	1.4	0.05268	5.27	0.516
2296	1145.00	33.84	1.4	0.05268	5.27	0.516
2297	1145.50	33.85	1.4	0.05268	5.27	0.516

2298	1146.00	33.85	1.4	0.05268	5.27	0.516
2299	1146.50	33.86	1.4	0.05268	5.27	0.516
2300	1147.00	33.87	1.4	0.05268	5.27	0.516
2301	1147.50	33.87	1.4	0.05268	5.27	0.516
2302	1148.00	33.88	1.4	0.05268	5.27	0.516
2303	1148.50	33.89	1.4	0.05268	5.27	0.516
2304	1149.00	33.90	1.4	0.05268	5.27	0.516
2305	1149.50	33.90	1.4	0.05263	5.26	0.516
2306	1150.00	33.91	1.41	0.05258	5.26	0.517
2307	1150.50	33.92	1.41	0.05263	5.26	0.516
2308	1151.00	33.93	1.42	0.05258	5.26	0.517
2309	1151.50	33.93	1.43	0.05263	5.26	0.516
2310	1152.00	33.94	1.43	0.05263	5.26	0.516
2311	1152.50	33.95	1.43	0.05268	5.27	0.516
2312	1153.00	33.96	1.44	0.05268	5.27	0.516
2313	1153.50	33.96	1.45	0.05268	5.27	0.516
2314	1154.00	33.97	1.45	0.05268	5.27	0.516
2315	1154.50	33.98	1.43	0.05268	5.27	0.516
2316	1155.00	33.99	1.42	0.05268	5.27	0.516
2317	1155.50	33.99	1.42	0.05268	5.27	0.516
2318	1156.00	34.00	1.42	0.05268	5.27	0.516
2319	1156.50	34.01	1.42	0.05263	5.26	0.516
2320	1157.00	34.01	1.42	0.05268	5.27	0.516
2321	1157.50	34.02	1.42	0.05268	5.27	0.516
2322	1158.00	34.03	1.42	0.05268	5.27	0.516
2323	1158.50	34.04	1.43	0.05268	5.27	0.516
2324	1159.00	34.04	1.41	0.05268	5.27	0.516
2325	1159.50	34.05	1.42	0.05268	5.27	0.516
2326	1160.00	34.06	1.41	0.05268	5.27	0.516
2327	1160.50	34.07	1.42	0.05268	5.27	0.516
2328	1161.00	34.07	1.41	0.05263	5.26	0.516
2329	1161.50	34.08	1.41	0.05268	5.27	0.516
2330	1162.00	34.09	1.42	0.05263	5.26	0.516
2331	1162.50	34.10	1.41	0.05263	5.26	0.516
2332	1163.00	34.10	1.41	0.05263	5.26	0.516
2333	1163.50	34.11	1.41	0.05263	5.26	0.516
2334	1164.00	34.12	1.41	0.05272	5.27	0.516
2335	1164.50	34.12	1.41	0.05268	5.27	0.516
2336	1165.00	34.13	1.41	0.05268	5.27	0.516
2337	1165.50	34.14	1.41	0.05268	5.27	0.516
2338	1166.00	34.15	1.41	0.05268	5.27	0.516
2339	1166.50	34.15	1.41	0.05268	5.27	0.516
2340	1167.00	34.16	1.41	0.05268	5.27	0.516
2341	1167.50	34.17	1.41	0.05268	5.27	0.516
2342	1168.00	34.18	1.41	0.05268	5.27	0.516
2343	1168.50	34.18	1.41	0.05268	5.27	0.516
2344	1169.00	34.19	1.41	0.05263	5.26	0.516
2345	1169.50	34.20	1.41	0.05268	5.27	0.516
2346	1170.00	34.21	1.41	0.05268	5.27	0.516
2347	1170.50	34.21	1.41	0.05258	5.26	0.517
2348	1171.00	34.22	1.42	0.05263	5.26	0.516
2349	1171.50	34.23	1.41	0.05258	5.26	0.517
2350	1172.00	34.23	1.42	0.05258	5.26	0.517
2351	1172.50	34.24	1.42	0.05258	5.26	0.517
2352	1173.00	34.25	1.43	0.05263	5.26	0.516
2353	1173.50	34.26	1.44	0.05263	5.26	0.516
2354	1174.00	34.26	1.44	0.05268	5.27	0.516
2355	1174.50	34.27	1.44	0.05268	5.27	0.516
2356	1175.00	34.28	1.44	0.05268	5.27	0.516
2357	1175.50	34.29	1.44	0.05268	5.27	0.516
2358	1176.00	34.29	1.44	0.05268	5.27	0.516
2359	1176.50	34.30	1.44	0.05268	5.27	0.516
2360	1177.00	34.31	1.44	0.05268	5.27	0.516
2361	1177.50	34.31	1.43	0.05268	5.27	0.516
2362	1178.00	34.32	1.44	0.05268	5.27	0.516
2363	1178.50	34.33	1.44	0.05272	5.27	0.516
2364	1179.00	34.34	1.42	0.05268	5.27	0.516
2365	1179.50	34.34	1.42	0.05268	5.27	0.516
2366	1180.00	34.35	1.41	0.05258	5.26	0.517
2367	1180.50	34.36	1.41	0.05263	5.26	0.516
2368	1181.00	34.37	1.41	0.05268	5.27	0.516
2369	1181.50	34.37	1.41	0.05263	5.26	0.516
2370	1182.00	34.38	1.41	0.05263	5.26	0.516
2371	1182.50	34.39	1.41	0.05263	5.26	0.516
2372	1183.00	34.39	1.41	0.05263	5.26	0.516
2373	1183.50	34.40	1.41	0.05263	5.26	0.516
2374	1184.00	34.41	1.41	0.05272	5.27	0.516
2375	1184.50	34.42	1.39	0.05268	5.27	0.516
2376	1185.00	34.42	1.39	0.05268	5.27	0.516
2377	1185.50	34.43	1.39	0.05268	5.27	0.516
2378	1186.00	34.44	1.39	0.05268	5.27	0.516
2379	1186.50	34.45	1.39	0.05268	5.27	0.516
2380	1187.00	34.45	1.39	0.05268	5.27	0.516
2381	1187.50	34.46	1.39	0.05263	5.26	0.516
2382	1188.00	34.47	1.39	0.05263	5.26	0.516
2383	1188.50	34.47	1.39	0.05263	5.26	0.516
2384	1189.00	34.48	1.39	0.05268	5.27	0.516
2385	1189.50	34.49	1.39	0.05263	5.26	0.516
2386	1190.00	34.50	1.39	0.05263	5.26	0.516

2387	1190.50	34.50	1.39	0.05263	5.26	0.516
2388	1191.00	34.51	1.4	0.05258	5.26	0.517
2389	1191.50	34.52	1.4	0.05263	5.26	0.516
2390	1192.00	34.53	1.4	0.05258	5.26	0.517
2391	1192.50	34.53	1.4	0.05263	5.26	0.516
2392	1193.00	34.54	1.4	0.05263	5.26	0.516
2393	1193.50	34.55	1.41	0.05263	5.26	0.516
2394	1194.00	34.55	1.42	0.05263	5.26	0.516
2395	1194.50	34.56	1.42	0.05263	5.26	0.516
2396	1195.00	34.57	1.43	0.05272	5.27	0.516
2397	1195.50	34.58	1.41	0.05268	5.27	0.516
2398	1196.00	34.58	1.4	0.05268	5.27	0.516
2399	1196.50	34.59	1.4	0.05268	5.27	0.516
2400	1197.00	34.60	1.4	0.05268	5.27	0.516
2401	1197.50	34.60	1.4	0.05268	5.27	0.516
2402	1198.00	34.61	1.41	0.05268	5.27	0.516
2403	1198.50	34.62	1.4	0.05268	5.27	0.516
2404	1199.00	34.63	1.4	0.05268	5.27	0.516
2405	1199.50	34.63	1.41	0.05268	5.27	0.516
2406	1200.00	34.64	1.41	0.05268	5.27	0.516
2407	1200.50	34.65	1.41	0.05268	5.27	0.516
2408	1201.00	34.66	1.41	0.05268	5.27	0.516
2409	1201.50	34.66	1.41	0.05268	5.27	0.516
2410	1202.00	34.67	1.41	0.05268	5.27	0.516
2411	1202.50	34.68	1.41	0.05268	5.27	0.516
2412	1203.00	34.68	1.42	0.05268	5.27	0.516
2413	1203.50	34.69	1.42	0.05268	5.27	0.516
2414	1204.00	34.70	1.42	0.05268	5.27	0.516
2415	1204.50	34.71	1.42	0.05268	5.27	0.516
2416	1205.00	34.71	1.41	0.05268	5.27	0.516
2417	1205.50	34.72	1.42	0.05268	5.27	0.516
2418	1206.00	34.73	1.41	0.05268	5.27	0.516
2419	1206.50	34.73	1.38	0.05268	5.27	0.516
2420	1207.00	34.74	1.38	0.05268	5.27	0.516
2421	1207.50	34.75	1.38	0.05268	5.27	0.516
2422	1208.00	34.76	1.38	0.05268	5.27	0.516
2423	1208.50	34.76	1.38	0.05268	5.27	0.516
2424	1209.00	34.77	1.38	0.05268	5.27	0.516
2425	1209.50	34.78	1.38	0.05268	5.27	0.516
2426	1210.00	34.79	1.37	0.05268	5.27	0.516
2427	1210.50	34.79	1.37	0.05258	5.26	0.517
2428	1211.00	34.80	1.37	0.05263	5.26	0.516
2429	1211.50	34.81	1.37	0.05268	5.27	0.516
2430	1212.00	34.81	1.37	0.05263	5.26	0.516
2431	1212.50	34.82	1.37	0.05268	5.27	0.516
2432	1213.00	34.83	1.37	0.05258	5.26	0.517
2433	1213.50	34.84	1.37	0.05263	5.26	0.516
2434	1214.00	34.84	1.37	0.05258	5.26	0.517
2435	1214.50	34.85	1.37	0.05258	5.26	0.517
2436	1215.00	34.86	1.37	0.05258	5.26	0.517
2437	1215.50	34.86	1.37	0.05258	5.26	0.517
2438	1216.00	34.87	1.4	0.05258	5.26	0.517
2439	1216.50	34.88	1.4	0.05268	5.27	0.516
2440	1217.00	34.89	1.41	0.05268	5.27	0.516
2441	1217.50	34.89	1.4	0.05268	5.27	0.516
2442	1218.00	34.90	1.4	0.05268	5.27	0.516
2443	1218.50	34.91	1.4	0.05268	5.27	0.516
2444	1219.00	34.91	1.4	0.05268	5.27	0.516
2445	1219.50	34.92	1.4	0.05268	5.27	0.516
2446	1220.00	34.93	1.4	0.05268	5.27	0.516
2447	1220.50	34.94	1.4	0.05268	5.27	0.516
2448	1221.00	34.94	1.4	0.05263	5.26	0.516
2449	1221.50	34.95	1.4	0.05268	5.27	0.516
2450	1222.00	34.96	1.4	0.05268	5.27	0.516
2451	1222.50	34.96	1.4	0.05268	5.27	0.516
2452	1223.00	34.97	1.4	0.05268	5.27	0.516
2453	1223.50	34.98	1.4	0.05263	5.26	0.516
2454	1224.00	34.99	1.4	0.05263	5.26	0.516
2455	1224.50	34.99	1.4	0.05263	5.26	0.516
2456	1225.00	35.00	1.41	0.05263	5.26	0.516
2457	1225.50	35.01	1.41	0.05263	5.26	0.516
2458	1226.00	35.01	1.4	0.05263	5.26	0.516
2459	1226.50	35.02	1.4	0.05263	5.26	0.516
2460	1227.00	35.03	1.41	0.05263	5.26	0.516
2461	1227.50	35.04	1.41	0.05263	5.26	0.516
2462	1228.00	35.04	1.4	0.05268	5.27	0.516
2463	1228.50	35.05	1.4	0.05268	5.27	0.516
2464	1229.00	35.06	1.39	0.05268	5.27	0.516
2465	1229.50	35.06	1.38	0.05263	5.26	0.516
2466	1230.00	35.07	1.38	0.05268	5.27	0.516
2467	1230.50	35.08	1.37	0.05268	5.27	0.516
2468	1231.00	35.09	1.38	0.05268	5.27	0.516
2469	1231.50	35.09	1.38	0.05268	5.27	0.516
2470	1232.00	35.10	1.37	0.05268	5.27	0.516
2471	1232.50	35.11	1.38	0.05263	5.26	0.516
2472	1233.00	35.11	1.37	0.05263	5.26	0.516
2473	1233.50	35.12	1.37	0.05263	5.26	0.516
2474	1234.00	35.13	1.37	0.05268	5.27	0.516
2475	1234.50	35.14	1.37	0.05268	5.27	0.516

2476	1235.00	35.14	1.37	0.05263	5.26	0.516
2477	1235.50	35.15	1.37	0.05263	5.26	0.516
2478	1236.00	35.16	1.37	0.05254	5.25	0.517
2479	1236.50	35.16	1.39	0.05258	5.26	0.517
2480	1237.00	35.17	1.39	0.05263	5.26	0.516
2481	1237.50	35.18	1.4	0.05263	5.26	0.516
2482	1238.00	35.19	1.4	0.05258	5.26	0.517
2483	1238.50	35.19	1.4	0.05263	5.26	0.516
2484	1239.00	35.20	1.4	0.05263	5.26	0.516
2485	1239.50	35.21	1.4	0.05263	5.26	0.516
2486	1240.00	35.21	1.4	0.05263	5.26	0.516
2487	1240.50	35.22	1.41	0.05263	5.26	0.516
2488	1241.00	35.23	1.4	0.05268	5.27	0.516
2489	1241.50	35.23	1.39	0.05268	5.27	0.516
2490	1242.00	35.24	1.39	0.05268	5.27	0.516
2491	1242.50	35.25	1.39	0.05268	5.27	0.516
2492	1243.00	35.26	1.39	0.05268	5.27	0.516
2493	1243.50	35.26	1.39	0.05268	5.27	0.516
2494	1244.00	35.27	1.39	0.05268	5.27	0.516
2495	1244.50	35.28	1.39	0.05263	5.26	0.516
2496	1245.00	35.28	1.39	0.05263	5.26	0.516
2497	1245.50	35.29	1.39	0.05263	5.26	0.516
2498	1246.00	35.30	1.39	0.05268	5.27	0.516
2499	1246.50	35.31	1.39	0.05263	5.26	0.516
2500	1247.00	35.31	1.39	0.05268	5.27	0.516
2501	1247.50	35.32	1.39	0.05268	5.27	0.516
2502	1248.00	35.33	1.39	0.05272	5.27	0.516
2503	1248.50	35.33	1.37	0.05268	5.27	0.516
2504	1249.00	35.34	1.38	0.05268	5.27	0.516
2505	1249.50	35.35	1.38	0.05258	5.26	0.517
2506	1250.00	35.36	1.38	0.05263	5.26	0.516
2507	1250.50	35.36	1.38	0.05258	5.26	0.517
2508	1251.00	35.37	1.38	0.05258	5.26	0.517
2509	1251.50	35.38	1.38	0.05263	5.26	0.516
2510	1252.00	35.38	1.39	0.05263	5.26	0.516
2511	1252.50	35.39	1.39	0.05268	5.27	0.516
2512	1253.00	35.40	1.39	0.05268	5.27	0.516
2513	1253.50	35.40	1.38	0.05272	5.27	0.516
2514	1254.00	35.41	1.39	0.05268	5.27	0.516
2515	1254.50	35.42	1.38	0.05268	5.27	0.516
2516	1255.00	35.43	1.38	0.05268	5.27	0.516
2517	1255.50	35.43	1.39	0.05268	5.27	0.516
2518	1256.00	35.44	1.4	0.05268	5.27	0.516
2519	1256.50	35.45	1.4	0.05268	5.27	0.516
2520	1257.00	35.45	1.4	0.05263	5.26	0.516
2521	1257.50	35.46	1.4	0.05268	5.27	0.516
2522	1258.00	35.47	1.4	0.05268	5.27	0.516
2523	1258.50	35.48	1.41	0.05268	5.27	0.516
2524	1259.00	35.48	1.41	0.05258	5.26	0.517
2525	1259.50	35.49	1.42	0.05263	5.26	0.516
2526	1260.00	35.50	1.41	0.05263	5.26	0.516
2527	1260.50	35.50	1.41	0.05268	5.27	0.516
2528	1261.00	35.51	1.42	0.05268	5.27	0.516
2529	1261.50	35.52	1.42	0.05268	5.27	0.516
2530	1262.00	35.52	1.44	0.05268	5.27	0.516
2531	1262.50	35.53	1.41	0.05272	5.27	0.516
2532	1263.00	35.54	1.39	0.05268	5.27	0.516
2533	1263.50	35.55	1.39	0.05268	5.27	0.516
2534	1264.00	35.55	1.39	0.05268	5.27	0.516
2535	1264.50	35.56	1.39	0.05268	5.27	0.516
2536	1265.00	35.57	1.39	0.05268	5.27	0.516
2537	1265.50	35.57	1.39	0.05268	5.27	0.516
2538	1266.00	35.58	1.39	0.05268	5.27	0.516
2539	1266.50	35.59	1.39	0.05263	5.26	0.516
2540	1267.00	35.59	1.39	0.05268	5.27	0.516
2541	1267.50	35.60	1.39	0.05268	5.27	0.516
2542	1268.00	35.61	1.39	0.05268	5.27	0.516
2543	1268.50	35.62	1.39	0.05268	5.27	0.516
2544	1269.00	35.62	1.39	0.05263	5.26	0.516
2545	1269.50	35.63	1.4	0.05263	5.26	0.516
2546	1270.00	35.64	1.4	0.05263	5.26	0.516
2547	1270.50	35.64	1.4	0.05263	5.26	0.516
2548	1271.00	35.65	1.4	0.05263	5.26	0.516
2549	1271.50	35.66	1.4	0.05263	5.26	0.516
2550	1272.00	35.67	1.41	0.05263	5.26	0.516
2551	1272.50	35.67	1.41	0.05272	5.27	0.516
2552	1273.00	35.68	1.39	0.05268	5.27	0.516
2553	1273.50	35.69	1.39	0.05268	5.27	0.516
2554	1274.00	35.69	1.39	0.05263	5.26	0.516
2555	1274.50	35.70	1.39	0.05268	5.27	0.516
2556	1275.00	35.71	1.39	0.05268	5.27	0.516
2557	1275.50	35.71	1.39	0.05263	5.26	0.516
2558	1276.00	35.72	1.39	0.05268	5.27	0.516
2559	1276.50	35.73	1.39	0.05268	5.27	0.516
2560	1277.00	35.74	1.39	0.05263	5.26	0.516
2561	1277.50	35.74	1.39	0.05268	5.27	0.516
2562	1278.00	35.75	1.39	0.05268	5.27	0.516
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2564	1279.00	35.76	1.39	0.05258	5.26	0.517

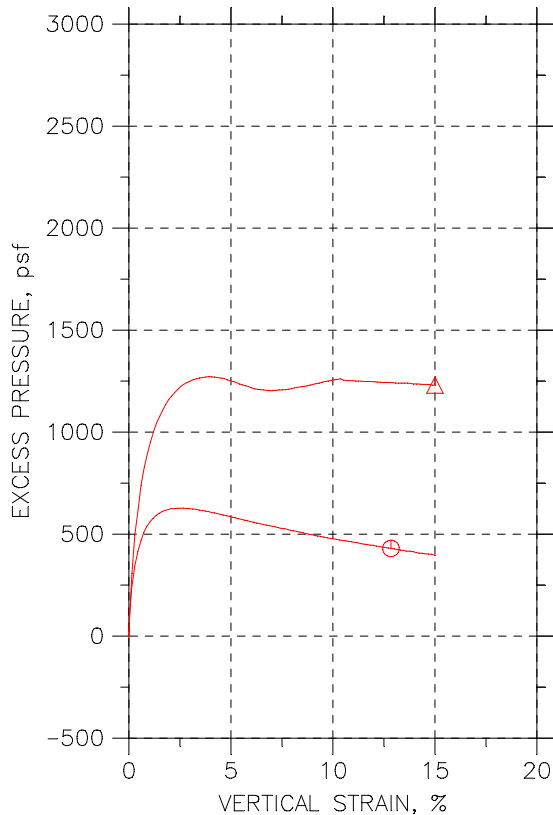
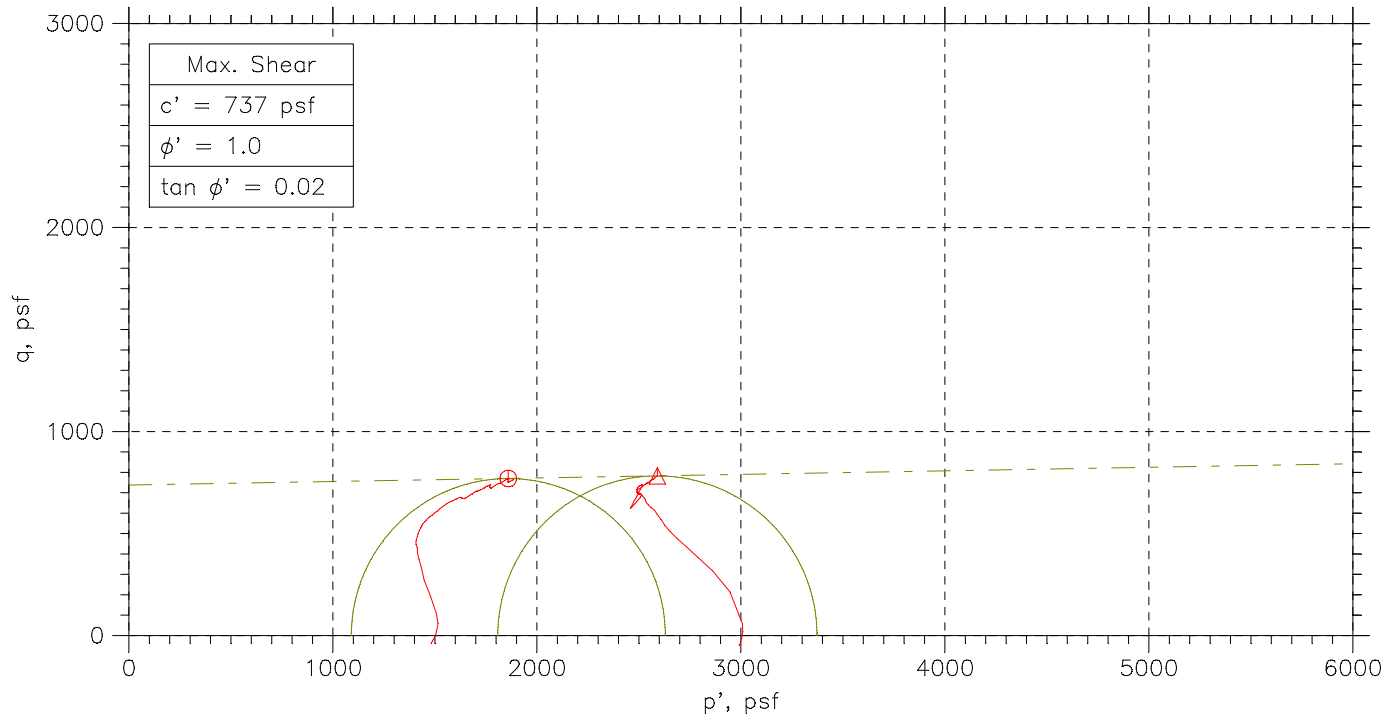
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2569	1281.50	35.80	1.4	0.05263	5.26	0.516
2570	1282.00	35.81	1.41	0.05268	5.27	0.516
2571	1282.50	35.81	1.4	0.05272	5.27	0.516
2572	1283.00	35.82	1.4	0.05268	5.27	0.516
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2575	1284.50	35.84	1.4	0.05268	5.27	0.516
2576	1285.00	35.85	1.4	0.05268	5.27	0.516
2577	1285.50	35.85	1.4	0.05268	5.27	0.516
2578	1286.00	35.86	1.41	0.05268	5.27	0.516
2579	1286.50	35.87	1.41	0.05268	5.27	0.516
2580	1287.00	35.87	1.41	0.05268	5.27	0.516
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2816	1405.00	37.48	1.38	0.05263	5.26	0.516
2817	1405.50	37.49	1.39	0.05263	5.26	0.516
2818	1406.00	37.50	1.38	0.05258	5.26	0.517
2819	1406.50	37.50	1.38	0.05263	5.26	0.516
2820	1407.00	37.51	1.38	0.05263	5.26	0.516
2821	1407.50	37.52	1.38	0.05268	5.27	0.516
2822	1408.00	37.52	1.38	0.05268	5.27	0.516
2823	1408.50	37.53	1.38	0.05268	5.27	0.516
2824	1409.00	37.54	1.38	0.05268	5.27	0.516
2825	1409.50	37.54	1.38	0.05268	5.27	0.516
2826	1410.00	37.55	1.38	0.05268	5.27	0.516
2827	1410.50	37.56	1.37	0.05268	5.27	0.516
2828	1411.00	37.56	1.37	0.05272	5.27	0.516
2829	1411.50	37.57	1.37	0.05268	5.27	0.516
2830	1412.00	37.58	1.37	0.05268	5.27	0.516
2831	1412.50	37.58	1.36	0.05268	5.27	0.516

2832	1413.00	37.59	1.36	0.05258	5.26	0.517
2833	1413.50	37.60	1.35	0.05258	5.26	0.517
2834	1414.00	37.60	1.35	0.05258	5.26	0.517
2835	1414.50	37.61	1.35	0.05263	5.26	0.516
2836	1415.00	37.62	1.35	0.05258	5.26	0.517
2837	1415.50	37.62	1.35	0.05263	5.26	0.516
2838	1416.00	37.63	1.35	0.05263	5.26	0.516
2839	1416.50	37.64	1.35	0.05263	5.26	0.516
2840	1417.00	37.64	1.35	0.05263	5.26	0.516
2841	1417.50	37.65	1.35	0.05263	5.26	0.516
2842	1418.00	37.66	1.35	0.05263	5.26	0.516
2843	1418.50	37.66	1.35	0.05263	5.26	0.516
2844	1419.00	37.67	1.35	0.05263	5.26	0.516
2845	1419.50	37.68	1.36	0.05263	5.26	0.516
2846	1420.00	37.68	1.37	0.05263	5.26	0.516
2847	1420.50	37.69	1.37	0.05263	5.26	0.516
2848	1421.00	37.70	1.38	0.05263	5.26	0.516
2849	1421.50	37.70	1.38	0.05268	5.27	0.516
2850	1422.00	37.71	1.38	0.05268	5.27	0.516
2851	1422.50	37.72	1.37	0.05268	5.27	0.516
2852	1423.00	37.72	1.37	0.05268	5.27	0.516
2853	1423.50	37.73	1.37	0.05268	5.27	0.516
2854	1424.00	37.74	1.35	0.05272	5.27	0.516
2855	1424.50	37.74	1.35	0.05272	5.27	0.516
2856	1425.00	37.75	1.35	0.05272	5.27	0.516
2857	1425.50	37.76	1.35	0.05272	5.27	0.516
2858	1426.00	37.76	1.35	0.05272	5.27	0.516
2859	1426.50	37.77	1.35	0.05272	5.27	0.516
2860	1427.00	37.78	1.35	0.05272	5.27	0.516
2861	1427.50	37.78	1.35	0.05272	5.27	0.516
2862	1428.00	37.79	1.36	0.05268	5.27	0.516
2863	1428.50	37.80	1.37	0.05268	5.27	0.516
2864	1429.00	37.80	1.38	0.05268	5.27	0.516
2865	1429.50	37.81	1.38	0.05272	5.27	0.516
2866	1430.00	37.82	1.39	0.05272	5.27	0.516
2867	1430.50	37.82	1.39	0.05272	5.27	0.516
2868	1431.00	37.83	1.39	0.05272	5.27	0.516
2869	1431.50	37.84	1.39	0.05272	5.27	0.516
2870	1432.00	37.84	1.39	0.05272	5.27	0.516
2871	1432.50	37.85	1.38	0.05277	5.28	0.516
2872	1433.00	37.85	1.38	0.05277	5.28	0.516
2873	1433.50	37.86	1.37	0.05277	5.28	0.516
2874	1434.00	37.87	1.36	0.05277	5.28	0.516
2875	1434.50	37.87	1.35	0.05277	5.28	0.516
2876	1435.00	37.88	1.36	0.05277	5.28	0.516
2877	1435.50	37.89	1.35	0.05277	5.28	0.516
2878	1436.00	37.89	1.39	0.05277	5.28	0.516
2879	1436.50	37.90	1.4	0.05277	5.28	0.516
2880	1437.00	37.91	1.39	0.05277	5.28	0.516
2881	1437.50	37.91	1.4	0.05277	5.28	0.516
2882	1438.00	37.92	1.41	0.05281	5.28	0.516
2883	1438.50	37.93	1.41	0.05286	5.29	0.516
2884	1439.00	37.93	1.41	0.05291	5.29	0.516
2885	1439.50	37.94	1.4	0.05286	5.29	0.516
2886	1440.00	37.95	1.4	0.05286	5.29	0.516
2887	1440.05	37.95	1.4	0.05286	5.29	0.516

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



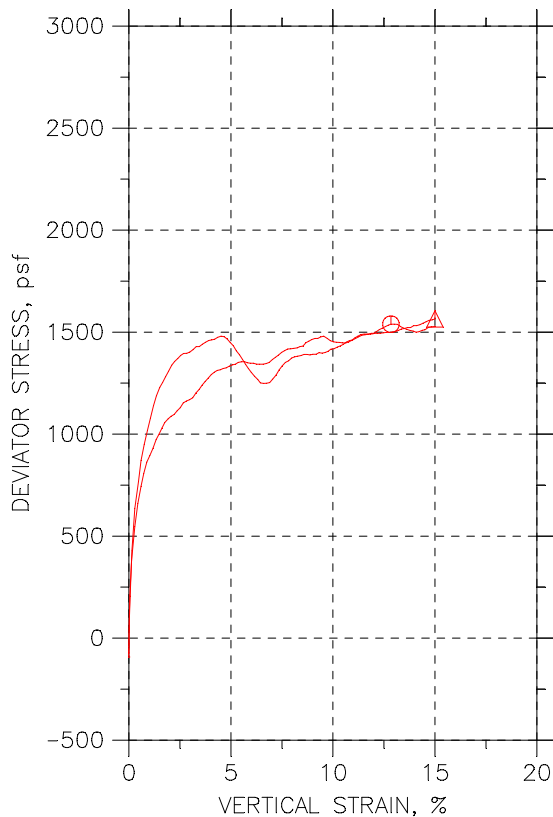
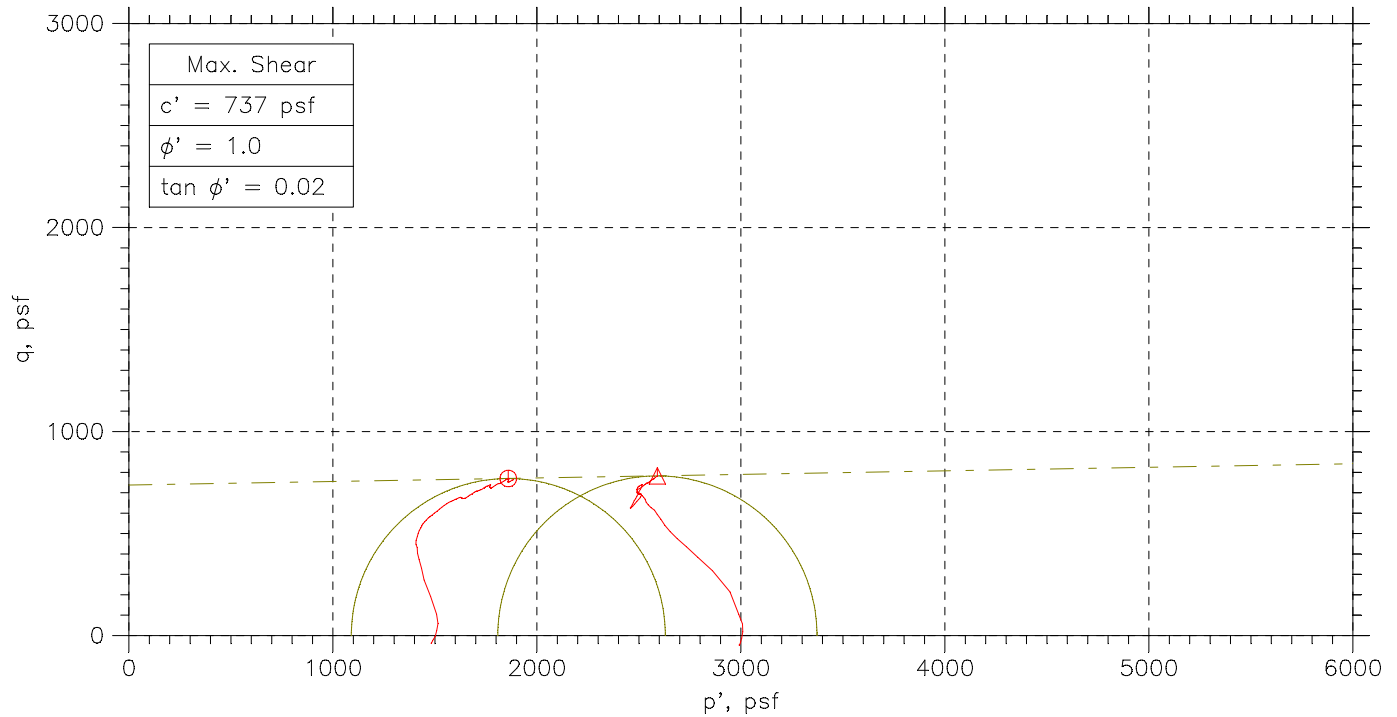
Symbol	⊙	△		
Sample No.	T-2	T-2		
Test No.	1	2		
Depth	11.7'-12.4'	12.4'-13.0'		
Initial	Diameter, in	2.858	2.854	
	Height, in	5.742	5.827	
	Water Content, %	27.0	30.4	
	Dry Density, pcf	95.47	90.2	
	Saturation, %	95.1	94.5	
Before Shear				
	Void Ratio	0.766	0.869	
	Water Content, %	28.3	32.4	
	Dry Density, pcf	95.61	89.94	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.763	0.874	
	Back Press., psf	10660	12100	
	Ver. Eff. Cons. Stress, psf	1520	3038	
	Shear Strength, psf	769.6	782.3	
	Strain at Failure, %	12.8	15	
	Strain Rate, %/min	0.03	0.03	
	B-Value	0.92	0.93	
	Estimated Specific Gravity	2.7	2.7	
	Liquid Limit	44	44	
	Plastic Limit	18	18	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description: Brown Lean CLAY (CL)				
	Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



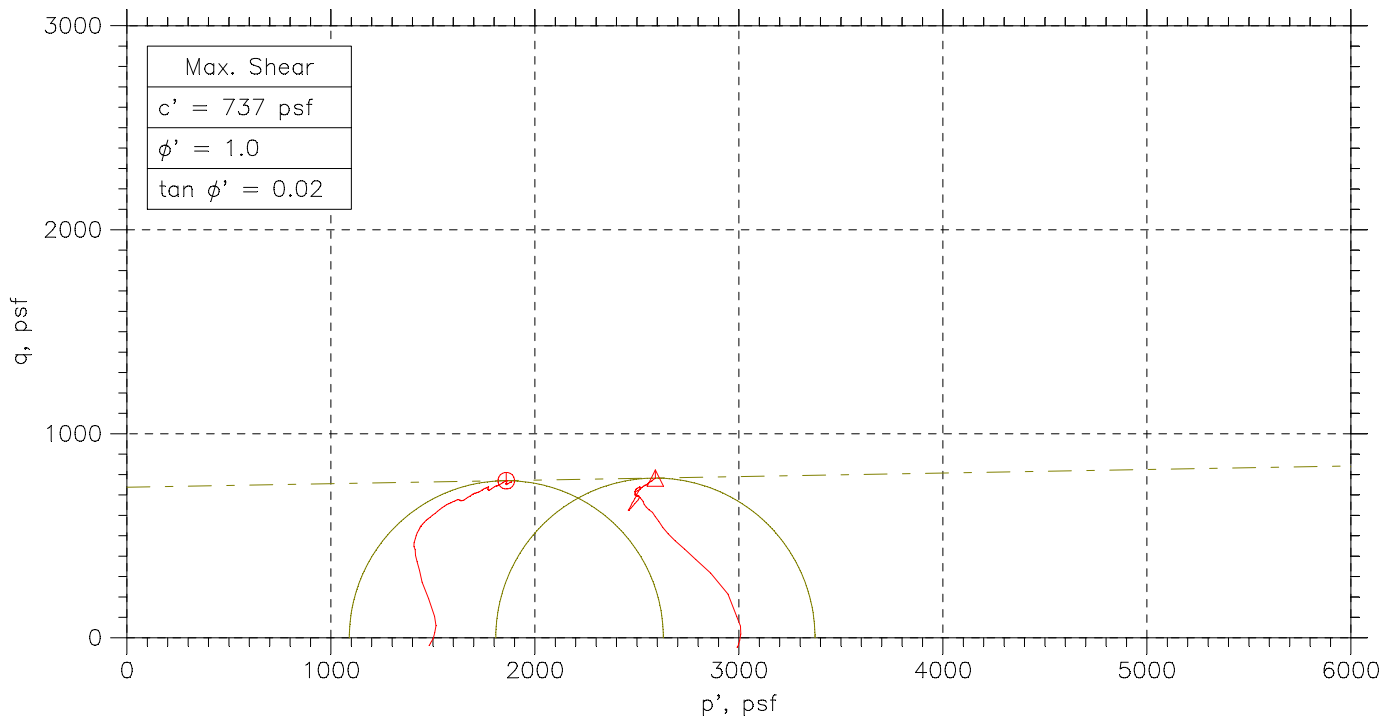
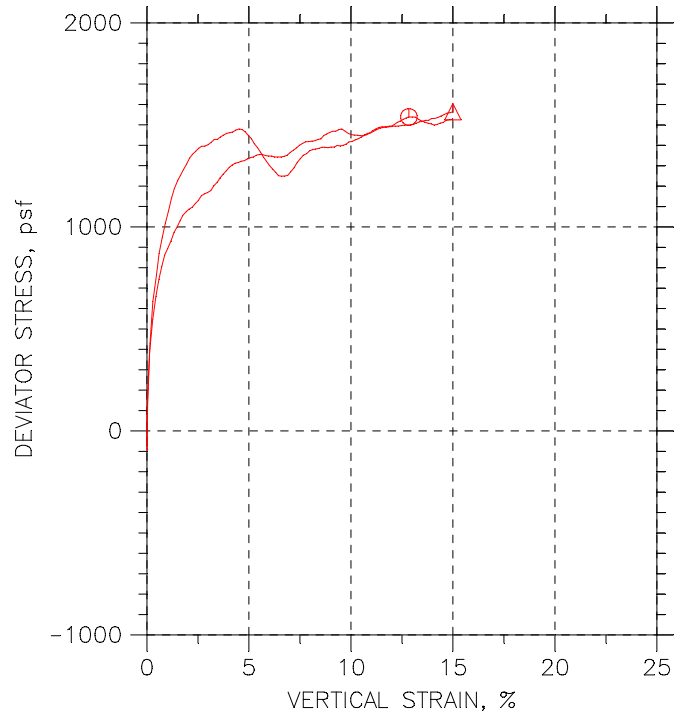
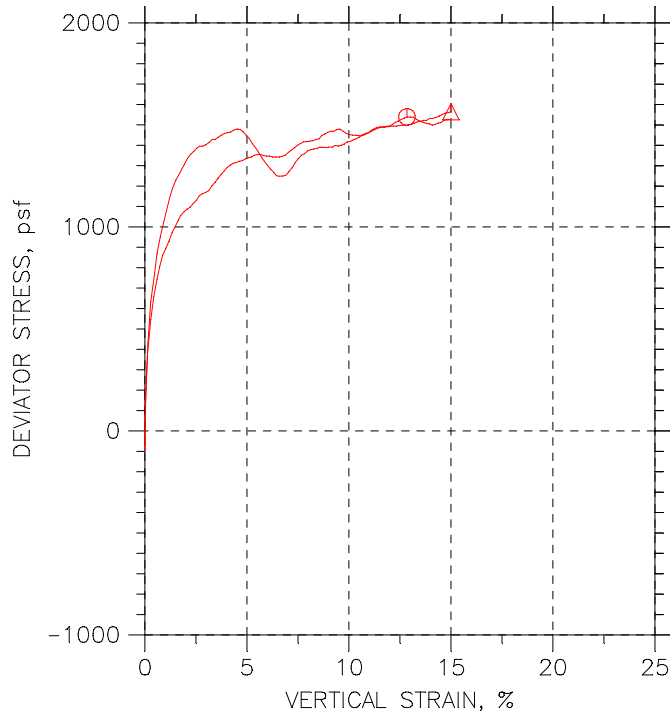
Symbol	⊖	Δ		
Sample No.	T-2	T-2		
Test No.	1	2		
Depth	11.7'-12.4'	12.4'-13.0'		
Initial	Diameter, in	2.858	2.854	
	Height, in	5.742	5.827	
	Water Content, %	27.0	30.4	
	Dry Density, pcf	95.47	90.2	
	Saturation, %	95.1	94.5	
Before Shear	Void Ratio	0.766	0.869	
	Water Content, %	28.3	32.4	
	Dry Density, pcf	95.61	89.94	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.763	0.874	
	Back Press., psf	10660	12100	
	Ver. Eff. Cons. Stress, psf	1520	3038	
	Shear Strength, psf	769.6	782.3	
	Strain at Failure, %	12.8	15	
	Strain Rate, %/min	0.03	0.03	
	B-Value	0.92	0.93	
	Estimated Specific Gravity	2.7	2.7	
	Liquid Limit	44	44	
	Plastic Limit	18	18	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description: Brown Lean CLAY (CL)				
	Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

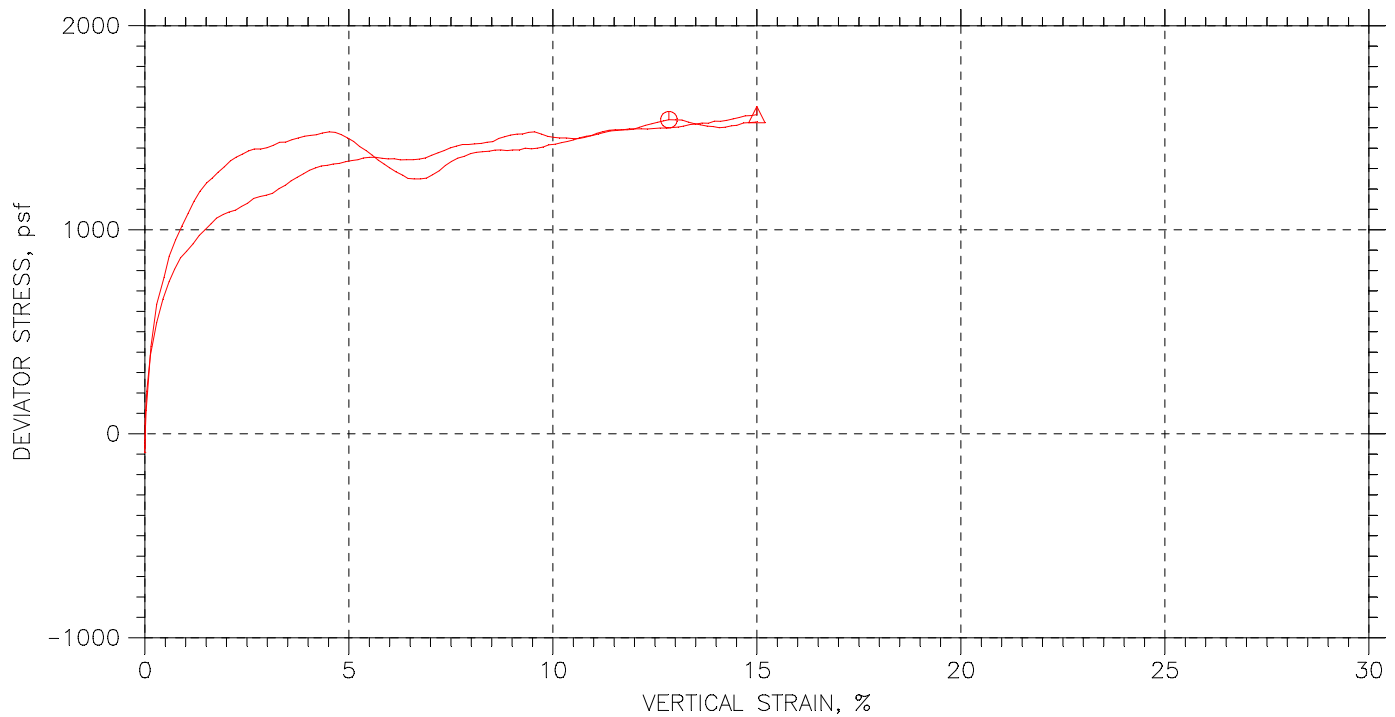
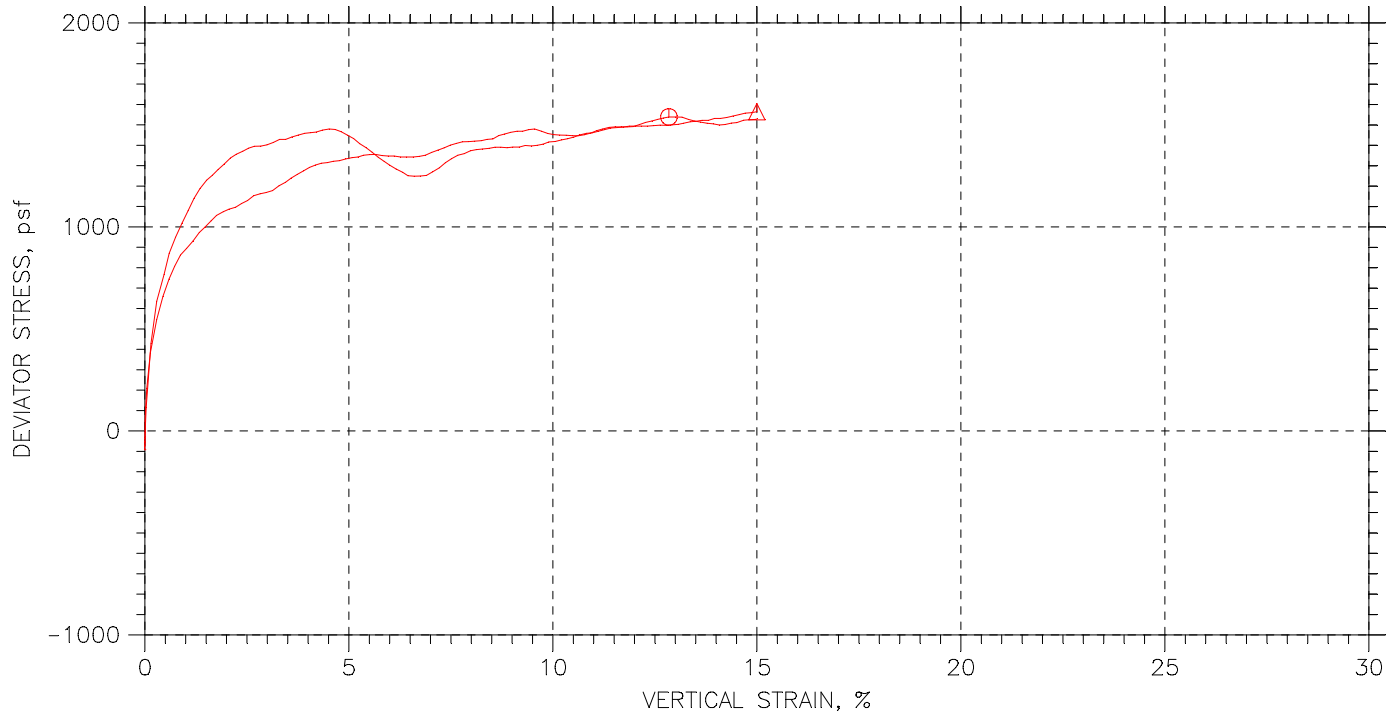


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	T-2	1	11.7'-12.4'	Jason	06/18/2015	Bert		CU TRIAXIAL GZ-7 11'0" - 13'0"
△	T-2	2	12.4'-13.0'	Jason	06/19/2015	Bert		CU TRIAXIAL GZ-7 11'0" - 13'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-7	Sample Type: Undisturbed	
Description: Brown Lean CLAY (CL)		
Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

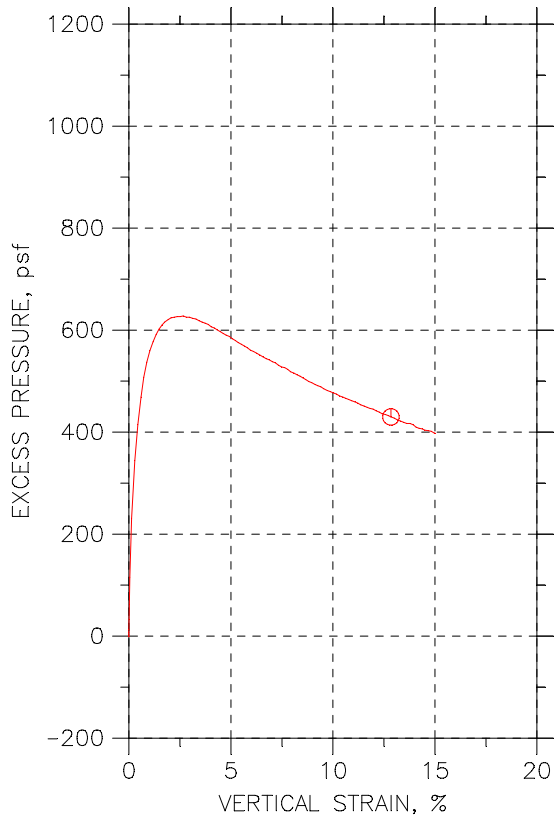
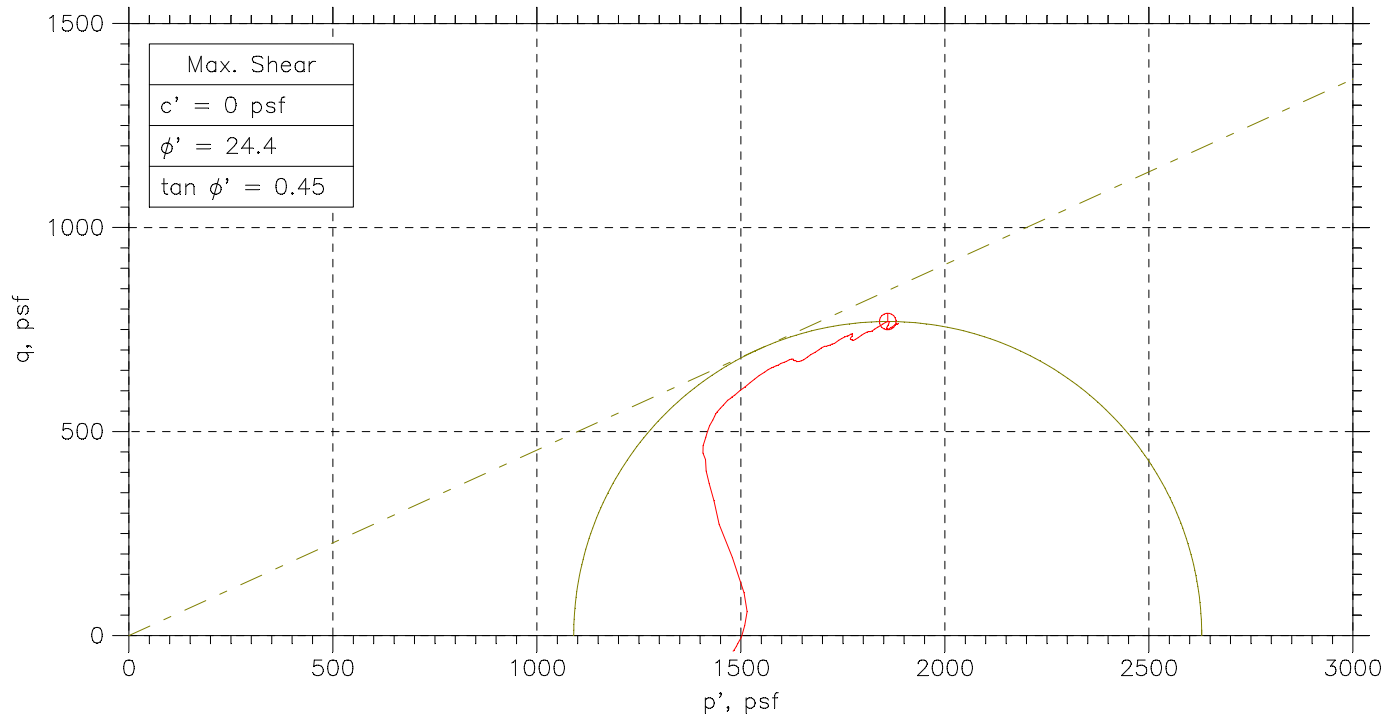


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	T-2	1	11.7'-12.4'	Jason	06/18/2015	Bert		CU TRIAXIAL GZ-7 11'0" - 13'0"
△	T-2	2	12.4'-13.0'	Jason	06/19/2015	Bert		CU TRIAXIAL GZ-7 11'0" - 13'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-7	Sample Type: Undisturbed	
Description: Brown Lean CLAY (CL)		
Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Ⓢ			
Sample No.	T-2			
Test No.	1			
Depth	11.7'-12.4'			
Initial	Diameter, in	2.858		
	Height, in	5.742		
	Water Content, %	27.0		
	Dry Density, pcf	95.47		
	Saturation, %	95.1		
Before Shear	Void Ratio	0.766		
	Water Content, %	28.3		
	Dry Density, pcf	95.61		
	Saturation*, %	100.0		
	Void Ratio	0.763		
	Back Press., psf	10660		
	Ver. Eff. Cons. Stress, psf	1520		
	Shear Strength, psf	769.6		
	Strain at Failure, %	12.8		
	Strain Rate, %/min	0.03		
	B-Value	0.92		
	Estimated Specific Gravity	2.7		
	Liquid Limit	44		
	Plastic Limit	18		

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description:				
	Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial - 1520 PSF				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-2
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/18/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 11.7'-12.4'
Elevation:

Soil Description: Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial

Specimen Height: 5.74 in
Specimen Area: 6.42 in²
Specimen Volume: 603.64 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 44

Plastic Limit: 18

Estimated Specific Gravity: 2.70

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	AB4	---	0	0
Wt. Container + Wet Soil, gm	71.01	---	---	634.1
Wt. Container + Dry Soil, gm	58.83	---	---	496.23
Wt. Container, gm	13.68	---	---	8.37
Wt. Wet Soil, gm	57.33	1172.2	1184	625.73
Wt. Dry Soil, gm	45.15	923.14	923.14	487.86
Wt. Water, gm	12.18	249.03	260.88	137.87
Water Content, %	26.98	26.98	28.26	28.26
Void Ratio	---	0.77	0.76	---
Degree of Saturation, %	---	95.15	100.00	---
Dry Unit Weight, pcf	---	95.47	95.606	---

Initial

Height: 5.742 in
Area: 6.4153 in²
Volume: 603.64 cc

Moisture: 26.98 %
Void Ratio: 0.77
Dry Unit Weight: 95.47 pcf
Saturation: 95.15 %

End of Initialization

Time: 10.162 min
Total Vertical Stress: 713.61 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 138.96 psf
Effective Horizontal Stress: 144.76 psf

Height Change: 0.0028587 in
Area Change: 0 in²
Volume Change: 0.90157 cc
Water Change: -5.3104 cc
Correction: 0 cc

Height: 5.7391 in
Area: 6.4153 in²
Volume: 602.74 cc

Moisture: 27.55 %
Void Ratio: 0.76
Dry Unit Weight: 95.613 pcf
Saturation: 97.51 %

End of Consolidation/A

Time: 10.162 min
Total Vertical Stress: 713.61 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 138.96 psf
Effective Horizontal Stress: 144.76 psf

Height Change: 0.0028587 in
Area Change: 0 in²
Volume Change: 0.90157 cc
Water Change: -5.3104 cc
Correction: 0 cc

Height: 5.7391 in
Area: 6.4153 in²
Volume: 602.74 cc

Moisture: 27.55 %
Void Ratio: 0.76
Dry Unit Weight: 95.613 pcf
Saturation: 97.51 %

End of Saturation

Time: 39.111 min
Total Vertical Stress: 10792 psf
Total Horizontal Stress: 10825 psf
Pore Pressure: 10630 psf
Effective Vertical Stress: 162.29 psf
Effective Horizontal Stress: 195.54 psf

Height Change: 0.020392 in
Area Change: 0 in²
Volume Change: 6.4312 cc
Water Change: -61.224 cc
Correction: 54.95 cc

Height: 5.7216 in
Area: 6.4153 in²
Volume: 597.21 cc

Moisture: 27.66 %
Void Ratio: 0.75
Dry Unit Weight: 96.498 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 160.15 min
Total Vertical Stress: 12099 psf
Total Horizontal Stress: 12176 psf
Pore Pressure: 10656 psf
Effective Vertical Stress: 1443.5 psf
Effective Horizontal Stress: 1520 psf

Height Change: 0.049264 in
Area Change: -0.04632 in²
Volume Change: 0.858 cc
Water Change: -18.087 cc
Correction: 6.2391 cc

Height: 5.6927 in
Area: 6.4616 in²
Volume: 602.78 cc

Moisture: 28.26 %
Void Ratio: 0.76
Dry Unit Weight: 95.606 pcf
Saturation: 100.00 %

End of Shear

Time: 660.93 min
Total Vertical Stress: 13759 psf
Total Horizontal Stress: 12176 psf
Pore Pressure: 11055 psf
Effective Vertical Stress: 2703.4 psf
Effective Horizontal Stress: 1120.8 psf

Height Change: 0.90324 in
Area Change: -1.1867 in²
Volume Change: 0.858 cc
Water Change: -18.087 cc
Correction: 6.2391 cc

Height: 4.8388 in
Area: 7.602 in²
Volume: 602.78 cc

Moisture: 28.26 %
Void Ratio: 0.76
Dry Unit Weight: 95.606 pcf
Saturation: 100.00 %

At Failure

Time: 590.15 min
Total Vertical Stress: 13716 psf
Total Horizontal Stress: 12177 psf
Pore Pressure: 11087 psf
Effective Vertical Stress: 2629.4 psf
Effective Horizontal Stress: 1090.2 psf

Height Change: 0.78042 in
Area Change: -1.2315 in²
Volume Change: 0.858 cc
Water Change: -18.087 cc
Correction: 0 cc

Height: 4.9616 in
Area: 7.6468 in²
Volume: 602.78 cc

Moisture: 28.26 %
Void Ratio: 0.76
Dry Unit Weight: 95.606 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-2
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/18/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 11.7'-12.4'
Elevation:

Soil Description: Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial

Specimen Height: 5.69 in
Specimen Area: 6.46 in²
Specimen Volume: 602.78 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 44

Plastic Limit: 18

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.6647	-0.10741	-76.449	10657	12176	12099
2	0.012267	0	0	6.6647	0.027838	-73.527	10656	12176	12102
3	0.0206	0	0	6.6647	0.16308	-70.605	10657	12176	12105
4	0.053933	0	0	6.6647	0.97644	-53.031	10659	12175	12122
5	0.10392	0	0	6.6647	1.6508	-38.46	10664	12176	12137
6	0.20392	0.0016739	0	6.6648	3.1404	-6.4202	10670	12175	12168
7	0.5039	0.0033477	0	6.6649	5.7101	48.955	10690	12175	12224
8	1.0038	0.020086	0	6.666	8.9541	117.58	10719	12176	12293
9	2.0037	0.046868	0	6.6678	13.282	208.7	10772	12176	12385
10	5.0035	0.13056	0	6.6734	21.667	382.23	10888	12176	12558
11	10.003	0.28791	0	6.6839	29.919	545.8	11001	12175	12720
12	15.003	0.44023	0	6.6941	35.868	659.73	11072	12176	12836
13	20.002	0.59088	0	6.7043	40.466	744.43	11126	12176	12920
14	25.002	0.72813	0	6.7135	43.983	806.9	11165	12176	12983
15	30.001	0.87376	0	6.7234	47.229	862.56	11194	12176	13038
16	35.001	1.0227	0	6.7335	49.393	894.55	11216	12176	13070
17	40	1.1801	0	6.7442	51.692	930.9	11234	12176	13107
18	45.004	1.3307	0	6.7545	53.721	972.47	11248	12176	13148
19	50.004	1.473	0	6.7643	55.071	999.57	11259	12177	13177
20	55.003	1.6237	0	6.7747	56.561	1029.4	11267	12176	13205
21	60.003	1.7576	0	6.7839	57.913	1056.5	11273	12176	13232
22	65.002	1.9199	0	6.7951	58.86	1074.5	11278	12176	13250
23	70.002	2.0622	0	6.805	59.536	1087	11281	12176	13263
24	75.001	2.2212	0	6.8161	60.077	1096.4	11282	12176	13272
25	80.001	2.3685	0	6.8263	61.024	1114.5	11284	12176	13290
26	85.001	2.5175	0	6.8368	61.835	1129.6	11284	12176	13305
27	90	2.6665	0	6.8472	63.052	1153.2	11285	12176	13329
28	95.004	2.8238	0	6.8583	63.593	1162.4	11282	12176	13338
29	100	2.9728	0	6.8689	63.999	1168.9	11282	12176	13345
30	105	3.1285	0	6.8799	64.54	1178.1	11280	12176	13354
31	110	3.2841	0	6.891	65.757	1201.3	11279	12176	13377
32	115	3.4448	0	6.9024	66.704	1218.8	11275	12176	13395
33	120	3.5821	0	6.9123	67.786	1239.4	11273	12176	13415
34	125	3.7311	0	6.923	68.733	1256.9	11271	12176	13433
35	130	3.8851	0	6.9341	69.68	1274.2	11268	12176	13450
36	135	4.0357	0	6.9449	70.626	1291.6	11263	12176	13467
37	140	4.183	0	6.9556	71.302	1303.4	11261	12176	13479
38	145	4.3253	0	6.966	71.842	1312.3	11258	12177	13489
39	150	4.4726	0	6.9767	72.114	1315.6	11254	12176	13492
40	155	4.6165	0	6.9872	72.52	1321.8	11251	12176	13498
41	160	4.7689	0	6.9984	72.79	1324.9	11247	12176	13501
42	165	4.9245	0	7.0099	73.331	1333.6	11245	12176	13509
43	170	5.0768	0	7.0211	73.737	1339.5	11240	12176	13515
44	175	5.2208	0	7.0318	74.007	1342.8	11236	12176	13519
45	180	5.3581	0	7.042	74.548	1351.6	11233	12176	13528
46	185	5.5104	0	7.0533	74.819	1354.7	11229	12176	13531
47	190	5.6594	0	7.0645	74.954	1355	11226	12176	13531
48	195	5.8117	0	7.0759	74.819	1349.8	11222	12176	13526
49	200	5.9623	0	7.0872	74.819	1347.4	11218	12176	13523
50	205	6.1096	0	7.0983	74.954	1347.8	11215	12176	13524
51	210	6.2653	0	7.1101	74.817	1342.5	11212	12177	13520
52	215	6.4143	0	7.1214	74.954	1342.8	11208	12176	13519
53	220	6.5766	0	7.1338	75.089	1342.9	11205	12176	13519
54	225	6.7273	0	7.1453	75.36	1345.9	11201	12176	13522
55	230	6.8729	0	7.1565	75.764	1351.7	11199	12177	13529
56	235	7.0303	0	7.1686	76.577	1365.4	11195	12176	13541
57	240	7.1826	0	7.1804	77.253	1376.5	11193	12176	13552
58	245	7.3316	0	7.1919	77.93	1387.5	11188	12176	13563
59	250	7.4872	0	7.204	78.741	1401.1	11185	12176	13577
60	255	7.6345	0	7.2155	79.282	1409.4	11183	12176	13585
61	260	7.7852	0	7.2273	79.823	1417.6	11180	12176	13594
62	265	7.9274	0	7.2385	79.958	1417.9	11175	12176	13594
63	270	8.0865	0	7.251	80.229	1420.5	11173	12176	13596
64	275	8.2455	0	7.2636	80.499	1423.1	11169	12176	13599
65	280	8.3827	0	7.2745	80.905	1428.7	11167	12176	13605
66	285	8.53	0	7.2862	81.174	1431.5	11163	12177	13609
67	290	8.6723	0	7.2975	82.122	1447.7	11160	12176	13624
68	295	8.8213	0	7.3094	82.663	1455.7	11156	12176	13632
69	300	8.9652	0	7.321	83.202	1463.7	11154	12177	13641
70	305	9.1192	0	7.3334	83.608	1468.9	11150	12177	13646
71	310	9.2582	0	7.3446	83.743	1469.1	11148	12177	13646
72	315	9.4072	0	7.3567	84.284	1477	11146	12177	13654
73	320	9.5528	0	7.3686	84.557	1479.6	11142	12176	13656
74	325	9.7202	0	7.3822	84.149	1468.6	11139	12177	13646
75	330	9.8742	0	7.3948	83.745	1458	11136	12176	13634
76	335	10.02	0	7.4068	83.61	1452.7	11134	12176	13629
77	340	10.169	0	7.4191	83.608	1450	11132	12177	13627
78	345	10.326	0	7.4321	83.745	1449.8	11128	12176	13626
79	350	10.487	0	7.4454	83.745	1446.9	11126	12176	13623
80	355	10.631	0	7.4574	83.88	1446.9	11123	12176	13623

81	360	10.773	0	7.4693	84.286	1452.1	11121	12176	13628
82	365	10.92	0	7.4817	84.827	1459.9	11119	12176	13636
83	370	11.079	0	7.4951	85.639	1472.5	11116	12176	13648
84	375	11.22	0	7.5069	86.18	1480.3	11114	12176	13656
85	380	11.374	0	7.52	86.721	1487.8	11110	12176	13664
86	385	11.526	0	7.5329	86.991	1490.1	11108	12176	13666
87	390	11.674	0	7.5455	87.126	1489.9	11106	12176	13666
88	395	11.818	0	7.5578	87.262	1489.8	11103	12176	13666
89	400	11.968	0	7.5707	87.53	1492.1	11102	12177	13669
90	405	12.126	0	7.5843	88.208	1502	11099	12176	13678
91	410	12.271	0	7.5969	88.884	1512	11096	12176	13688
92	415	12.425	0	7.6102	89.425	1519.3	11093	12176	13695
93	420	12.567	0	7.6226	89.966	1526.8	11092	12176	13703
94	425	12.716	0	7.6356	90.507	1534.1	11089	12176	13710
95	430	12.844	0	7.6468	90.911	1539.2	11087	12177	13716
96	435	13.004	0	7.6609	91.048	1538.6	11084	12176	13714
97	440	13.163	0	7.6749	91.184	1538	11081	12176	13714
98	445	13.319	0	7.6887	90.776	1527.3	11079	12177	13704
99	450	13.47	0	7.7021	90.506	1519.3	11076	12177	13696
100	455	13.62	0	7.7155	90.372	1513.9	11074	12176	13690
101	460	13.781	0	7.7299	90.235	1508.2	11074	12177	13685
102	465	13.933	0	7.7436	90.235	1505.2	11072	12177	13682
103	470	14.076	0	7.7564	90.102	1500	11067	12176	13676
104	475	14.218	0	7.7693	90.372	1502.2	11064	12176	13678
105	480	14.379	0	7.7839	90.913	1509.1	11063	12176	13685
106	485	14.511	0	7.7959	91.184	1511.5	11061	12176	13687
107	490	14.676	0	7.811	91.995	1523.2	11060	12176	13699
108	495	14.822	0	7.8244	92.264	1525.2	11059	12177	13702
109	500	14.973	0	7.8383	92.536	1527.2	11055	12176	13703
110	500.78	15.001	0	7.8409	92.671	1529.1	11055	12176	13705

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-2
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/18/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 11.7'-12.4'
Elevation:

Soil Description: Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial

Specimen Height: 5.69 in
Specimen Area: 6.46 in²
Specimen Volume: 602.78 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 44

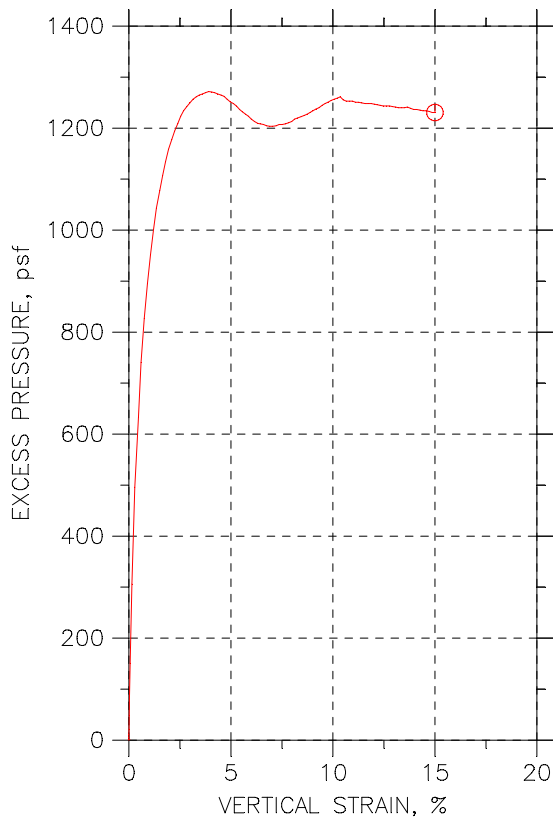
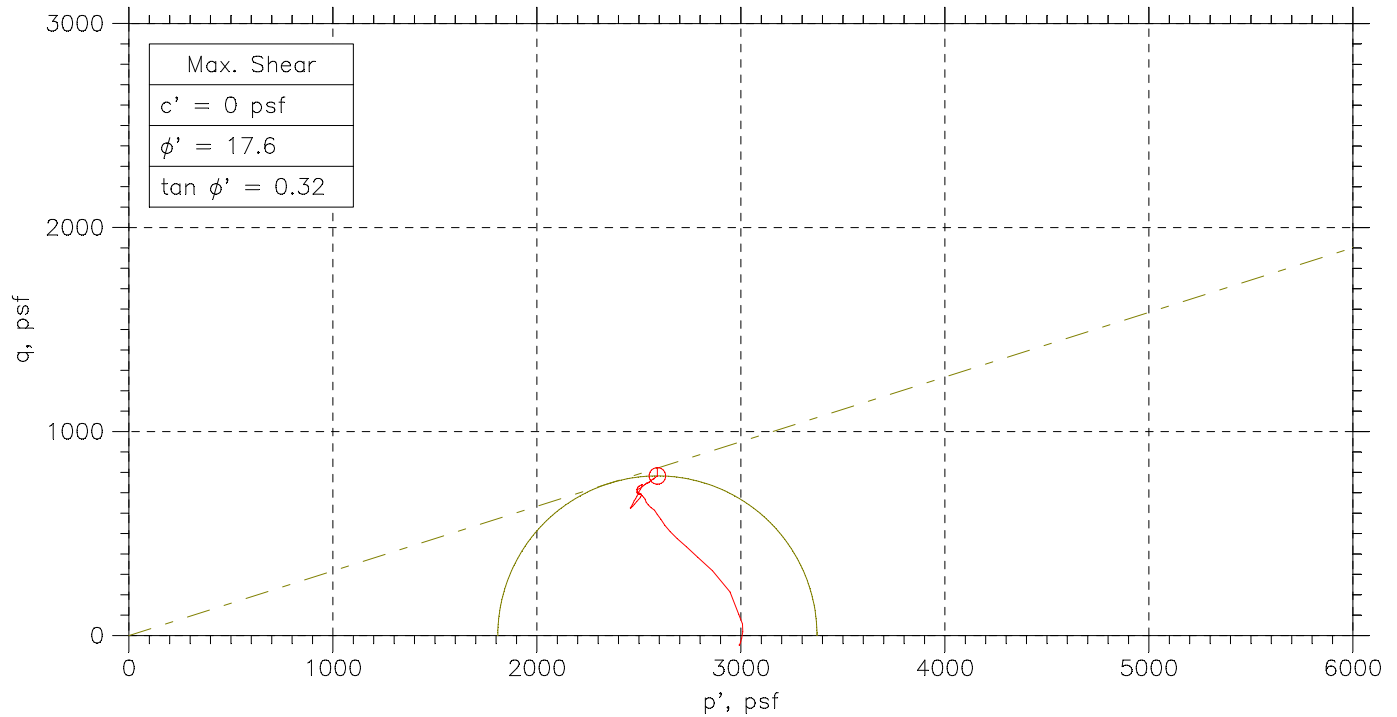
Plastic Limit: 18

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	12099	12176	0	0.000	1442.4	1518.8	1.053	1480.6	-38.224
2	0.00	12102	12176	-1.1776	-0.403	1446.5	1520	1.051	1483.3	-36.763
3	0.00	12105	12176	0	0.000	1448.2	1518.8	1.049	1483.5	-35.302
4	0.00	12122	12175	2.3551	0.151	1462.3	1515.3	1.036	1488.8	-26.515
5	0.00	12137	12176	7.0654	0.186	1473.3	1511.8	1.026	1492.5	-19.23
6	0.00	12168	12175	12.953	0.202	1498.3	1504.7	1.004	1501.5	-3.2101
7	0.00	12224	12175	32.972	0.272	1533.6	1484.7	1.033	1509.2	24.478
8	0.02	12293	12176	62.411	0.322	1574	1456.4	1.081	1515.2	58.789
9	0.05	12385	12176	115.4	0.405	1612.1	1403.4	1.149	1507.8	104.35
10	0.13	12558	12176	230.8	0.503	1670.3	1288	1.297	1479.2	191.11
11	0.29	12720	12175	343.85	0.554	1719.6	1173.8	1.465	1446.7	272.9
12	0.44	12836	12176	414.51	0.563	1764.1	1104.3	1.597	1434.2	329.87
13	0.59	12920	12176	468.67	0.571	1794.6	1050.2	1.709	1422.4	372.21
14	0.73	12983	12176	507.53	0.575	1818.2	1011.3	1.798	1414.8	403.45
15	0.87	13038	12176	536.97	0.572	1844.4	981.87	1.878	1413.1	431.28
16	1.02	13070	12176	559.35	0.576	1854	959.49	1.932	1406.8	447.28
17	1.18	13107	12176	577.01	0.573	1872.7	941.83	1.988	1407.3	465.45
18	1.33	13148	12176	591.14	0.564	1900.2	927.7	2.048	1413.9	486.23
19	1.47	13177	12177	601.74	0.558	1917.8	918.28	2.089	1418.1	499.78
20	1.62	13205	12176	609.98	0.552	1938.3	908.86	2.133	1423.6	514.72
21	1.76	13232	12176	615.87	0.544	1959.5	902.97	2.170	1431.2	528.25
22	1.92	13250	12176	620.58	0.539	1972.8	898.26	2.196	1435.5	537.27
23	2.06	13263	12176	624.11	0.536	1981.8	894.73	2.215	1438.2	543.52
24	2.22	13272	12176	625.29	0.533	1990	893.55	2.227	1441.8	548.21
25	2.37	13290	12176	626.47	0.526	2006.9	892.37	2.249	1449.6	557.24
26	2.52	13305	12176	626.47	0.519	2022	892.37	2.266	1457.2	564.8
27	2.67	13329	12176	627.65	0.510	2044.4	891.19	2.294	1467.8	576.61
28	2.82	13338	12176	625.29	0.505	2056	893.55	2.301	1474.8	581.22
29	2.97	13345	12176	625.29	0.502	2062.4	893.55	2.308	1478	584.45
30	3.13	13354	12176	622.94	0.497	2074	895.91	2.315	1484.9	589.03
31	3.28	13377	12176	621.76	0.487	2098.4	897.08	2.339	1497.7	600.66
32	3.44	13395	12176	618.23	0.477	2119.4	900.62	2.353	1510	609.4
33	3.58	13415	12176	615.87	0.468	2142.3	902.97	2.373	1522.6	619.68
34	3.73	13433	12176	613.52	0.460	2162.2	905.33	2.388	1533.8	628.43
35	3.89	13450	12176	611.16	0.452	2181.9	907.68	2.404	1544.8	637.12
36	4.04	13467	12176	606.45	0.443	2204	912.39	2.416	1558.2	645.8
37	4.18	13479	12176	604.1	0.438	2218.1	914.75	2.425	1566.4	651.68
38	4.33	13489	12177	600.56	0.432	2231.8	919.46	2.427	1575.6	656.15
39	4.47	13492	12176	597.03	0.429	2237.5	921.81	2.427	1579.6	657.82
40	4.62	13498	12176	593.5	0.424	2247.1	925.34	2.428	1586.2	660.88
41	4.77	13501	12176	589.96	0.421	2253.8	928.88	2.426	1591.3	662.47
42	4.92	13509	12176	587.61	0.417	2264.8	931.23	2.432	1598	666.8
43	5.08	13515	12176	582.9	0.412	2275.5	935.94	2.431	1605.7	669.76
44	5.22	13519	12176	579.37	0.408	2282.2	939.48	2.429	1610.9	671.38
45	5.36	13528	12176	575.83	0.403	2294.6	943.01	2.433	1618.8	675.81
46	5.51	13531	12176	572.3	0.400	2301.2	946.54	2.431	1623.9	677.35
47	5.66	13531	12176	568.77	0.397	2305.1	950.07	2.426	1627.6	677.52
48	5.81	13526	12176	565.24	0.396	2303.4	953.61	2.415	1628.5	674.91
49	5.96	13523	12176	560.52	0.394	2305.7	958.32	2.406	1632	673.69
50	6.11	13524	12176	558.17	0.392	2308.4	960.67	2.403	1634.5	673.88
51	6.27	13520	12177	554.64	0.390	2307.8	965.38	2.391	1636.6	671.23
52	6.41	13519	12176	551.1	0.388	2310.6	967.74	2.388	1639.1	671.41
53	6.58	13519	12176	547.57	0.386	2314.2	971.27	2.383	1642.7	671.46
54	6.73	13522	12176	544.04	0.382	2320.7	974.8	2.381	1647.8	672.96
55	6.87	13529	12177	541.68	0.378	2330	978.34	2.382	1654.2	675.84
56	7.03	13541	12176	538.15	0.373	2346.1	980.69	2.392	1663.4	682.72
57	7.18	13552	12176	535.8	0.369	2359.5	983.05	2.400	1671.3	688.24
58	7.33	13563	12176	531.09	0.363	2375.3	987.76	2.405	1681.5	693.77
59	7.49	13577	12176	527.55	0.357	2392.4	991.29	2.413	1691.9	700.57
60	7.63	13585	12176	526.38	0.354	2401.9	992.47	2.420	1697.2	704.71
61	7.79	13594	12176	522.84	0.350	2413.6	996	2.423	1704.8	708.81
62	7.93	13594	12176	518.13	0.347	2418.6	1000.7	2.417	1709.6	708.93
63	8.09	13596	12176	515.78	0.345	2423.6	1003.1	2.416	1713.3	710.24
64	8.25	13599	12176	512.24	0.342	2429.7	1006.6	2.414	1718.1	711.55
65	8.38	13605	12176	509.89	0.339	2437.7	1009	2.416	1723.3	714.37
66	8.53	13609	12177	506.36	0.335	2445.1	1013.7	2.412	1729.4	715.74
67	8.67	13624	12176	502.82	0.330	2463.7	1016	2.425	1739.9	723.85
68	8.82	13632	12176	499.29	0.326	2475.3	1019.6	2.428	1747.4	727.85
69	8.97	13641	12177	496.94	0.322	2486.8	1023.1	2.431	1755	731.87
70	9.12	13646	12177	493.4	0.319	2495.6	1026.6	2.431	1761.1	734.47
71	9.26	13646	12177	491.05	0.317	2498.1	1029	2.428	1763.5	734.54
72	9.41	13654	12177	488.69	0.314	2508.3	1031.3	2.432	1769.8	738.49
73	9.55	13656	12176	485.16	0.312	2513.3	1033.7	2.431	1773.5	739.82
74	9.72	13646	12177	481.63	0.311	2507	1038.4	2.414	1772.7	734.32
75	9.87	13634	12176	479.27	0.312	2497.5	1039.6	2.402	1768.6	728.99
76	10.02	13629	12176	476.92	0.312	2494.6	1041.9	2.394	1768.3	726.35
77	10.17	13627	12177	474.56	0.310	2495.4	1045.5	2.387	1770.4	724.99
78	10.33	13626	12176	471.03	0.309	2497.6	1047.8	2.384	1772.7	724.9
79	10.49	13623	12176	468.67	0.308	2497.1	1050.2	2.378	1773.6	723.44

80	10.63	13623	12176	466.32	0.306	2499.4	1052.5	2.375	1776	723.45
81	10.77	13628	12176	463.96	0.304	2507	1054.9	2.377	1780.9	726.07
82	10.92	13636	12176	461.61	0.300	2517.1	1057.2	2.381	1787.2	729.93
83	11.08	13648	12176	459.25	0.296	2532.1	1059.6	2.390	1795.9	736.27
84	11.22	13656	12176	456.9	0.293	2542.3	1061.9	2.394	1802.1	740.16
85	11.37	13664	12176	453.37	0.290	2553.3	1065.5	2.396	1809.4	743.91
86	11.53	13666	12176	451.01	0.288	2558	1067.8	2.395	1812.9	745.06
87	11.67	13666	12176	448.66	0.286	2560.1	1070.2	2.392	1815.2	744.97
88	11.82	13666	12176	446.3	0.285	2562.3	1072.5	2.389	1817.4	744.9
89	11.97	13669	12177	445.12	0.283	2567	1074.9	2.388	1820.9	746.04
90	12.13	13678	12176	441.59	0.280	2579.2	1077.3	2.394	1828.2	750.99
91	12.27	13688	12176	439.23	0.277	2591.6	1079.6	2.401	1835.6	756.01
92	12.43	13695	12176	435.7	0.273	2602.4	1083.1	2.403	1842.8	759.65
93	12.57	13703	12176	434.52	0.271	2611.1	1084.3	2.408	1847.7	763.38
94	12.72	13710	12176	432.17	0.268	2620.7	1086.7	2.412	1853.7	767.04
95	12.84	13716	12177	429.81	0.265	2629.4	1090.2	2.412	1859.8	769.6
96	13.00	13714	12176	427.46	0.265	2630	1091.4	2.410	1860.7	769.31
97	13.16	13714	12176	423.93	0.263	2632.9	1094.9	2.405	1863.9	769.01
98	13.32	13704	12177	421.57	0.262	2625.8	1098.4	2.390	1862.1	763.66
99	13.47	13696	12177	419.22	0.262	2620.1	1100.8	2.380	1860.5	759.65
100	13.62	13690	12176	416.86	0.262	2615.9	1102	2.374	1858.9	756.94
101	13.78	13685	12177	416.86	0.262	2611.3	1103.2	2.367	1857.3	754.09
102	13.93	13682	12177	414.51	0.261	2610.7	1105.5	2.362	1858.1	752.61
103	14.08	13676	12176	409.8	0.260	2609	1109	2.352	1859	749.98
104	14.22	13678	12176	407.44	0.258	2613.6	1111.4	2.352	1862.5	751.1
105	14.38	13685	12176	406.26	0.256	2621.7	1112.6	2.356	1867.1	754.54
106	14.51	13687	12176	403.91	0.254	2626.4	1114.9	2.356	1870.7	755.74
107	14.68	13699	12176	402.73	0.252	2639.3	1116.1	2.365	1877.7	761.58
108	14.82	13702	12177	401.55	0.250	2643.7	1118.5	2.364	1881.1	762.61
109	14.97	13703	12176	398.02	0.248	2648	1120.8	2.363	1884.4	763.61
110	15.00	13705	12176	398.02	0.248	2650	1120.8	2.364	1885.4	764.57

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Ⓢ			
Sample No.	T-2			
Test No.	2			
Depth	12.4'-13.0'			
Initial	Diameter, in	2.854		
	Height, in	5.827		
	Water Content, %	30.4		
	Dry Density, pcf	90.2		
	Saturation, %	94.5		
Before Shear	Void Ratio	0.869		
	Water Content, %	32.4		
	Dry Density, pcf	89.94		
	Saturation*, %	100.0		
	Void Ratio	0.874		
	Back Press., psf	12100		
	Ver. Eff. Cons. Stress, psf	3038		
	Shear Strength, psf	782.3		
	Strain at Failure, %	15		
	Strain Rate, %/min	0.03		
	B-Value	0.93		
	Estimated Specific Gravity	2.7		
	Liquid Limit	44		
	Plastic Limit	18		

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description:				
	Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial - 3040 PSF				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-2
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/19/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 12.4'-13.0'
Elevation:

Soil Description: Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial

Specimen Height: 5.83 in
Specimen Area: 6.40 in²
Specimen Volume: 610.86 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 44

Plastic Limit: 18

Estimated Specific Gravity: 2.70

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	279	---	0	0
Wt. Container + Wet Soil, gm	156.86	---	---	1156.3
Wt. Container + Dry Soil, gm	127.7	---	---	875.17
Wt. Container, gm	31.8	---	---	6.8
Wt. Wet Soil, gm	125.06	1151	1168.3	1149.5
Wt. Dry Soil, gm	95.9	882.62	882.62	868.37
Wt. Water, gm	29.16	268.37	285.71	281.1
Water Content, %	30.41	30.41	32.37	32.37
Void Ratio	---	0.87	0.87	---
Degree of Saturation, %	---	94.51	100.00	---
Dry Unit Weight, pcf	---	90.2	89.943	---

Initial

Height: 5.827 in
Area: 6.3973 in²
Volume: 610.86 cc

Moisture: 30.41 %
Void Ratio: 0.87
Dry Unit Weight: 90.2 pcf
Saturation: 94.51 %

End of Initialization

Time: 10.203 min
Total Vertical Stress: 991.39 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 575.83 psf
Effective Vertical Stress: 415.55 psf
Effective Horizontal Stress: 431.35 psf

Height Change: 0.0067655 in
Area Change: 0 in²
Volume Change: 2.1278 cc
Water Change: -1.8063 cc
Correction: 0 cc

Height: 5.8202 in
Area: 6.3973 in²
Volume: 608.74 cc

Moisture: 30.61 %
Void Ratio: 0.86
Dry Unit Weight: 90.515 pcf
Saturation: 95.86 %

End of Consolidation/A

Time: 10.203 min
Total Vertical Stress: 991.39 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 575.83 psf
Effective Vertical Stress: 415.55 psf
Effective Horizontal Stress: 431.35 psf

Height Change: 0.0067655 in
Area Change: 0 in²
Volume Change: 2.1278 cc
Water Change: -1.8063 cc
Correction: 0 cc

Height: 5.8202 in
Area: 6.3973 in²
Volume: 608.74 cc

Moisture: 30.61 %
Void Ratio: 0.86
Dry Unit Weight: 90.515 pcf
Saturation: 95.86 %

End of Saturation

Time: 232.66 min
Total Vertical Stress: 12514 psf
Total Horizontal Stress: 12527 psf
Pore Pressure: 12094 psf
Effective Vertical Stress: 420.47 psf
Effective Horizontal Stress: 433.66 psf

Height Change: 0.0069561 in
Area Change: 0 in²
Volume Change: 2.1877 cc
Water Change: -24.362 cc
Correction: 10.955 cc

Height: 5.82 in
Area: 6.3973 in²
Volume: 608.68 cc

Moisture: 31.93 %
Void Ratio: 0.86
Dry Unit Weight: 90.524 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 437.06 min
Total Vertical Stress: 15041 psf
Total Horizontal Stress: 15134 psf
Pore Pressure: 12096 psf
Effective Vertical Stress: 2945.1 psf
Effective Horizontal Stress: 3037.7 psf

Height Change: 0.060985 in
Area Change: -0.086109 in²
Volume Change: -1.7431 cc
Water Change: -6.0403 cc
Correction: -11.297 cc

Height: 5.766 in
Area: 6.4834 in²
Volume: 612.61 cc

Moisture: 32.37 %
Void Ratio: 0.87
Dry Unit Weight: 89.943 pcf
Saturation: 100.00 %

End of Shear

Time: 936 min
Total Vertical Stress: 16712 psf
Total Horizontal Stress: 15135 psf
Pore Pressure: 13327 psf
Effective Vertical Stress: 3385.2 psf
Effective Horizontal Stress: 1808.3 psf

Height Change: 0.92592 in
Area Change: -1.2303 in²
Volume Change: -1.7431 cc
Water Change: -6.0403 cc
Correction: -11.297 cc

Height: 4.9011 in
Area: 7.6276 in²
Volume: 612.61 cc

Moisture: 32.37 %
Void Ratio: 0.87
Dry Unit Weight: 89.943 pcf
Saturation: 100.00 %

At Failure

Time: 936 min
Total Vertical Stress: 16700 psf
Total Horizontal Stress: 15135 psf
Pore Pressure: 13327 psf
Effective Vertical Stress: 3373 psf
Effective Horizontal Stress: 1808.3 psf

Height Change: 0.92592 in
Area Change: -1.2838 in²
Volume Change: -1.7431 cc
Water Change: -6.0403 cc
Correction: 0 cc

Height: 4.9011 in
Area: 7.6811 in²
Volume: 612.61 cc

Moisture: 32.37 %
Void Ratio: 0.87
Dry Unit Weight: 89.943 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-2
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/19/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 12.4'-13.0'
Elevation:

Soil Description: Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial

Specimen Height: 5.77 in
Specimen Area: 6.48 in²
Specimen Volume: 612.61 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 44

Plastic Limit: 18

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.5289	-0.10007	-92.633	12096	15135	15042
2	0.012317	0	0	6.5289	-0.10007	-92.633	12097	15135	15042
3	0.02065	0	0	6.5289	0.17043	-86.667	12097	15135	15048
4	0.053983	0	0	6.5289	0.84666	-71.752	12102	15135	15063
5	0.10398	0.0016526	0	6.529	1.5248	-56.938	12107	15134	15077
6	0.20397	0.0049578	0	6.5292	2.8753	-27.435	12117	15135	15108
7	0.50393	0.014873	0	6.5299	5.8508	37.327	12144	15135	15172
8	1.0039	0.029747	0	6.5308	9.3672	113.57	12184	15135	15249
9	2.0038	0.064451	0	6.5331	13.697	205.97	12247	15134	15340
10	5.0035	0.14708	0	6.5385	24.109	427.96	12402	15135	15563
11	10.003	0.2892	0	6.5478	34.117	635.15	12592	15135	15770
12	15.003	0.46934	0	6.5597	40.879	766.84	12730	15135	15902
13	20.002	0.59659	0	6.5681	46.154	870.46	12837	15135	16005
14	25.002	0.75358	0	6.5785	50.482	950.17	12923	15135	16085
15	30.001	0.90728	0	6.5887	54.269	1018.1	12991	15135	16153
16	35.001	1.0593	0	6.5988	57.379	1079.3	13048	15135	16214
17	40	1.2031	0	6.6084	60.22	1139.4	13097	15135	16274
18	45	1.3469	0	6.618	62.519	1187.5	13139	15135	16322
19	50.004	1.5121	0	6.6291	64.548	1229.3	13174	15135	16364
20	55.003	1.6526	0	6.6386	65.765	1253.7	13203	15135	16389
21	60.003	1.7931	0	6.6481	67.117	1281	13230	15135	16416
22	65.002	1.9435	0	6.6583	68.468	1308	13255	15136	16444
23	70.002	2.0971	0	6.6688	69.957	1337.8	13274	15135	16473
24	75.002	2.2376	0	6.6783	70.904	1356.1	13290	15135	16491
25	80.001	2.3979	0	6.6893	71.716	1371	13305	15135	16506
26	85.001	2.5417	0	6.6992	72.527	1386.2	13320	15135	16521
27	90	2.6805	0	6.7087	73.068	1395.6	13330	15135	16531
28	95.004	2.8408	0	6.7198	73.205	1395.9	13338	15134	16530
29	100	2.9895	0	6.7301	73.609	1402.2	13345	15135	16537
30	105	3.1465	0	6.741	74.283	1414	13353	15136	16550
31	110	3.3002	0	6.7517	75.097	1428.9	13357	15135	16564
32	115	3.4506	0	6.7622	75.234	1429.3	13361	15134	16563
33	120	3.6043	0	6.773	75.908	1441.1	13363	15135	16576
34	125	3.758	0	6.7838	76.449	1450	13365	15135	16585
35	130	3.915	0	6.7949	76.99	1458.8	13368	15135	16594
36	135	4.0604	0	6.8052	77.261	1462.1	13367	15135	16597
37	140	4.2026	0	6.8153	77.531	1465.3	13365	15135	16600
38	145	4.3529	0	6.826	78.07	1474.1	13363	15136	16610
39	150	4.5182	0	6.8379	78.478	1479.9	13361	15135	16615
40	155	4.662	0	6.8482	78.478	1477.4	13358	15135	16612
41	160	4.8107	0	6.8589	78.072	1466.3	13353	15135	16601
42	165	4.9661	0	6.8701	77.396	1449.5	13348	15135	16584
43	170	5.1181	0	6.8811	76.72	1432.7	13344	15135	16568
44	175	5.2668	0	6.8919	75.638	1407.6	13340	15135	16543
45	180	5.4222	0	6.9032	74.826	1388.1	13332	15135	16523
46	185	5.5676	0	6.9138	73.879	1365.9	13328	15135	16501
47	190	5.7213	0	6.9251	72.796	1340.9	13323	15136	16477
48	195	5.8601	0	6.9353	71.986	1321.9	13320	15135	16457
49	200	5.9973	0	6.9454	71.175	1302.9	13314	15135	16438
50	205	6.1559	0	6.9572	70.363	1283.6	13309	15135	16419
51	210	6.3195	0	6.9693	69.687	1267.1	13305	15135	16402
52	215	6.4451	0	6.9787	69.009	1251.1	13304	15136	16387
53	220	6.6005	0	6.9903	69.009	1248.8	13303	15136	16385
54	225	6.7525	0	7.0017	69.146	1249.3	13301	15135	16384
55	230	6.9012	0	7.0129	69.416	1252.6	13300	15135	16388
56	235	7.0483	0	7.024	70.363	1269.7	13300	15135	16405
57	240	7.2136	0	7.0365	71.445	1289.3	13301	15135	16424
58	245	7.3623	0	7.0478	72.796	1314.6	13303	15136	16451
59	250	7.5144	0	7.0594	73.879	1334.2	13303	15135	16469
60	255	7.6681	0	7.0711	74.826	1351	13304	15135	16486
61	260	7.8284	0	7.0834	75.367	1359.4	13307	15135	16494
62	265	7.9804	0	7.0951	76.179	1373.3	13309	15135	16508
63	270	8.1209	0	7.106	76.584	1379.2	13314	15135	16514
64	275	8.2762	0	7.118	76.855	1382	13316	15135	16517
65	280	8.4349	0	7.1303	77.125	1384.8	13318	15135	16520
66	285	8.5803	0	7.1417	77.531	1390.5	13321	15135	16525
67	290	8.7241	0	7.1529	77.666	1390.7	13323	15135	16526
68	295	8.8761	0	7.1649	77.666	1388.1	13327	15135	16523
69	300	9.0199	0	7.1762	77.937	1391.1	13330	15135	16526
70	305	9.1752	0	7.1885	78.072	1391.1	13334	15135	16526
71	310	9.319	0	7.1999	78.613	1399.5	13336	15135	16534
72	315	9.4743	0	7.2122	78.613	1396.8	13341	15135	16532
73	320	9.6148	0	7.2234	78.884	1399.8	13344	15135	16535
74	325	9.7569	0	7.2348	79.289	1405.4	13347	15135	16540
75	330	9.9007	0	7.2463	79.966	1416.3	13350	15135	16551
76	335	10.059	0	7.2591	80.236	1418.9	13353	15135	16554
77	340	10.215	0	7.2717	80.777	1426.8	13355	15135	16562
78	345	10.357	0	7.2832	81.183	1432.3	13357	15135	16567
79	350	10.507	0	7.2955	81.724	1440.3	13351	15135	16575
80	355	10.659	0	7.3079	82.4	1450.9	13349	15135	16586

81	360	10.823	0	7.3213	82.941	1458.5	13349	15135	16593
82	365	10.965	0	7.333	83.211	1461.3	13349	15135	16596
83	370	11.115	0	7.3454	83.752	1469.1	13347	15135	16604
84	375	11.264	0	7.3577	84.293	1476.9	13347	15135	16612
85	380	11.418	0	7.3704	84.834	1484.7	13345	15135	16620
86	385	11.575	0	7.3835	85.105	1487	13344	15135	16622
87	390	11.722	0	7.3958	85.375	1489.5	13344	15135	16624
88	395	11.879	0	7.409	85.781	1494.4	13344	15135	16629
89	400	12.029	0	7.4217	85.916	1494.2	13343	15135	16629
90	405	12.165	0	7.4331	86.052	1494.3	13342	15135	16629
91	410	12.315	0	7.4459	86.185	1494	13341	15136	16630
92	415	12.47	0	7.4591	86.457	1496.3	13340	15135	16631
93	420	12.626	0	7.4724	86.728	1498.5	13340	15135	16633
94	425	12.776	0	7.4852	86.863	1498.3	13340	15135	16633
95	430	12.925	0	7.498	87.134	1500.6	13338	15135	16636
96	435	13.07	0	7.5106	87.404	1503	13337	15135	16638
97	440	13.203	0	7.522	87.81	1508.2	13336	15135	16643
98	445	13.363	0	7.5359	88.351	1515.4	13336	15135	16650
99	450	13.502	0	7.548	88.621	1517.9	13336	15135	16653
100	455	13.655	0	7.5615	89.025	1522.6	13337	15136	16659
101	460	13.809	0	7.5749	89.162	1522.2	13335	15135	16657
102	465	13.961	0	7.5883	89.839	1532	13332	15135	16667
103	470	14.108	0	7.6013	89.974	1531.7	13332	15135	16667
104	475	14.262	0	7.6149	90.38	1536.3	13331	15135	16671
105	480	14.416	0	7.6286	90.92	1543.4	13330	15135	16678
106	485	14.566	0	7.642	91.46	1550.6	13330	15136	16687
107	490	14.711	0	7.6551	92.002	1557.9	13329	15135	16693
108	495	14.865	0	7.6689	92.271	1559.8	13327	15136	16696
109	498.94	15.001	0	7.6811	92.679	1564.7	13327	15135	16700

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-2
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/19/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 12.4'-13.0'
Elevation:

Soil Description: Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 11'0" - 13'0" - CU Triaxial

Specimen Height: 5.77 in
Specimen Area: 6.48 in²
Specimen Volume: 612.61 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 44

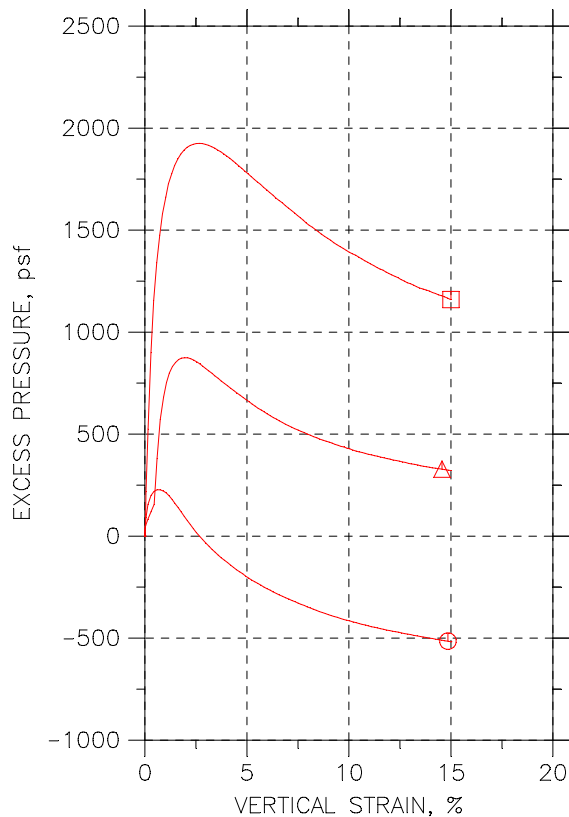
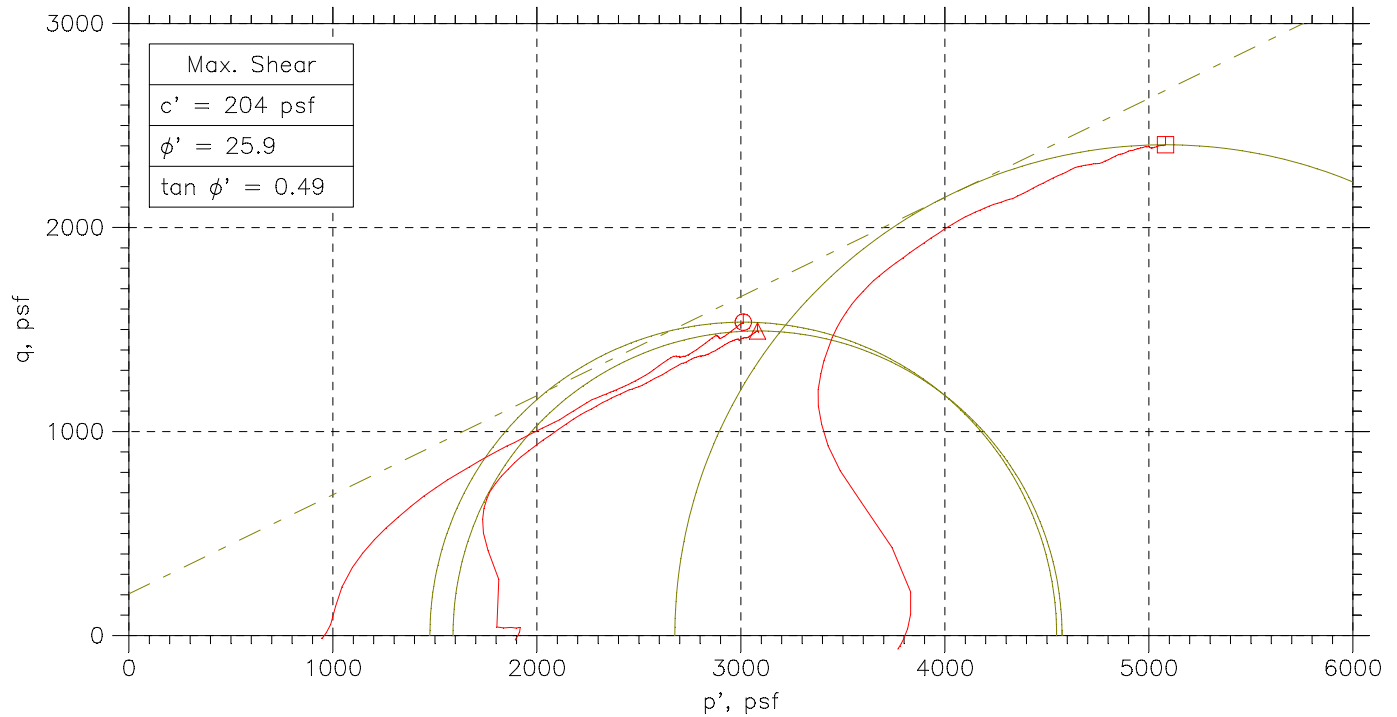
Plastic Limit: 18

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	15042	15135	0	0.000	2946.3	3038.9	1.031	2992.6	-46.316
2	0.00	15042	15135	1.1776	0.000	2945.1	3037.7	1.031	2991.4	-46.316
3	0.00	15048	15135	1.1776	0.197	2951.1	3037.7	1.029	2994.4	-43.333
4	0.00	15063	15135	5.8879	0.282	2961.3	3033	1.024	2997.1	-35.876
5	0.00	15077	15134	10.598	0.330	2970.2	3027.1	1.019	2998.7	-28.469
6	0.00	15108	15135	21.196	0.325	2990.3	3017.7	1.009	3004	-13.717
7	0.01	15172	15135	48.281	0.372	3027.9	2990.6	1.012	3009.3	18.663
8	0.03	15249	15135	88.318	0.428	3064.2	2950.6	1.038	3007.4	56.785
9	0.06	15340	15134	150.73	0.509	3093	2887	1.071	2990	102.98
10	0.15	15563	15135	306.17	0.588	3160.7	2732.7	1.157	2946.7	213.98
11	0.29	15770	15135	495.76	0.681	3178.3	2543.1	1.250	2860.7	317.58
12	0.47	15902	15135	633.53	0.737	3172.2	2405.4	1.319	2788.8	383.42
13	0.60	16005	15135	740.69	0.769	3168.7	2298.2	1.379	2733.4	435.23
14	0.75	16085	15135	826.66	0.793	3162.4	2212.2	1.430	2687.3	475.09
15	0.91	16153	15135	894.96	0.806	3162	2143.9	1.475	2653	509.04
16	1.06	16214	15135	951.48	0.812	3166.8	2087.4	1.517	2627.1	539.67
17	1.20	16274	15135	1000.9	0.812	3177.4	2038	1.559	2607.7	569.71
18	1.35	16322	15135	1043.3	0.815	3183.1	1995.6	1.595	2589.3	593.76
19	1.51	16364	15135	1077.5	0.815	3190.7	1961.4	1.627	2576.1	614.66
20	1.65	16389	15135	1106.9	0.822	3185.7	1932	1.649	2558.8	626.86
21	1.79	16416	15135	1134	0.826	3185.9	1904.9	1.672	2545.4	640.49
22	1.94	16444	15136	1158.7	0.826	3189.3	1881.3	1.695	2535.3	653.98
23	2.10	16473	15135	1177.6	0.823	3199.1	1861.3	1.719	2530.2	668.9
24	2.24	16491	15135	1194.1	0.824	3200.9	1844.8	1.735	2522.9	678.03
25	2.40	16506	15135	1209.4	0.826	3200.5	1829.5	1.749	2515	685.51
26	2.54	16521	15135	1223.5	0.827	3201.6	1815.4	1.764	2508.5	693.09
27	2.68	16531	15135	1234.1	0.829	3200.4	1804.8	1.773	2502.6	697.79
28	2.84	16530	15134	1242.3	0.835	3191.3	1795.4	1.778	2493.3	697.96
29	2.99	16537	15135	1249.4	0.836	3191.7	1789.5	1.784	2490.6	701.08
30	3.15	16550	15136	1256.5	0.833	3197.6	1783.6	1.793	2490.6	707.01
31	3.30	16564	15135	1261.2	0.829	3206.6	1777.7	1.804	2492.1	714.43
32	3.45	16563	15134	1264.7	0.832	3202.3	1773	1.806	2487.6	714.64
33	3.60	16576	15135	1267.1	0.826	3212.9	1771.8	1.813	2492.4	720.53
34	3.76	16585	15135	1269.4	0.823	3219.5	1769.5	1.819	2494.5	724.99
35	3.92	16594	15135	1271.8	0.820	3225.9	1767.1	1.826	2496.5	729.4
36	4.06	16597	15135	1270.6	0.817	3230.4	1768.3	1.827	2499.3	731.03
37	4.20	16600	15135	1269.4	0.815	3234.8	1769.5	1.828	2502.1	732.67
38	4.35	16610	15136	1267.1	0.808	3247.2	1773	1.831	2510.1	737.07
39	4.52	16615	15135	1264.7	0.804	3254.1	1774.2	1.834	2514.1	739.94
40	4.66	16612	15135	1262.4	0.804	3253.9	1776.5	1.832	2515.2	738.7
41	4.81	16601	15135	1256.5	0.806	3248.7	1782.4	1.823	2515.6	733.15
42	4.97	16584	15135	1251.8	0.812	3236.6	1787.1	1.811	2511.9	724.73
43	5.12	16568	15135	1248.2	0.818	3223.4	1790.7	1.800	2507	716.35
44	5.27	16543	15135	1243.5	0.829	3203	1795.4	1.784	2499.2	703.79
45	5.42	16523	15135	1236.5	0.835	3190.5	1802.4	1.770	2496.5	694.03
46	5.57	16501	15135	1231.7	0.844	3173.1	1807.2	1.756	2490.1	682.97
47	5.72	16477	15136	1227	0.855	3154	1813	1.740	2483.5	670.45
48	5.86	16457	15135	1223.5	0.865	3137.3	1815.4	1.728	2476.3	660.93
49	6.00	16438	15135	1217.6	0.873	3124.2	1821.3	1.715	2472.7	651.43
50	6.16	16419	15135	1212.9	0.881	3109.6	1826	1.703	2467.8	641.79
51	6.32	16402	15135	1209.4	0.889	3096.6	1829.5	1.693	2463.1	633.53
52	6.45	16387	15136	1208.2	0.898	3083	1831.9	1.683	2457.5	625.57
53	6.60	16385	15136	1207	0.899	3081.8	1833.1	1.681	2457.5	624.39
54	6.75	16384	15135	1204.7	0.898	3083.5	1834.2	1.681	2458.9	624.64
55	6.90	16388	15135	1203.5	0.895	3088	1835.4	1.682	2461.7	626.29
56	7.05	16405	15135	1203.5	0.883	3105.1	1835.4	1.692	2470.3	634.86
57	7.21	16424	15135	1204.7	0.872	3123.5	1834.2	1.703	2478.9	644.65
58	7.36	16451	15136	1207	0.857	3147.6	1833.1	1.717	2490.3	657.28
59	7.51	16469	15135	1207	0.846	3166.1	1831.9	1.728	2499	667.11
60	7.67	16486	15135	1208.2	0.837	3181.7	1830.7	1.738	2506.2	675.5
61	7.83	16494	15135	1210.5	0.834	3187.7	1828.4	1.743	2508	679.68
62	7.98	16508	15135	1212.9	0.827	3199.3	1826	1.752	2512.6	686.65
63	8.12	16514	15135	1217.6	0.827	3200.4	1821.3	1.757	2510.9	689.58
64	8.28	16517	15135	1220	0.827	3200.9	1818.9	1.760	2509.9	691
65	8.43	16520	15135	1222.3	0.827	3201.4	1816.6	1.762	2509	692.39
66	8.58	16525	15135	1224.7	0.826	3204.7	1814.2	1.766	2509.5	695.24
67	8.72	16526	15135	1227	0.827	3202.6	1811.9	1.768	2507.2	695.37
68	8.88	16523	15135	1230.6	0.831	3196.5	1808.3	1.768	2502.4	694.07
69	9.02	16526	15135	1234.1	0.832	3195.9	1804.8	1.771	2500.4	695.55
70	9.18	16526	15135	1237.6	0.834	3192.4	1801.3	1.772	2496.8	695.57
71	9.32	16534	15135	1240	0.831	3198.4	1798.9	1.778	2498.7	699.75
72	9.47	16532	15135	1244.7	0.836	3191	1794.2	1.779	2492.6	698.4
73	9.61	16535	15135	1248.2	0.836	3190.4	1790.7	1.782	2490.6	699.88
74	9.76	16540	15135	1250.6	0.835	3193.7	1788.3	1.786	2491	702.68
75	9.90	16551	15135	1254.1	0.831	3201.1	1784.8	1.794	2492.9	708.14
76	10.06	16554	15135	1256.5	0.831	3201.3	1782.4	1.796	2491.9	709.43
77	10.21	16562	15135	1258.8	0.828	3206.9	1780.1	1.802	2493.5	713.41
78	10.36	16567	15135	1261.2	0.827	3210	1777.7	1.806	2493.9	716.15
79	10.51	16575	15135	1255.3	0.819	3223.9	1783.6	1.808	2503.8	720.14

80	10.66	16586	15135	1252.9	0.812	3236.8	1786	1.812	2511.4	725.44
81	10.82	16593	15135	1252.9	0.808	3244.5	1786	1.817	2515.2	729.27
82	10.96	16596	15135	1252.9	0.806	3247.2	1786	1.818	2516.6	730.63
83	11.12	16604	15135	1250.6	0.801	3257.4	1788.3	1.821	2522.9	734.55
84	11.26	16612	15135	1250.6	0.797	3265.3	1788.3	1.826	2526.8	738.47
85	11.42	16620	15135	1249.4	0.792	3274.1	1789.5	1.830	2531.8	742.33
86	11.57	16622	15135	1248.2	0.790	3277.7	1790.7	1.830	2534.2	743.49
87	11.72	16624	15135	1248.2	0.789	3280.2	1790.7	1.832	2535.4	744.75
88	11.88	16629	15135	1248.2	0.787	3285.1	1790.7	1.835	2537.9	747.21
89	12.03	16629	15135	1247.1	0.786	3286.1	1791.9	1.834	2539	747.1
90	12.16	16629	15135	1245.9	0.785	3287.3	1793	1.833	2540.2	747.13
91	12.32	16630	15136	1244.7	0.784	3289.4	1795.4	1.832	2542.4	746.99
92	12.47	16631	15135	1243.5	0.783	3291.7	1795.4	1.833	2543.5	748.14
93	12.63	16633	15135	1243.5	0.782	3293.9	1795.4	1.835	2544.7	749.27
94	12.78	16633	15135	1243.5	0.782	3293.6	1795.4	1.835	2544.5	749.13
95	12.92	16636	15135	1242.3	0.780	3297.2	1796.6	1.835	2546.9	750.3
96	13.07	16638	15135	1241.2	0.778	3300.7	1797.7	1.836	2549.2	751.5
97	13.20	16643	15135	1240	0.775	3307.1	1798.9	1.838	2553	754.11
98	13.36	16650	15135	1240	0.771	3314.4	1798.9	1.842	2556.6	757.72
99	13.50	16653	15135	1240	0.770	3316.8	1798.9	1.844	2557.9	758.95
100	13.66	16659	15136	1241.2	0.768	3321.5	1798.9	1.846	2560.2	761.3
101	13.81	16657	15135	1238.8	0.767	3322.3	1800.1	1.846	2561.2	761.09
102	13.96	16667	15135	1236.5	0.761	3334.5	1802.4	1.850	2568.5	766.01
103	14.11	16667	15135	1236.5	0.761	3334.1	1802.4	1.850	2568.3	765.84
104	14.26	16671	15135	1235.3	0.758	3339.9	1803.6	1.852	2571.8	768.15
105	14.42	16678	15135	1234.1	0.754	3348.2	1804.8	1.855	2576.5	771.72
106	14.57	16687	15136	1234.1	0.750	3356.6	1806	1.859	2581.3	775.29
107	14.71	16693	15135	1232.9	0.747	3363.8	1806	1.863	2584.9	778.93
108	14.87	16696	15136	1230.6	0.744	3369.3	1809.5	1.862	2589.4	779.89
109	15.00	16700	15135	1230.6	0.743	3373	1808.3	1.865	2590.7	782.34

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



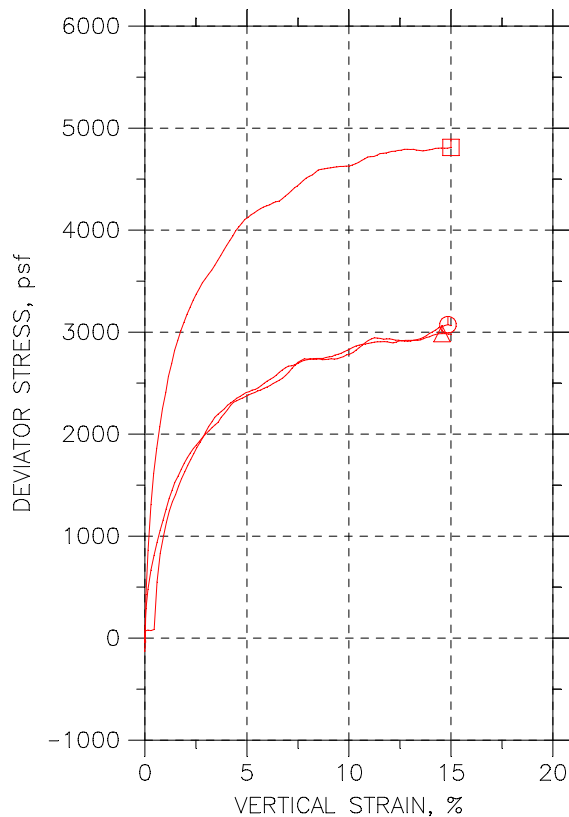
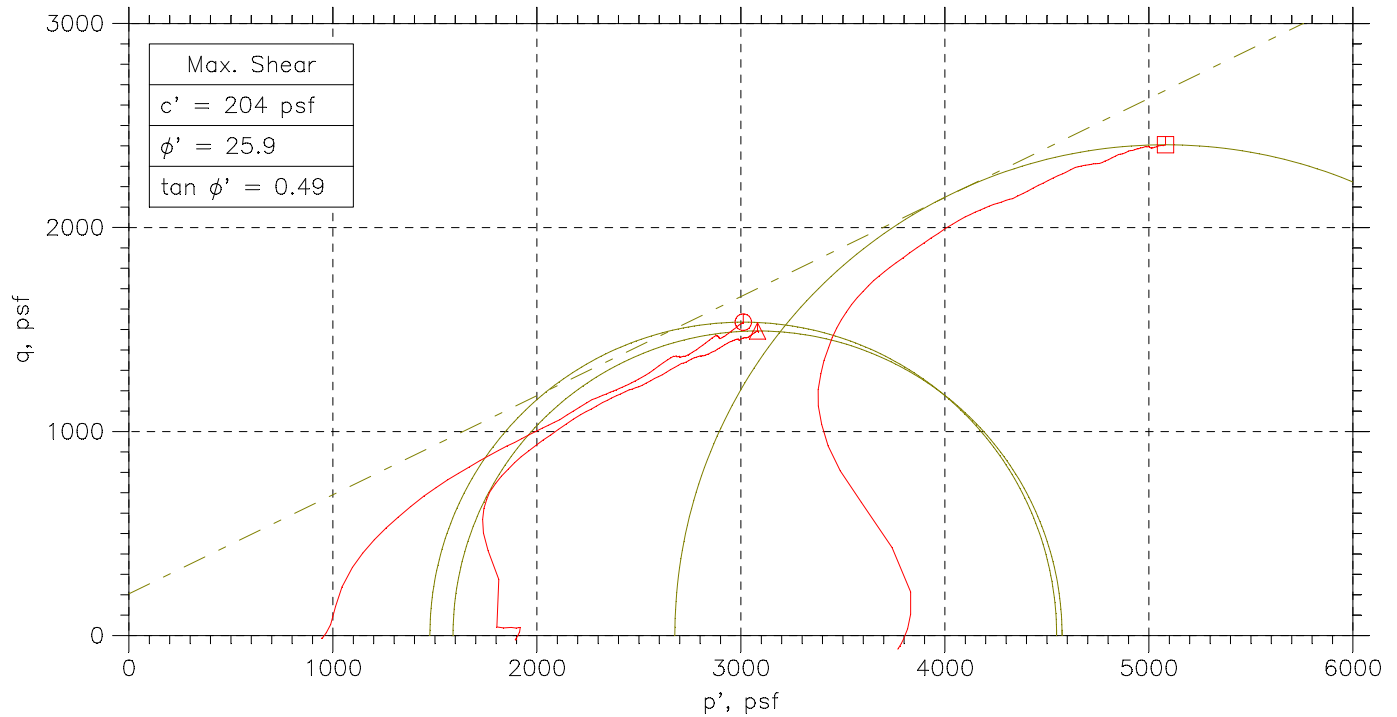
Symbol	⊕	△	□	
Sample No.	T-3	T-3	T-3	
Test No.	3	1	2	
Depth	15.0'-15.8'	5.8'-16.4'	16.4'-17'	
Initial	Diameter, in	2.839	2.837	2.835
	Height, in	5.775	5.863	5.765
	Water Content, %	20.6	17.4	21.8
	Dry Density, pcf	105.8	106.9	103.9
	Saturation, %	93.7	81.2	94.7
Before Shear	Void Ratio	0.594	0.577	0.623
	Water Content, %	21.4	21.1	22.6
	Dry Density, pcf	106.9	107.3	104.7
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.577	0.571	0.611
	Back Press., psf	12090	12090	12010
	Ver. Eff. Cons. Stress, psf	960.8	1918	3835
	Shear Strength, psf	1536	1493	2406
	Strain at Failure, %	14.9	14.6	15
	Strain Rate, %/min	0.03	0.03	0.03
	B-Value	0.95	0.95	0.94
	Estimated Specific Gravity	2.7	2.7	2.7
	Liquid Limit	34	34	34
	Plastic Limit	16	16	16

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description: Yellowish Brown Sandy Lean CLAY (CL)				
	Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



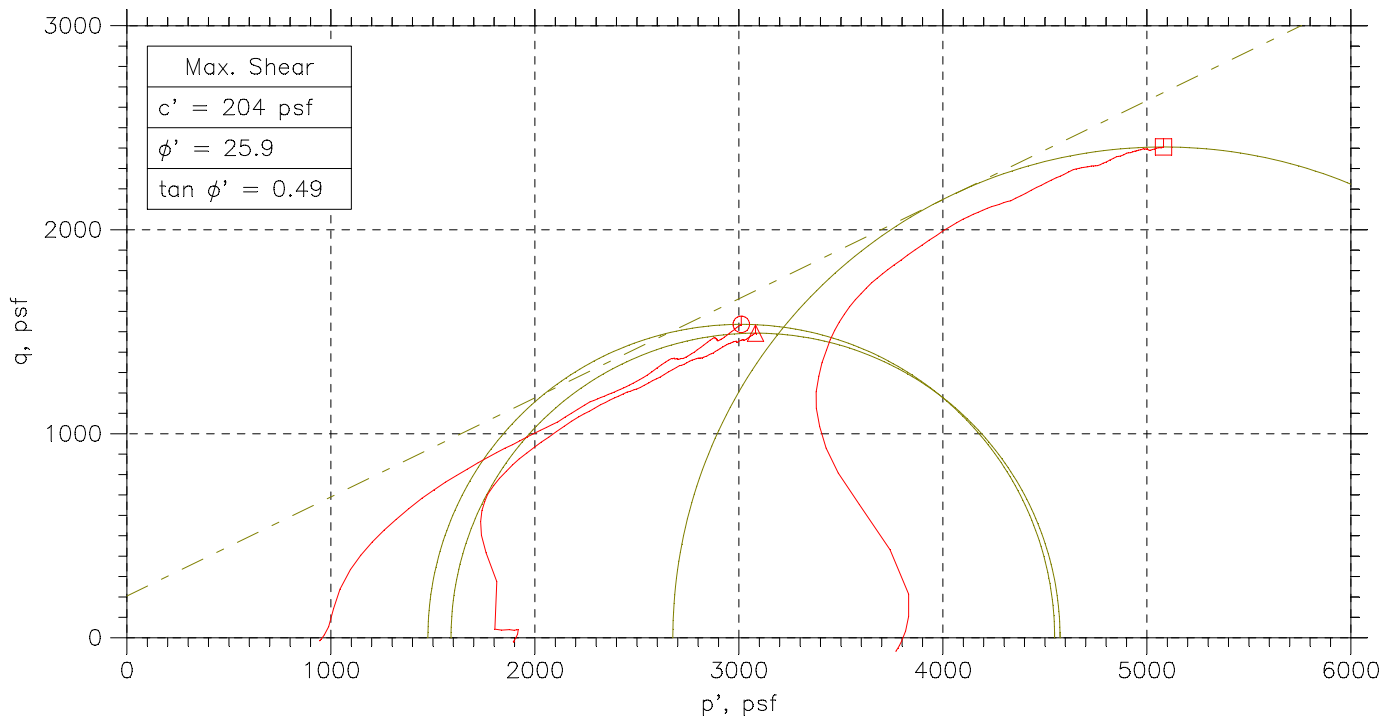
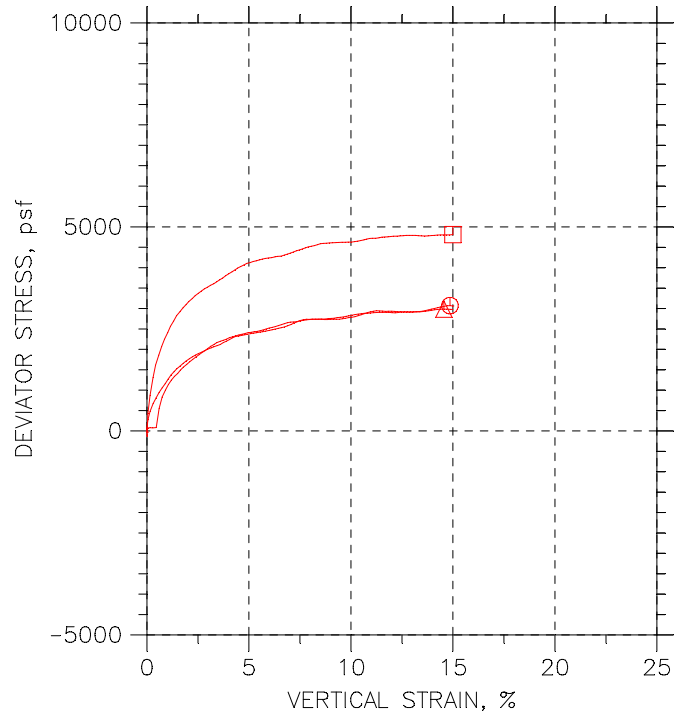
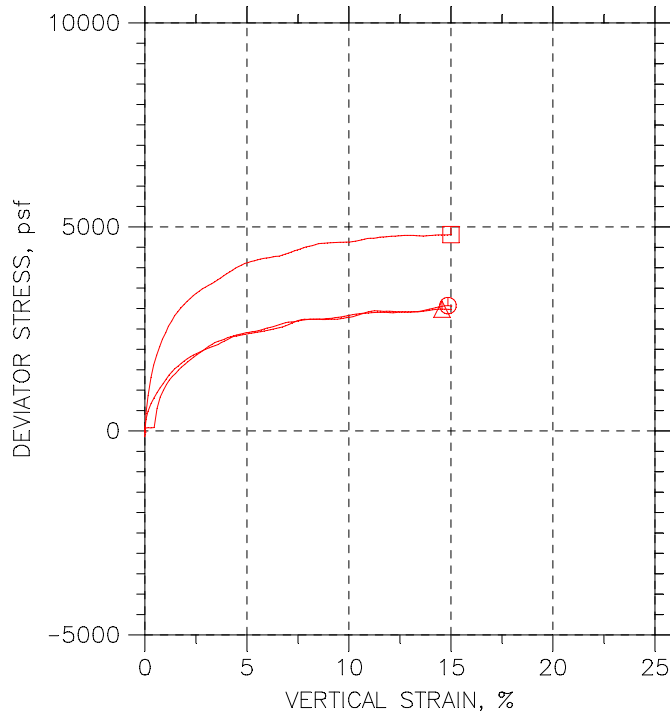
Symbol	⊙	△	□	
Sample No.	T-3	T-3	T-3	
Test No.	3	1	2	
Depth	15.0'-15.8'	5.8'-16.4'	16.4'-17'	
Initial	Diameter, in	2.839	2.837	2.835
	Height, in	5.775	5.863	5.765
	Water Content, %	20.6	17.4	21.8
	Dry Density, pcf	105.8	106.9	103.9
	Saturation, %	93.7	81.2	94.7
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	Water Content, %	21.4	21.1	22.6
	Dry Density, pcf	106.9	107.3	104.7
	Saturation*, %	100.0	100.0	100.0
	Void Ratio	0.577	0.571	0.611
	Back Press., psf	12090	12090	12010
	Ver. Eff. Cons. Stress, psf	960.8	1918	3835
	Shear Strength, psf	1536	1493	2406
	Strain at Failure, %	14.9	14.6	15
	Strain Rate, %/min	0.03	0.03	0.03
	B-Value	0.95	0.95	0.94
	Estimated Specific Gravity	2.7	2.7	2.7
	Liquid Limit	34	34	34
	Plastic Limit	16	16	16

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description: Yellowish Brown Sandy Lean CLAY (CL)				
	Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

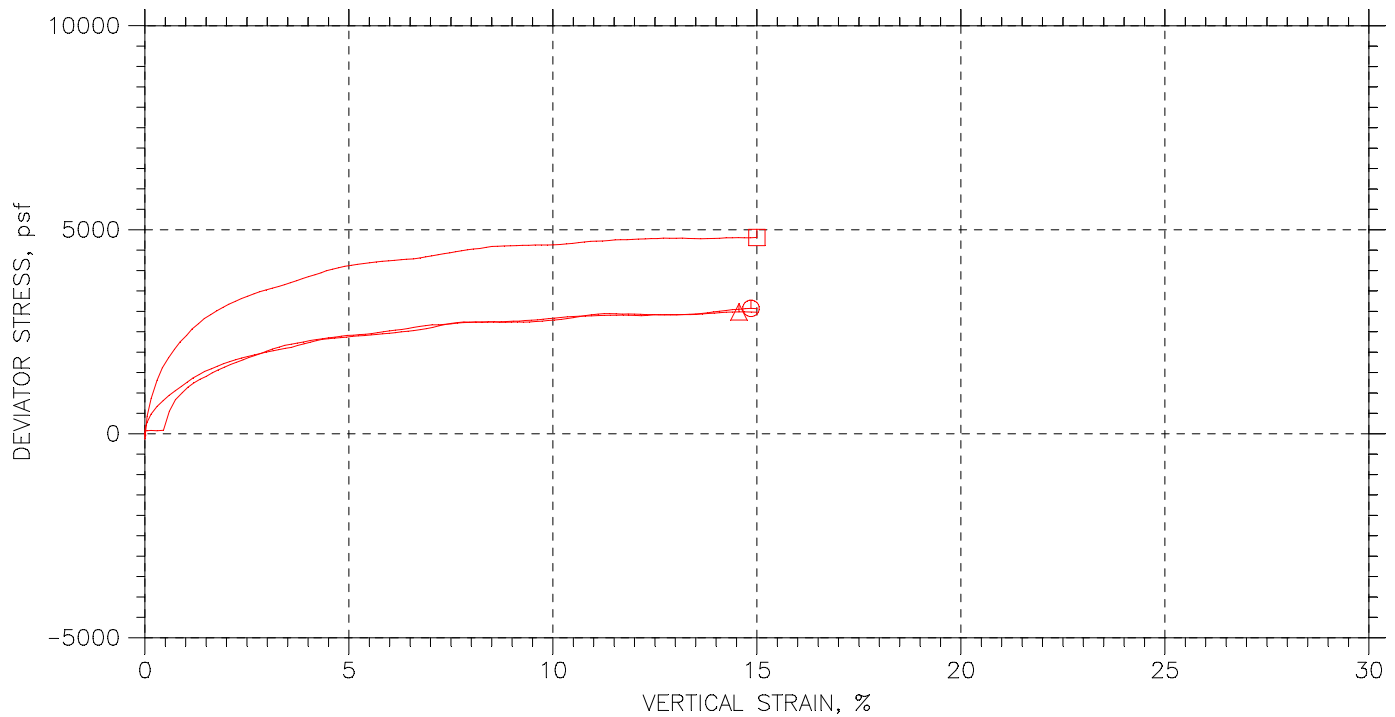
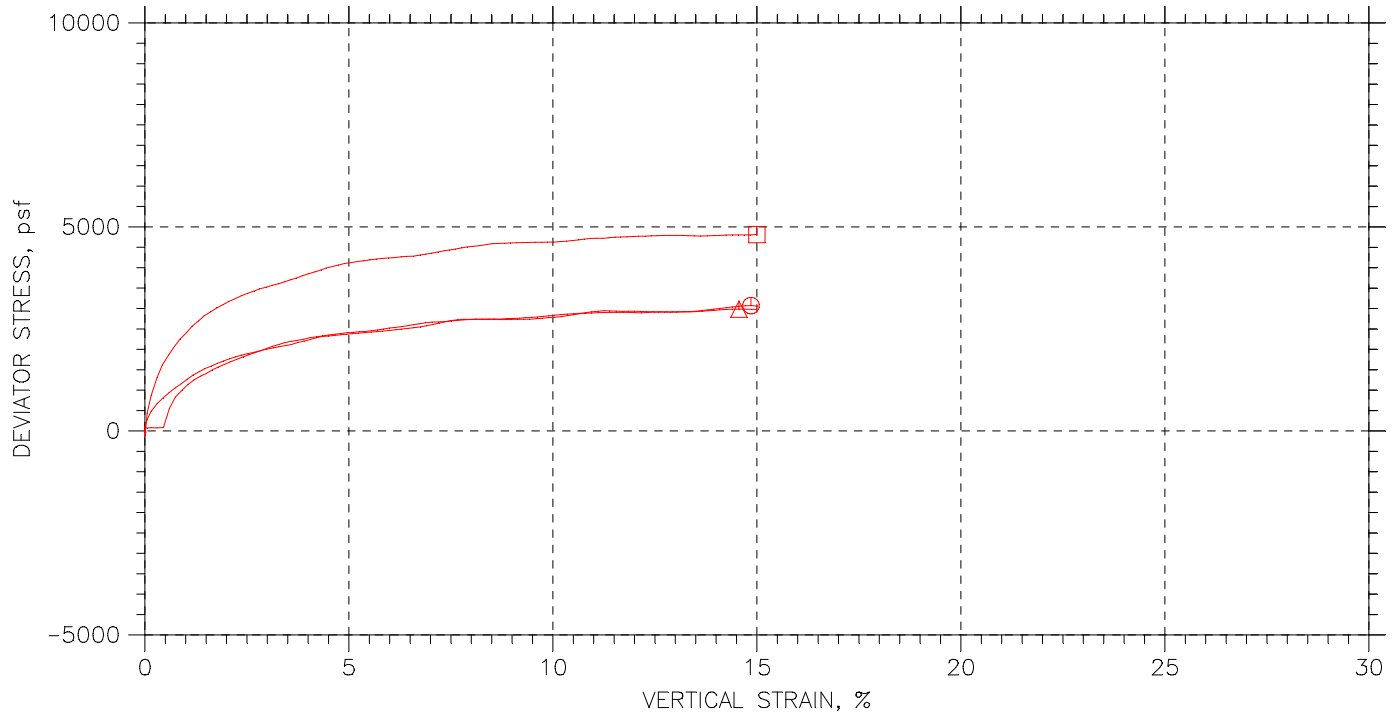


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File	
⊙	T-3	3	15.0'-15.8'	Jason	06/24/2015	Bert		CU TRIAXIAL GZ-7 15'0"	17'0"
△	T-3	1	15.8'-16.4'	Jason	06/22/2015	Bert		CU TRIAXIAL GZ-7 15'0"	17'0"
□	T-3	2	16.4'-17'	Jason	06/23/2015	Bert		CU TRIAXIAL GZ-7 15'0"	17'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-7	Sample Type: Undisturbed	
Description: Yellowish Brown Sandy Lean CLAY (CL)		
Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File	
⊙	T-3	3	15.0'-15.8'	Jason	06/24/2015	Bert		CU TRIAXIAL GZ-7 15'0"	17'0"
△	T-3	1	15.8'-16.4'	Jason	06/22/2015	Bert		CU TRIAXIAL GZ-7 15'0"	17'0"
□	T-3	2	16.4'-17'	Jason	06/23/2015	Bert		CU TRIAXIAL GZ-7 15'0"	17'0"

			
	Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
	Boring No.: GZ-7	Sample Type: Undisturbed	
	Description: Yellowish Brown Sandy Lean CLAY (CL)		
	Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial		

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/24/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 15.0'-15.8'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)
Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.78 in
Specimen Area: 6.33 in²
Specimen Volume: 599.06 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID		---	0	0
Wt. Container + Wet Soil, gm	220.93	---	---	1248.8
Wt. Container + Dry Soil, gm	188.61	---	---	1030.5
Wt. Container, gm	31.78	---	---	8.35
Wt. Wet Soil, gm	189.15	1224	1231.6	1240.4
Wt. Dry Soil, gm	156.83	1014.9	1014.9	1022.2
Wt. Water, gm	32.32	209.15	216.71	218.26
Water Content, %	20.61	20.61	21.35	21.35
Void Ratio	---	0.59	0.58	---
Degree of Saturation, %	---	93.71	100.00	---
Dry Unit Weight, pcf	---	105.76	106.92	---

Initial

Height: 5.775 in
Area: 6.3302 in²
Volume: 599.06 cc

Moisture: 20.61 %
Void Ratio: 0.59
Dry Unit Weight: 105.76 pcf
Saturation: 93.71 %

End of Initialization

Time: 10.253 min
Total Vertical Stress: 997.25 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 577.01 psf
Effective Vertical Stress: 420.24 psf
Effective Horizontal Stress: 430.18 psf

Height Change: 0.0068608 in
Area Change: 0 in²
Volume Change: 2.1351 cc
Water Change: 2.3667 cc
Correction: 0 cc

Height: 5.7681 in
Area: 6.3302 in²
Volume: 596.93 cc

Moisture: 20.38 %
Void Ratio: 0.59
Dry Unit Weight: 106.14 pcf
Saturation: 93.54 %

End of Consolidation/A

Time: 10.253 min
Total Vertical Stress: 997.25 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 577.01 psf
Effective Vertical Stress: 420.24 psf
Effective Horizontal Stress: 430.18 psf

Height Change: 0.0068608 in
Area Change: 0 in²
Volume Change: 2.1351 cc
Water Change: 2.3667 cc
Correction: 0 cc

Height: 5.7681 in
Area: 6.3302 in²
Volume: 596.93 cc

Moisture: 20.38 %
Void Ratio: 0.59
Dry Unit Weight: 106.14 pcf
Saturation: 93.54 %

End of Saturation

Time: 71.663 min
Total Vertical Stress: 12506 psf
Total Horizontal Stress: 12527 psf
Pore Pressure: 12094 psf
Effective Vertical Stress: 412.22 psf
Effective Horizontal Stress: 433.66 psf

Height Change: 0.012388 in
Area Change: 0 in²
Volume Change: 3.855 cc
Water Change: -17.778 cc
Correction: 7.595 cc

Height: 5.7626 in
Area: 6.3302 in²
Volume: 595.21 cc

Moisture: 21.61 %
Void Ratio: 0.58
Dry Unit Weight: 106.44 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 191.74 min
Total Vertical Stress: 13029 psf
Total Horizontal Stress: 13055 psf
Pore Pressure: 12094 psf
Effective Vertical Stress: 935.04 psf
Effective Horizontal Stress: 960.84 psf

Height Change: 0.018963 in
Area Change: 0.047848 in²
Volume Change: 6.4803 cc
Water Change: -14.459 cc
Correction: 6.9011 cc

Height: 5.756 in
Area: 6.2824 in²
Volume: 592.58 cc

Moisture: 21.35 %
Void Ratio: 0.58
Dry Unit Weight: 106.92 pcf
Saturation: 100.00 %

End of Shear

Time: 691.76 min
Total Vertical Stress: 16230 psf
Total Horizontal Stress: 13055 psf
Pore Pressure: 11576 psf
Effective Vertical Stress: 4654.8 psf
Effective Horizontal Stress: 1479 psf

Height Change: 0.88238 in
Area Change: -1.0608 in²
Volume Change: 6.4803 cc
Water Change: -14.459 cc
Correction: 6.9011 cc

Height: 4.8926 in
Area: 7.3911 in²
Volume: 592.58 cc

Moisture: 21.35 %
Void Ratio: 0.58
Dry Unit Weight: 106.92 pcf
Saturation: 100.00 %

At Failure

Time: 686.74 min
Total Vertical Stress: 16127 psf
Total Horizontal Stress: 13055 psf
Pore Pressure: 11579 psf
Effective Vertical Stress: 4547.6 psf
Effective Horizontal Stress: 1475.4 psf

Height Change: 0.87399 in
Area Change: -1.3089 in²
Volume Change: 6.4803 cc
Water Change: -14.459 cc
Correction: 0 cc

Height: 4.901 in
Area: 7.6391 in²
Volume: 592.58 cc

Moisture: 21.35 %
Void Ratio: 0.58
Dry Unit Weight: 106.92 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/24/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 15.0'-15.8'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.76 in
Specimen Area: 6.28 in²
Specimen Volume: 592.58 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.5044	-0.023078	-28.881	12094	13055	13026
2	0.01245	0	0	6.5044	0.11405	-25.845	12094	13053	13027
3	0.020767	0	0	6.5044	-0.023078	-28.881	12094	13055	13026
4	0.0541	0	0	6.5044	-0.023078	-28.881	12095	13055	13026
5	0.1041	0.0016555	0	6.5045	0.65315	-14.053	12095	13055	13040
6	0.2041	0.0033109	0	6.5046	2.5466	27.722	12101	13055	13082
7	0.50407	0.0082773	0	6.5049	6.1982	108.13	12120	13055	13163
8	1.004	0.019866	0	6.5057	9.5813	182	12145	13053	13235
9	2.0039	0.056286	0	6.5081	14.448	286.47	12184	13055	13341
10	5.0037	0.14734	0	6.514	23.374	475.66	12248	13055	13530
11	10.003	0.29798	0	6.5238	32.706	667.9	12293	13055	13722
12	15.003	0.44532	0	6.5335	39.739	809.15	12313	13055	13864
13	20.002	0.591	0	6.5431	46.231	938.19	12321	13055	13993
14	25.002	0.74496	0	6.5532	52.182	1054.1	12321	13055	14109
15	30.001	0.89229	0	6.563	57.592	1158.4	12315	13055	14213
16	35.001	1.038	0	6.5726	63.137	1265.5	12306	13055	14320
17	40.001	1.1787	0	6.582	68.411	1366.8	12292	13055	14421
18	45	1.3293	0	6.592	72.875	1449.1	12274	13055	14504
19	50.004	1.4651	0	6.6011	77.067	1526.6	12255	13055	14581
20	55.003	1.6257	0	6.6119	80.719	1589.6	12234	13055	14644
21	60.003	1.7747	0	6.6219	83.965	1653.1	12213	13055	14708
22	65.003	1.9236	0	6.632	86.94	1714.9	12190	13055	14769
23	70.002	2.0776	0	6.6424	89.51	1767.7	12170	13055	14822
24	75.002	2.2266	0	6.6525	91.809	1814.5	12150	13055	14869
25	80.001	2.3756	0	6.6627	93.973	1858.2	12130	13055	14913
26	85.001	2.5213	0	6.6726	95.731	1893.1	12110	13055	14948
27	90	2.6835	0	6.6838	97.625	1930.5	12094	13055	14985
28	95.004	2.8308	0	6.6939	99.518	1968	12077	13055	15023
29	100	2.9848	0	6.7045	101.28	2002.4	12060	13055	15057
30	105	3.1454	0	6.7156	102.9	2033.6	12044	13055	15088
31	110	3.2811	0	6.7251	104.39	2062.4	12029	13055	15117
32	115	3.4384	0	6.736	105.87	2090.6	12015	13055	15145
33	120	3.5907	0	6.7466	107.23	2115.8	12001	13055	15170
34	125	3.7413	0	6.7572	109.66	2164.1	11988	13055	15219
35	130	3.897	0	6.7681	111.55	2200.7	11976	13055	15255
36	135	4.0493	0	6.7789	113.58	2240	11964	13055	15295
37	140	4.1999	0	6.7895	115.75	2282.1	11951	13055	15337
38	145	4.3406	0	6.7995	117.37	2312.9	11941	13055	15367
39	150	4.4913	0	6.8103	118.18	2326.1	11929	13055	15381
40	155	4.6518	0	6.8217	119.13	2341.9	11918	13055	15396
41	160	4.8008	0	6.8324	119.94	2355.1	11909	13055	15410
42	165	4.9349	0	6.842	120.75	2368.6	11898	13055	15423
43	170	5.0856	0	6.8529	121.7	2384.4	11888	13055	15439
44	175	5.2313	0	6.8634	122.51	2397.5	11878	13056	15453
45	180	5.3836	0	6.8745	123.19	2407.6	11870	13055	15462
46	185	5.5392	0	6.8858	124.13	2423.1	11862	13055	15478
47	190	5.6832	0	6.8963	124.81	2433.3	11853	13055	15488
48	195	5.8305	0	6.9071	125.76	2449	11844	13055	15503
49	200	5.9845	0	6.9184	126.57	2461.6	11836	13055	15516
50	205	6.1368	0	6.9297	127.51	2477	11829	13055	15531
51	210	6.2792	0	6.9402	128.6	2495.4	11820	13055	15550
52	215	6.4447	0	6.9525	129.68	2513.1	11812	13055	15568
53	220	6.5854	0	6.9629	130.63	2528.7	11805	13053	15582
54	225	6.7493	0	6.9752	131.84	2549	11798	13055	15604
55	230	6.8967	0	6.9862	133.33	2575.4	11791	13055	15630
56	235	7.0589	0	6.9984	135.09	2606.8	11785	13055	15661
57	240	7.2062	0	7.0095	137.12	2644.1	11778	13055	15699
58	245	7.3585	0	7.021	138.87	2675.5	11772	13055	15730
59	250	7.5059	0	7.0322	140.5	2704.2	11765	13055	15759
60	255	7.6565	0	7.0437	141.58	2721.6	11759	13055	15776
61	260	7.8187	0	7.0561	142.66	2738.6	11753	13055	15793
62	265	7.9561	0	7.0666	142.66	2734.3	11746	13053	15788
63	270	8.1035	0	7.078	143.2	2740.6	11742	13055	15795
64	275	8.2508	0	7.0893	143.07	2733.2	11736	13055	15788
65	280	8.3998	0	7.1009	143.34	2734	11730	13055	15788
66	285	8.5438	0	7.112	143.74	2737.6	11724	13055	15792
67	290	8.6945	0	7.1238	143.61	2730.1	11719	13055	15785
68	295	8.8385	0	7.135	143.88	2731	11714	13055	15785
69	300	8.9842	0	7.1464	144.28	2734.5	11709	13055	15789
70	305	9.1282	0	7.1578	144.69	2738.1	11704	13055	15793
71	310	9.2772	0	7.1695	144.82	2736	11699	13056	15792
72	315	9.4328	0	7.1818	145.23	2739.1	11696	13056	15795
73	320	9.5851	0	7.1939	146.04	2750.5	11690	13055	15805
74	325	9.7325	0	7.2057	146.72	2759.3	11685	13055	15814
75	330	9.8781	0	7.2173	147.8	2776.1	11682	13055	15831
76	335	10.037	0	7.2301	148.48	2784.4	11678	13055	15839
77	340	10.201	0	7.2433	149.56	2800.5	11673	13056	15856
78	345	10.345	0	7.2549	150.91	2822.6	11670	13055	15877
79	350	10.501	0	7.2675	152.4	2846.9	11665	13055	15901
80	355	10.64	0	7.2788	153.75	2868.9	11662	13055	15923

81	360	10.804	0	7.2922	155.51	2898	11658	13056	15954
82	365	10.949	0	7.3041	156.73	2917	11654	13055	15972
83	370	11.105	0	7.3169	157.81	2932.9	11650	13055	15987
84	375	11.252	0	7.3291	158.62	2943.7	11647	13055	15998
85	380	11.395	0	7.3408	158.75	2941.4	11644	13056	15997
86	385	11.545	0	7.3534	158.89	2938.7	11640	13056	15994
87	390	11.704	0	7.3666	158.76	2930.5	11637	13055	15985
88	395	11.846	0	7.3785	159.16	2933.4	11633	13055	15988
89	400	12.002	0	7.3915	159.43	2933.2	11631	13055	15988
90	405	12.143	0	7.4034	159.43	2928.2	11627	13055	15983
91	410	12.288	0	7.4157	159.29	2920.4	11625	13056	15976
92	415	12.439	0	7.4284	159.57	2920.4	11623	13056	15976
93	420	12.583	0	7.4407	159.57	2915.3	11619	13056	15971
94	425	12.735	0	7.4537	159.7	2912.6	11616	13055	15967
95	430	12.883	0	7.4663	159.84	2910	11613	13055	15964
96	435	13.033	0	7.4792	160.24	2912.4	11611	13055	15967
97	440	13.184	0	7.4922	160.92	2920.1	11607	13055	15975
98	445	13.345	0	7.5061	161.6	2927.3	11605	13055	15982
99	450	13.5	0	7.5196	162.27	2934.7	11601	13055	15989
100	455	13.638	0	7.5315	163.22	2947.9	11599	13055	16002
101	460	13.79	0	7.5448	164.3	2963	11597	13055	16018
102	465	13.941	0	7.558	165.79	2985.9	11593	13055	16040
103	470	14.086	0	7.5708	166.87	3001.1	11592	13056	16057
104	475	14.255	0	7.5858	168.22	3020.5	11588	13056	16076
105	480	14.399	0	7.5985	169.58	3040.8	11586	13055	16095
106	485	14.555	0	7.6124	170.39	3050.3	11584	13055	16105
107	490	14.707	0	7.626	171.47	3065	11580	13055	16120
108	495	14.854	0	7.6391	172.15	3072.2	11579	13055	16127
109	500	14.998	0	7.6521	172.01	3064.1	11576	13056	16120
110	500.02	15	0	7.6522	171.87	3061.5	11576	13055	16116

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/24/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 15.0'-15.8'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.76 in
Specimen Area: 6.28 in²
Specimen Volume: 592.58 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	13026	13055	0	0.000	931.96	960.84	1.031	946.4	-14.44
2	0.00	13027	13053	0	0.388	933.81	959.66	1.028	946.74	-12.922
3	0.00	13026	13055	0	0.000	931.96	960.84	1.031	946.4	-14.44
4	0.00	13026	13055	1.1776	0.000	930.78	959.66	1.031	945.22	-14.44
5	0.00	13040	13055	1.1776	0.079	945.61	959.66	1.015	952.63	-7.0263
6	0.00	13082	13055	7.0654	0.125	981.49	953.77	1.029	967.63	13.861
7	0.01	13163	13055	25.907	0.189	1043.1	934.93	1.116	988.99	54.064
8	0.02	13235	13053	51.813	0.251	1089.8	907.84	1.200	998.84	90.998
9	0.06	13341	13055	90.673	0.288	1156.6	870.16	1.329	1013.4	143.24
10	0.15	13530	13055	154.26	0.306	1282.2	806.58	1.590	1044.4	237.83
11	0.30	13722	13055	199.01	0.286	1429.7	761.83	1.877	1095.8	333.95
12	0.45	13864	13055	219.03	0.261	1551	741.81	2.091	1146.4	404.57
13	0.59	13993	13055	227.27	0.235	1671.8	733.57	2.279	1202.7	469.1
14	0.74	14109	13055	227.27	0.210	1787.7	733.57	2.437	1260.6	527.06
15	0.89	14213	13055	221.38	0.186	1897.9	739.45	2.567	1318.7	579.21
16	1.04	14320	13055	211.96	0.164	2014.4	748.87	2.690	1381.6	632.76
17	1.18	14421	13055	197.83	0.142	2129.8	763	2.791	1446.4	683.41
18	1.33	14504	13055	180.17	0.122	2229.7	780.67	2.856	1505.2	724.53
19	1.47	14581	13055	161.33	0.104	2326.2	799.51	2.909	1562.8	763.32
20	1.63	14644	13055	140.13	0.087	2410.3	820.71	2.937	1615.5	794.8
21	1.77	14708	13055	118.93	0.071	2495	841.9	2.964	1668.5	826.55
22	1.92	14769	13055	96.561	0.055	2579.2	864.28	2.984	1721.7	857.47
23	2.08	14822	13055	76.542	0.043	2652	884.29	2.999	1768.1	883.84
24	2.23	14869	13055	56.524	0.031	2718.8	904.31	3.006	1811.6	907.25
25	2.38	14913	13055	36.505	0.019	2782.6	924.33	3.010	1853.4	929.12
26	2.52	14948	13055	16.486	0.009	2837.5	944.35	3.005	1890.9	946.57
27	2.68	14985	13055	0	0.000	2891.3	960.84	3.009	1926.1	965.25
28	2.83	15023	13055	-16.486	-0.008	2945.4	977.32	3.014	1961.3	984.02
29	2.98	15057	13055	-34.15	-0.017	2997.4	994.99	3.013	1996.2	1001.2
30	3.15	15088	13055	-49.458	-0.024	3043.9	1010.3	3.013	2027.1	1016.8
31	3.28	15117	13055	-64.767	-0.031	3088	1025.6	3.011	2056.8	1031.2
32	3.44	15145	13055	-78.897	-0.037	3130.3	1039.7	3.011	2085	1045.3
33	3.59	15170	13055	-93.028	-0.043	3169.7	1053.9	3.008	2111.8	1057.9
34	3.74	15219	13055	-105.98	-0.048	3231	1066.8	3.029	2148.9	1082.1
35	3.90	15255	13055	-117.76	-0.053	3279.3	1078.6	3.040	2178.9	1100.3
36	4.05	15295	13055	-129.53	-0.057	3330.4	1090.4	3.054	2210.4	1120
37	4.20	15337	13055	-142.49	-0.062	3385.4	1103.3	3.068	2244.4	1141
38	4.34	15367	13055	-153.08	-0.065	3426.8	1113.9	3.076	2270.4	1156.4
39	4.49	15381	13055	-164.86	-0.070	3451.8	1125.7	3.066	2288.8	1163.1
40	4.65	15396	13055	-175.46	-0.074	3478.2	1136.3	3.061	2307.2	1170.9
41	4.80	15410	13055	-184.88	-0.078	3500.8	1145.7	3.056	2323.2	1177.5
42	4.93	15423	13055	-195.48	-0.082	3524.9	1156.3	3.048	2340.6	1184.3
43	5.09	15439	13055	-206.08	-0.085	3551.4	1166.9	3.043	2359.1	1192.2
44	5.23	15453	13056	-215.5	-0.089	3575	1177.5	3.036	2376.3	1198.8
45	5.38	15462	13055	-223.74	-0.092	3592.2	1184.6	3.032	2388.4	1203.8
46	5.54	15478	13055	-231.98	-0.095	3616	1192.8	3.031	2404.4	1211.6
47	5.68	15488	13055	-240.22	-0.098	3634.4	1201.1	3.026	2417.7	1216.6
48	5.83	15503	13055	-249.65	-0.101	3659.4	1210.5	3.023	2435	1224.5
49	5.98	15516	13055	-257.89	-0.104	3680.3	1218.7	3.020	2449.5	1230.8
50	6.14	15531	13055	-264.95	-0.106	3702.8	1225.8	3.021	2464.3	1238.5
51	6.28	15550	13055	-273.2	-0.108	3729.4	1234	3.022	2481.7	1247.7
52	6.44	15568	13055	-281.44	-0.111	3755.4	1242.3	3.023	2498.8	1256.5
53	6.59	15582	13053	-288.51	-0.112	3776.8	1248.2	3.026	2512.5	1264.3
54	6.75	15604	13055	-295.57	-0.115	3805.4	1256.4	3.029	2530.9	1274.5
55	6.90	15630	13055	-302.64	-0.116	3838.9	1263.5	3.038	2551.2	1287.7
56	7.06	15661	13055	-308.52	-0.117	3876.1	1269.4	3.054	2572.8	1303.4
57	7.21	15699	13055	-315.59	-0.118	3920.5	1276.4	3.071	2598.5	1322
58	7.36	15730	13055	-321.48	-0.119	3957.8	1282.3	3.086	2620.1	1337.7
59	7.51	15759	13055	-328.54	-0.120	3993.6	1289.4	3.097	2641.5	1352.1
60	7.66	15776	13055	-334.43	-0.122	4016.9	1295.3	3.101	2656.1	1360.8
61	7.82	15793	13055	-340.32	-0.123	4039.8	1301.2	3.105	2670.5	1369.3
62	7.96	15788	13053	-347.38	-0.125	4041.4	1307	3.092	2674.2	1367.2
63	8.10	15795	13055	-352.09	-0.127	4053.6	1312.9	3.087	2683.2	1370.3
64	8.25	15788	13055	-357.98	-0.130	4052	1318.8	3.072	2685.4	1366.6
65	8.40	15788	13055	-363.87	-0.132	4058.7	1324.7	3.064	2691.7	1367
66	8.54	15792	13055	-369.76	-0.134	4068.2	1330.6	3.057	2699.4	1368.8
67	8.69	15785	13055	-374.47	-0.136	4065.4	1335.3	3.045	2700.4	1365
68	8.84	15785	13055	-379.18	-0.137	4071	1340	3.038	2705.5	1365.5
69	8.98	15789	13055	-385.07	-0.139	4080.4	1345.9	3.032	2713.2	1367.3
70	9.13	15793	13055	-389.78	-0.141	4088.7	1350.6	3.027	2719.7	1369
71	9.28	15792	13056	-394.49	-0.143	4092.5	1356.5	3.017	2724.5	1368
72	9.43	15795	13056	-398.02	-0.144	4099.2	1360	3.014	2729.6	1369.6
73	9.59	15805	13055	-403.91	-0.145	4115.3	1364.7	3.015	2740	1375.3
74	9.73	15814	13055	-408.62	-0.147	4128.7	1369.5	3.015	2749.1	1379.6
75	9.88	15831	13055	-412.15	-0.147	4149.1	1373	3.022	2761	1388.1
76	10.04	15839	13055	-415.68	-0.148	4160.9	1376.5	3.023	2768.7	1392.2
77	10.20	15856	13056	-420.39	-0.149	4182.9	1382.4	3.026	2782.6	1400.2
78	10.34	15877	13055	-423.93	-0.149	4207.3	1384.8	3.038	2796.1	1411.3
79	10.50	15901	13055	-428.64	-0.149	4236.3	1389.5	3.049	2812.9	1423.4

80	10.64	15923	13055	-432.17	-0.149	4261.9	1393	3.060	2827.5	1434.5
81	10.80	15954	13056	-435.7	-0.149	4295.7	1397.7	3.073	2846.7	1449
82	10.95	15972	13055	-439.23	-0.149	4317.1	1400.1	3.083	2858.6	1458.5
83	11.10	15987	13055	-443.95	-0.150	4337.7	1404.8	3.088	2871.3	1466.5
84	11.25	15998	13055	-446.3	-0.150	4350.9	1407.1	3.092	2879	1471.9
85	11.39	15997	13056	-449.83	-0.152	4353.2	1411.8	3.083	2882.5	1470.7
86	11.55	15994	13056	-453.37	-0.153	4354.1	1415.4	3.076	2884.7	1469.4
87	11.70	15985	13055	-456.9	-0.154	4348.2	1417.7	3.067	2883	1465.3
88	11.85	15988	13055	-460.43	-0.155	4354.7	1421.3	3.064	2888	1466.7
89	12.00	15988	13055	-462.79	-0.156	4356.8	1423.6	3.060	2890.2	1466.6
90	12.14	15983	13055	-466.32	-0.158	4355.4	1427.2	3.052	2891.3	1464.1
91	12.29	15976	13056	-468.67	-0.159	4351.1	1430.7	3.041	2890.9	1460.2
92	12.44	15976	13056	-471.03	-0.160	4353.4	1433	3.038	2893.2	1460.2
93	12.58	15971	13056	-474.56	-0.162	4351.9	1436.6	3.029	2894.2	1457.6
94	12.74	15967	13055	-478.09	-0.163	4351.5	1438.9	3.024	2895.2	1456.3
95	12.88	15964	13055	-480.45	-0.163	4351.2	1441.3	3.019	2896.3	1455
96	13.03	15967	13055	-482.81	-0.164	4356.1	1443.6	3.017	2899.9	1456.2
97	13.18	15975	13055	-486.34	-0.165	4367.3	1447.2	3.018	2907.2	1460
98	13.34	15982	13055	-488.69	-0.165	4376.9	1449.5	3.020	2913.2	1463.7
99	13.50	15989	13055	-492.23	-0.166	4387.8	1453.1	3.020	2920.4	1467.4
100	13.64	16002	13055	-494.58	-0.166	4403.3	1455.4	3.025	2929.4	1473.9
101	13.79	16018	13055	-496.94	-0.166	4420.8	1457.8	3.033	2939.3	1481.5
102	13.94	16040	13055	-500.47	-0.166	4447.2	1461.3	3.043	2954.3	1492.9
103	14.09	16057	13056	-501.65	-0.166	4464.8	1463.7	3.050	2964.2	1500.5
104	14.26	16076	13056	-505.18	-0.166	4487.7	1467.2	3.059	2977.5	1510.3
105	14.40	16095	13055	-507.53	-0.165	4509.2	1468.4	3.071	2988.8	1520.4
106	14.55	16105	13055	-509.89	-0.166	4521.1	1470.7	3.074	2995.9	1525.2
107	14.71	16120	13055	-513.42	-0.166	4539.3	1474.3	3.079	3006.8	1532.5
108	14.85	16127	13055	-514.6	-0.166	4547.6	1475.4	3.082	3011.5	1536.1
109	15.00	16120	13056	-518.13	-0.168	4544.3	1480.1	3.070	3012.2	1532.1
110	15.00	16116	13055	-518.13	-0.168	4540.5	1479	3.070	3009.7	1530.8

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/22/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 15.8'-16.4'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)
Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.86 in
Specimen Area: 6.32 in²
Specimen Volume: 607.34 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	19	---	0	0
Wt. Container + Wet Soil, gm	180.26	---	---	1244.6
Wt. Container + Dry Soil, gm	155.14	---	---	1028.6
Wt. Container, gm	10.36	---	---	6.61
Wt. Wet Soil, gm	169.9	1220.4	1259.7	1238
Wt. Dry Soil, gm	144.78	1039.9	1039.9	1022
Wt. Water, gm	25.12	180.43	219.74	215.96
Water Content, %	17.35	17.35	21.13	21.13
Void Ratio	---	0.58	0.57	---
Degree of Saturation, %	---	81.21	100.00	---
Dry Unit Weight, pcf	---	106.89	107.32	---

Initial

Height: 5.863 in
Area: 6.3213 in²
Volume: 607.34 cc

Moisture: 17.35 %
Void Ratio: 0.58
Dry Unit Weight: 106.89 pcf
Saturation: 81.21 %

End of Initialization

Time: 10.166 min
Total Vertical Stress: 1002.6 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 427.95 psf
Effective Horizontal Stress: 432.53 psf

Height Change: 0.0012388 in
Area Change: 0 in²
Volume Change: 0.38496 cc
Water Change: -6.4538 cc
Correction: 0 cc

Height: 5.8618 in
Area: 6.3213 in²
Volume: 606.95 cc

Moisture: 17.97 %
Void Ratio: 0.58
Dry Unit Weight: 106.96 pcf
Saturation: 84.26 %

End of Consolidation/A

Time: 10.166 min
Total Vertical Stress: 1002.6 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 427.95 psf
Effective Horizontal Stress: 432.53 psf

Height Change: 0.0012388 in
Area Change: 0 in²
Volume Change: 0.38496 cc
Water Change: -6.4538 cc
Correction: 0 cc

Height: 5.8618 in
Area: 6.3213 in²
Volume: 606.95 cc

Moisture: 17.97 %
Void Ratio: 0.58
Dry Unit Weight: 106.96 pcf
Saturation: 84.26 %

End of Saturation

Time: 87.198 min
Total Vertical Stress: 12520 psf
Total Horizontal Stress: 12527 psf
Pore Pressure: 12095 psf
Effective Vertical Stress: 425.07 psf
Effective Horizontal Stress: 432.48 psf

Height Change: 0.0030492 in
Area Change: 0 in²
Volume Change: 0.9476 cc
Water Change: -30.222 cc
Correction: 0 cc

Height: 5.86 in
Area: 6.3213 in²
Volume: 606.39 cc

Moisture: 20.26 %
Void Ratio: 0.57
Dry Unit Weight: 107.06 pcf
Saturation: 95.22 %

End of Consolidation/B

Time: 207.28 min
Total Vertical Stress: 13968 psf
Total Horizontal Stress: 14013 psf
Pore Pressure: 12095 psf
Effective Vertical Stress: 1873.2 psf
Effective Horizontal Stress: 1918.5 psf

Height Change: 0.02973 in
Area Change: -0.0066767 in²
Volume Change: 2.4415 cc
Water Change: -18.916 cc
Correction: -20.393 cc

Height: 5.8333 in
Area: 6.328 in²
Volume: 604.9 cc

Moisture: 21.13 %
Void Ratio: 0.57
Dry Unit Weight: 107.32 pcf
Saturation: 100.00 %

End of Shear

Time: 707.18 min
Total Vertical Stress: 17101 psf
Total Horizontal Stress: 14013 psf
Pore Pressure: 12418 psf
Effective Vertical Stress: 4683.9 psf
Effective Horizontal Stress: 1595.8 psf

Height Change: 0.90477 in
Area Change: -1.1235 in²
Volume Change: 2.4415 cc
Water Change: -18.916 cc
Correction: -20.393 cc

Height: 4.9582 in
Area: 7.4448 in²
Volume: 604.9 cc

Moisture: 21.13 %
Void Ratio: 0.57
Dry Unit Weight: 107.32 pcf
Saturation: 100.00 %

At Failure

Time: 692.28 min
Total Vertical Stress: 16999 psf
Total Horizontal Stress: 14013 psf
Pore Pressure: 12425 psf
Effective Vertical Stress: 4574.3 psf
Effective Horizontal Stress: 1588.8 psf

Height Change: 0.87904 in
Area Change: -1.3465 in²
Volume Change: 2.4415 cc
Water Change: -18.916 cc
Correction: 0 cc

Height: 4.984 in
Area: 7.6679 in²
Volume: 604.9 cc

Moisture: 21.13 %
Void Ratio: 0.57
Dry Unit Weight: 107.32 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/22/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 15.8'-16.4'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.83 in
Specimen Area: 6.33 in²
Specimen Volume: 604.90 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.5514	-0.066841	-45.281	12096	14013	13968
2	0.012433	0	0	6.5514	0.20365	-39.336	12096	14013	13974
3	0.020767	0	0	6.5514	0.20553	-39.294	12098	14012	13973
4	0.0541	0	0	6.5514	1.1523	-18.485	12102	14012	13994
5	0.1041	0	0	6.5514	1.9618	-0.69052	12107	14013	14013
6	0.20408	0.0016335	0	6.5515	3.5867	34.882	12115	14012	14047
7	0.50407	0.0081677	0	6.552	5.6154	78.901	12134	14012	14091
8	1.004	0.019603	0	6.5527	5.6135	77.863	12141	14013	14091
9	2.0039	0.049006	0	6.5546	5.4801	72.369	12150	14012	14085
10	5.0037	0.14865	0	6.5612	6.1545	78.484	12178	14013	14092
11	10.003	0.29567	0	6.5709	6.5583	74.497	12215	14015	14089
12	15.003	0.45576	0	6.5814	7.6422	84.219	12251	14013	14098
13	20.002	0.59788	0	6.5908	29.552	550.46	12475	14013	14564
14	25.002	0.7498	0	6.6009	43.079	831.5	12667	14012	14844
15	30.001	0.91478	0	6.6119	51.732	1004.2	12778	14013	15018
16	35.001	1.0536	0	6.6212	58.495	1137.8	12849	14013	15151
17	40.001	1.199	0	6.6309	64.177	1246.8	12896	14012	15259
18	45	1.3509	0	6.6412	69.044	1337.1	12927	14013	15350
19	50.004	1.5045	0	6.6515	72.968	1406.9	12947	14012	15419
20	55.003	1.6515	0	6.6614	77.023	1492.2	12962	14013	15506
21	60.003	1.7936	0	6.6711	80.405	1562.8	12969	14013	15576
22	65.003	1.9554	0	6.6821	83.786	1632.8	12970	14013	15646
23	70.002	2.0975	0	6.6918	86.761	1694.2	12970	14013	15708
24	75.002	2.2461	0	6.702	89.603	1752.4	12965	14012	15765
25	80.001	2.4013	0	6.7126	92.441	1810.3	12958	14013	15824
26	85.001	2.55	0	6.7229	95.282	1868.1	12950	14013	15881
27	90	2.6937	0	6.7328	97.716	1917.1	12940	14013	15930
28	95.004	2.8407	0	6.743	100.15	1966	12929	14013	15979
29	100	2.9812	0	6.7527	102.86	2020.6	12918	14013	16034
30	105	3.1299	0	6.7631	105.56	2074.8	12906	14013	16088
31	110	3.2949	0	6.7746	107.99	2122.7	12894	14013	16136
32	115	3.4288	0	6.784	110.16	2165.5	12881	14013	16179
33	120	3.5905	0	6.7954	111.78	2195.9	12870	14013	16209
34	125	3.7359	0	6.8057	113.13	2221	12857	14013	16234
35	130	3.8944	0	6.8169	114.62	2248.5	12845	14012	16261
36	135	4.0496	0	6.8279	116.52	2284.5	12833	14013	16298
37	140	4.208	0	6.8392	117.73	2306.1	12820	14013	16319
38	145	4.355	0	6.8497	118.95	2327.9	12810	14012	16340
39	150	4.5102	0	6.8609	120.3	2352.2	12798	14013	16366
40	155	4.6589	0	6.8716	121.25	2368.1	12787	14013	16381
41	160	4.8141	0	6.8828	122.47	2389.4	12775	14013	16403
42	165	4.9611	0	6.8934	123.55	2408.1	12765	14013	16421
43	170	5.1097	0	6.9042	124.09	2415.3	12754	14013	16429
44	175	5.2551	0	6.9148	125.04	2431.1	12744	14013	16444
45	180	5.4054	0	6.9258	125.58	2438.2	12733	14013	16452
46	185	5.5491	0	6.9363	126.52	2453.9	12723	14013	16467
47	190	5.6994	0	6.9474	127.74	2474.9	12714	14012	16487
48	195	5.8481	0	6.9584	129.09	2498.7	12705	14013	16512
49	200	5.9918	0	6.969	130.31	2519.8	12695	14012	16532
50	205	6.1454	0	6.9804	131.39	2537.8	12686	14012	16550
51	210	6.2957	0	6.9916	132.47	2555.7	12677	14013	16569
52	215	6.4443	0	7.0027	133.83	2579.1	12670	14013	16592
53	220	6.5864	0	7.0134	135.31	2605.5	12661	14013	16619
54	225	6.7318	0	7.0243	136.67	2628.9	12653	14013	16642
55	230	6.8821	0	7.0356	137.88	2649.3	12645	14013	16663
56	235	7.034	0	7.0471	138.97	2666.8	12638	14013	16680
57	240	7.1958	0	7.0594	139.37	2670.1	12629	14013	16683
58	245	7.3411	0	7.0705	140.05	2679.5	12622	14013	16693
59	250	7.5029	0	7.0829	140.99	2693.7	12617	14013	16707
60	255	7.6564	0	7.0946	142.08	2710.9	12609	14013	16724
61	260	7.8034	0	7.1059	142.89	2722.8	12604	14013	16736
62	265	7.9505	0	7.1173	143.43	2729.1	12597	14013	16742
63	270	8.1171	0	7.1302	143.97	2734.8	12591	14013	16748
64	275	8.2608	0	7.1414	144.51	2741.2	12584	14013	16754
65	280	8.4258	0	7.1542	144.78	2741.4	12578	14013	16755
66	285	8.5598	0	7.1647	145.05	2742.5	12572	14013	16756
67	290	8.7297	0	7.1781	145.32	2742.5	12566	14013	16756
68	295	8.8799	0	7.1899	146	2751.3	12561	14013	16765
69	300	9.0302	0	7.2018	146.54	2757.3	12556	14013	16771
70	305	9.174	0	7.2132	146.95	2760.7	12552	14013	16774
71	310	9.3177	0	7.2246	147.89	2775	12546	14013	16788
72	315	9.4762	0	7.2372	148.57	2783.3	12541	14013	16797
73	320	9.6167	0	7.2485	149.24	2792.1	12535	14013	16805
74	325	9.7555	0	7.2597	150.19	2806.3	12533	14015	16821
75	330	9.9009	0	7.2714	151.14	2820.3	12527	14013	16834
76	335	10.046	0	7.2831	152.08	2834.2	12523	14013	16848
77	340	10.197	0	7.2953	153.17	2850.5	12518	14013	16864
78	345	10.352	0	7.3079	154.11	2863.9	12513	14013	16877
79	350	10.497	0	7.3198	154.79	2872.3	12509	14013	16886
80	355	10.647	0	7.3321	155.47	2880.5	12506	14013	16894

81	360	10.788	0	7.3437	155.87	2883.6	12502	14015	16898
82	365	10.948	0	7.3569	156.41	2888.8	12498	14013	16902
83	370	11.118	0	7.3709	157.09	2896.1	12494	14013	16909
84	375	11.258	0	7.3826	157.63	2901.8	12491	14015	16916
85	380	11.402	0	7.3946	158.04	2904.7	12488	14013	16918
86	385	11.559	0	7.4077	158.31	2904.6	12483	14013	16918
87	390	11.721	0	7.4213	158.71	2906.8	12480	14013	16920
88	395	11.863	0	7.4332	158.85	2904.5	12476	14013	16918
89	400	12.015	0	7.4461	158.85	2899.2	12474	14013	16913
90	405	12.165	0	7.4588	158.85	2893.9	12469	14013	16907
91	410	12.317	0	7.4717	159.53	2901.7	12467	14012	16914
92	415	12.48	0	7.4857	160.47	2914.1	12463	14013	16927
93	420	12.627	0	7.4983	160.88	2916.7	12460	14013	16930
94	425	12.774	0	7.5109	161.28	2919.3	12458	14013	16933
95	430	12.926	0	7.524	161.55	2919.1	12453	14013	16932
96	435	13.06	0	7.5356	161.82	2919.5	12450	14013	16933
97	440	13.22	0	7.5495	162.09	2919	12448	14013	16932
98	445	13.375	0	7.563	162.36	2918.6	12445	14013	16932
99	450	13.516	0	7.5753	162.9	2923.9	12441	14013	16937
100	455	13.656	0	7.5876	163.72	2934.2	12439	14013	16948
101	460	13.803	0	7.6006	164.66	2946.9	12436	14013	16960
102	465	13.95	0	7.6136	165.34	2954.4	12434	14013	16968
103	470	14.089	0	7.6259	166.29	2967.2	12430	14013	16981
104	475	14.248	0	7.64	167.1	2976.7	12429	14013	16990
105	480	14.4	0	7.6535	167.77	2983.8	12427	14013	16997
106	485	14.56	0	7.6679	168.18	2985.6	12425	14013	16999
107	490	14.7	0	7.6805	168.45	2985.4	12422	14013	16999
108	495	14.857	0	7.6946	168.58	2982.2	12420	14013	16996
109	499.9	15.001	0	7.7076	168.58	2976.8	12418	14013	16990

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/22/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 15.8'-16.4'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.83 in
Specimen Area: 6.33 in²
Specimen Volume: 604.90 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	13968	14013	0	0.000	1872	1917.3	1.024	1894.7	-22.64
2	0.00	13974	14013	0	0.000	1878	1917.3	1.021	1897.6	-19.668
3	0.00	13973	14012	2.3551	0.590	1874.5	1913.8	1.021	1894.1	-19.647
4	0.00	13994	14012	5.8879	0.264	1891.8	1910.2	1.010	1901	-9.2426
5	0.00	14013	14013	10.598	0.238	1906	1906.7	1.000	1906.4	-0.34526
6	0.00	14047	14012	18.841	0.250	1932.2	1897.3	1.018	1914.7	17.441
7	0.01	14091	14012	37.682	0.313	1957.4	1878.5	1.042	1917.9	39.451
8	0.02	14091	14013	44.748	0.363	1950.4	1872.6	1.042	1911.5	38.932
9	0.05	14085	14012	54.168	0.470	1934.3	1862	1.039	1898.2	36.185
10	0.15	14092	14013	82.43	0.666	1913.4	1834.9	1.043	1874.1	39.242
11	0.30	14089	14015	118.93	0.983	1874.1	1799.6	1.041	1836.8	37.249
12	0.46	14098	14013	155.44	1.200	1846.1	1761.9	1.048	1804	42.11
13	0.60	14564	14013	379.18	0.636	2088.6	1538.1	1.358	1813.4	275.23
14	0.75	14844	14012	571.12	0.653	2176.5	1345	1.618	1760.8	415.75
15	0.91	15018	14013	681.81	0.650	2239.7	1235.5	1.813	1737.6	502.11
16	1.05	15151	14013	752.47	0.636	2302.6	1164.8	1.977	1733.7	568.89
17	1.20	15259	14012	799.57	0.620	2363.4	1116.6	2.117	1740	623.4
18	1.35	15350	14013	831.37	0.601	2423.1	1085.9	2.231	1754.5	668.57
19	1.50	15419	14012	851.39	0.587	2471.6	1064.7	2.321	1768.2	703.45
20	1.65	15506	14013	865.52	0.563	2544	1051.8	2.419	1797.9	746.1
21	1.79	15576	14013	872.58	0.543	2607.5	1044.7	2.496	1826.1	781.39
22	1.96	15646	14013	873.76	0.521	2676.3	1043.6	2.565	1860	816.4
23	2.10	15708	14013	873.76	0.502	2737.8	1043.6	2.623	1890.7	847.1
24	2.25	15765	14012	869.05	0.484	2799.5	1047.1	2.674	1923.3	876.22
25	2.40	15824	14013	861.98	0.465	2865.6	1055.3	2.715	1960.5	905.13
26	2.55	15881	14013	853.74	0.446	2931.7	1063.6	2.756	1997.6	934.04
27	2.69	15930	14013	844.32	0.430	2990.1	1073	2.787	2031.6	958.57
28	2.84	15979	14013	832.54	0.414	3050.7	1084.8	2.812	2067.8	982.98
29	2.98	16034	14013	821.95	0.398	3115.9	1095.4	2.845	2105.6	1010.3
30	3.13	16088	14013	810.17	0.382	3181.9	1107.1	2.874	2144.5	1037.4
31	3.29	16136	14013	798.39	0.368	3241.6	1118.9	2.897	2180.3	1061.4
32	3.43	16179	14013	785.44	0.355	3297.3	1131.9	2.913	2214.6	1082.7
33	3.59	16209	14013	773.67	0.345	3339.6	1143.6	2.920	2241.6	1098
34	3.74	16234	14013	760.71	0.336	3377.6	1156.6	2.920	2267.1	1110.5
35	3.89	16261	14012	748.94	0.327	3415.7	1167.2	2.926	2291.5	1124.3
36	4.05	16298	14013	737.16	0.316	3464.6	1180.2	2.936	2322.4	1142.2
37	4.21	16319	14013	724.21	0.308	3499.2	1193.1	2.933	2346.1	1153
38	4.36	16340	14012	713.61	0.301	3530.4	1202.5	2.936	2366.5	1163.9
39	4.51	16366	14013	701.83	0.293	3567.7	1215.5	2.935	2391.6	1176.1
40	4.66	16381	14013	691.24	0.286	3594.2	1226.1	2.931	2410.1	1184
41	4.81	16403	14013	679.46	0.279	3627.3	1237.9	2.930	2432.6	1194.7
42	4.96	16421	14013	668.86	0.273	3656.5	1248.5	2.929	2452.5	1204
43	5.11	16429	14013	658.26	0.268	3674.4	1259.1	2.918	2466.7	1207.7
44	5.26	16444	14013	647.67	0.262	3700.7	1269.6	2.915	2485.2	1215.5
45	5.41	16452	14013	637.07	0.257	3718.4	1280.2	2.904	2499.3	1219.1
46	5.55	16467	14013	626.47	0.251	3744.7	1290.8	2.901	2517.8	1226.9
47	5.70	16487	14012	618.23	0.246	3772.9	1297.9	2.907	2535.4	1237.5
48	5.85	16512	14013	608.81	0.239	3807.2	1308.5	2.910	2557.9	1249.4
49	5.99	16532	14012	599.38	0.234	3836.6	1316.8	2.914	2576.7	1259.9
50	6.15	16550	14012	589.96	0.229	3863.9	1326.2	2.914	2595	1268.9
51	6.30	16569	14013	580.54	0.223	3892.4	1336.8	2.912	2614.6	1277.8
52	6.44	16592	14013	573.48	0.219	3923	1343.8	2.919	2633.4	1289.6
53	6.59	16619	14013	565.24	0.213	3957.6	1352.1	2.927	2654.8	1302.8
54	6.73	16642	14013	556.99	0.208	3989.2	1360.3	2.933	2674.8	1314.5
55	6.88	16663	14013	548.75	0.204	4017.9	1368.6	2.936	2693.2	1324.7
56	7.03	16680	14013	541.68	0.200	4042.4	1375.6	2.939	2709	1333.4
57	7.20	16683	14013	533.44	0.196	4054	1383.9	2.929	2718.9	1335.1
58	7.34	16693	14013	526.38	0.193	4070.4	1390.9	2.926	2730.7	1339.7
59	7.50	16707	14013	520.49	0.190	4090.6	1396.8	2.928	2743.7	1346.9
60	7.66	16724	14013	513.42	0.186	4114.8	1403.9	2.931	2759.4	1355.5
61	7.80	16736	14013	507.53	0.183	4132.6	1409.8	2.931	2771.2	1361.4
62	7.95	16742	14013	500.47	0.180	4146	1416.8	2.926	2781.4	1364.6
63	8.12	16748	14013	494.58	0.178	4157.5	1422.7	2.922	2790.1	1367.4
64	8.26	16754	14013	487.52	0.175	4171	1429.8	2.917	2800.4	1370.6
65	8.43	16755	14013	481.63	0.173	4177	1435.7	2.909	2806.4	1370.7
66	8.56	16756	14013	475.74	0.171	4184.1	1441.6	2.902	2812.8	1371.3
67	8.73	16756	14013	469.85	0.169	4190	1447.5	2.895	2818.7	1371.3
68	8.88	16765	14013	465.14	0.166	4203.5	1452.2	2.895	2827.8	1375.6
69	9.03	16771	14013	460.43	0.164	4214.2	1456.9	2.893	2835.5	1378.6
70	9.17	16774	14013	455.72	0.162	4222.3	1461.6	2.889	2842	1380.4
71	9.32	16788	14013	449.83	0.160	4242.5	1467.5	2.891	2855	1387.5
72	9.48	16797	14013	445.12	0.157	4255.5	1472.2	2.891	2863.8	1391.6
73	9.62	16805	14013	439.23	0.155	4270.2	1478.1	2.889	2874.1	1396.1
74	9.76	16821	14015	436.88	0.153	4287.9	1481.6	2.894	2884.8	1403.2
75	9.90	16834	14013	430.99	0.150	4306.6	1486.3	2.897	2896.5	1410.1
76	10.05	16848	14013	427.46	0.148	4324	1489.9	2.902	2906.9	1417.1
77	10.20	16864	14013	421.57	0.146	4346.3	1495.7	2.906	2921	1425.3
78	10.35	16877	14013	416.86	0.143	4364.4	1500.5	2.909	2932.4	1432
79	10.50	16886	14013	413.33	0.142	4376.3	1504	2.910	2940.2	1436.2

80	10.65	16894	14013	409.8	0.140	4388	1507.5	2.911	2947.8	1440.2
81	10.79	16898	14015	406.26	0.138	4395.8	1512.2	2.907	2954	1441.8
82	10.95	16902	14013	401.55	0.137	4404.5	1515.8	2.906	2960.1	1444.4
83	11.12	16909	14013	398.02	0.135	4415.4	1519.3	2.906	2967.4	1448.1
84	11.26	16916	14015	394.49	0.133	4425.8	1524	2.904	2974.9	1450.9
85	11.40	16918	14013	392.13	0.133	4429.9	1525.2	2.905	2977.6	1452.4
86	11.56	16918	14013	387.42	0.131	4434.5	1529.9	2.899	2982.2	1452.3
87	11.72	16920	14013	383.89	0.130	4440.2	1533.4	2.896	2986.8	1453.4
88	11.86	16918	14013	380.36	0.129	4441.4	1537	2.890	2989.2	1452.2
89	12.01	16913	14013	378	0.128	4438.5	1539.3	2.883	2988.9	1449.6
90	12.16	16907	14013	373.29	0.127	4437.9	1544	2.874	2991	1447
91	12.32	16914	14012	370.94	0.126	4446.9	1545.2	2.878	2996	1450.8
92	12.48	16927	14013	367.4	0.124	4464	1549.9	2.880	3007	1457.1
93	12.63	16930	14013	363.87	0.123	4470.2	1553.4	2.878	3011.8	1458.4
94	12.77	16933	14013	361.52	0.122	4475.1	1555.8	2.876	3015.5	1459.7
95	12.93	16932	14013	356.8	0.120	4479.6	1560.5	2.871	3020.1	1459.6
96	13.06	16933	14013	354.45	0.120	4482.4	1562.9	2.868	3022.6	1459.8
97	13.22	16932	14013	352.09	0.119	4484.2	1565.2	2.865	3024.7	1459.5
98	13.38	16932	14013	348.56	0.118	4487.4	1568.8	2.860	3028.1	1459.3
99	13.52	16937	14013	345.03	0.116	4496.2	1572.3	2.860	3034.2	1461.9
100	13.66	16948	14013	342.67	0.115	4508.9	1574.6	2.863	3041.8	1467.1
101	13.80	16960	14013	340.32	0.114	4523.9	1577	2.869	3050.4	1473.4
102	13.95	16968	14013	337.96	0.113	4533.7	1579.4	2.871	3056.5	1477.2
103	14.09	16981	14013	334.43	0.111	4550.1	1582.9	2.875	3066.5	1483.6
104	14.25	16990	14013	333.25	0.110	4560.8	1584.1	2.879	3072.4	1488.3
105	14.40	16997	14013	330.9	0.109	4570.3	1586.4	2.881	3078.3	1491.9
106	14.56	16999	14013	328.54	0.108	4574.3	1588.8	2.879	3081.5	1492.8
107	14.70	16999	14013	326.19	0.108	4576.6	1591.1	2.876	3083.8	1492.7
108	14.86	16996	14013	323.83	0.107	4575.6	1593.5	2.871	3084.6	1491.1
109	15.00	16990	14013	321.48	0.106	4572.7	1595.8	2.865	3084.3	1488.4

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 3

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/23/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 16.4'-17'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)
Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.76 in
Specimen Area: 6.31 in²
Specimen Volume: 596.34 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	19	---	0	0
Wt. Container + Wet Soil, gm	98.23	---	---	1218.9
Wt. Container + Dry Soil, gm	82.48	---	---	995.61
Wt. Container, gm	10.36	---	---	8.25
Wt. Wet Soil, gm	87.87	1208.9	1216.6	1210.7
Wt. Dry Soil, gm	72.12	992.18	992.18	987.36
Wt. Water, gm	15.75	216.68	224.4	223.31
Water Content, %	21.84	21.84	22.62	22.62
Void Ratio	---	0.62	0.61	---
Degree of Saturation, %	---	94.67	100.00	---
Dry Unit Weight, pcf	---	103.87	104.65	---

Initial

Height: 5.765 in
Area: 6.3124 in²
Volume: 596.34 cc

Moisture: 21.84 %
Void Ratio: 0.62
Dry Unit Weight: 103.87 pcf
Saturation: 94.67 %

End of Initialization

Time: 10.241 min
Total Vertical Stress: 986.15 psf
Total Horizontal Stress: 1006 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 411.5 psf
Effective Horizontal Stress: 431.35 psf

Height Change: 0.011435 in
Area Change: 0 in²
Volume Change: 3.5485 cc
Water Change: -0.70416 cc
Correction: 0 cc

Height: 5.7536 in
Area: 6.3124 in²
Volume: 592.79 cc

Moisture: 21.91 %
Void Ratio: 0.61
Dry Unit Weight: 104.49 pcf
Saturation: 96.48 %

End of Consolidation/A

Time: 10.241 min
Total Vertical Stress: 986.15 psf
Total Horizontal Stress: 1006 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 411.5 psf
Effective Horizontal Stress: 431.35 psf

Height Change: 0.011435 in
Area Change: 0 in²
Volume Change: 3.5485 cc
Water Change: -0.70416 cc
Correction: 0 cc

Height: 5.7536 in
Area: 6.3124 in²
Volume: 592.79 cc

Moisture: 21.91 %
Void Ratio: 0.61
Dry Unit Weight: 104.49 pcf
Saturation: 96.48 %

End of Saturation

Time: 127.65 min
Total Vertical Stress: 12496 psf
Total Horizontal Stress: 12526 psf
Pore Pressure: 12015 psf
Effective Vertical Stress: 481.23 psf
Effective Horizontal Stress: 511.37 psf

Height Change: 0.0182 in
Area Change: 0 in²
Volume Change: 5.648 cc
Water Change: -25.107 cc
Correction: 18.565 cc

Height: 5.7468 in
Area: 6.3124 in²
Volume: 590.7 cc

Moisture: 22.50 %
Void Ratio: 0.61
Dry Unit Weight: 104.86 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 247.83 min
Total Vertical Stress: 15716 psf
Total Horizontal Stress: 15848 psf
Pore Pressure: 12014 psf
Effective Vertical Stress: 3702.5 psf
Effective Horizontal Stress: 3834.9 psf

Height Change: 0.087952 in
Area Change: -0.049763 in²
Volume Change: 4.4684 cc
Water Change: -3.361 cc
Correction: -4.3609 cc

Height: 5.677 in
Area: 6.3622 in²
Volume: 591.88 cc

Moisture: 22.62 %
Void Ratio: 0.61
Dry Unit Weight: 104.65 pcf
Saturation: 100.00 %

End of Shear

Time: 748.81 min
Total Vertical Stress: 20727 psf
Total Horizontal Stress: 15850 psf
Pore Pressure: 13174 psf
Effective Vertical Stress: 7553.2 psf
Effective Horizontal Stress: 2676.1 psf

Height Change: 0.93955 in
Area Change: -1.1726 in²
Volume Change: 4.4684 cc
Water Change: -3.361 cc
Correction: -4.3609 cc

Height: 4.8255 in
Area: 7.485 in²
Volume: 591.88 cc

Moisture: 22.62 %
Void Ratio: 0.61
Dry Unit Weight: 104.65 pcf
Saturation: 100.00 %

At Failure

Time: 748.81 min
Total Vertical Stress: 20661 psf
Total Horizontal Stress: 15850 psf
Pore Pressure: 13174 psf
Effective Vertical Stress: 7487.3 psf
Effective Horizontal Stress: 2676.1 psf

Height Change: 0.93955 in
Area Change: -1.2716 in²
Volume Change: 4.4684 cc
Water Change: -3.361 cc
Correction: 0 cc

Height: 4.8255 in
Area: 7.584 in²
Volume: 591.88 cc

Moisture: 22.62 %
Void Ratio: 0.61
Dry Unit Weight: 104.65 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-3
Test No.: 3

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/23/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 16.4'-17'
Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.68 in
Specimen Area: 6.36 in²
Specimen Volume: 591.88 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 34

Plastic Limit: 16

Estimated Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.4463	-0.022506	-132.32	12014	15848	15716
2	0.012283	0	0	6.4463	0.10897	-129.38	12015	15851	15721
3	0.020617	0	0	6.4463	0.38135	-123.29	12016	15850	15726
4	0.05395	0.0016785	0	6.4465	1.33	-102.25	12018	15848	15746
5	0.10395	0.003357	0	6.4466	2.41	-78.265	12024	15850	15771
6	0.20393	0.006714	0	6.4468	4.3054	-36.217	12034	15848	15812
7	0.50392	0.020142	0	6.4476	8.9037	65.327	12064	15848	15914
8	1.0039	0.03357	0	6.4485	15.397	209.17	12120	15847	16056
9	2.0038	0.052033	0	6.4497	25.268	427.92	12230	15848	16276
10	5.0035	0.15106	0	6.4561	45.15	862.37	12539	15848	16711
11	10.003	0.29709	0	6.4656	65.705	1306.3	12912	15850	17156
12	15.003	0.42802	0	6.4741	80.178	1615.1	13169	15848	17464
13	20.002	0.57908	0	6.4839	91.537	1860.1	13353	15850	17710
14	25.002	0.72511	0	6.4934	101.14	2070.1	13489	15850	17920
15	30.001	0.86275	0	6.5024	109.39	2249.7	13594	15848	18098
16	35.001	1.0222	0	6.5129	116.83	2410.3	13676	15850	18260
17	40	1.1548	0	6.5217	124	2565.1	13740	15850	18415
18	45	1.3143	0	6.5322	130.08	2694.8	13791	15850	18544
19	50.004	1.4536	0	6.5414	136.03	2821.8	13831	15850	18671
20	55.003	1.6147	0	6.5521	140.77	2920.9	13862	15850	18771
21	60.003	1.7641	0	6.5621	145.23	3014.1	13887	15850	18864
22	65.002	1.9118	0	6.572	149.15	3095.3	13905	15850	18945
23	70.002	2.0578	0	6.5818	152.94	3173.3	13919	15850	19023
24	75.002	2.219	0	6.5926	156.46	3244.6	13928	15848	19093
25	80.001	2.3633	0	6.6024	159.84	3313.3	13934	15848	19162
26	85.001	2.5194	0	6.613	162.81	3372.5	13938	15850	19222
27	90	2.6722	0	6.6233	165.65	3428.7	13939	15850	19278
28	95.004	2.8165	0	6.6332	168.36	3482.1	13938	15848	19331
29	100	2.9659	0	6.6434	170.52	3523.4	13934	15850	19373
30	105	3.1186	0	6.6539	172.82	3567.3	13930	15850	19417
31	110	3.2798	0	6.6649	174.99	3607.9	13922	15848	19456
32	115	3.4241	0	6.6749	177.42	3654.7	13915	15848	19503
33	120	3.5634	0	6.6845	179.85	3701.6	13906	15850	19551
34	125	3.7195	0	6.6954	182.42	3750.6	13898	15850	19600
35	130	3.8622	0	6.7053	185.13	3802.9	13887	15850	19653
36	135	4.0066	0	6.7154	187.56	3849.1	13877	15850	19699
37	140	4.166	0	6.7266	190.13	3897.5	13866	15850	19747
38	145	4.3154	0	6.7371	192.57	3943.2	13853	15850	19793
39	150	4.448	0	6.7464	195.14	3992.3	13842	15850	19842
40	155	4.6041	0	6.7575	197.3	4031.6	13828	15850	19881
41	160	4.7535	0	6.7681	199.33	4068.2	13816	15850	19918
42	165	4.8995	0	6.7785	201.36	4104.8	13802	15850	19954
43	170	5.0607	0	6.79	202.71	4126.2	13789	15850	19976
44	175	5.2084	0	6.8005	204.2	4151	13776	15850	20001
45	180	5.3594	0	6.8114	205.41	4169.9	13762	15850	20020
46	185	5.5139	0	6.8225	206.77	4191.4	13749	15848	20040
47	190	5.6683	0	6.8337	207.98	4209.8	13738	15850	20059
48	195	5.8093	0	6.8439	209.07	4226.1	13723	15850	20076
49	200	5.9738	0	6.8559	210.01	4238.3	13710	15850	20088
50	205	6.1181	0	6.8664	210.82	4248.5	13698	15850	20098
51	210	6.2776	0	6.8781	212.04	4266.5	13685	15850	20116
52	215	6.4135	0	6.8881	212.85	4277	13672	15850	20127
53	220	6.578	0	6.9002	213.53	4283.3	13659	15850	20133
54	225	6.7408	0	6.9123	215.15	4309.3	13647	15850	20159
55	230	6.8852	0	6.923	216.64	4333.4	13634	15850	20183
56	235	7.0312	0	6.9339	218.13	4357.2	13622	15850	20207
57	240	7.1823	0	6.9452	219.89	4386.3	13610	15850	20236
58	245	7.3367	0	6.9567	221.64	4415.1	13597	15850	20265
59	250	7.4743	0	6.9671	222.86	4433.4	13586	15850	20283
60	255	7.6204	0	6.9781	224.48	4459.6	13574	15850	20309
61	260	7.763	0	6.9889	226.11	4485.9	13562	15850	20336
62	265	7.904	0	6.9996	227.59	4509.4	13549	15850	20359
63	270	8.0551	0	7.0111	228.81	4526.7	13537	15851	20378
64	275	8.2078	0	7.0228	229.89	4541.1	13528	15850	20391
65	280	8.3589	0	7.0343	231.52	4566.6	13516	15850	20416
66	285	8.5033	0	7.0454	233	4589.5	13506	15850	20439
67	290	8.6443	0	7.0563	233.68	4596	13495	15850	20446
68	295	8.8054	0	7.0688	234.36	4601.3	13483	15850	20451
69	300	8.9548	0	7.0804	235.03	4607.3	13474	15850	20457
70	305	9.1075	0	7.0923	235.57	4610.2	13464	15850	20460
71	310	9.2636	0	7.1045	236.25	4615.7	13451	15850	20465
72	315	9.4063	0	7.1157	236.79	4619.2	13442	15848	20468
73	320	9.5641	0	7.1281	237.47	4624.5	13433	15850	20474
74	325	9.7185	0	7.1403	237.87	4624.5	13424	15850	20474
75	330	9.8679	0	7.1521	238.41	4627.4	13415	15850	20477
76	335	10.017	0	7.164	238.82	4627.6	13405	15850	20477
77	340	10.173	0	7.1764	239.77	4638.3	13397	15850	20488
78	345	10.338	0	7.1896	240.85	4651.1	13390	15850	20501
79	350	10.486	0	7.2015	241.93	4664.8	13381	15850	20514
80	355	10.635	0	7.2135	243.28	4683.8	13373	15850	20533

81	360	10.781	0	7.2253	244.5	4700.1	13363	15850	20550
82	365	10.927	0	7.2371	245.72	4716.3	13356	15850	20566
83	370	11.06	0	7.2479	246.26	4719.8	13348	15850	20569
84	375	11.219	0	7.261	246.8	4721.8	13340	15850	20571
85	380	11.377	0	7.2739	247.88	4734.5	13330	15850	20584
86	385	11.521	0	7.2858	249.1	4750.6	13323	15848	20599
87	390	11.667	0	7.2978	249.64	4753.1	13317	15850	20603
88	395	11.815	0	7.31	250.18	4755.5	13308	15850	20605
89	400	11.958	0	7.3219	250.99	4763.5	13301	15850	20613
90	405	12.097	0	7.3335	251.8	4771.6	13294	15850	20621
91	410	12.26	0	7.3471	252.34	4773.1	13287	15850	20623
92	415	12.404	0	7.3592	253.16	4780.8	13281	15850	20630
93	420	12.555	0	7.3719	253.7	4782.8	13271	15850	20632
94	425	12.711	0	7.3851	254.64	4792.4	13264	15850	20642
95	430	12.857	0	7.3975	255.05	4792	13256	15850	20642
96	435	13.017	0	7.411	255.45	4790.8	13251	15851	20642
97	440	13.171	0	7.4242	256	4792.5	13244	15850	20642
98	445	13.31	0	7.4361	256	4784.5	13237	15850	20634
99	450	13.468	0	7.4497	256.27	4780.8	13230	15850	20630
100	455	13.626	0	7.4633	256.54	4776.9	13225	15850	20627
101	460	13.782	0	7.4768	257.21	4781	13221	15850	20631
102	465	13.95	0	7.4914	258.02	4787	13215	15850	20637
103	470	14.089	0	7.5035	258.7	4791.9	13208	15850	20642
104	475	14.24	0	7.5168	259.65	4801.3	13203	15850	20651
105	480	14.396	0	7.5305	260.19	4802.6	13196	15850	20652
106	485	14.544	0	7.5435	260.73	4804.4	13192	15850	20654
107	490	14.689	0	7.5562	261.13	4803.6	13186	15851	20654
108	495	14.84	0	7.5696	261.54	4802.6	13181	15850	20652
109	500	14.979	0	7.5821	262.35	4809.9	13174	15850	20659
110	500.97	15.001	0	7.584	262.49	4811.2	13174	15850	20661

TRIAXIAL TEST

Project: VRE Alexandria
 Boring No.: GZ-7
 Sample No.: T-3
 Test No.: 3

Location: Alexandria, VA
 Tested By: Jason
 Test Date: 06/23/2015
 Sample Type: Undisturbed

Project No.: 16679-0
 Checked By: Bert
 Depth: 16.4'-17'
 Elevation:

Soil Description: Yellowish Brown Sandy Lean CLAY (CL)
 Remarks: 16667-0 VRE Alexandria GZ-7 15'0" - 17'0" - CU Triaxial

Specimen Height: 5.68 in
 Specimen Area: 6.36 in²
 Specimen Volume: 591.88 cc

Piston Area: 0.23 in²
 Piston Friction: 0.00 lb
 Piston Weight: 0.00 lb

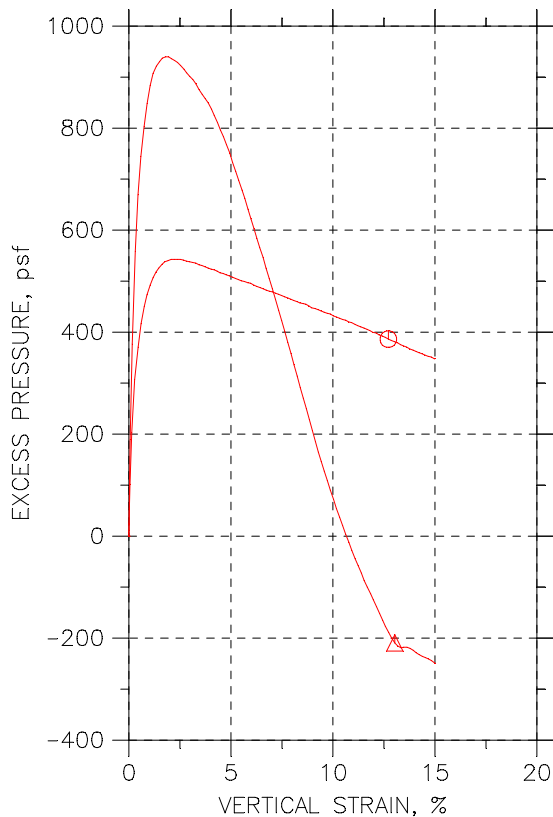
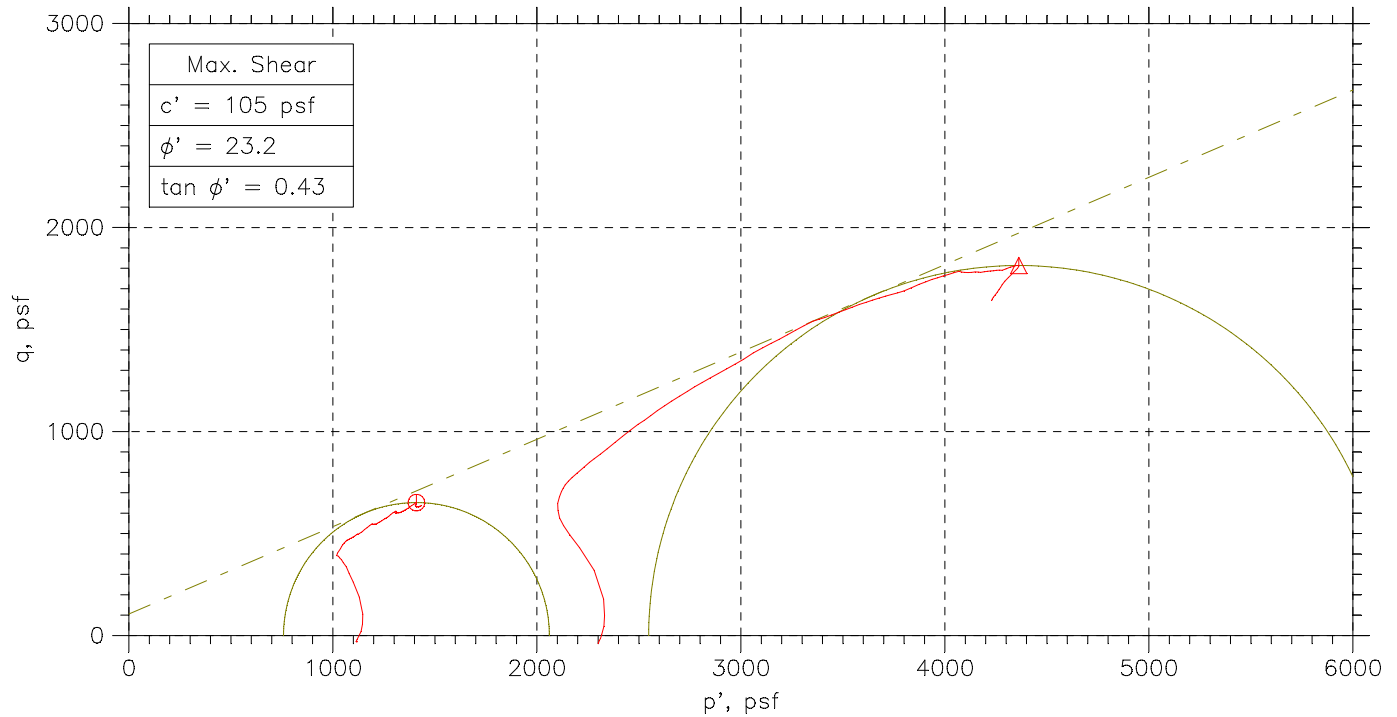
Filter Strip Correction: 172.80 psf
 Membrane Correction: 1.65 lb/in
 Correction Type: Uniform

Liquid Limit: 34 Plastic Limit: 16 Estimated Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	15716	15848	0	0.000	3702.5	3834.9	1.036	3768.7	-66.158
2	0.00	15721	15851	1.1776	-0.402	3706.7	3836	1.035	3771.3	-64.689
3	0.00	15726	15850	2.3551	0.130	3710.4	3833.7	1.033	3772	-61.647
4	0.00	15746	15848	4.7103	0.157	3727.9	3830.1	1.027	3779	-51.124
5	0.00	15771	15850	10.598	0.174	3747.2	3825.4	1.021	3786.3	-39.132
6	0.01	15812	15848	20.019	0.208	3778.6	3814.8	1.010	3796.7	-18.108
7	0.02	15914	15848	50.636	0.256	3849.5	3784.2	1.017	3816.9	32.663
8	0.03	16056	15847	105.98	0.314	3936.9	3727.7	1.056	3832.3	104.58
9	0.05	16276	15848	216.67	0.387	4046.1	3618.2	1.118	3832.1	213.96
10	0.15	16711	15848	525.2	0.528	4172	3309.7	1.261	3740.8	431.19
11	0.30	17156	15850	898.49	0.624	4243.8	2937.5	1.445	3590.7	653.14
12	0.43	17464	15848	1155.2	0.661	4294.8	2679.7	1.603	3487.2	807.57
13	0.58	17710	15850	1338.9	0.671	4357.3	2497.1	1.745	3427.2	930.07
14	0.73	17920	15850	1475.5	0.669	4430.6	2360.5	1.877	3395.6	1035
15	0.86	18098	15848	1580.3	0.663	4504.3	2254.6	1.998	3379.4	1124.9
16	1.02	18260	15850	1662.7	0.653	4583.6	2173.3	2.109	3378.4	1205.1
17	1.15	18415	15850	1726.3	0.640	4674.8	2109.7	2.216	3392.2	1282.5
18	1.31	18544	15850	1777	0.628	4753.9	2059.1	2.309	3406.5	1347.4
19	1.45	18671	15850	1817	0.615	4840.8	2019	2.398	3429.9	1410.9
20	1.61	18771	15850	1848.8	0.605	4908.1	1987.2	2.470	3447.7	1460.5
21	1.76	18864	15850	1873.5	0.595	4976.7	1962.5	2.536	3469.6	1507.1
22	1.91	18945	15850	1891.2	0.586	5040.1	1944.9	2.592	3492.5	1547.6
23	2.06	19023	15850	1905.3	0.576	5104	1930.7	2.644	3517.4	1586.6
24	2.22	19093	15848	1914.7	0.567	5164.7	1920.1	2.690	3542.4	1622.3
25	2.36	19162	15848	1920.6	0.557	5227.6	1914.2	2.731	3570.9	1656.7
26	2.52	19222	15850	1924.2	0.549	5284.4	1911.9	2.764	3598.1	1686.2
27	2.67	19278	15850	1925.3	0.540	5339.4	1910.7	2.794	3625	1714.3
28	2.82	19331	15848	1924.2	0.532	5392.8	1910.7	2.822	3651.8	1741.1
29	2.97	19373	15850	1920.6	0.525	5438.8	1915.4	2.839	3677.1	1761.7
30	3.12	19417	15850	1915.9	0.518	5487.4	1920.1	2.858	3703.8	1783.6
31	3.28	19456	15848	1908.8	0.510	5533.9	1926	2.873	3729.9	1803.9
32	3.42	19503	15848	1901.8	0.502	5587.8	1933.1	2.891	3760.4	1827.4
33	3.56	19551	15850	1892.4	0.493	5645.3	1943.7	2.904	3794.5	1850.8
34	3.72	19600	15850	1884.1	0.485	5702.5	1951.9	2.922	3827.2	1875.3
35	3.86	19653	15850	1873.5	0.476	5765.4	1962.5	2.938	3864	1901.5
36	4.01	19699	15850	1862.9	0.468	5822.2	1973.1	2.951	3897.7	1924.6
37	4.17	19747	15850	1852.3	0.459	5881.2	1983.7	2.965	3932.4	1948.7
38	4.32	19793	15850	1839.4	0.451	5939.8	1996.7	2.975	3968.2	1971.6
39	4.45	19842	15850	1828.8	0.443	5999.6	2007.3	2.989	4003.4	1996.1
40	4.60	19881	15850	1814.6	0.436	6053	2021.4	2.994	4037.2	2015.8
41	4.75	19918	15850	1802.9	0.429	6101.4	2033.2	3.001	4067.3	2034.1
42	4.90	19954	15850	1788.7	0.422	6152.1	2047.3	3.005	4099.7	2052.4
43	5.06	19976	15850	1775.8	0.417	6186.5	2060.3	3.003	4123.4	2063.1
44	5.21	20001	15850	1762.8	0.411	6224.2	2073.2	3.002	4148.7	2075.5
45	5.36	20020	15850	1748.7	0.406	6257.2	2087.3	2.998	4172.3	2084.9
46	5.51	20040	15848	1735.7	0.401	6290.5	2099.1	2.997	4194.8	2095.7
47	5.67	20059	15850	1724	0.397	6321.9	2112.1	2.993	4217	2104.9
48	5.81	20076	15850	1709.8	0.392	6352.3	2126.2	2.988	4239.2	2113
49	5.97	20088	15850	1696.9	0.388	6377.4	2139.2	2.981	4258.3	2119.1
50	6.12	20098	15850	1683.9	0.384	6400.6	2152.1	2.974	4276.4	2124.3
51	6.28	20116	15850	1671	0.380	6431.5	2165.1	2.971	4298.3	2133.2
52	6.41	20127	15850	1658	0.376	6455	2178	2.964	4316.5	2138.5
53	6.58	20133	15850	1645.1	0.372	6474.3	2191	2.955	4332.6	2141.7
54	6.74	20159	15850	1633.3	0.367	6512.1	2202.7	2.956	4357.4	2154.7
55	6.89	20183	15850	1620.3	0.363	6549	2215.7	2.956	4382.4	2166.7
56	7.03	20207	15850	1608.6	0.358	6584.6	2227.5	2.956	4406.1	2178.6
57	7.18	20236	15850	1596.8	0.353	6625.5	2239.2	2.959	4432.4	2193.1
58	7.34	20265	15850	1583.8	0.348	6667.3	2252.2	2.960	4459.7	2207.5
59	7.47	20283	15850	1572.1	0.344	6697.4	2264	2.958	4480.7	2216.7
60	7.62	20309	15850	1560.3	0.340	6735.4	2275.7	2.960	4505.6	2229.8
61	7.76	20336	15850	1548.5	0.335	6773.5	2287.5	2.961	4530.5	2243
62	7.90	20359	15850	1535.6	0.331	6809.9	2300.5	2.960	4555.2	2254.7
63	8.06	20378	15851	1523.8	0.327	6840.1	2313.4	2.957	4576.8	2263.3
64	8.21	20391	15850	1514.4	0.324	6862.8	2321.7	2.956	4592.2	2270.6
65	8.36	20416	15850	1502.6	0.320	6900	2333.5	2.957	4616.7	2283.3
66	8.50	20439	15850	1492	0.316	6933.6	2344	2.958	4638.8	2294.8
67	8.64	20446	15850	1481.4	0.313	6950.6	2354.6	2.952	4652.6	2298
68	8.81	20451	15850	1469.6	0.310	6967.8	2366.4	2.944	4667.1	2300.7
69	8.95	20457	15850	1460.2	0.308	6983.1	2375.8	2.939	4679.5	2303.6
70	9.11	20460	15850	1450.8	0.306	6995.5	2385.3	2.933	4690.4	2305.1
71	9.26	20465	15850	1437.8	0.303	7014	2398.2	2.925	4706.1	2307.9
72	9.41	20468	15848	1428.4	0.301	7025.7	2406.5	2.919	4716.1	2309.6
73	9.56	20474	15850	1419	0.298	7041.5	2417.1	2.913	4729.3	2312.2
74	9.72	20474	15850	1410.7	0.296	7049.8	2425.3	2.907	4737.5	2312.2
75	9.87	20477	15850	1401.3	0.294	7062.1	2434.7	2.901	4748.4	2313.7
76	10.02	20477	15850	1391.9	0.292	7071.8	2444.1	2.893	4758	2313.8
77	10.17	20488	15850	1383.6	0.290	7090.7	2452.4	2.891	4771.5	2319.1
78	10.34	20501	15850	1376.6	0.288	7110.6	2459.5	2.891	4785	2325.6
79	10.49	20514	15850	1367.2	0.285	7133.7	2468.9	2.889	4801.3	2332.4

80	10.63	20533	15850	1358.9	0.282	7160.9	2477.1	2.891	4819	2341.9
81	10.78	20550	15850	1349.5	0.279	7186.6	2486.5	2.890	4836.6	2350
82	10.93	20566	15850	1342.4	0.277	7209.9	2493.6	2.891	4851.8	2358.2
83	11.06	20569	15850	1334.2	0.275	7221.6	2501.8	2.887	4861.7	2359.9
84	11.22	20571	15850	1325.9	0.273	7231.8	2510.1	2.881	4871	2360.9
85	11.38	20584	15850	1316.5	0.270	7254	2519.5	2.879	4886.7	2367.2
86	11.52	20599	15848	1309.5	0.268	7276	2525.4	2.881	4900.7	2375.3
87	11.67	20603	15850	1303.6	0.267	7285.5	2532.5	2.877	4909	2376.5
88	11.81	20605	15850	1294.2	0.265	7297.4	2541.9	2.871	4919.6	2377.8
89	11.96	20613	15850	1287.1	0.263	7312.4	2548.9	2.869	4930.7	2381.7
90	12.10	20621	15850	1280	0.261	7327.6	2556	2.867	4941.8	2385.8
91	12.26	20623	15850	1273	0.259	7336.1	2563.1	2.862	4949.6	2386.5
92	12.40	20630	15850	1267.1	0.258	7349.8	2569	2.861	4959.4	2390.4
93	12.56	20632	15850	1257.6	0.256	7361.2	2578.4	2.855	4969.8	2391.4
94	12.71	20642	15850	1250.6	0.254	7377.9	2585.5	2.854	4981.7	2396.2
95	12.86	20642	15850	1242.3	0.252	7385.7	2593.7	2.848	4989.7	2396
96	13.02	20642	15851	1237.6	0.251	7390.4	2599.6	2.843	4995	2395.4
97	13.17	20642	15850	1230.6	0.250	7398	2605.5	2.839	5001.7	2396.3
98	13.31	20634	15850	1223.5	0.249	7397.1	2612.5	2.831	5004.8	2392.3
99	13.47	20630	15850	1216.4	0.247	7400.4	2619.6	2.825	5010	2390.4
100	13.63	20627	15850	1211.7	0.247	7401.2	2624.3	2.820	5012.8	2388.5
101	13.78	20631	15850	1207	0.245	7410	2629	2.819	5019.5	2390.5
102	13.95	20637	15850	1201.1	0.244	7421.9	2634.9	2.817	5028.4	2393.5
103	14.09	20642	15850	1194.1	0.242	7433.9	2642	2.814	5037.9	2396
104	14.24	20651	15850	1189.3	0.241	7448	2646.7	2.814	5047.3	2400.7
105	14.40	20652	15850	1182.3	0.239	7456.4	2653.8	2.810	5055.1	2401.3
106	14.54	20654	15850	1178.8	0.239	7461.6	2657.3	2.808	5059.5	2402.2
107	14.69	20654	15851	1172.9	0.237	7468	2664.4	2.803	5066.2	2401.8
108	14.84	20652	15850	1167	0.236	7471.6	2669.1	2.799	5070.4	2401.3
109	14.98	20659	15850	1159.9	0.234	7486	2676.1	2.797	5081.1	2404.9
110	15.00	20661	15850	1159.9	0.234	7487.3	2676.1	2.798	5081.7	2405.6

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



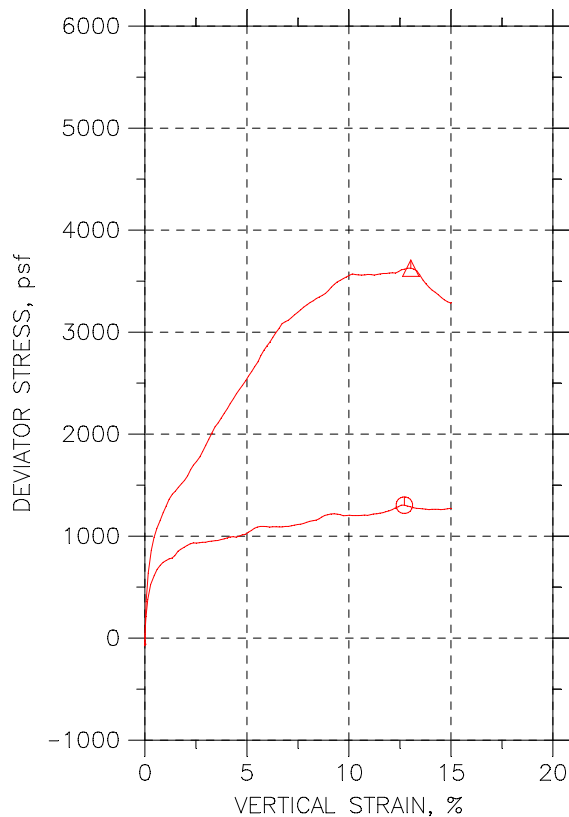
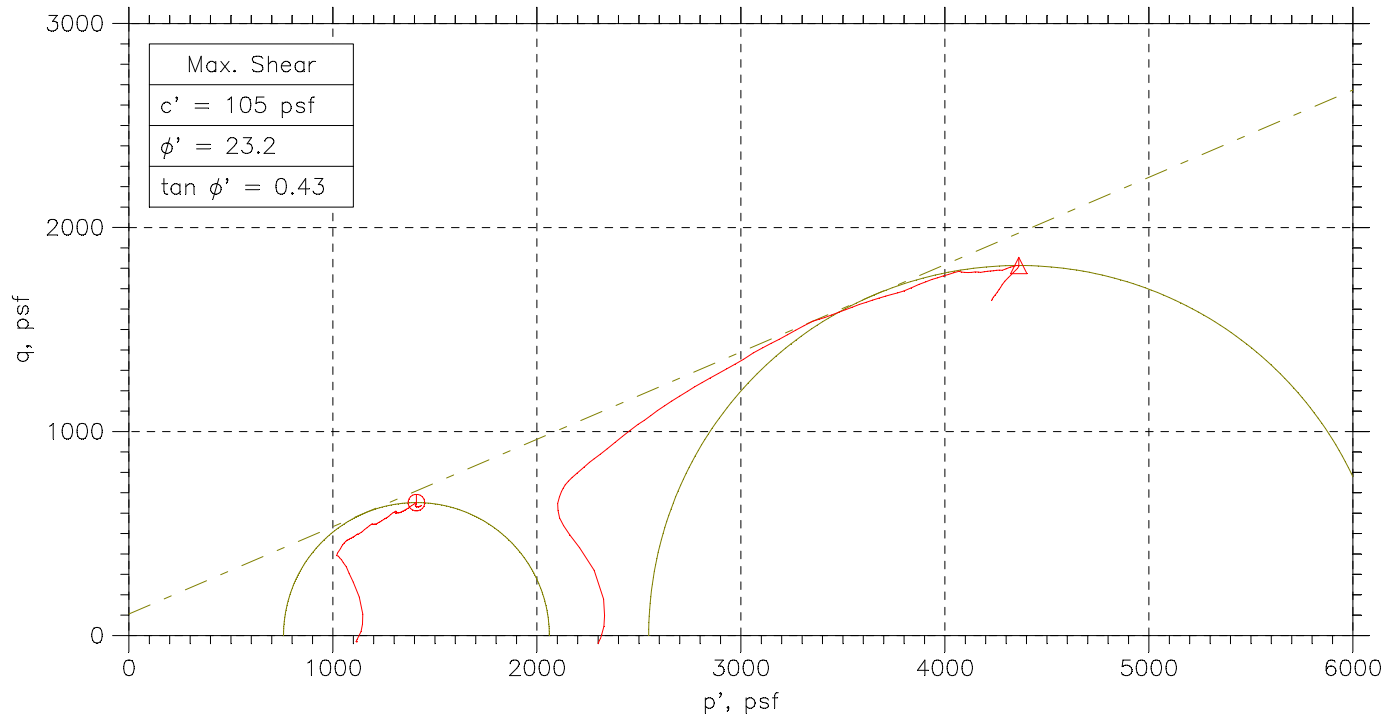
Symbol	⊖	Δ		
Sample No.	T-5	T-5		
Test No.	1	2		
Depth	23.6'-24.424.4'-25.0'			
Initial	Diameter, in	2.855	2.852	
	Height, in	5.72	5.832	
	Water Content, %	34.3	30.1	
	Dry Density, pcf	88.7	93.92	
	Saturation, %	102.6	101.8	
	Void Ratio	0.907	0.801	
Before Shear	Water Content, %	34.7	32.0	
	Dry Density, pcf	87.21	90.55	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.94	0.868	
	Back Press., psf	12100	12100	
Ver. Eff. Cons. Stress, psf		1144	2339	
Shear Strength, psf		651.5	1814	
Strain at Failure, %		12.7	13	
Strain Rate, %/min		0.03	0.03	
B-Value		0.91	0.95	
Measured Specific Gravity		2.71	2.71	
Liquid Limit		69	69	
Plastic Limit		23	23	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description: Light Yellowish Brown Fat CLAY (CH)				
	Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



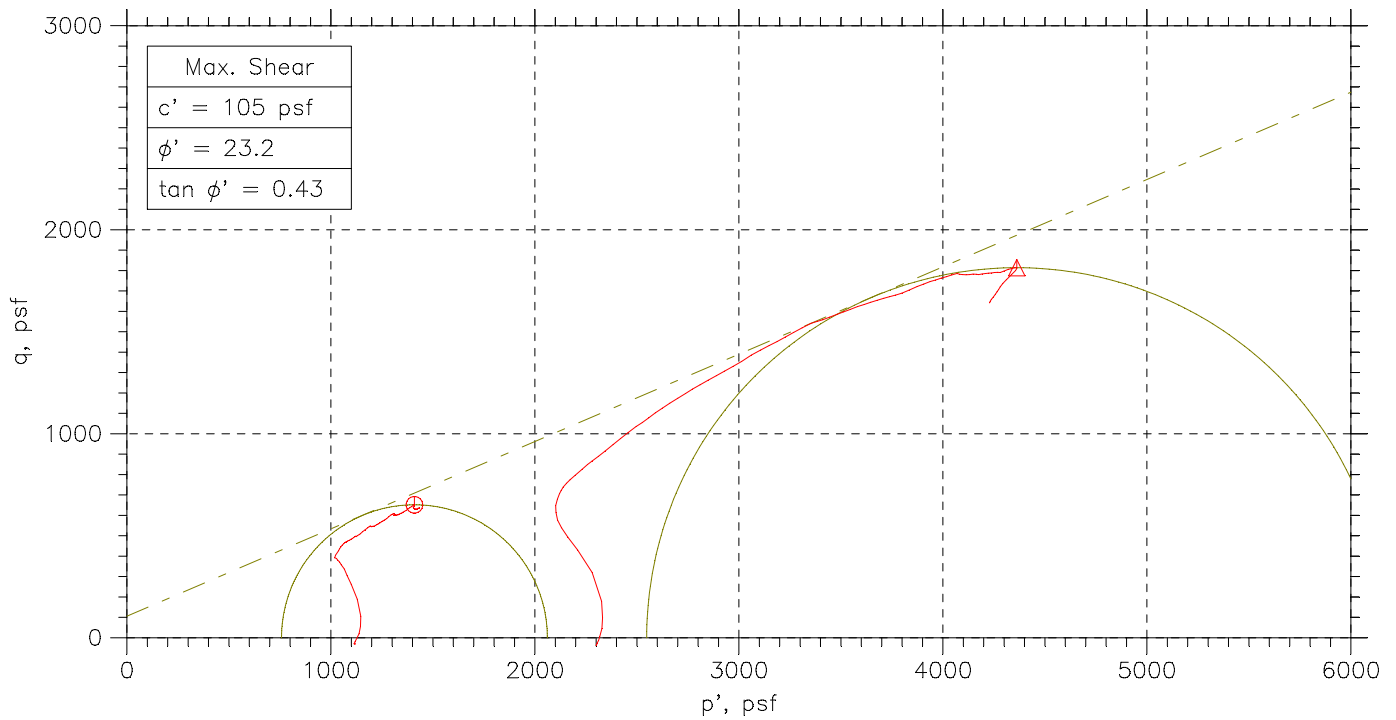
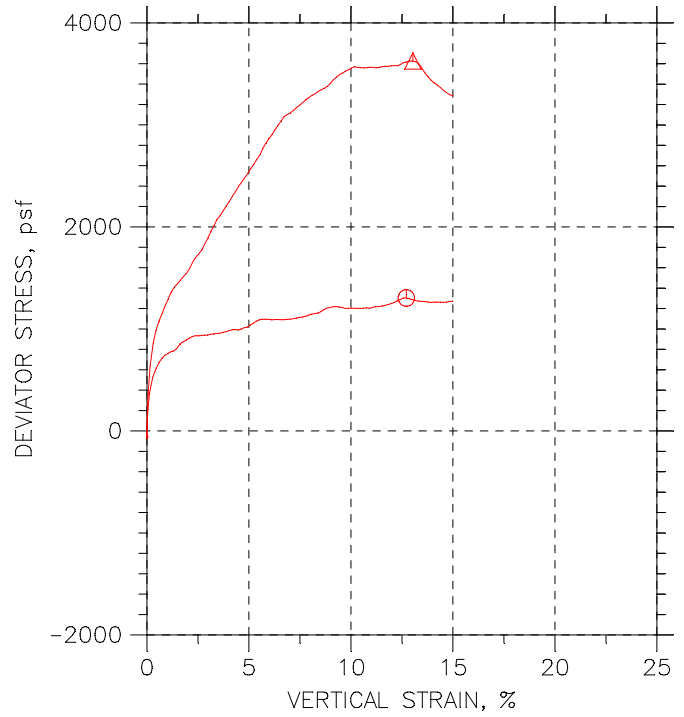
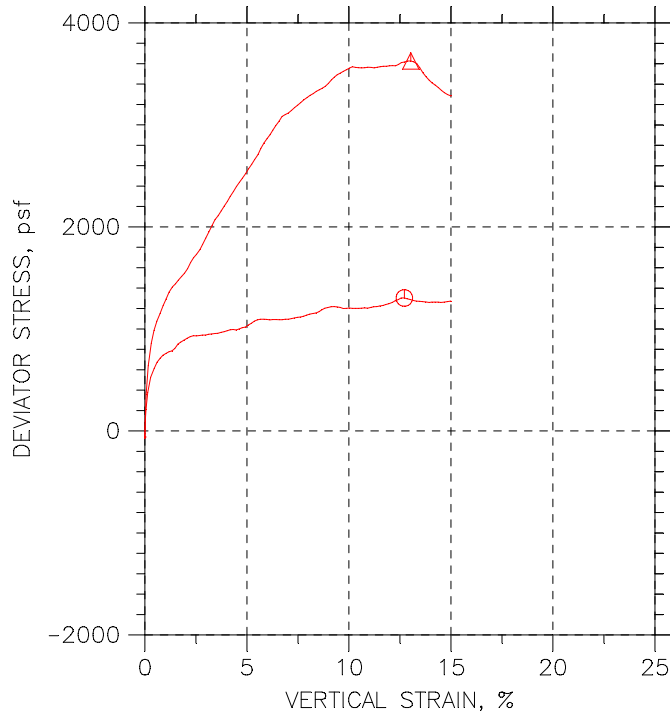
Symbol	⊕	Δ		
Sample No.	T-5	T-5		
Test No.	1	2		
Depth	23.6'-24.424.4'-25.0'			
Initial	Diameter, in	2.855	2.852	
	Height, in	5.72	5.832	
	Water Content, %	34.3	30.1	
	Dry Density, pcf	88.7	93.92	
	Saturation, %	102.6	101.8	
	Void Ratio	0.907	0.801	
Before Shear	Water Content, %	34.7	32.0	
	Dry Density, pcf	87.21	90.55	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.94	0.868	
	Back Press., psf	12100	12100	
Ver. Eff. Cons. Stress, psf		1144	2339	
Shear Strength, psf		651.5	1814	
Strain at Failure, %		12.7	13	
Strain Rate, %/min		0.03	0.03	
B-Value		0.91	0.95	
Measured Specific Gravity		2.71	2.71	
Liquid Limit		69	69	
Plastic Limit		23	23	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-7				
	Sample Type: Undisturbed				
	Description: Light Yellowish Brown Fat CLAY (CH)				
	Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	T-5	1	23.6'-24.4'	Jason	06/26/2015	Bert		CU TRIAXIAL GZ-7 23'0" - 25'0"
△	T-5	2	24.4'-25.0'	Jason	06/29/2015	Bert		CU TRIAXIAL GZ-7 23'0" - 25'0"



Project: VRE Alexandria

Location: Alexandria, VA

Project No.: 16679-0

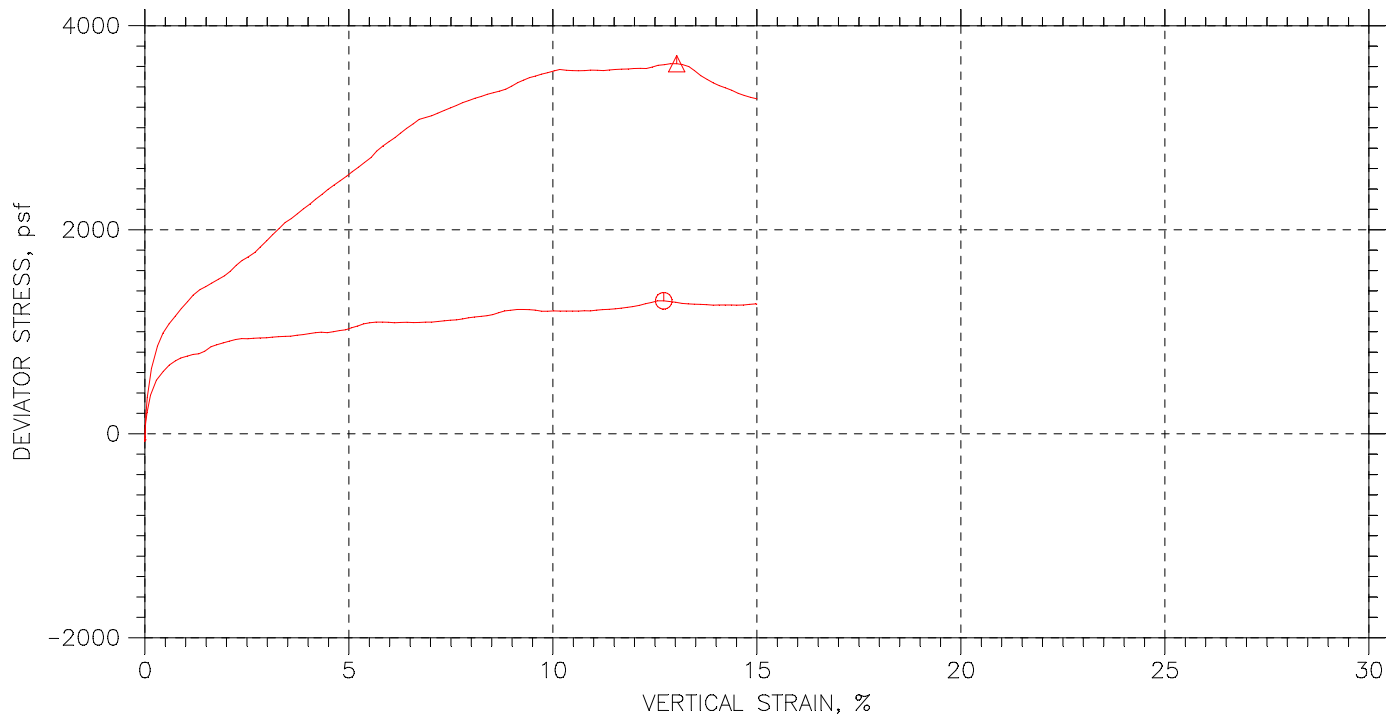
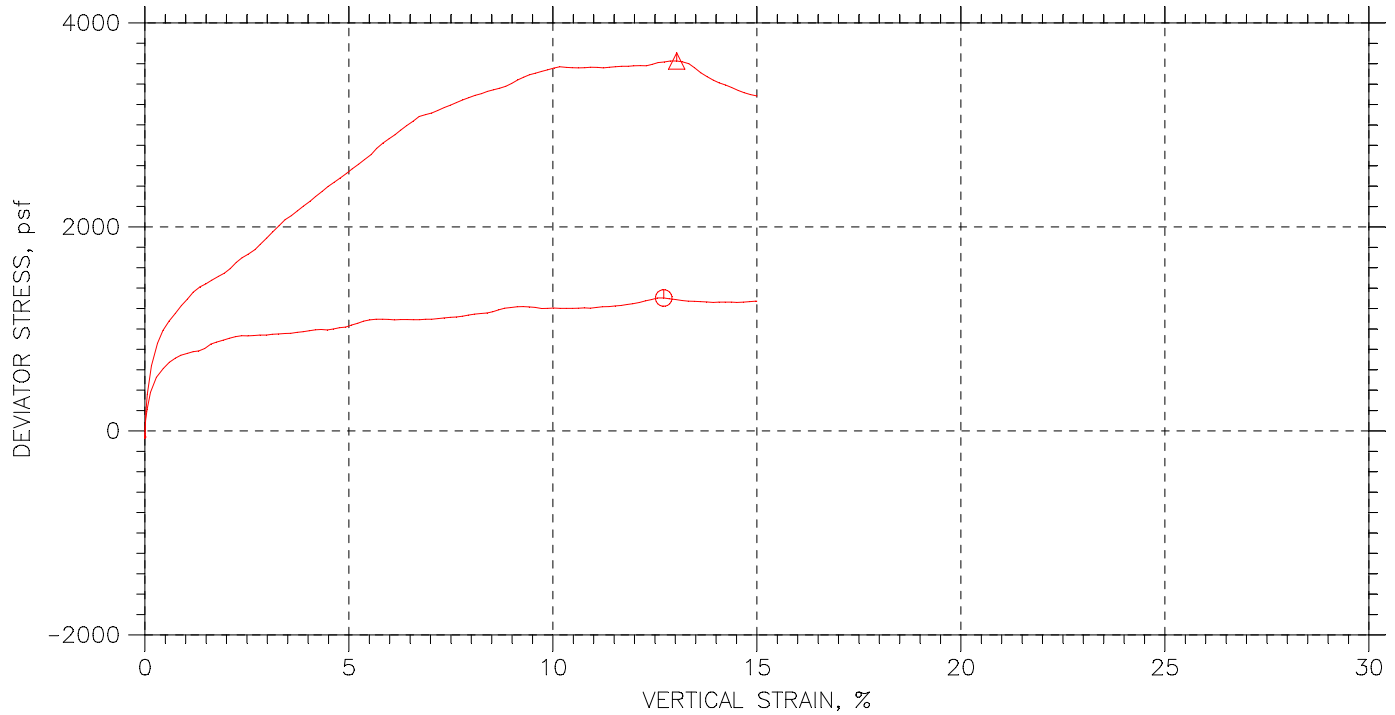
Boring No.: GZ-7

Sample Type: Undisturbed

Description: Light Yellowish Brown Fat CLAY (CH)

Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	T-5	1	23.6'-24.4'	Jason	06/26/2015	Bert		CU TRIAXIAL GZ-7 23'0" - 25'0"
Δ	T-5	2	24.4'-25.0'	Jason	06/29/2015	Bert		CU TRIAXIAL GZ-7 23'0" - 25'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-7	Sample Type: Undisturbed	
Description: Light Yellowish Brown Fat CLAY (CH)		
Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial		

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-5
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/26/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 23.6'-24.4'
Elevation:

Soil Description: Light Yellowish Brown Fat CLAY (CH)
Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

Specimen Height: 5.72 in
Specimen Area: 6.40 in²
Specimen Volume: 600.07 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 69

Plastic Limit: 23

Measured Specific Gravity: 2.71

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	F8	---	0	0
Wt. Container + Wet Soil, gm	162.4	---	---	460.4
Wt. Container + Dry Soil, gm	123.54	---	---	344.12
Wt. Container, gm	10.41	---	---	8.89
Wt. Wet Soil, gm	151.99	1145.5	1148.3	451.51
Wt. Dry Soil, gm	113.13	852.59	852.59	335.23
Wt. Water, gm	38.86	292.87	295.74	116.28
Water Content, %	34.35	34.35	34.69	34.69
Void Ratio	---	0.91	0.94	---
Degree of Saturation, %	---	102.60	100.00	---
Dry Unit Weight, pcf	---	88.7	87.206	---

Initial

Height: 5.72 in
Area: 6.4018 in²
Volume: 600.07 cc

Moisture: 34.35 %
Void Ratio: 0.91
Dry Unit Weight: 88.7 pcf
Saturation: 102.60 %

End of Initialization

Time: 10.17 min
Total Vertical Stress: 984.04 psf
Total Horizontal Stress: 1006 psf
Pore Pressure: 573.92 psf
Effective Vertical Stress: 410.12 psf
Effective Horizontal Stress: 432.09 psf

Height Change: 0.012769 in
Area Change: 0 in²
Volume Change: 4.0186 cc
Water Change: -6.079 cc
Correction: 17.507 cc

Height: 5.7072 in
Area: 6.4018 in²
Volume: 596.05 cc

Moisture: 33.01 %
Void Ratio: 0.89
Dry Unit Weight: 89.298 pcf
Saturation: 100.00 %

End of Consolidation/A

Time: 10.17 min
Total Vertical Stress: 984.04 psf
Total Horizontal Stress: 1006 psf
Pore Pressure: 573.92 psf
Effective Vertical Stress: 410.12 psf
Effective Horizontal Stress: 432.09 psf

Height Change: 0.012769 in
Area Change: 0 in²
Volume Change: 4.0186 cc
Water Change: -6.079 cc
Correction: 17.507 cc

Height: 5.7072 in
Area: 6.4018 in²
Volume: 596.05 cc

Moisture: 33.01 %
Void Ratio: 0.89
Dry Unit Weight: 89.298 pcf
Saturation: 100.00 %

End of Saturation

Time: 266.31 min
Total Vertical Stress: 12489 psf
Total Horizontal Stress: 12527 psf
Pore Pressure: 12096 psf
Effective Vertical Stress: 393.84 psf
Effective Horizontal Stress: 431.69 psf

Height Change: 0.023155 in
Area Change: 0 in²
Volume Change: 7.2874 cc
Water Change: -28.075 cc
Correction: 42.772 cc

Height: 5.6968 in
Area: 6.4018 in²
Volume: 592.78 cc

Moisture: 32.63 %
Void Ratio: 0.88
Dry Unit Weight: 89.79 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 588 min
Total Vertical Stress: 13183 psf
Total Horizontal Stress: 13240 psf
Pore Pressure: 12096 psf
Effective Vertical Stress: 1087.1 psf
Effective Horizontal Stress: 1144 psf

Height Change: 0.038973 in
Area Change: -0.15435 in²
Volume Change: -10.281 cc
Water Change: -20.367 cc
Correction: 17.496 cc

Height: 5.681 in
Area: 6.5562 in²
Volume: 610.35 cc

Moisture: 34.69 %
Void Ratio: 0.94
Dry Unit Weight: 87.206 pcf
Saturation: 100.00 %

End of Shear

Time: 1088.9 min
Total Vertical Stress: 14537 psf
Total Horizontal Stress: 13241 psf
Pore Pressure: 12445 psf
Effective Vertical Stress: 2092.1 psf
Effective Horizontal Stress: 796.29 psf

Height Change: 0.09114 in
Area Change: -1.3113 in²
Volume Change: -10.281 cc
Water Change: -20.367 cc
Correction: 17.496 cc

Height: 4.8289 in
Area: 7.7131 in²
Volume: 610.35 cc

Moisture: 34.69 %
Void Ratio: 0.94
Dry Unit Weight: 87.206 pcf
Saturation: 100.00 %

At Failure

Time: 1013 min
Total Vertical Stress: 14544 psf
Total Horizontal Stress: 13241 psf
Pore Pressure: 12483 psf
Effective Vertical Stress: 2060.9 psf
Effective Horizontal Stress: 757.79 psf

Height Change: 0.76136 in
Area Change: -1.2336 in²
Volume Change: -10.281 cc
Water Change: -20.367 cc
Correction: 0 cc

Height: 4.9586 in
Area: 7.6354 in²
Volume: 610.35 cc

Moisture: 34.69 %
Void Ratio: 0.94
Dry Unit Weight: 87.206 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-5
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/26/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 23.6'-24.4'
Elevation:

Soil Description: Light Yellowish Brown Fat CLAY (CH)
Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

Specimen Height: 5.68 in
Specimen Area: 6.56 in²
Specimen Volume: 610.35 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 69

Plastic Limit: 23

Measured Specific Gravity: 2.71

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.6645	-0.050214	-59.954	12097	13241	13181
2	0.01245	0	0	6.6645	-0.050214	-59.954	12097	13241	13181
3	0.020783	0	0	6.6645	-0.050214	-59.954	12097	13241	13181
4	0.054117	0	0	6.6645	-0.050214	-59.954	12097	13241	13181
5	0.1041	0	0	6.6645	0.085032	-57.031	12098	13241	13184
6	0.2041	0.0016773	0	6.6646	0.89651	-39.642	12103	13241	13201
7	0.50407	0.0067093	0	6.6649	4.5481	38.821	12122	13241	13280
8	1.004	0.020128	0	6.6658	7.9312	110.74	12150	13240	13350
9	2.0039	0.051997	0	6.668	12.663	210.14	12199	13241	13451
10	5.0037	0.13586	0	6.6736	20.778	377.81	12300	13241	13619
11	10.003	0.28179	0	6.6833	28.216	524.9	12404	13241	13766
12	15.003	0.44952	0	6.6946	32.95	611.3	12467	13241	13852
13	20.002	0.59713	0	6.7045	36.464	673.07	12513	13242	13915
14	25.002	0.74976	0	6.7148	39.036	713.92	12547	13241	13955
15	30.002	0.88059	0	6.7237	40.929	742.14	12570	13241	13983
16	35.001	1.045	0	6.7349	42.552	761.28	12589	13241	14002
17	40.001	1.1808	0	6.7441	43.903	777.21	12603	13242	14019
18	45	1.3217	0	6.7538	44.851	784.01	12614	13241	14025
19	50	1.4643	0	6.7635	46.069	808.03	12623	13241	14049
20	55.004	1.6203	0	6.7743	48.233	852.48	12630	13241	14093
21	60.003	1.7545	0	6.7835	49.179	871.18	12635	13241	14112
22	65.003	1.9155	0	6.7946	50.126	889.53	12637	13241	14130
23	70.003	2.0681	0	6.8052	51.073	907.91	12639	13241	14149
24	75.002	2.2174	0	6.8156	51.884	923.41	12639	13241	14164
25	80.002	2.3734	0	6.8265	52.425	933.07	12639	13241	14174
26	85.001	2.5227	0	6.837	52.425	931.38	12639	13241	14172
27	90.001	2.6669	0	6.8471	52.696	935.43	12638	13241	14176
28	95.001	2.8196	0	6.8579	52.966	939.37	12636	13241	14180
29	100	2.9789	0	6.8691	53.101	940.39	12635	13241	14181
30	105	3.1215	0	6.8792	53.507	947.24	12633	13241	14188
31	110	3.2792	0	6.8904	53.778	951.07	12632	13241	14192
32	115	3.4402	0	6.9019	54.048	954.85	12629	13241	14196
33	120	3.5744	0	6.9115	54.183	956.1	12627	13241	14197
34	125	3.7304	0	6.9227	54.724	965.52	12625	13241	14206
35	130	3.878	0	6.9334	55.13	972.21	12623	13241	14213
36	135	4.0256	0	6.944	55.671	981.67	12620	13241	14223
37	140	4.1816	0	6.9553	56.212	990.99	12619	13241	14232
38	145	4.3191	0	6.9653	56.483	994.91	12617	13241	14236
39	150	4.4701	0	6.9763	56.347	990.28	12613	13241	14231
40	155	4.6193	0	6.9873	56.888	999.61	12612	13241	14240
41	160	4.7669	0	6.9981	57.563	1011.7	12609	13242	14254
42	165	4.9213	0	7.0094	57.968	1018.1	12607	13242	14260
43	170	5.0705	0	7.0205	59.052	1038.4	12605	13241	14279
44	175	5.2181	0	7.0314	59.999	1056	12602	13241	14297
45	180	5.359	0	7.0419	61.081	1076.3	12600	13241	14317
46	185	5.5117	0	7.0532	61.757	1088	12597	13241	14329
47	190	5.6643	0	7.0647	62.163	1094.3	12596	13241	14335
48	195	5.8304	0	7.0771	62.298	1094.8	12594	13241	14336
49	200	5.9679	0	7.0875	62.296	1092.9	12593	13242	14335
50	205	6.1205	0	7.099	62.161	1088.1	12589	13242	14330
51	210	6.2715	0	7.1104	62.432	1091.6	12587	13242	14334
52	215	6.4208	0	7.1218	62.569	1092.3	12584	13241	14333
53	220	6.5902	0	7.1347	62.569	1090	12582	13241	14331
54	225	6.7277	0	7.1452	62.704	1090.9	12579	13241	14332
55	230	6.8871	0	7.1574	62.974	1094.2	12577	13241	14335
56	235	7.0313	0	7.1685	63.108	1094.9	12576	13242	14337
57	240	7.1823	0	7.1802	63.515	1101	12573	13241	14342
58	245	7.3316	0	7.1918	63.921	1107.1	12571	13241	14348
59	250	7.4909	0	7.2042	64.327	1113	12568	13241	14354
60	255	7.6335	0	7.2153	64.597	1116.4	12566	13241	14357
61	260	7.7878	0	7.2273	65.138	1125	12564	13241	14366
62	265	7.932	0	7.2387	65.815	1136.5	12561	13241	14377
63	270	8.083	0	7.2506	66.356	1145.1	12559	13241	14386
64	275	8.2407	0	7.263	66.761	1150.8	12556	13241	14392
65	280	8.3849	0	7.2745	67.167	1156.8	12554	13241	14398
66	285	8.5275	0	7.2858	67.841	1168.1	12553	13242	14410
67	290	8.6717	0	7.2973	68.923	1187.3	12552	13242	14429
68	295	8.8193	0	7.3091	69.872	1203.8	12548	13241	14445
69	300	8.9636	0	7.3207	70.278	1209.6	12544	13241	14450
70	305	9.1229	0	7.3335	70.819	1217.8	12543	13241	14459
71	310	9.2655	0	7.3451	70.954	1218.3	12541	13241	14459
72	315	9.4148	0	7.3572	70.954	1216	12538	13241	14457
73	320	9.5641	0	7.3693	70.819	1211	12536	13241	14452
74	325	9.7251	0	7.3824	70.413	1200.7	12534	13241	14442
75	330	9.871	0	7.3944	70.546	1201	12532	13242	14443
76	335	10.022	0	7.4068	70.819	1204	12529	13241	14445
77	340	10.171	0	7.4191	70.819	1201.7	12526	13241	14443
78	345	10.324	0	7.4317	70.952	1202	12524	13242	14444
79	350	10.487	0	7.4452	71.089	1202.1	12522	13241	14443
80	355	10.629	0	7.4571	71.224	1202.6	12520	13241	14443

81	360	10.772	0	7.469	71.495	1205.6	12517	13241	14446
82	365	10.918	0	7.4813	71.493	1203.3	12516	13242	14445
83	370	11.077	0	7.4947	72.036	1211.3	12512	13241	14452
84	375	11.216	0	7.5064	72.442	1216.9	12510	13241	14458
85	380	11.374	0	7.5198	72.712	1219.6	12507	13241	14460
86	385	11.523	0	7.5325	73.118	1225	12505	13241	14466
87	390	11.671	0	7.5451	73.524	1230.4	12502	13241	14471
88	395	11.813	0	7.5573	74.065	1238.5	12500	13241	14479
89	400	11.961	0	7.5699	74.606	1246.4	12496	13241	14487
90	405	12.124	0	7.5839	75.417	1259.2	12495	13241	14500
91	410	12.268	0	7.5964	76.364	1274.8	12491	13241	14516
92	415	12.421	0	7.6097	77.173	1287.6	12489	13242	14530
93	420	12.565	0	7.6222	78.122	1303.1	12487	13241	14544
94	425	12.716	0	7.6354	78.257	1303.1	12483	13241	14544
95	430	12.85	0	7.6471	77.987	1295.7	12481	13241	14537
96	435	13.009	0	7.6612	77.716	1288	12478	13241	14529
97	440	13.165	0	7.6749	77.31	1277.7	12476	13241	14519
98	445	13.318	0	7.6884	77.175	1272.6	12472	13241	14514
99	450	13.467	0	7.7017	77.175	1270.2	12470	13241	14511
100	455	13.615	0	7.7149	77.175	1267.7	12467	13241	14509
101	460	13.772	0	7.729	77.175	1265.1	12464	13241	14506
102	465	13.93	0	7.7431	77.04	1259.9	12461	13241	14501
103	470	14.071	0	7.7558	77.31	1262.6	12459	13241	14503
104	475	14.217	0	7.769	77.446	1262.7	12457	13241	14504
105	480	14.378	0	7.7836	77.581	1262.5	12454	13241	14503
106	485	14.509	0	7.7955	77.581	1260.3	12452	13241	14501
107	490	14.675	0	7.8107	77.851	1262.5	12449	13241	14503
108	495	14.821	0	7.8241	78.257	1267.5	12448	13241	14508
109	500	14.97	0	7.8378	78.663	1272.4	12445	13241	14513
110	500.87	15	0	7.8406	78.663	1271.9	12445	13241	14513

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-5
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/26/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 23.6'-24.4'
Elevation:

Soil Description: Light Yellowish Brown Fat CLAY (CH)
Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

Specimen Height: 5.68 in
Specimen Area: 6.56 in²
Specimen Volume: 610.35 cc
Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb
Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 69
Plastic Limit: 23
Measured Specific Gravity: 2.71

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	13181	13241	0	0.000	1084.1	1144	1.055	1114	-29.977
2	0.00	13181	13241	0	0.000	1084.1	1144	1.055	1114	-29.977
3	0.00	13181	13241	0	0.000	1084.1	1144	1.055	1114	-29.977
4	0.00	13181	13241	0	0.000	1084.1	1144	1.055	1114	-29.977
5	0.00	13184	13241	1.2032	0.412	1085.8	1142.8	1.053	1114.3	-28.516
6	0.00	13201	13241	6.0159	0.296	1098.4	1138	1.036	1118.2	-19.821
7	0.01	13280	13241	25.267	0.256	1157.6	1118.7	1.035	1138.2	19.411
8	0.02	13350	13240	52.94	0.317	1200.6	1089.9	1.102	1145.3	55.37
9	0.05	13451	13241	102.27	0.379	1251.9	1041.7	1.202	1146.8	105.07
10	0.14	13619	13241	203.34	0.464	1318.5	940.67	1.402	1129.6	188.9
11	0.28	13766	13241	306.81	0.525	1362.1	837.2	1.627	1099.6	262.45
12	0.45	13852	13241	370.58	0.552	1384.7	773.43	1.790	1079.1	305.65
13	0.60	13915	13242	416.3	0.566	1402	728.89	1.923	1065.4	336.54
14	0.75	13955	13241	449.99	0.581	1407.9	694.02	2.029	1051	356.96
15	0.88	13983	13241	472.85	0.590	1413.3	671.16	2.106	1042.2	371.07
16	1.04	14002	13241	492.1	0.599	1413.2	651.91	2.168	1032.5	380.64
17	1.18	14019	13242	506.54	0.604	1415.9	638.65	2.217	1027.3	388.61
18	1.32	14025	13241	517.37	0.613	1410.6	626.64	2.251	1018.6	392.01
19	1.46	14049	13241	525.79	0.606	1426.2	618.22	2.307	1022.2	404.02
20	1.62	14093	13241	533.01	0.584	1463.5	611	2.395	1037.2	426.24
21	1.75	14112	13241	537.82	0.578	1477.4	606.18	2.437	1041.8	435.59
22	1.92	14130	13241	540.23	0.569	1493.3	603.78	2.473	1048.5	444.76
23	2.07	14149	13241	542.64	0.561	1509.3	601.37	2.510	1055.3	453.95
24	2.22	14164	13241	542.64	0.552	1524.8	601.37	2.535	1063.1	461.7
25	2.37	14174	13241	542.64	0.546	1534.4	601.37	2.552	1067.9	466.53
26	2.52	14172	13241	542.64	0.547	1532.8	601.37	2.549	1067.1	465.69
27	2.67	14176	13241	541.43	0.544	1538	602.58	2.552	1070.3	467.72
28	2.82	14180	13241	539.03	0.539	1544.4	604.98	2.553	1074.7	469.69
29	2.98	14181	13241	537.82	0.538	1546.6	606.18	2.551	1076.4	470.19
30	3.12	14188	13241	536.62	0.533	1554.6	607.39	2.560	1081	473.62
31	3.28	14192	13241	535.42	0.530	1559.7	608.59	2.563	1084.1	475.54
32	3.44	14196	13241	531.81	0.524	1567	612.2	2.560	1089.6	477.42
33	3.57	14197	13241	530.61	0.522	1569.5	613.4	2.559	1091.5	478.05
34	3.73	14206	13241	528.2	0.515	1581.3	615.81	2.568	1098.6	482.76
35	3.88	14213	13241	525.79	0.509	1590.4	618.22	2.573	1104.3	486.1
36	4.03	14223	13241	523.39	0.502	1602.3	620.62	2.582	1111.5	490.83
37	4.18	14232	13241	522.18	0.497	1612.8	621.83	2.594	1117.3	495.49
38	4.32	14236	13241	519.78	0.493	1619.1	624.23	2.594	1121.7	497.46
39	4.47	14231	13241	516.17	0.491	1618.1	627.84	2.577	1123	495.14
40	4.62	14240	13241	514.96	0.486	1628.7	629.05	2.589	1128.8	499.8
41	4.77	14254	13242	512.56	0.477	1644.3	632.63	2.599	1138.5	505.84
42	4.92	14260	13242	510.15	0.472	1653.1	635.04	2.603	1144.1	509.04
43	5.07	14279	13241	507.75	0.462	1674.7	636.26	2.632	1155.5	519.22
44	5.22	14297	13241	505.34	0.453	1694.6	638.67	2.653	1166.6	527.98
45	5.36	14317	13241	502.93	0.443	1717.3	641.08	2.679	1179.2	538.13
46	5.51	14329	13241	500.53	0.436	1731.5	643.48	2.691	1187.5	544.02
47	5.66	14335	13241	499.32	0.433	1739	644.69	2.697	1191.8	547.14
48	5.83	14336	13241	496.92	0.430	1741.9	647.09	2.692	1194.5	547.4
49	5.97	14335	13242	495.71	0.429	1742.4	649.48	2.683	1195.9	546.45
50	6.12	14330	13242	492.1	0.428	1741.2	653.09	2.666	1197.1	544.06
51	6.27	14334	13242	489.7	0.424	1747.1	655.49	2.665	1201.3	545.78
52	6.42	14333	13241	487.29	0.423	1749	656.72	2.663	1202.9	546.16
53	6.59	14331	13241	484.88	0.422	1749.2	659.12	2.654	1204.1	545.01
54	6.73	14332	13241	482.48	0.419	1752.4	661.53	2.649	1207	545.45
55	6.89	14335	13241	480.07	0.416	1758.1	663.94	2.648	1211	547.09
56	7.03	14337	13242	478.87	0.414	1761.2	666.32	2.643	1213.8	547.45
57	7.18	14342	13241	476.46	0.410	1768.6	667.55	2.649	1218.1	550.51
58	7.33	14348	13241	474.06	0.406	1777	669.95	2.652	1223.5	553.54
59	7.49	14354	13241	471.65	0.402	1785.4	672.36	2.655	1228.9	556.5
60	7.63	14357	13241	469.24	0.399	1791.2	674.77	2.655	1233	558.21
61	7.79	14366	13241	466.84	0.394	1802.2	677.17	2.661	1239.7	562.52
62	7.93	14377	13241	464.43	0.388	1816	679.58	2.672	1247.8	568.23
63	8.08	14386	13241	462.02	0.383	1827	681.99	2.679	1254.5	572.53
64	8.24	14392	13241	459.62	0.380	1835.2	684.39	2.682	1259.8	575.42
65	8.38	14398	13241	457.21	0.376	1843.6	686.8	2.684	1265.2	578.4
66	8.53	14410	13242	456.01	0.370	1857.2	689.18	2.695	1273.2	584.03
67	8.67	14429	13242	454.8	0.364	1877.7	690.38	2.720	1284	593.64
68	8.82	14445	13241	451.2	0.357	1896.6	692.81	2.738	1294.7	601.89
69	8.96	14450	13241	447.59	0.353	1906	696.42	2.737	1301.2	604.79
70	9.12	14459	13241	446.38	0.349	1915.4	697.63	2.746	1306.5	608.89
71	9.27	14459	13241	443.98	0.347	1918.3	700.03	2.740	1309.2	609.13
72	9.41	14457	13241	441.57	0.346	1918.4	702.44	2.731	1310.4	607.98
73	9.56	14452	13241	439.16	0.346	1915.9	704.85	2.718	1310.4	605.52
74	9.73	14442	13241	436.76	0.346	1907.9	707.25	2.698	1307.6	600.33
75	9.87	14443	13242	435.55	0.344	1910.7	709.63	2.692	1310.2	600.52
76	10.02	14445	13241	431.94	0.342	1916.1	712.07	2.691	1314.1	602.01
77	10.17	14443	13241	429.54	0.340	1916.2	714.47	2.682	1315.3	600.87
78	10.32	14444	13242	427.13	0.338	1920	718.06	2.674	1319.1	601
79	10.49	14443	13241	424.73	0.337	1921.4	719.28	2.671	1320.4	601.07

80	10.63	14443	13241	423.52	0.335	1923.1	720.49	2.669	1321.8	601.29
81	10.77	14446	13241	419.91	0.332	1929.7	724.1	2.665	1326.9	602.8
82	10.92	14445	13242	418.71	0.331	1929.8	726.48	2.656	1328.1	601.65
83	11.08	14452	13241	415.1	0.327	1940.2	728.91	2.662	1334.5	605.64
84	11.22	14458	13241	412.69	0.323	1948.2	731.32	2.664	1339.8	608.44
85	11.37	14460	13241	410.29	0.321	1953.3	733.72	2.662	1343.5	609.8
86	11.52	14466	13241	407.88	0.317	1961.1	736.13	2.664	1348.6	612.51
87	11.67	14471	13241	405.47	0.314	1969	738.54	2.666	1353.7	615.21
88	11.81	14479	13241	403.07	0.310	1979.4	740.94	2.671	1360.2	619.23
89	11.96	14487	13241	399.46	0.306	1990.9	744.55	2.674	1367.7	623.2
90	12.12	14500	13241	398.26	0.302	2004.9	745.75	2.688	1375.3	629.59
91	12.27	14516	13241	394.65	0.296	2024.1	749.36	2.701	1386.8	637.39
92	12.42	14530	13242	392.24	0.290	2040.5	752.95	2.710	1396.7	643.79
93	12.56	14544	13241	389.83	0.286	2057.3	754.18	2.728	1405.7	651.55
94	12.72	14544	13241	386.22	0.283	2060.9	757.79	2.720	1409.3	651.55
95	12.85	14537	13241	383.82	0.283	2055.9	760.19	2.704	1408.1	647.87
96	13.01	14529	13241	381.41	0.283	2050.6	762.6	2.689	1406.6	643.98
97	13.17	14519	13241	379	0.283	2042.7	765.01	2.670	1403.9	638.87
98	13.32	14514	13241	375.39	0.282	2041.3	768.61	2.656	1404.9	636.32
99	13.47	14511	13241	372.99	0.280	2041.2	771.02	2.647	1406.1	635.08
100	13.61	14509	13241	370.58	0.279	2041.1	773.43	2.639	1407.3	633.85
101	13.77	14506	13241	366.97	0.277	2042.1	777.04	2.628	1409.6	632.53
102	13.93	14501	13241	364.57	0.276	2039.4	779.44	2.616	1409.4	629.96
103	14.07	14503	13241	362.16	0.274	2044.5	781.85	2.615	1413.2	631.3
104	14.22	14504	13241	359.75	0.272	2046.9	784.26	2.610	1415.6	631.34
105	14.38	14503	13241	357.35	0.270	2049.1	786.66	2.605	1417.9	631.24
106	14.51	14501	13241	354.94	0.269	2049.4	789.07	2.597	1419.2	630.14
107	14.67	14503	13241	352.53	0.267	2054	791.48	2.595	1422.7	631.24
108	14.82	14508	13241	351.33	0.265	2060.2	792.68	2.599	1426.4	633.75
109	14.97	14513	13241	347.72	0.261	2068.7	796.29	2.598	1432.5	636.22
110	15.00	14513	13241	347.72	0.261	2068.2	796.29	2.597	1432.2	635.96

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-5
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/29/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 24.4'-25.0'
Elevation:

Soil Description: Light Yellowish Brown Fat CLAY (CH)
Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

Specimen Height: 5.83 in
Specimen Area: 6.39 in²
Specimen Volume: 610.53 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 69

Plastic Limit: 23

Measured Specific Gravity: 2.71

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	19	---	0	0
Wt. Container + Wet Soil, gm	129.87	---	---	1221.6
Wt. Container + Dry Soil, gm	102.22	---	---	927.35
Wt. Container, gm	10.34	---	---	8.96
Wt. Wet Soil, gm	119.53	1194.9	1212.8	1212.7
Wt. Dry Soil, gm	91.88	918.52	918.52	918.39
Wt. Water, gm	27.65	276.42	294.3	294.26
Water Content, %	30.09	30.09	32.04	32.04
Void Ratio	---	0.80	0.87	---
Degree of Saturation, %	---	101.78	100.00	---
Dry Unit Weight, pcf	---	93.921	90.552	---

Initial

Height: 5.832 in
Area: 6.3884 in²
Volume: 610.53 cc

Moisture: 30.09 %
Void Ratio: 0.80
Dry Unit Weight: 93.921 pcf
Saturation: 101.78 %

End of Initialization

Time: 10.166 min
Total Vertical Stress: 993.03 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 572.72 psf
Effective Vertical Stress: 420.31 psf
Effective Horizontal Stress: 434.47 psf

Height Change: 0.0077184 in
Area Change: 0 in²
Volume Change: 2.424 cc
Water Change: -4.4749 cc
Correction: 11.723 cc

Height: 5.8243 in
Area: 6.3884 in²
Volume: 608.11 cc

Moisture: 29.30 %
Void Ratio: 0.79
Dry Unit Weight: 94.295 pcf
Saturation: 100.00 %

End of Consolidation/A

Time: 10.166 min
Total Vertical Stress: 993.03 psf
Total Horizontal Stress: 1007.2 psf
Pore Pressure: 572.72 psf
Effective Vertical Stress: 420.31 psf
Effective Horizontal Stress: 434.47 psf

Height Change: 0.0077184 in
Area Change: 0 in²
Volume Change: 2.424 cc
Water Change: -4.4749 cc
Correction: 11.723 cc

Height: 5.8243 in
Area: 6.3884 in²
Volume: 608.11 cc

Moisture: 29.30 %
Void Ratio: 0.79
Dry Unit Weight: 94.295 pcf
Saturation: 100.00 %

End of Saturation

Time: 262.37 min
Total Vertical Stress: 12489 psf
Total Horizontal Stress: 12527 psf
Pore Pressure: 12096 psf
Effective Vertical Stress: 393.8 psf
Effective Horizontal Stress: 431.69 psf

Height Change: 0.023632 in
Area Change: 0 in²
Volume Change: 7.4217 cc
Water Change: -24.198 cc
Correction: 36.445 cc

Height: 5.8084 in
Area: 6.3884 in²
Volume: 603.11 cc

Moisture: 28.76 %
Void Ratio: 0.78
Dry Unit Weight: 95.077 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 396.02 min
Total Vertical Stress: 14358 psf
Total Horizontal Stress: 14434 psf
Pore Pressure: 12096 psf
Effective Vertical Stress: 2262.3 psf
Effective Horizontal Stress: 2338.7 psf

Height Change: 0.050694 in
Area Change: -0.29573 in²
Volume Change: -22.71 cc
Water Change: -15.846 cc
Correction: -2.0399 cc

Height: 5.7813 in
Area: 6.6841 in²
Volume: 633.24 cc

Moisture: 32.04 %
Void Ratio: 0.87
Dry Unit Weight: 90.552 pcf
Saturation: 100.00 %

End of Shear

Time: 896.24 min
Total Vertical Stress: 17683 psf
Total Horizontal Stress: 14434 psf
Pore Pressure: 11848 psf
Effective Vertical Stress: 5835.3 psf
Effective Horizontal Stress: 2586.6 psf

Height Change: 0.91792 in
Area Change: -1.4753 in²
Volume Change: -22.71 cc
Water Change: -15.846 cc
Correction: -2.0399 cc

Height: 4.9141 in
Area: 7.8637 in²
Volume: 633.24 cc

Moisture: 32.04 %
Void Ratio: 0.87
Dry Unit Weight: 90.552 pcf
Saturation: 100.00 %

At Failure

Time: 831.02 min
Total Vertical Stress: 18063 psf
Total Horizontal Stress: 14436 psf
Pore Pressure: 11887 psf
Effective Vertical Stress: 6175.5 psf
Effective Horizontal Stress: 2548.1 psf

Height Change: 0.80433 in
Area Change: -1.2144 in²
Volume Change: -22.71 cc
Water Change: -15.846 cc
Correction: 0 cc

Height: 5.0277 in
Area: 7.6027 in²
Volume: 633.24 cc

Moisture: 32.04 %
Void Ratio: 0.87
Dry Unit Weight: 90.552 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-7
Sample No.: T-5
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/29/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 24.4'-25.0'
Elevation:

Soil Description: Light Yellowish Brown Fat CLAY (CH)
Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

Specimen Height: 5.78 in
Specimen Area: 6.68 in²
Specimen Volume: 633.24 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 69

Plastic Limit: 23

Measured Specific Gravity: 2.71

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.6116	-0.063101	-76.476	12097	14434	14358
2	0.012433	0	0	6.6116	0.072145	-73.531	12097	14434	14361
3	0.020767	0	0	6.6116	0.34264	-67.639	12098	14434	14367
4	0.0541	0	0	6.6116	1.0189	-52.911	12103	14434	14381
5	0.10408	0.0032965	0	6.6118	2.2361	-26.684	12109	14434	14408
6	0.20408	0.0065929	0	6.6121	3.8609	8.4179	12120	14433	14442
7	0.50405	0.011538	0	6.6124	7.6459	90.417	12151	14434	14525
8	1.004	0.026372	0	6.6134	12.517	195.18	12199	14433	14628
9	2.0039	0.059336	0	6.6156	20.089	357.08	12286	14434	14791
10	5.0037	0.15988	0	6.6222	33.478	639.18	12473	14434	15074
11	10.003	0.30822	0	6.6321	44.298	860.32	12655	14434	15295
12	15.003	0.44337	0	6.6411	50.654	985.27	12766	14434	15420
13	20.002	0.59006	0	6.6509	55.523	1076.5	12842	14434	15511
14	25.002	0.745	0	6.6613	59.716	1152	12899	14434	15586
15	30.002	0.89334	0	6.6712	63.908	1227.9	12945	14434	15662
16	35.001	1.045	0	6.6815	67.695	1294.4	12980	14434	15729
17	40.001	1.1851	0	6.6909	71.212	1359.8	13004	14434	15794
18	45	1.3482	0	6.702	73.783	1412.5	13018	14433	15846
19	50	1.4949	0	6.712	75.269	1442	13027	14434	15876
20	55.004	1.64	0	6.7219	77.027	1477.3	13034	14434	15912
21	60.003	1.8015	0	6.7329	78.921	1515.1	13037	14434	15949
22	65.003	1.9466	0	6.7429	80.544	1547.3	13037	14434	15982
23	70.003	2.09	0	6.7528	82.707	1590.9	13033	14434	16025
24	75.002	2.2399	0	6.7631	85.683	1651.6	13029	14434	16086
25	80.002	2.38	0	6.7728	87.982	1697.8	13026	14434	16132
26	85.001	2.53	0	6.7832	89.74	1732.3	13020	14434	16167
27	90.001	2.6965	0	6.7949	92.039	1777.7	13012	14434	16212
28	95.001	2.8284	0	6.8041	94.609	1829.5	13005	14434	16264
29	100	2.9882	0	6.8153	97.72	1891.9	12998	14434	16326
30	105	3.1316	0	6.8254	100.69	1951.6	12992	14436	16387
31	110	3.2849	0	6.8362	103.67	2011	12984	14434	16445
32	115	3.4333	0	6.8467	106.65	2070.2	12973	14433	16503
33	120	3.5865	0	6.8576	108.67	2109.2	12963	14434	16544
34	125	3.7365	0	6.8683	111.11	2156.7	12955	14434	16591
35	130	3.8865	0	6.879	113.54	2204	12946	14434	16638
36	135	4.0447	0	6.8903	115.98	2251	12934	14434	16685
37	140	4.1815	0	6.9002	118.41	2298.4	12922	14434	16733
38	145	4.3447	0	6.9119	120.98	2347.7	12908	14434	16782
39	150	4.4848	0	6.9221	123.42	2394.6	12893	14434	16829
40	155	4.6365	0	6.9331	125.72	2438.3	12880	14434	16873
41	160	4.7832	0	6.9438	127.88	2479.2	12864	14434	16914
42	165	4.9447	0	6.9556	130.31	2525.1	12848	14434	16959
43	170	5.0831	0	6.9657	132.61	2568.7	12830	14434	17003
44	175	5.2381	0	6.9771	135.05	2614.4	12812	14434	17049
45	180	5.3815	0	6.9877	137.48	2660.4	12795	14436	17096
46	185	5.5446	0	6.9997	140.05	2708.4	12775	14434	17143
47	190	5.6814	0	7.0099	143.3	2770.9	12759	14434	17205
48	195	5.8347	0	7.0213	146	2821.6	12738	14434	17256
49	200	5.9814	0	7.0323	148.3	2864	12719	14434	17298
50	205	6.1298	0	7.0434	150.47	2903.4	12700	14434	17338
51	210	6.2715	0	7.054	152.9	2948.5	12680	14434	17383
52	215	6.4165	0	7.065	155.33	2993.3	12662	14434	17428
53	220	6.5764	0	7.077	157.77	3037.4	12643	14434	17472
54	225	6.7215	0	7.0881	160.2	3081.9	12623	14434	17516
55	230	6.8797	0	7.1001	161.42	3101	12602	14434	17535
56	235	7.0313	0	7.1117	162.5	3117.6	12582	14434	17552
57	240	7.1797	0	7.123	163.99	3142.4	12561	14434	17577
58	245	7.3379	0	7.1352	165.61	3169.5	12540	14434	17604
59	250	7.4895	0	7.1469	167.1	3194	12519	14436	17630
60	255	7.6346	0	7.1581	168.59	3218.7	12499	14434	17653
61	260	7.7895	0	7.1702	170.21	3245.6	12477	14436	17681
62	265	7.9412	0	7.182	171.56	3267.1	12455	14436	17703
63	270	8.0895	0	7.1936	172.92	3288.6	12433	14434	17723
64	275	8.2494	0	7.2061	174.13	3306.9	12411	14434	17741
65	280	8.3944	0	7.2175	175.49	3328.4	12388	14434	17763
66	285	8.5461	0	7.2295	176.57	3344.2	12368	14434	17779
67	290	8.696	0	7.2413	177.65	3359.9	12347	14436	17795
68	295	8.846	0	7.2533	178.87	3378.2	12325	14436	17814
69	300	8.9911	0	7.2648	180.63	3407.5	12304	14434	17842
70	305	9.1411	0	7.2768	182.65	3441.7	12282	14434	17876
71	310	9.2861	0	7.2884	184.28	3468	12262	14434	17902
72	315	9.4262	0	7.2997	185.76	3491.7	12244	14434	17926
73	320	9.5745	0	7.3117	186.85	3507.1	12224	14434	17941
74	325	9.7229	0	7.3237	188.06	3524.9	12206	14436	17960
75	330	9.8745	0	7.336	189.15	3540	12187	14434	17974
76	335	10.028	0	7.3485	190.36	3557.5	12169	14434	17992
77	340	10.168	0	7.36	191.31	3570.2	12151	14434	18005
78	345	10.331	0	7.3734	191.31	3563.4	12134	14434	17998
79	350	10.474	0	7.3852	191.45	3560.1	12117	14434	17994
80	355	10.626	0	7.3977	191.72	3559	12100	14434	17993

81	360	10.783	0	7.4107	192.12	3560.4	12085	14434	17995
82	365	10.924	0	7.4225	192.66	3564.9	12069	14434	17999
83	370	11.088	0	7.4361	192.93	3563.3	12052	14434	17998
84	375	11.239	0	7.4488	193.07	3559.6	12039	14434	17994
85	380	11.391	0	7.4616	193.74	3566.3	12025	14434	18001
86	385	11.528	0	7.4731	194.29	3570.9	12010	14434	18005
87	390	11.688	0	7.4866	194.83	3574.5	11997	14434	18009
88	395	11.847	0	7.5002	195.23	3575.5	11984	14434	18010
89	400	11.984	0	7.5119	195.77	3580.1	11972	14434	18014
90	405	12.139	0	7.5251	196.18	3581.2	11958	14436	18017
91	410	12.291	0	7.5381	196.45	3579.9	11945	14436	18015
92	415	12.434	0	7.5505	197.53	3594.4	11932	14434	18029
93	420	12.574	0	7.5626	198.75	3611.6	11920	14434	18046
94	425	12.733	0	7.5763	199.42	3617.6	11908	14434	18052
95	430	12.876	0	7.5888	200.24	3626.8	11897	14434	18061
96	435	13.036	0	7.6027	200.64	3627.4	11887	14436	18063
97	440	13.171	0	7.6145	200.51	3619	11881	14434	18053
98	445	13.331	0	7.6286	199.83	3599.3	11878	14434	18034
99	450	13.471	0	7.6409	198.07	3560	11879	14436	17996
100	455	13.628	0	7.6548	195.77	3510	11879	14436	17946
101	460	13.778	0	7.6681	194.15	3473.2	11877	14434	17908
102	465	13.932	0	7.6819	192.66	3438.7	11873	14434	17873
103	470	14.076	0	7.6947	191.58	3412.5	11868	14434	17847
104	475	14.229	0	7.7085	190.77	3390.9	11865	14434	17825
105	480	14.382	0	7.7223	189.82	3366.9	11861	14434	17801
106	485	14.541	0	7.7366	188.6	3337.6	11859	14436	17773
107	490	14.684	0	7.7496	187.79	3316.7	11856	14436	17752
108	495	14.841	0	7.7638	187.12	3297.7	11853	14436	17733
109	500	14.991	0	7.7775	186.71	3284.1	11848	14434	17719
110	500.22	15.001	0	7.7784	186.85	3286.2	11848	14434	17721

TRIAXIAL TEST

Project: VRE Alexandria
 Boring No.: GZ-7
 Sample No.: T-5
 Test No.: 2

Location: Alexandria, VA
 Tested By: Jason
 Test Date: 06/29/2015
 Sample Type: Undisturbed

Project No.: 16679-0
 Checked By: Bert
 Depth: 24.4'-25.0'
 Elevation:

Soil Description: Light Yellowish Brown Fat CLAY (CH)
 Remarks: 16667-0 VRE Alexandria GZ-7 23'0" - 25'0" - CU Triaxial

Specimen Height: 5.78 in
 Specimen Area: 6.68 in²
 Specimen Volume: 633.24 cc

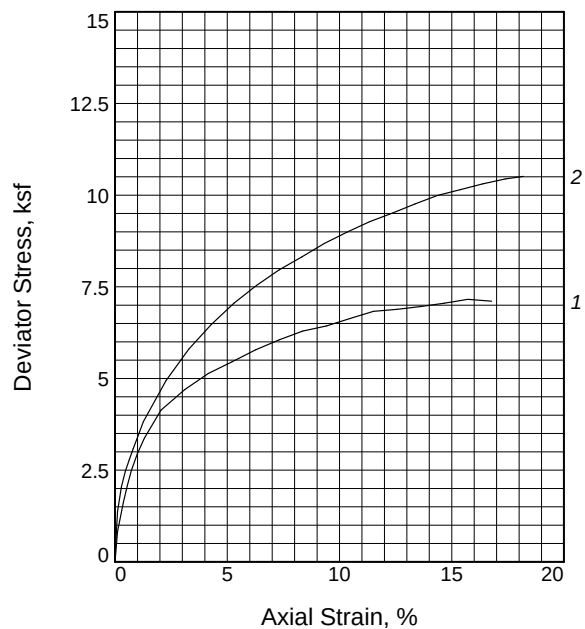
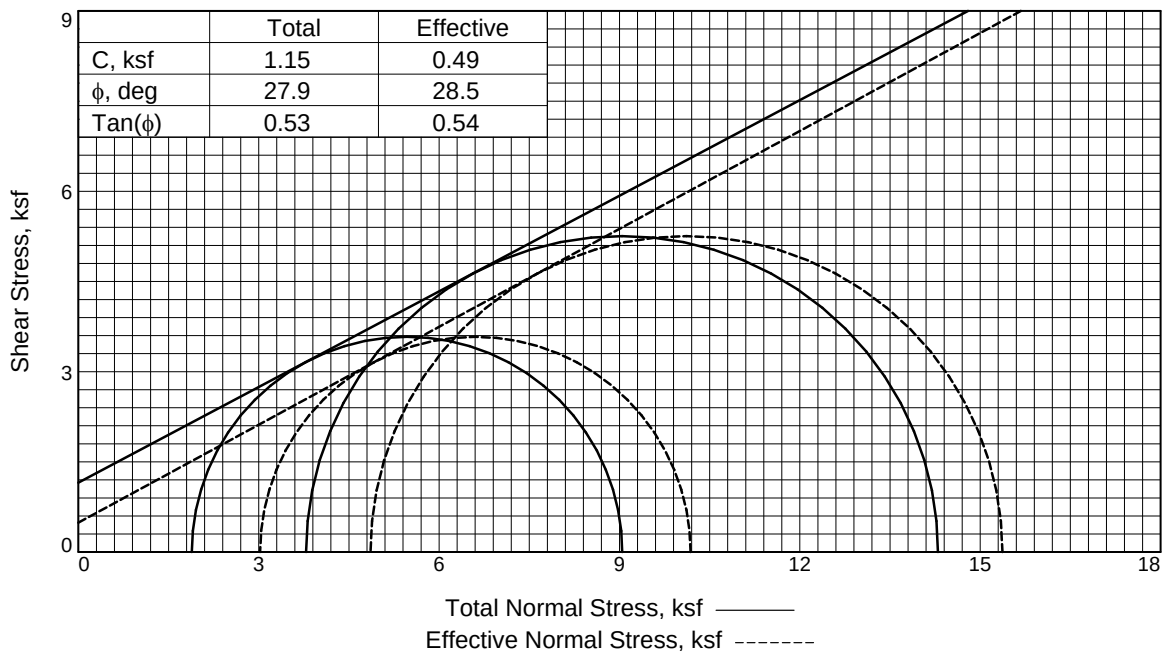
Piston Area: 0.23 in²
 Piston Friction: 0.00 lb
 Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
 Membrane Correction: 1.65 lb/in
 Correction Type: Uniform

Liquid Limit: 69 Plastic Limit: 23 Measured Specific Gravity: 2.71

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	14358	14434	0	0.000	2261.1	2337.5	1.034	2299.3	-38.238
2	0.00	14361	14434	0	0.000	2264	2337.5	1.032	2300.8	-36.765
3	0.00	14367	14434	1.2032	0.136	2268.7	2336.3	1.030	2302.5	-33.82
4	0.00	14381	14434	6.0159	0.255	2278.6	2331.5	1.023	2305.1	-26.456
5	0.00	14408	14434	12.032	0.242	2298.8	2325.5	1.012	2312.2	-13.342
6	0.01	14442	14433	22.861	0.283	2321.9	2313.5	1.004	2317.7	4.209
7	0.01	14525	14434	54.143	0.324	2373.8	2283.4	1.040	2328.6	45.209
8	0.03	14628	14433	102.27	0.381	2429.3	2234.1	1.087	2331.7	97.589
9	0.06	14791	14434	188.9	0.436	2505.7	2148.6	1.166	2327.2	178.54
10	0.16	15074	14434	376.6	0.526	2600.1	1960.9	1.326	2280.5	319.59
11	0.31	15295	14434	558.28	0.596	2639.6	1779.3	1.484	2209.4	430.16
12	0.44	15420	14434	668.97	0.630	2653.8	1668.6	1.590	2161.2	492.63
13	0.59	15511	14434	744.77	0.646	2669.3	1592.8	1.676	2131	538.25
14	0.74	15586	14434	802.53	0.653	2687	1535	1.750	2111	576
15	0.89	15662	14434	848.25	0.650	2717.2	1489.3	1.824	2103.2	613.93
16	1.04	15729	14434	883.14	0.644	2748.8	1454.4	1.890	2101.6	647.19
17	1.19	15794	14434	907.2	0.632	2790.1	1430.3	1.951	2110.2	679.9
18	1.35	15846	14433	921.64	0.620	2827.2	1414.7	1.998	2121	706.26
19	1.49	15876	14434	930.06	0.612	2849.5	1407.5	2.025	2128.5	721.02
20	1.64	15912	14434	937.28	0.603	2877.6	1400.3	2.055	2138.9	738.66
21	1.80	15949	14434	939.69	0.590	2913	1397.8	2.084	2155.4	757.55
22	1.95	15982	14434	939.69	0.579	2945.1	1397.8	2.107	2171.5	773.64
23	2.09	16025	14434	936.08	0.561	2992.4	1401.5	2.135	2196.9	795.45
24	2.24	16086	14434	932.47	0.540	3056.6	1405.1	2.175	2230.8	825.78
25	2.38	16132	14434	928.86	0.524	3106.5	1408.7	2.205	2257.6	848.91
26	2.53	16167	14434	922.84	0.510	3147	1414.7	2.224	2280.8	866.14
27	2.70	16212	14434	915.63	0.494	3199.7	1421.9	2.250	2310.8	888.87
28	2.83	16264	14434	908.41	0.477	3258.6	1429.1	2.280	2343.9	914.74
29	2.99	16326	14434	901.19	0.458	3328.3	1436.4	2.317	2382.3	945.96
30	3.13	16387	14436	895.17	0.441	3395.1	1443.5	2.352	2419.3	975.8
31	3.28	16445	14434	886.75	0.425	3461.7	1450.8	2.386	2456.3	1005.5
32	3.43	16503	14433	875.92	0.409	3530.7	1460.4	2.418	2495.5	1035.1
33	3.59	16544	14434	866.3	0.396	3580.5	1471.2	2.434	2525.9	1054.6
34	3.74	16591	14434	857.87	0.384	3636.4	1479.7	2.458	2558	1078.4
35	3.89	16638	14434	849.45	0.372	3692.1	1488.1	2.481	2590.1	1102
36	4.04	16685	14434	837.42	0.360	3751.1	1500.1	2.501	2625.6	1125.5
37	4.18	16733	14434	825.39	0.348	3810.5	1512.2	2.520	2661.3	1149.2
38	4.34	16782	14434	810.95	0.335	3874.3	1526.6	2.538	2700.4	1173.8
39	4.48	16829	14434	796.51	0.322	3935.7	1541	2.554	2738.3	1197.3
40	4.64	16873	14434	783.28	0.311	3992.6	1554.3	2.569	2773.4	1219.2
41	4.78	16914	14434	767.63	0.300	4049.1	1569.9	2.579	2809.5	1239.6
42	4.94	16959	14434	750.79	0.289	4111.8	1586.7	2.591	2849.3	1262.5
43	5.08	17003	14434	732.74	0.277	4173.5	1604.8	2.601	2889.1	1284.3
44	5.24	17049	14434	714.69	0.266	4237.3	1622.8	2.611	2930.1	1307.2
45	5.38	17096	14436	697.85	0.255	4301.2	1640.9	2.621	2971	1330.2
46	5.54	17143	14434	678.6	0.244	4367.3	1658.9	2.633	3013.1	1354.2
47	5.68	17205	14434	661.75	0.232	4446.7	1675.8	2.653	3061.2	1385.4
48	5.83	17256	14434	641.3	0.221	4517.8	1696.2	2.663	3107	1410.8
49	5.98	17298	14434	622.05	0.212	4579.5	1715.5	2.669	3147.5	1432
50	6.13	17338	14434	602.8	0.202	4638.2	1734.7	2.674	3186.5	1451.7
51	6.27	17383	14434	583.55	0.193	4702.5	1754	2.681	3228.2	1474.2
52	6.42	17428	14434	565.5	0.184	4765.3	1772	2.689	3268.7	1496.6
53	6.58	17472	14434	546.25	0.175	4828.7	1791.3	2.696	3310	1518.7
54	6.72	17516	14434	525.79	0.166	4893.6	1811.7	2.701	3352.7	1540.9
55	6.88	17535	14434	505.34	0.159	4933.2	1832.2	2.693	3382.7	1550.5
56	7.03	17552	14434	484.88	0.152	4970.3	1852.7	2.683	3411.5	1558.8
57	7.18	17577	14434	464.43	0.144	5015.5	1873.1	2.678	3444.3	1571.2
58	7.34	17604	14434	442.77	0.136	5064.3	1894.8	2.673	3479.5	1584.8
59	7.49	17630	14436	422.32	0.129	5110.4	1916.4	2.667	3513.4	1597
60	7.63	17653	14434	401.86	0.122	5154.4	1935.7	2.663	3545	1609.3
61	7.79	17681	14436	380.21	0.114	5204.1	1958.5	2.657	3581.3	1622.8
62	7.94	17703	14436	358.55	0.107	5247.2	1980.2	2.650	3613.7	1633.5
63	8.09	17723	14434	335.69	0.100	5290.5	2001.8	2.643	3646.2	1644.3
64	8.25	17741	14434	314.03	0.093	5330.4	2023.5	2.634	3677	1653.5
65	8.39	17763	14434	291.17	0.086	5374.8	2046.4	2.626	3710.6	1664.2
66	8.55	17779	14434	270.72	0.079	5411	2066.8	2.618	3738.9	1672.1
67	8.70	17795	14436	250.26	0.072	5448.3	2088.5	2.609	3768.4	1679.9
68	8.85	17814	14436	228.61	0.066	5488.4	2110.1	2.601	3799.2	1689.1
69	8.99	17842	14434	206.95	0.059	5538.1	2130.6	2.599	3834.3	1703.7
70	9.14	17876	14434	185.29	0.053	5594	2152.2	2.599	3873.1	1720.9
71	9.29	17902	14434	164.84	0.047	5640.7	2172.7	2.596	3906.7	1734
72	9.43	17926	14434	146.79	0.041	5682.5	2190.7	2.594	3936.6	1745.9
73	9.57	17941	14434	127.54	0.036	5717.1	2210	2.587	3963.5	1753.5
74	9.72	17960	14436	109.49	0.030	5754.1	2229.2	2.581	3991.7	1762.5
75	9.87	17974	14434	90.239	0.025	5787.3	2247.3	2.575	4017.3	1770
76	10.03	17992	14434	72.191	0.020	5822.9	2265.3	2.570	4044.1	1778.8
77	10.17	18005	14434	54.143	0.015	5853.6	2283.4	2.564	4068.5	1785.1
78	10.33	17998	14434	37.299	0.010	5863.7	2300.2	2.549	4082	1781.7
79	10.47	17994	14434	20.454	0.006	5877.2	2317.1	2.536	4097.1	1780

80	10.63	17993	14434	3.6096	0.001	5893	2333.9	2.525	4113.4	1779.5
81	10.78	17995	14434	-12.032	-0.003	5909.9	2349.6	2.515	4129.8	1780.2
82	10.92	17999	14434	-27.673	-0.008	5930.2	2365.2	2.507	4147.7	1782.5
83	11.09	17998	14434	-44.518	-0.012	5945.4	2382.1	2.496	4163.7	1781.7
84	11.24	17994	14434	-57.753	-0.016	5954.9	2395.3	2.486	4175.1	1779.8
85	11.39	18001	14434	-72.191	-0.020	5976	2409.7	2.480	4192.9	1783.1
86	11.53	18005	14434	-86.63	-0.024	5995.1	2424.2	2.473	4209.6	1785.5
87	11.69	18009	14434	-99.865	-0.027	6011.9	2437.4	2.467	4224.7	1787.3
88	11.85	18010	14434	-113.1	-0.031	6026.2	2450.6	2.459	4238.4	1787.8
89	11.98	18014	14434	-125.13	-0.034	6042.8	2462.7	2.454	4252.7	1790.1
90	12.14	18017	14436	-138.37	-0.038	6058.3	2477.1	2.446	4267.7	1790.6
91	12.29	18015	14436	-151.6	-0.042	6070.2	2490.3	2.438	4280.3	1790
92	12.43	18029	14434	-164.84	-0.045	6096.8	2502.4	2.436	4299.6	1797.2
93	12.57	18046	14434	-176.87	-0.048	6126	2514.4	2.436	4320.2	1805.8
94	12.73	18052	14434	-188.9	-0.051	6144	2526.4	2.432	4335.2	1808.8
95	12.88	18061	14434	-199.73	-0.054	6164	2537.3	2.429	4350.7	1813.4
96	13.04	18063	14436	-209.35	-0.057	6175.5	2548.1	2.424	4361.8	1813.7
97	13.17	18053	14434	-215.37	-0.058	6171.9	2552.9	2.418	4362.4	1809.5
98	13.33	18034	14434	-218.98	-0.060	6155.8	2556.5	2.408	4356.2	1799.6
99	13.47	17996	14436	-217.78	-0.060	6116.5	2556.5	2.393	4336.5	1780
100	13.63	17946	14436	-217.78	-0.061	6066.5	2556.5	2.373	4311.5	1755
101	13.78	17908	14434	-220.18	-0.062	6030.9	2557.7	2.358	4294.3	1736.6
102	13.93	17873	14434	-223.79	-0.064	6000.1	2561.3	2.343	4280.7	1719.4
103	14.08	17847	14434	-228.61	-0.066	5978.6	2566.1	2.330	4272.4	1706.2
104	14.23	17825	14434	-232.22	-0.067	5960.7	2569.8	2.320	4265.2	1695.5
105	14.38	17801	14434	-235.82	-0.068	5940.2	2573.4	2.308	4256.8	1683.4
106	14.54	17773	14436	-238.23	-0.070	5914.6	2576.9	2.295	4245.8	1668.8
107	14.68	17752	14436	-240.64	-0.071	5896	2579.4	2.286	4237.7	1658.3
108	14.84	17733	14436	-244.25	-0.073	5880.7	2583	2.277	4231.8	1648.9
109	14.99	17719	14434	-249.06	-0.074	5870.7	2586.6	2.270	4228.7	1642.1
110	15.00	17721	14434	-249.06	-0.074	5872.8	2586.6	2.270	4229.7	1643.1



Type of Test:

CU with Pore Pressures

Sample Type: Undisturbed

Description: Yellowish brown lean CLAY with sand

LL= 33

PL= 22

PI= 11

Assumed Specific Gravity= 2.725

Remarks:

Figure _____

Sample No.	1	2
Initial		
Water Content, %	19.6	19.5
Dry Density, pcf	106.5	107.4
Saturation, %	89.3	90.9
Void Ratio	0.5974	0.5835
Diameter, in.	2.86	2.87
Height, in.	5.81	5.80
At Test		
Water Content, %	21.3	20.4
Dry Density, pcf	107.0	108.1
Saturation, %	98.3	96.7
Void Ratio	0.5896	0.5737
Diameter, in.	2.86	2.86
Height, in.	5.79	5.79
Strain rate, in./min.	0.00	0.00
Back Pressure, psi	30.00	30.00
Cell Pressure, psi	43.10	56.30
Fail. Stress, ksf	7.2	10.5
Total Pore Pr., ksf	3.2	3.2
Ult. Stress, ksf		
Total Pore Pr., ksf		
$\bar{\sigma}_1$ Failure, ksf	10.2	15.4
$\bar{\sigma}_3$ Failure, ksf	3.0	4.9

Client: GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

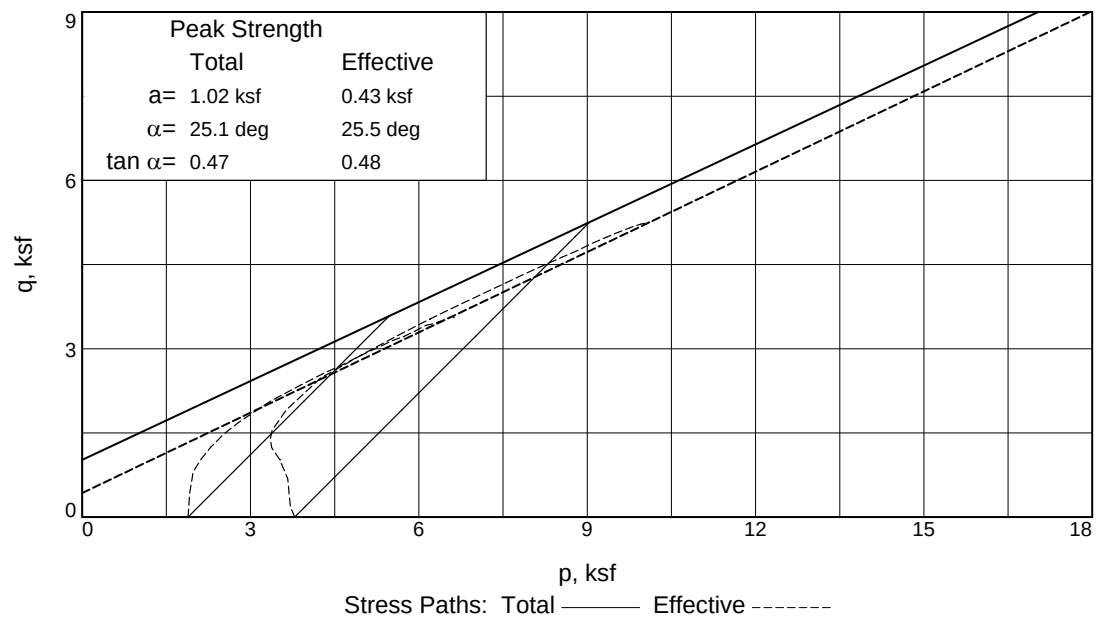
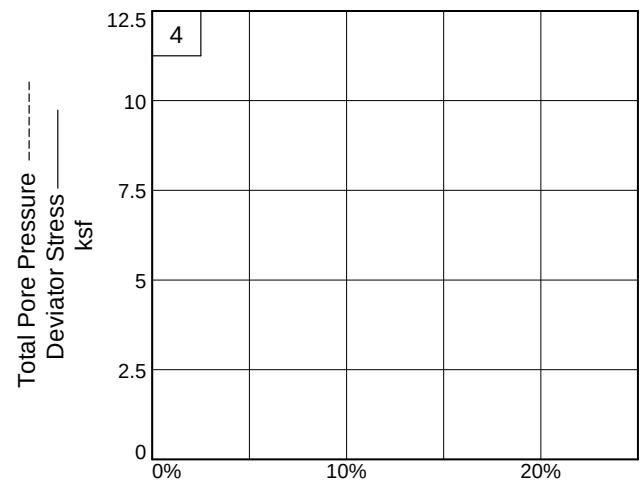
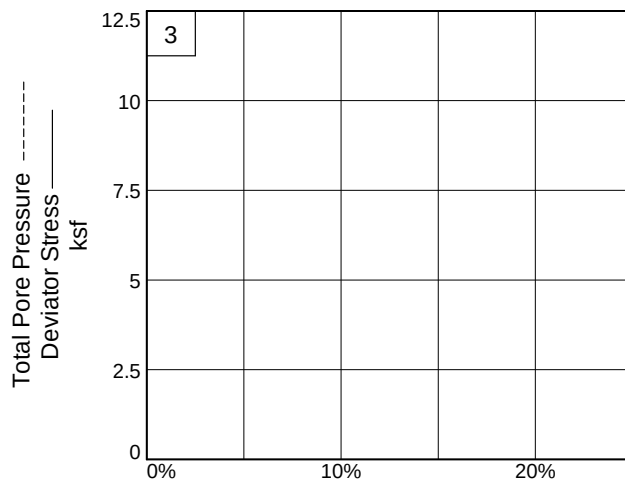
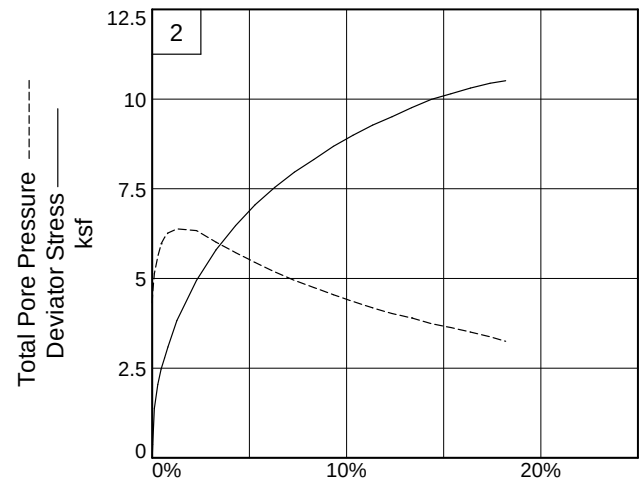
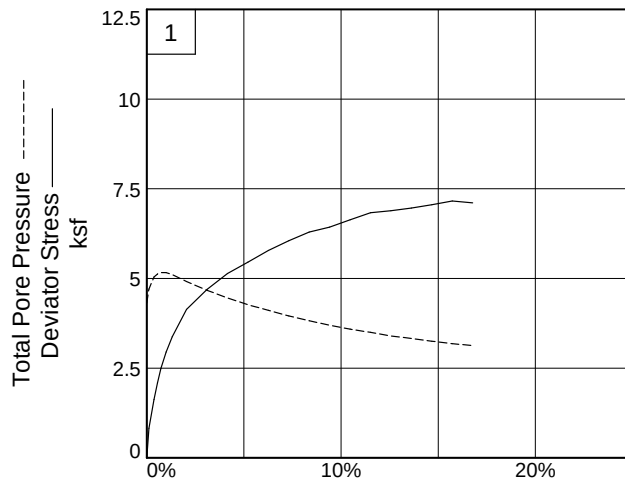
Source of Sample: GZ-8

Depth: 15'-17'

Proj. No.: 33088-087

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
BURGESS AND NIPLE, INC.
Chantilly, VA



Client: GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

Source of Sample: GZ-8 **Depth:** 15'-17'

Project No.: 33088-087

Figure _____

BURGESS AND NIPLE, INC.

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

8/24/2015
5:50 PM

Date:
Client: GeoConcepts Engineering, Inc.
Project: GZ 8 / VRE Alexandria Station
Project No.: 33088-087
Location: GZ-8
Depth: 15'-17'
Description: Yellowish brown lean CLAY with sand

Remarks:

Type of Sample: Undisturbed

Assumed Specific Gravity=2.725 **LL**=33 **PL**=22 **PI**=11

Test Method: ASTM D 4767 Method A

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	197.710			1267.460
Moisture content: Dry soil+tare, gms.	171.360			1046.520
Moisture content: Tare, gms.	36.800			8.030
Moisture, %	19.6	21.6	21.3	21.3
Moist specimen weight, gms.	1250.3			
Diameter, in.	2.86	2.86	2.86	
Area, in. ²	6.44	6.44	6.43	
Height, in.	5.81	5.81	5.79	
Net decrease in height, in.		0.00	0.02	
Net decrease in water volume, cc.			3.00	
Wet density, pcf	127.3	129.5	129.8	
Dry density, pcf	106.5	106.5	107.0	
Void ratio	0.5974	0.5974	0.5896	
Saturation, %	89.3	98.3	98.3	

Test Readings for Specimen No. 1

Consolidation cell pressure = 43.10 psi (6.21 ksf)
Consolidation back pressure = 30.00 psi (4.32 ksf)
Consolidation effective confining stress = 1.89 ksf
Strain rate, in./min. = 0.00
Fail. Stress = 7.16 ksf at reading no. 20

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	1.89	1.89	1.00	30.00	1.89	0.00
1	0.0063	36.790	36.8	0.1	0.82	1.50	2.33	1.55	32.67	1.91	0.41
2	0.0216	72.880	72.9	0.4	1.63	1.17	2.79	2.39	35.00	1.98	0.81
3	0.0319	93.700	93.7	0.6	2.09	1.08	3.17	2.93	35.58	2.13	1.04
4	0.0420	112.210	112.2	0.7	2.50	1.04	3.54	3.39	35.85	2.29	1.25
5	0.0578	133.030	133.0	1.0	2.95	1.04	3.99	3.83	35.85	2.52	1.48
6	0.0760	152.700	152.7	1.3	3.38	1.10	4.48	4.07	35.46	2.79	1.69
7	0.1186	188.560	188.6	2.0	4.14	1.29	5.43	4.21	34.14	3.36	2.07
8	0.1796	216.330	216.3	3.1	4.70	1.54	6.23	4.06	32.43	3.88	2.35
9	0.2405	239.230	239.2	4.2	5.14	1.75	6.88	3.94	30.96	4.32	2.57
10	0.3014	256.810	256.8	5.2	5.45	1.94	7.39	3.81	29.64	4.67	2.73
11	0.3623	275.320	275.3	6.3	5.78	2.09	7.88	3.76	28.56	4.98	2.89
12	0.4232	291.520	291.5	7.3	6.05	2.25	8.30	3.69	27.47	5.28	3.03
13	0.4841	306.560	306.6	8.4	6.29	2.38	8.68	3.64	26.54	5.53	3.15
14	0.5450	316.970	317.0	9.4	6.43	2.51	8.94	3.56	25.68	5.72	3.22
15	0.6059	330.850	330.9	10.5	6.64	2.62	9.26	3.53	24.91	5.94	3.32
16	0.6668	344.730	344.7	11.5	6.83	2.71	9.54	3.52	24.29	6.13	3.42
17	0.7277	351.670	351.7	12.6	6.89	2.81	9.70	3.45	23.59	6.25	3.44
18	0.7886	359.770	359.8	13.6	6.96	2.88	9.84	3.42	23.12	6.36	3.48
19	0.8495	369.030	369.0	14.7	7.05	2.95	10.01	3.39	22.58	6.48	3.53
20	0.9104	379.210	379.2	15.7	7.16	3.02	10.18	3.37	22.11	6.60	3.58
21	0.9713	381.170	381.2	16.8	7.11	3.08	10.18	3.31	21.73	6.63	3.55

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	189.120			1275.210
Moisture content: Dry soil+tare, gms.	163.870			1060.950
Moisture content: Tare, gms.	34.110			8.340
Moisture, %	19.5	20.7	20.4	20.4
Moist specimen weight, gms.	1260.4			
Diameter, in.	2.87	2.87	2.86	
Area, in. ²	6.45	6.45	6.42	
Height, in.	5.80	5.80	5.79	
Net decrease in height, in.		0.00	0.01	
Net decrease in water volume, cc.			3.80	
Wet density, pcf	128.3	129.7	130.1	
Dry density, pcf	107.4	107.4	108.1	
Void ratio	0.5835	0.5835	0.5737	
Saturation, %	90.9	96.7	96.7	

Test Readings for Specimen No. 2

Consolidation cell pressure = 56.30 psi (8.11 ksf)

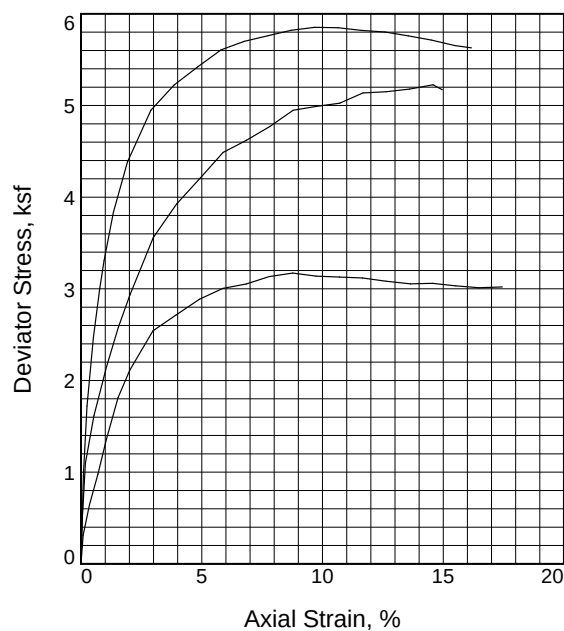
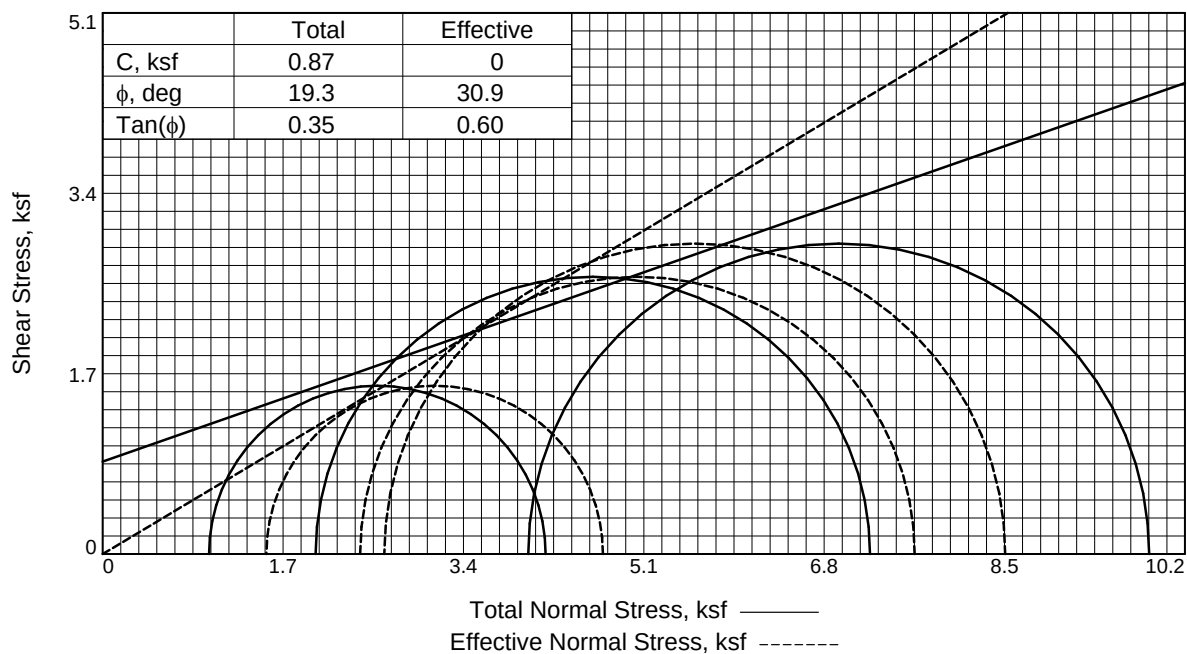
Consolidation back pressure = 30.00 psi (4.32 ksf)

Consolidation effective confining stress = 3.79 ksf

Strain rate, in./min. = 0.00

Fail. Stress = 10.51 ksf at reading no. 24

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	3.79	3.79	1.00	30.00	3.79	0.00
1	0.0013	16.770	16.8	0.0	0.38	3.52	3.90	1.11	31.84	3.71	0.19
2	0.0063	61.310	61.3	0.1	1.37	2.98	4.35	1.46	35.64	3.66	0.69
3	0.0165	91.390	91.4	0.3	2.04	2.50	4.54	1.82	38.95	3.52	1.02
4	0.0266	110.820	110.8	0.5	2.47	2.14	4.61	2.16	41.44	3.38	1.24
5	0.0368	124.940	124.9	0.6	2.79	1.96	4.75	2.42	42.68	3.35	1.39
6	0.0469	138.820	138.8	0.8	3.09	1.84	4.93	2.68	43.53	3.38	1.54
7	0.0733	172.710	172.7	1.3	3.83	1.73	5.55	3.22	44.31	3.64	1.91
8	0.1317	225.580	225.6	2.3	4.95	1.77	6.72	3.79	44.00	4.24	2.47
9	0.1901	267.230	267.2	3.3	5.80	2.10	7.89	3.77	41.75	4.99	2.90
10	0.2484	301.350	301.4	4.3	6.47	2.39	8.86	3.71	39.73	5.62	3.24
11	0.3068	332.010	332.0	5.3	7.05	2.66	9.72	3.65	37.81	6.19	3.53
12	0.3651	358.620	358.6	6.3	7.54	2.92	10.46	3.58	36.00	6.69	3.77
13	0.4235	382.910	382.9	7.3	7.96	3.16	11.12	3.52	34.37	7.14	3.98
14	0.4819	404.310	404.3	8.3	8.32	3.36	11.67	3.48	32.98	7.52	4.16
15	0.5402	426.870	426.9	9.3	8.68	3.56	12.24	3.44	31.58	7.90	4.34
16	0.5986	446.880	446.9	10.3	8.99	3.75	12.74	3.40	30.26	8.24	4.50
17	0.6569	466.200	466.2	11.3	9.27	3.93	13.20	3.36	29.04	8.56	4.64
18	0.7153	483.550	483.6	12.3	9.51	4.09	13.59	3.33	27.93	8.84	4.75
19	0.7737	502.060	502.1	13.4	9.76	4.21	13.97	3.32	27.08	9.09	4.88
20	0.8320	519.990	520.0	14.4	9.99	4.36	14.36	3.29	25.99	9.36	5.00
21	0.8904	534.450	534.5	15.4	10.15	4.48	14.62	3.27	25.22	9.55	5.07
22	0.9489	549.490	549.5	16.4	10.31	4.60	14.91	3.24	24.36	9.75	5.15
23	1.0073	563.370	563.4	17.4	10.44	4.73	15.18	3.21	23.43	9.95	5.22
24	1.0540	572.630	572.6	18.2	10.51	4.86	15.37	3.16	22.56	10.11	5.26



Sample No.		1	2	3
Initial	Water Content, %	23.4	23.6	23.8
	Dry Density, pcf	102.9	101.7	101.9
	Saturation, %	96.9	95.4	96.2
	Void Ratio	0.6588	0.6771	0.6747
	Diameter, in.	2.87	2.87	2.87
	Height, in.	5.80	5.80	5.82
At Test	Water Content, %	23.8	23.5	22.6
	Dry Density, pcf	103.5	103.8	104.2
	Saturation, %	100.2	99.8	96.8
	Void Ratio	0.6480	0.6443	0.6366
	Diameter, in.	2.86	2.85	2.85
	Height, in.	5.79	5.79	5.76
Strain rate, in./min.		0.00	0.00	0.00
Back Pressure, psi		30.00	30.00	30.00
Cell Pressure, psi		36.96	43.93	57.85
Fail. Stress, ksf		3.17	5.23	5.85
Total Pore Pr., ksf		3.78	3.90	5.68
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		4.71	7.65	8.51
$\bar{\sigma}_3$ Failure, ksf		1.54	2.43	2.65

Type of Test:

CU with Pore Pressures

Sample Type: Undisturbed

Description: Light olive brown lean CLAY

LL= 34 **PL=** 21 **PI=** 13

Assumed Specific Gravity= 2.733

Remarks:

Figure _____

Client: GeoConcepts Engineering, Inc.

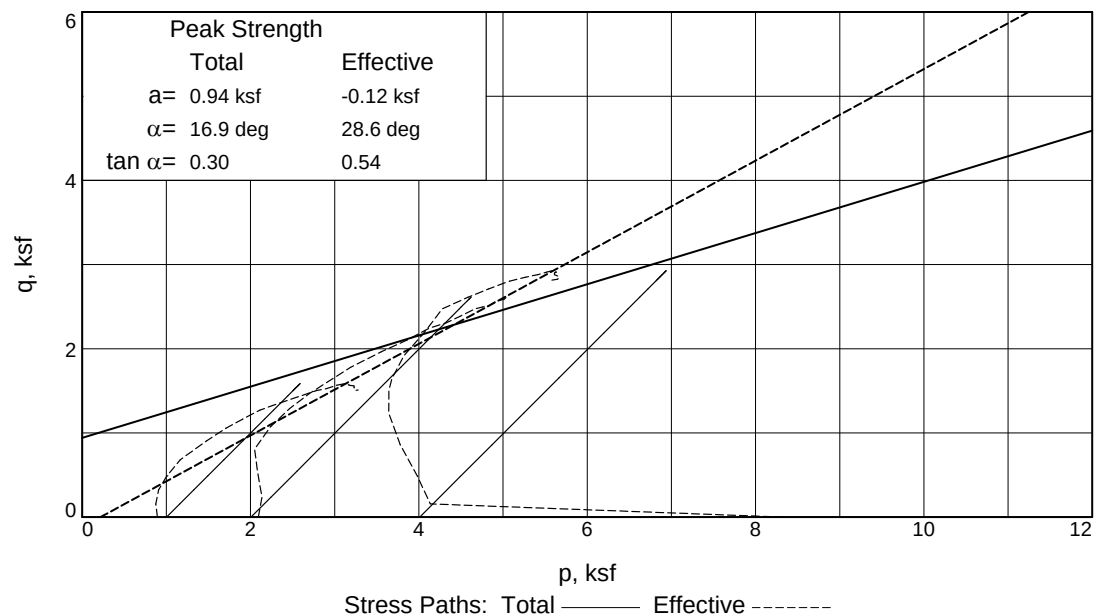
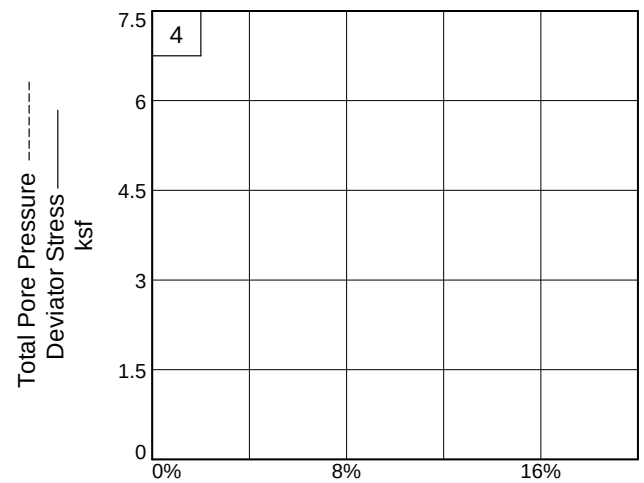
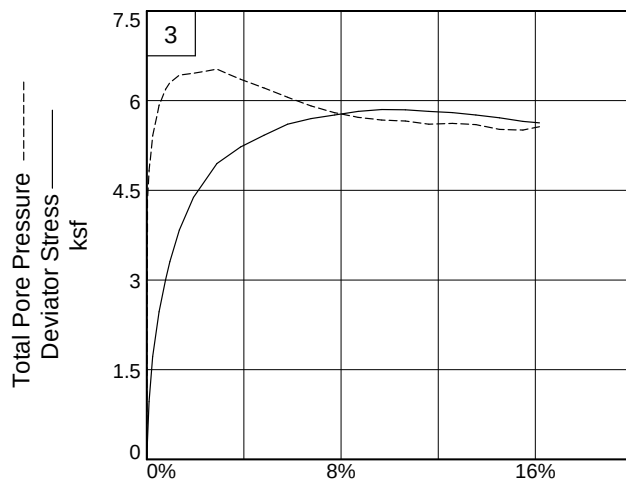
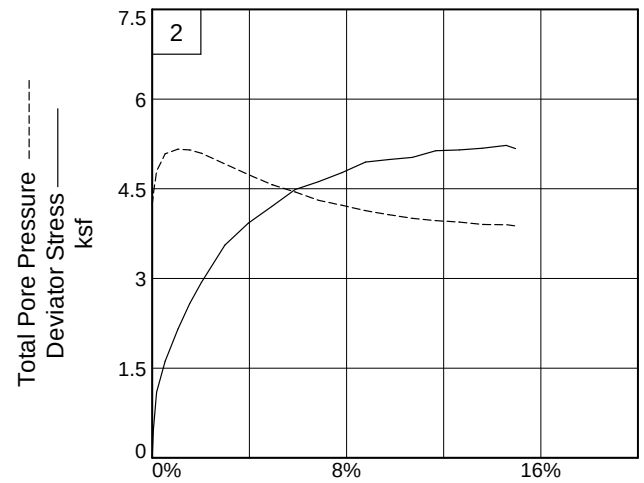
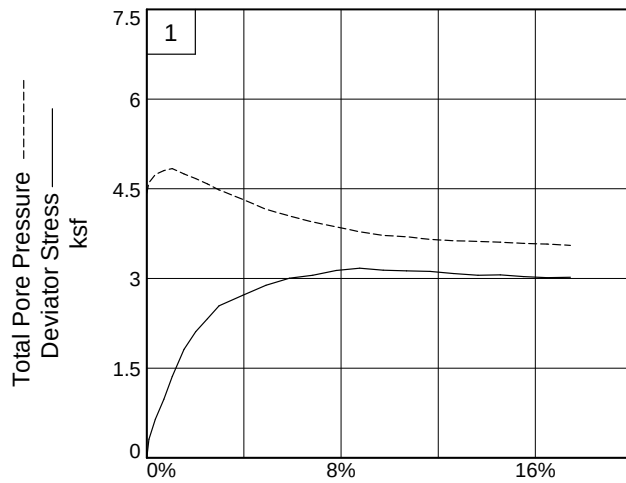
Project: GZ 8 / VRE Alexandria Station

Source of Sample: GZ-8 **Depth:** 17'-19'

Proj. No.: 33088-087

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
BURGESS AND NIPLE, INC.
Chantilly, VA



Client: GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

Source of Sample: GZ-8 **Depth:** 17'-19'

Project No.: 33088-087

Figure _____

BURGESS AND NIPLE, INC.

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

8/24/2015
5:47 PM

Date:
Client: GeoConcepts Engineering, Inc.
Project: GZ 8 / VRE Alexandria Station
Project No.: 33088-087
Location: GZ-8
Depth: 17'-19'
Description: Light olive brown lean CLAY

Remarks:

Type of Sample: Undisturbed

Assumed Specific Gravity=2.733 **LL**=34 **PL**=21 **PI**=13

Test Method: ASTM D 4767 Method A

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	211.480			1463.220
Moisture content: Dry soil+tare, gms.	178.370			1222.280
Moisture content: Tare, gms.	36.580			208.280
Moisture, %	23.4	24.2	23.8	23.8
Moist specimen weight, gms.	1246.1			
Diameter, in.	2.87	2.87	2.86	
Area, in. ²	6.45	6.45	6.42	
Height, in.	5.80	5.80	5.79	
Net decrease in height, in.		0.00	0.01	
Net decrease in water volume, cc.			4.00	
Wet density, pcf	126.9	127.7	128.1	
Dry density, pcf	102.9	102.9	103.5	
Void ratio	0.6588	0.6588	0.6480	
Saturation, %	96.9	100.2	100.2	

Test Readings for Specimen No. 1

Consolidation cell pressure = 36.96 psi (5.32 ksf)
Consolidation back pressure = 30.00 psi (4.32 ksf)
Consolidation effective confining stress = 1.00 ksf
Strain rate, in./min. = 0.00
Fail. Stress = 3.17 ksf at reading no. 14

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	0.89	0.89	1.00	30.75	0.89	0.00
1	0.0051	13.880	13.9	0.1	0.31	0.72	1.03	1.43	31.97	0.87	0.16
2	0.0203	28.920	28.9	0.4	0.65	0.58	1.23	2.11	32.90	0.91	0.32
3	0.0406	43.960	44.0	0.7	0.98	0.52	1.50	2.89	33.37	1.01	0.49
4	0.0609	61.310	61.3	1.1	1.36	0.48	1.84	3.81	33.60	1.16	0.68
5	0.0888	82.130	82.1	1.5	1.81	0.57	2.39	4.17	32.98	1.48	0.91
6	0.1167	96.020	96.0	2.0	2.11	0.65	2.76	4.24	32.43	1.71	1.06
7	0.1446	106.430	106.4	2.5	2.33	0.74	3.07	4.14	31.81	1.91	1.16
8	0.1725	116.840	116.8	3.0	2.54	0.84	3.38	4.02	31.12	2.11	1.27
9	0.2284	126.090	126.1	3.9	2.72	1.00	3.71	3.72	30.03	2.36	1.36
10	0.2842	135.350	135.3	4.9	2.89	1.16	4.05	3.48	28.87	2.61	1.44
11	0.3401	142.290	142.3	5.9	3.00	1.28	4.28	3.35	28.09	2.78	1.50
12	0.3959	146.110	146.1	6.8	3.05	1.38	4.43	3.22	27.39	2.90	1.53
13	0.4518	151.540	151.5	7.8	3.13	1.46	4.59	3.15	26.83	3.03	1.57
14	0.5077	155.010	155.0	8.8	3.17	1.54	4.71	3.06	26.25	3.13	1.59
15	0.5636	155.010	155.0	9.7	3.14	1.60	4.74	2.96	25.84	3.17	1.57
16	0.6194	156.170	156.2	10.7	3.13	1.62	4.75	2.93	25.68	3.19	1.56
17	0.6752	157.330	157.3	11.7	3.12	1.67	4.79	2.87	25.37	3.23	1.56
18	0.7310	157.330	157.3	12.6	3.08	1.69	4.77	2.82	25.22	3.23	1.54
19	0.7898	157.680	157.7	13.6	3.05	1.70	4.76	2.79	25.14	3.23	1.53
20	0.8427	159.640	159.6	14.6	3.06	1.72	4.77	2.78	25.05	3.24	1.53
21	0.8985	159.990	160.0	15.5	3.03	1.74	4.77	2.75	24.91	3.25	1.52
22	0.9543	160.800	160.8	16.5	3.01	1.75	4.76	2.72	24.83	3.25	1.51
23	1.0101	163.110	163.1	17.4	3.02	1.77	4.79	2.71	24.68	3.28	1.51

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	241.250			905.360
Moisture content: Dry soil+tare, gms.	201.520			743.040
Moisture content: Tare, gms.	33.440			53.020
Moisture, %	23.6	24.7	23.5	23.5
Moist specimen weight, gms.	1238.7			
Diameter, in.	2.87	2.87	2.85	
Area, in. ²	6.46	6.46	6.36	
Height, in.	5.80	5.80	5.79	
Net decrease in height, in.		0.00	0.02	
Net decrease in water volume, cc.			12.00	
Wet density, pcf	125.8	126.9	128.2	
Dry density, pcf	101.7	101.7	103.8	
Void ratio	0.6771	0.6771	0.6443	
Saturation, %	95.4	99.8	99.8	

Test Readings for Specimen No. 2

Consolidation cell pressure = 43.93 psi (6.33 ksf)

Consolidation back pressure = 30.00 psi (4.32 ksf)

Consolidation effective confining stress = 2.01 ksf

Strain rate, in./min. = 0.00

Fail. Stress = 5.23 ksf at reading no. 19

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	2.09	2.09	1.00	29.40	2.09	0.00
1	0.0028	20.820	20.8	0.0	0.47	1.90	2.37	1.25	30.73	2.14	0.24
2	0.0104	48.590	48.6	0.2	1.10	1.53	2.63	1.72	33.29	2.08	0.55
3	0.0307	71.720	71.7	0.5	1.62	1.24	2.86	2.30	35.31	2.05	0.81
4	0.0613	96.020	96.0	1.1	2.15	1.16	3.32	2.85	35.85	2.24	1.08
5	0.0892	115.680	115.7	1.5	2.58	1.18	3.75	3.20	35.77	2.46	1.29
6	0.1171	132.220	132.2	2.0	2.93	1.23	4.17	3.38	35.38	2.70	1.47
7	0.1729	161.960	162.0	3.0	3.56	1.41	4.97	3.52	34.14	3.19	1.78
8	0.2289	180.460	180.5	4.0	3.93	1.59	5.51	3.47	32.90	3.55	1.96
9	0.2847	195.270	195.3	4.9	4.21	1.76	5.96	3.40	31.74	3.86	2.10
10	0.3405	210.540	210.5	5.9	4.49	1.88	6.37	3.39	30.88	4.12	2.24
11	0.3963	218.990	219.0	6.9	4.62	2.02	6.64	3.29	29.91	4.33	2.31
12	0.4522	228.470	228.5	7.8	4.77	2.10	6.87	3.27	29.33	4.49	2.39
13	0.5080	239.460	239.5	8.8	4.95	2.19	7.14	3.26	28.71	4.67	2.47
14	0.5638	244.090	244.1	9.7	4.99	2.26	7.25	3.21	28.24	4.75	2.49
15	0.6196	248.490	248.5	10.7	5.03	2.32	7.35	3.17	27.82	4.83	2.51
16	0.6755	256.810	256.8	11.7	5.14	2.36	7.50	3.18	27.55	4.93	2.57
17	0.7314	260.290	260.3	12.6	5.15	2.38	7.53	3.16	27.39	4.96	2.58
18	0.7873	264.680	264.7	13.6	5.18	2.42	7.60	3.14	27.10	5.01	2.59
19	0.8431	270.120	270.1	14.6	5.23	2.43	7.65	3.15	27.08	5.04	2.61
20	0.8654	268.540	268.5	15.0	5.17	2.45	7.62	3.11	26.93	5.03	2.59

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	162.910			1241.030
Moisture content: Dry soil+tare, gms.	138.570			1014.110
Moisture content: Tare, gms.	36.090			8.170
Moisture, %	23.8	24.0	22.6	22.6
Moist specimen weight, gms.	1243.9			
Diameter, in.	2.87	2.87	2.85	
Area, in. ²	6.46	6.46	6.38	
Height, in.	5.82	5.82	5.76	
Net decrease in height, in.		0.00	0.06	
Net decrease in water volume, cc.			14.00	
Wet density, pcf	126.1	126.3	127.8	
Dry density, pcf	101.9	101.9	104.2	
Void ratio	0.6747	0.6747	0.6366	
Saturation, %	96.2	97.0	96.8	

Test Readings for Specimen No. 3

Consolidation cell pressure = 57.85 psi (8.33 ksf)

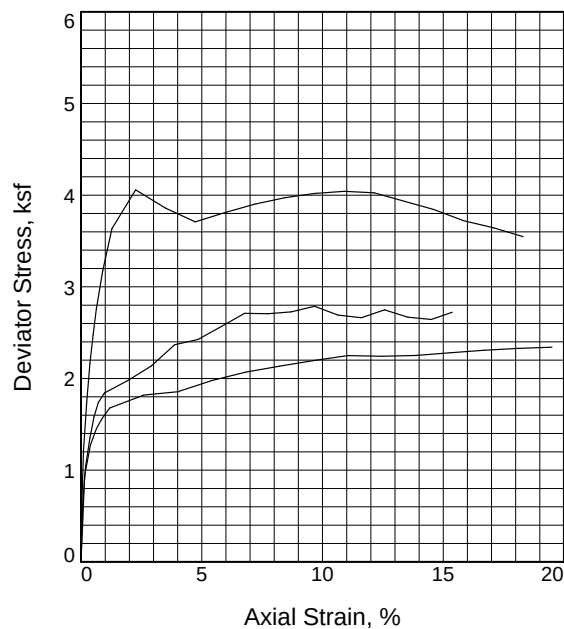
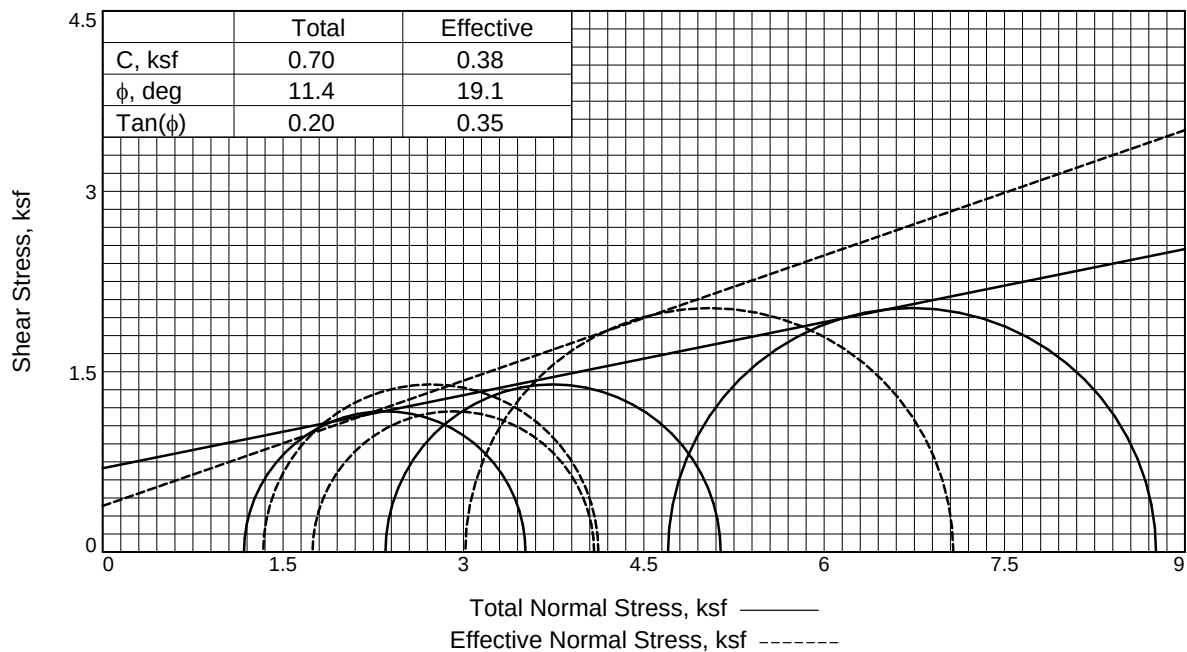
Consolidation back pressure = 30.00 psi (4.32 ksf)

Consolidation effective confining stress = 4.01 ksf

Strain rate, in./min. = 0.00

Fail. Stress = 5.85 ksf at reading no. 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	8.33	8.33	1.00	0.00	8.33	0.00
1	0.0017	13.880	13.9	0.0	0.31	3.98	4.29	1.08	30.21	4.14	0.16
2	0.0055	42.800	42.8	0.1	0.97	3.50	4.47	1.28	33.54	3.98	0.48
3	0.0141	76.350	76.3	0.2	1.72	2.92	4.64	1.59	37.58	3.78	0.86
4	0.0293	109.900	109.9	0.5	2.47	2.41	4.88	2.03	41.13	3.64	1.23
5	0.0447	134.190	134.2	0.8	3.01	2.14	5.15	2.41	42.99	3.64	1.50
6	0.0548	147.840	147.8	1.0	3.31	2.03	5.34	2.63	43.76	3.68	1.65
7	0.0771	172.140	172.1	1.3	3.84	1.91	5.74	3.01	44.62	3.82	1.92
8	0.1106	197.820	197.8	1.9	4.38	1.87	6.25	3.34	44.85	4.06	2.19
9	0.1665	225.580	225.6	2.9	4.95	1.80	6.75	3.74	45.32	4.28	2.47
10	0.2223	240.620	240.6	3.9	5.22	1.97	7.20	3.65	44.15	4.59	2.61
11	0.2781	252.190	252.2	4.8	5.42	2.12	7.54	3.56	43.14	4.83	2.71
12	0.3339	263.520	263.5	5.8	5.61	2.27	7.88	3.47	42.06	5.08	2.80
13	0.3897	270.700	270.7	6.8	5.70	2.42	8.12	3.36	41.05	5.27	2.85
14	0.4457	276.480	276.5	7.7	5.76	2.53	8.29	3.28	40.27	5.41	2.88
15	0.5015	282.270	282.3	8.7	5.82	2.61	8.43	3.23	39.73	5.52	2.91
16	0.5574	286.890	286.9	9.7	5.85	2.65	8.51	3.21	39.42	5.58	2.93
17	0.6132	289.780	289.8	10.6	5.85	2.67	8.52	3.19	39.30	5.60	2.92
18	0.6690	291.520	291.5	11.6	5.82	2.72	8.54	3.14	38.94	5.63	2.91
19	0.7248	293.830	293.8	12.6	5.80	2.71	8.51	3.14	39.03	5.61	2.90
20	0.7807	294.990	295.0	13.6	5.76	2.73	8.49	3.11	38.88	5.61	2.88
21	0.8365	295.920	295.9	14.5	5.71	2.81	8.52	3.03	38.33	5.67	2.86
22	0.8923	296.150	296.1	15.5	5.65	2.82	8.48	3.00	38.25	5.65	2.83
23	0.9314	297.300	297.3	16.2	5.63	2.77	8.40	3.03	38.64	5.58	2.81



Sample No.	1	2	3
Initial	Water Content, %	36.0	45.8
	Dry Density, pcf	83.7	76.0
	Saturation, %	94.3	100.2
	Void Ratio	1.0498	1.2574
	Diameter, in.	2.86	2.85
	Height, in.	5.81	5.81
At Test	Water Content, %	36.1	44.6
	Dry Density, pcf	84.4	76.8
	Saturation, %	96.1	99.4
	Void Ratio	1.0310	1.2326
	Diameter, in.	2.85	2.85
	Height, in.	5.80	5.78
Strain rate, in./min.			
Back Pressure, psi			
Cell Pressure, psi			
Fail. Stress, ksf			
Total Pore Pr., ksf			
Ult. Stress, ksf			
Total Pore Pr., ksf			
$\bar{\sigma}_1$ Failure, ksf			
$\bar{\sigma}_3$ Failure, ksf			

Type of Test:

CU with Pore Pressures

Sample Type: Undisturbed

Description: Brown fat CLAY

LL= 90

PL= 33

PI= 57

Assumed Specific Gravity= 2.747

Remarks:

Figure _____

Client: GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

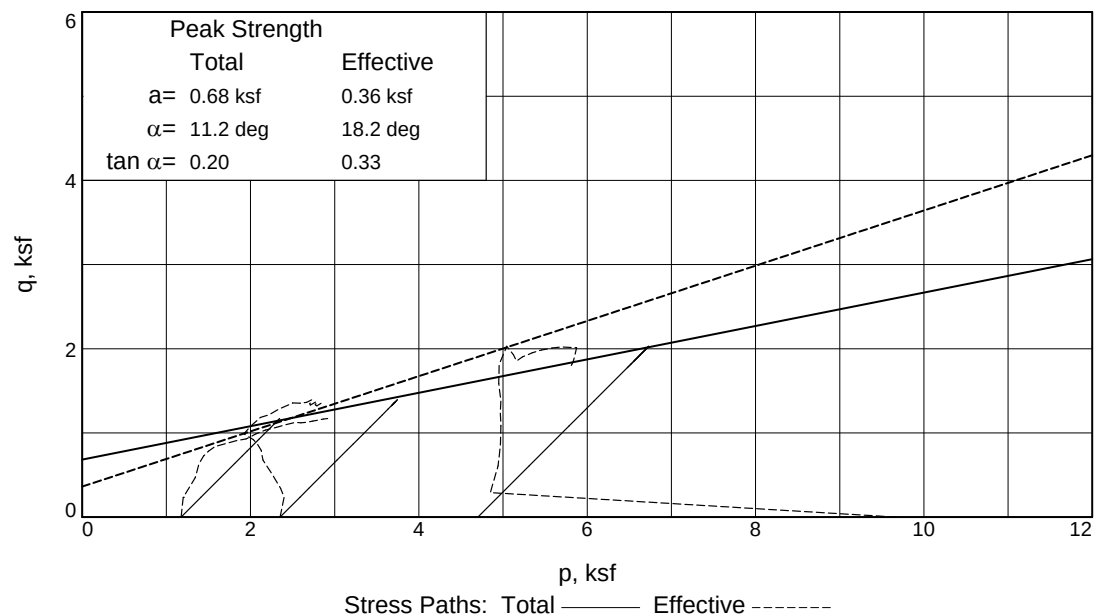
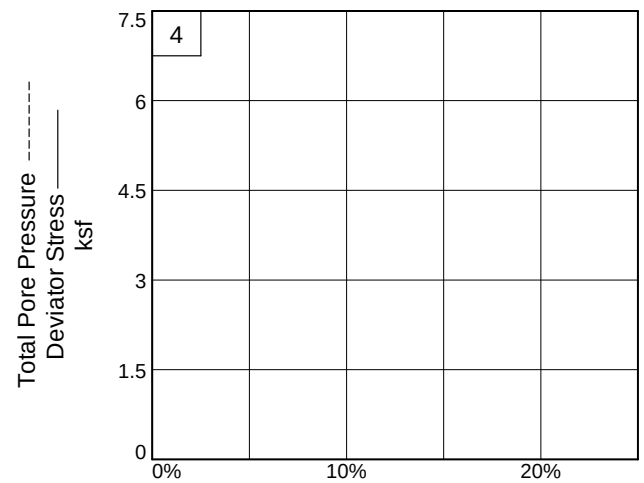
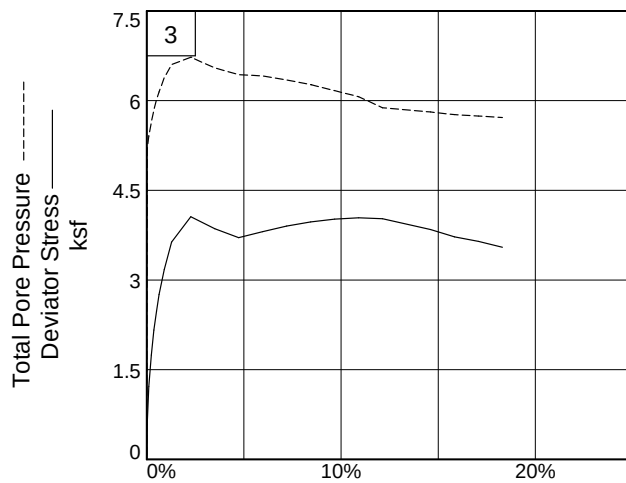
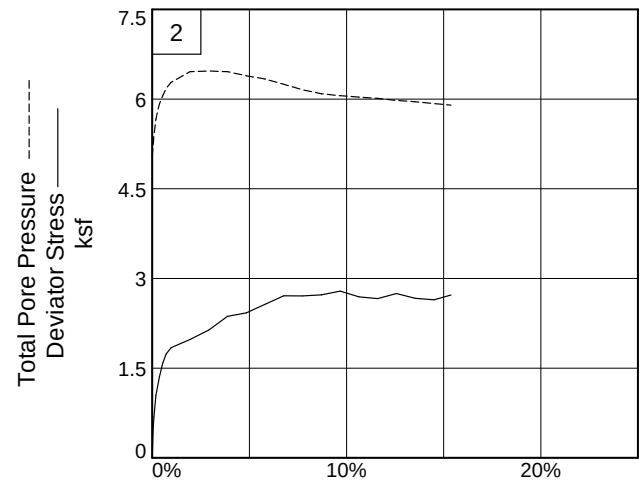
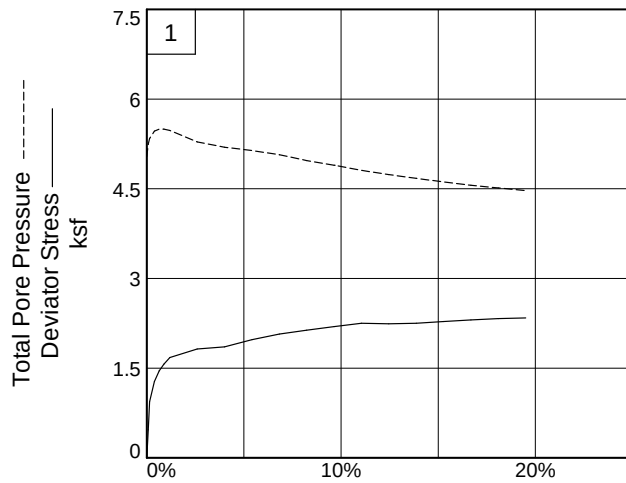
Source of Sample: GZ-8

Depth: 22'-24'

Proj. No.: 33088-087

Date Sampled:

TRIAXIAL SHEAR TEST REPORT
BURGESS AND NIPLE, INC.
Chantilly, VA



Client: GeoConcepts Engineering, Inc.

Project: GZ 8 / VRE Alexandria Station

Source of Sample: GZ-8 **Depth:** 22'-24'

Project No.: 33088-087

Figure _____

BURGESS AND NIPLE, INC.

TRIAXIAL COMPRESSION TEST
CU with Pore Pressures

8/24/2015
5:52 PM

Date:
Client: GeoConcepts Engineering, Inc.
Project: GZ 8 / VRE Alexandria Station
Project No.: 33088-087
Location: GZ-8
Depth: 22'-24'
Description: Brown fat CLAY
Remarks:
Type of Sample: Undisturbed
Assumed Specific Gravity=2.747 **LL**=90 **PL**=33 **PI**=57
Test Method: ASTM D 4767 Method A

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	159.020			1127.560
Moisture content: Dry soil+tare, gms.	125.980			830.770
Moisture content: Tare, gms.	34.280			8.210
Moisture, %	36.0	36.8	36.1	36.1
Moist specimen weight, gms.	1114.8			
Diameter, in.	2.86	2.86	2.85	
Area, in. ²	6.42	6.42	6.37	
Height, in.	5.81	5.81	5.80	
Net decrease in height, in.		0.00	0.01	
Net decrease in water volume, cc.			5.60	
Wet density, pcf	113.8	114.4	114.9	
Dry density, pcf	83.7	83.7	84.4	
Void ratio	1.0498	1.0498	1.0310	
Saturation, %	94.3	96.2	96.1	

Test Readings for Specimen No. 1

Consolidation cell pressure = 43.16 psi (6.22 ksf)
Consolidation back pressure = 35.00 psi (5.04 ksf)
Consolidation effective confining stress = 1.18 ksf
Strain rate, in./min. = 0.00
Fail. Stress = 2.34 ksf at reading no. 19

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	1.18	1.18	1.00	35.00	1.18	0.00
1	0.0045	20.800	20.8	0.1	0.47	0.97	1.44	1.49	36.45	1.20	0.23
2	0.0085	41.650	41.6	0.1	0.94	0.87	1.81	2.07	37.09	1.34	0.47
3	0.0227	56.680	56.7	0.4	1.28	0.75	2.03	2.70	37.94	1.39	0.64
4	0.0369	64.780	64.8	0.6	1.45	0.72	2.17	3.03	38.18	1.44	0.73
5	0.0512	69.990	70.0	0.9	1.57	0.72	2.28	3.19	38.18	1.50	0.78
6	0.0689	75.190	75.2	1.2	1.68	0.74	2.42	3.27	38.02	1.58	0.84
7	0.1506	82.710	82.7	2.6	1.82	0.93	2.75	2.96	36.70	1.84	0.91
8	0.2323	85.600	85.6	4.0	1.86	1.02	2.88	2.82	36.08	1.95	0.93
9	0.3141	92.550	92.5	5.4	1.98	1.08	3.05	2.84	35.69	2.06	0.99
10	0.3958	98.330	98.3	6.8	2.07	1.14	3.21	2.81	35.21	2.18	1.03
11	0.4775	102.960	103.0	8.2	2.13	1.24	3.38	2.72	34.53	2.31	1.07
12	0.5592	107.580	107.6	9.6	2.20	1.32	3.52	2.66	33.99	2.42	1.10
13	0.6409	111.980	112.0	11.0	2.25	1.41	3.66	2.60	33.39	2.53	1.13
14	0.7227	113.370	113.4	12.5	2.24	1.48	3.72	2.52	32.90	2.60	1.12
15	0.8044	115.680	115.7	13.9	2.25	1.54	3.79	2.46	32.46	2.67	1.13
16	0.8861	119.150	119.2	15.3	2.28	1.60	3.88	2.43	32.05	2.74	1.14
17	0.9678	122.620	122.6	16.7	2.31	1.66	3.96	2.39	31.66	2.81	1.15
18	1.0495	125.860	125.9	18.1	2.33	1.70	4.03	2.37	31.35	2.86	1.16
19	1.1312	128.750	128.8	19.5	2.34	1.75	4.09	2.34	31.04	2.92	1.17

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	171.480			701.900
Moisture content: Dry soil+tare, gms.	129.140			499.380
Moisture content: Tare, gms.	36.790			45.100
Moisture, %	45.8	45.5	44.6	44.6
Moist specimen weight, gms.	1080.0			
Diameter, in.	2.85	2.85	2.85	
Area, in. ²	6.39	6.39	6.36	
Height, in.	5.81	5.81	5.78	
Net decrease in height, in.		0.00	0.04	
Net decrease in water volume, cc.			6.70	
Wet density, pcf	110.8	110.5	111.1	
Dry density, pcf	76.0	76.0	76.8	
Void ratio	1.2574	1.2574	1.2326	
Saturation, %	100.2	99.4	99.4	

Test Readings for Specimen No. 2

Consolidation cell pressure = 51.33 psi (7.39 ksf)

Consolidation back pressure = 35.00 psi (5.04 ksf)

Consolidation effective confining stress = 2.35 ksf

Strain rate, in./min. = 0.00

Fail. Stress = 2.79 ksf at reading no. 16

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	2.35	2.35	1.00	35.00	2.35	0.00
1	0.0028	20.820	20.8	0.0	0.47	2.16	2.63	1.22	36.31	2.40	0.24
2	0.0048	30.080	30.1	0.1	0.68	2.02	2.70	1.34	37.32	2.36	0.34
3	0.0109	46.270	46.3	0.2	1.05	1.73	2.77	1.61	39.34	2.25	0.52
4	0.0211	59.920	59.9	0.4	1.35	1.47	2.82	1.92	41.11	2.15	0.68
5	0.0312	70.330	70.3	0.5	1.58	1.33	2.92	2.19	42.06	2.13	0.79
6	0.0414	77.280	77.3	0.7	1.74	1.21	2.95	2.43	42.91	2.08	0.87
7	0.0561	82.130	82.1	1.0	1.84	1.11	2.95	2.66	43.61	2.03	0.92
8	0.1119	89.080	89.1	1.9	1.98	0.93	2.91	3.12	44.85	1.92	0.99
9	0.1679	97.170	97.2	2.9	2.14	0.92	3.06	3.32	44.93	1.99	1.07
10	0.2237	108.740	108.7	3.9	2.37	0.93	3.30	3.54	44.85	2.12	1.18
11	0.2795	112.560	112.6	4.8	2.43	1.00	3.43	3.42	44.38	2.21	1.21
12	0.3353	120.310	120.3	5.8	2.57	1.06	3.62	3.43	44.00	2.34	1.28
13	0.3912	128.410	128.4	6.8	2.71	1.14	3.86	3.37	43.38	2.50	1.36
14	0.4470	129.560	129.6	7.7	2.71	1.24	3.94	3.19	42.75	2.59	1.35
15	0.5028	131.880	131.9	8.7	2.73	1.30	4.03	3.09	42.29	2.67	1.36
16	0.5586	136.270	136.3	9.7	2.79	1.33	4.12	3.09	42.06	2.73	1.39
17	0.6145	133.030	133.0	10.6	2.69	1.36	4.05	2.98	41.90	2.70	1.35
18	0.6703	133.030	133.0	11.6	2.66	1.38	4.04	2.93	41.75	2.71	1.33
19	0.7261	138.820	138.8	12.6	2.75	1.41	4.16	2.94	41.51	2.79	1.37
20	0.7819	136.270	136.3	13.5	2.67	1.44	4.10	2.86	41.36	2.77	1.33
21	0.8377	136.510	136.5	14.5	2.64	1.47	4.11	2.80	41.15	2.79	1.32
22	0.8880	142.060	142.1	15.4	2.72	1.49	4.21	2.83	40.97	2.85	1.36

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	195.810			1138.530
Moisture content: Dry soil+tare, gms.	154.360			857.310
Moisture content: Tare, gms.	33.910			8.620
Moisture, %	34.4	35.0	33.1	33.1
Moist specimen weight, gms.	1129.3			
Diameter, in.	2.85	2.85	2.83	
Area, in. ²	6.40	6.40	6.29	
Height, in.	5.80	5.80	5.76	
Net decrease in height, in.		0.00	0.05	
Net decrease in water volume, cc.			15.30	
Wet density, pcf	115.8	116.3	117.7	
Dry density, pcf	86.2	86.2	88.4	
Void ratio	0.9904	0.9904	0.9403	
Saturation, %	95.5	97.0	96.8	

Test Readings for Specimen No. 3

Consolidation cell pressure = 67.65 psi (9.74 ksf)

Consolidation back pressure = 35.00 psi (5.04 ksf)

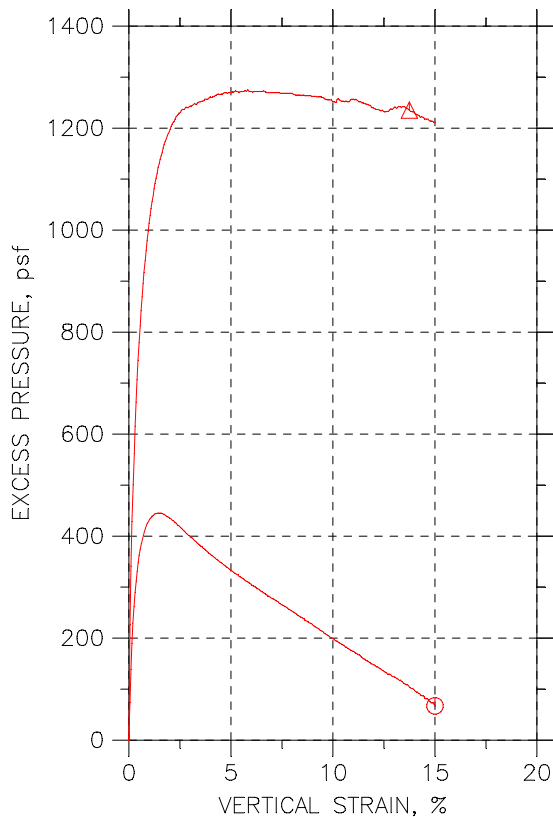
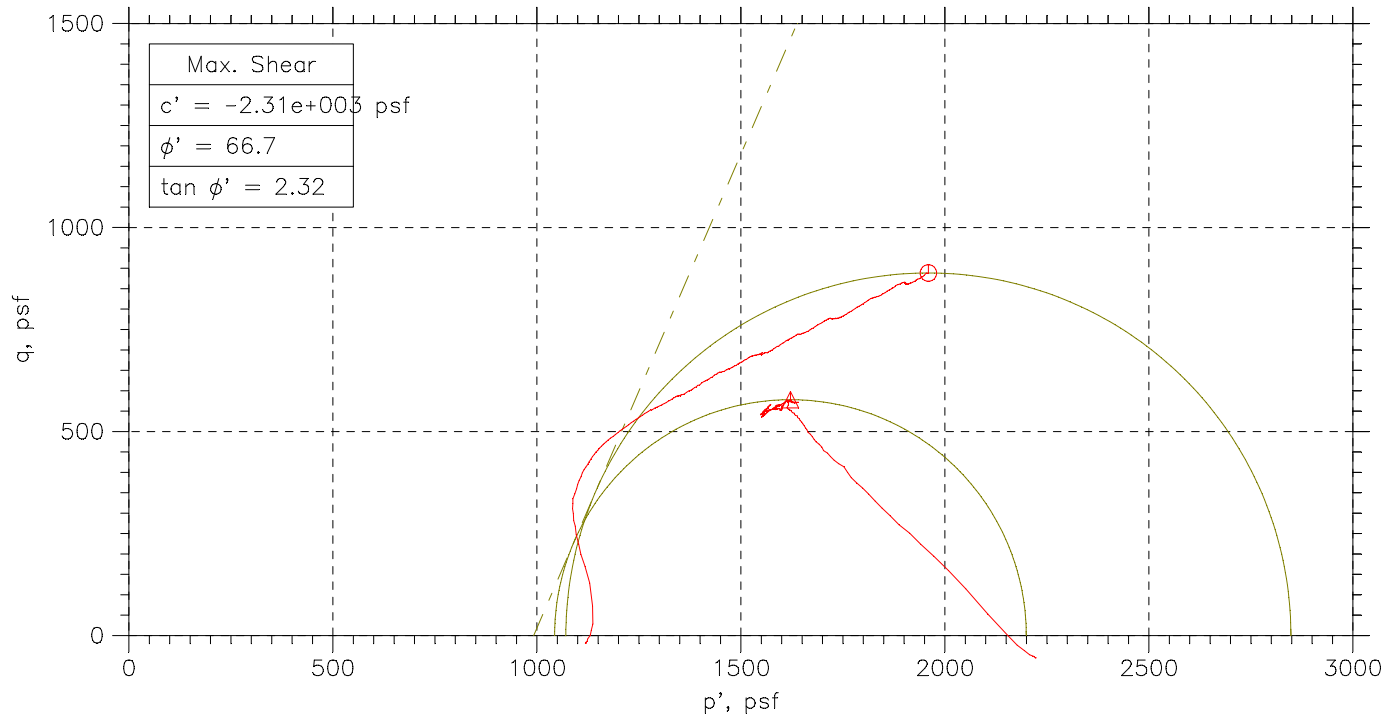
Consolidation effective confining stress = 4.70 ksf

Strain rate, in./min. = 0.00

Fail. Stress = 4.06 ksf at reading no. 9

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.000	0.0	0.0	0.00	9.67	9.67	1.00	0.50	9.67	0.00
1	0.0014	25.450	25.4	0.0	0.58	4.56	5.14	1.13	36.00	4.85	0.29
2	0.0060	53.210	53.2	0.1	1.22	4.33	5.55	1.28	37.56	4.94	0.61
3	0.0136	76.350	76.3	0.2	1.74	4.10	5.84	1.43	39.19	4.97	0.87
4	0.0212	94.860	94.9	0.4	2.16	3.89	6.06	1.56	40.62	4.97	1.08
5	0.0288	108.740	108.7	0.5	2.48	3.73	6.21	1.66	41.75	4.97	1.24
6	0.0364	121.240	121.2	0.6	2.76	3.60	6.35	1.77	42.68	4.97	1.38
7	0.0517	139.980	140.0	0.9	3.18	3.36	6.54	1.94	44.31	4.95	1.59
8	0.0735	160.800	160.8	1.3	3.63	3.14	6.77	2.16	45.86	4.95	1.82
9	0.1303	181.390	181.4	2.3	4.06	3.02	7.07	2.35	46.71	5.04	2.03
10	0.2014	174.680	174.7	3.5	3.86	3.19	7.05	2.21	45.47	5.12	1.93
11	0.2724	170.050	170.1	4.7	3.71	3.31	7.01	2.12	44.69	5.16	1.85
12	0.3435	176.990	177.0	6.0	3.81	3.33	7.14	2.14	44.54	5.23	1.90
13	0.4145	183.700	183.7	7.2	3.90	3.40	7.30	2.15	44.07	5.35	1.95
14	0.4856	189.490	189.5	8.4	3.97	3.47	7.45	2.14	43.53	5.46	1.99
15	0.5566	194.350	194.3	9.7	4.02	3.57	7.59	2.12	42.83	5.58	2.01
16	0.6277	198.160	198.2	10.9	4.04	3.67	7.72	2.10	42.13	5.70	2.02
17	0.6987	200.130	200.1	12.1	4.03	3.86	7.89	2.04	40.84	5.87	2.01
18	0.8408	196.660	196.7	14.6	3.84	3.93	7.78	1.98	40.35	5.85	1.92
19	0.9118	193.190	193.2	15.8	3.72	3.98	7.70	1.94	40.04	5.84	1.86
20	0.9829	192.030	192.0	17.1	3.65	4.00	7.64	1.91	39.88	5.82	1.82
21	1.0539	189.720	189.7	18.3	3.55	4.02	7.57	1.88	39.71	5.80	1.77

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



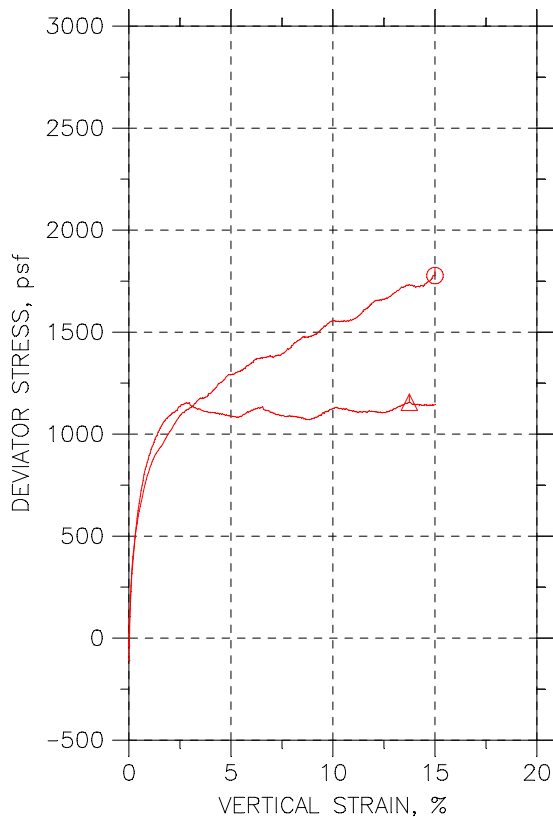
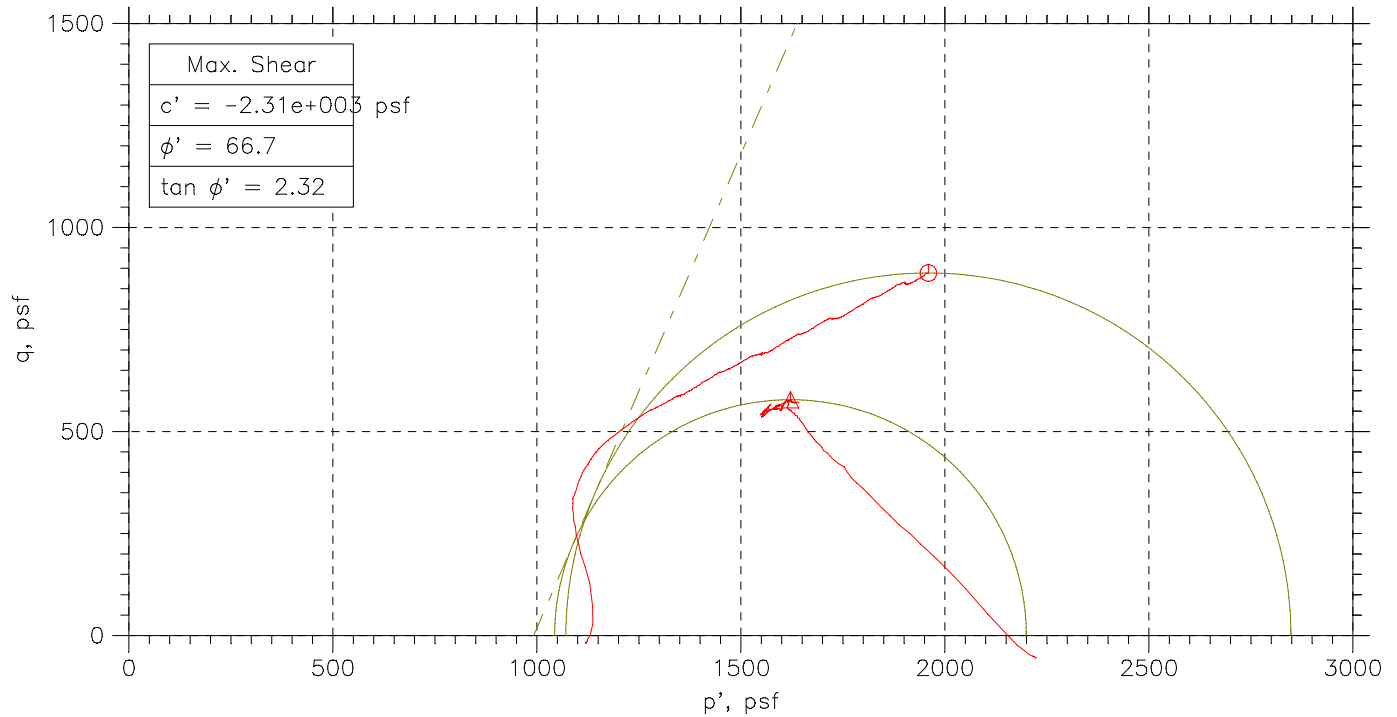
Symbol	⊖	Δ		
Sample No.	T-2	T-2		
Test No.	1	2		
Depth	9'0"-9'6" 8.5' - 9.0'			
Initial	Diameter, in	2.86	2.86	
	Height, in	5.608	5.63	
	Water Content, %	20.5	28.8	
	Dry Density, pcf	100.	90.87	
	Saturation, %	81.2	91.4	
Before Shear	Void Ratio	0.679	0.848	
	Water Content, %	31.1	30.5	
	Dry Density, pcf	91.49	92.21	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.836	0.821	
	Back Press., psf	9217	7777	
	Ver. Eff. Cons. Stress, psf	1138	2279	
	Shear Strength, psf	888.5	578.	
	Strain at Failure, %	15	13.7	
	Strain Rate, %/min	0.01	0.01	
	B-Value	0.95	0.96	
	Measured Specific Gravity	2.69	2.69	
	Liquid Limit	23	23	
	Plastic Limit	19	19	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-9				
	Sample Type: Undisturbed				
	Description: Brown Sandy Silty CLAY (CL-ML)				
	Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



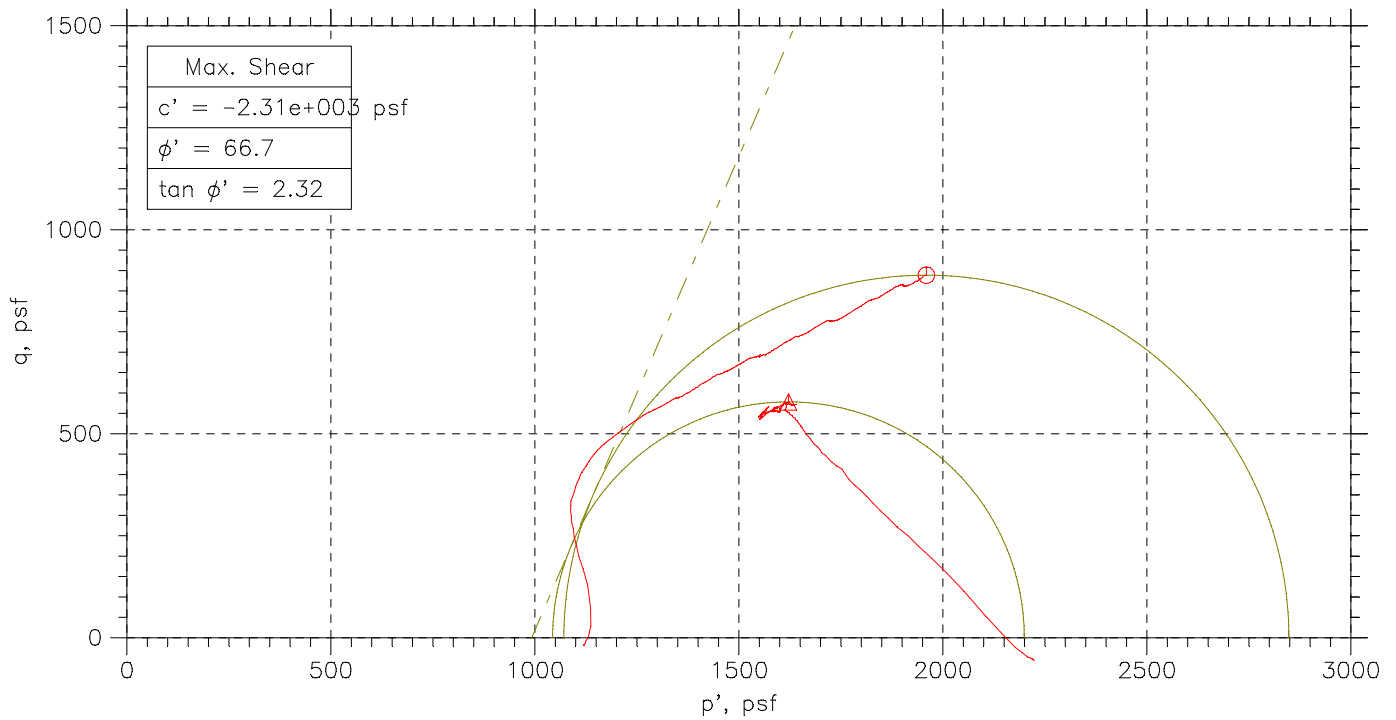
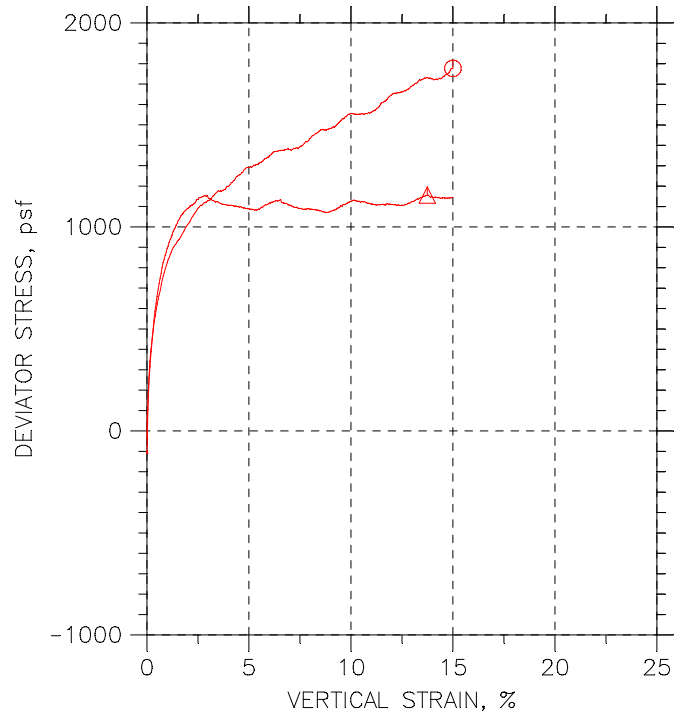
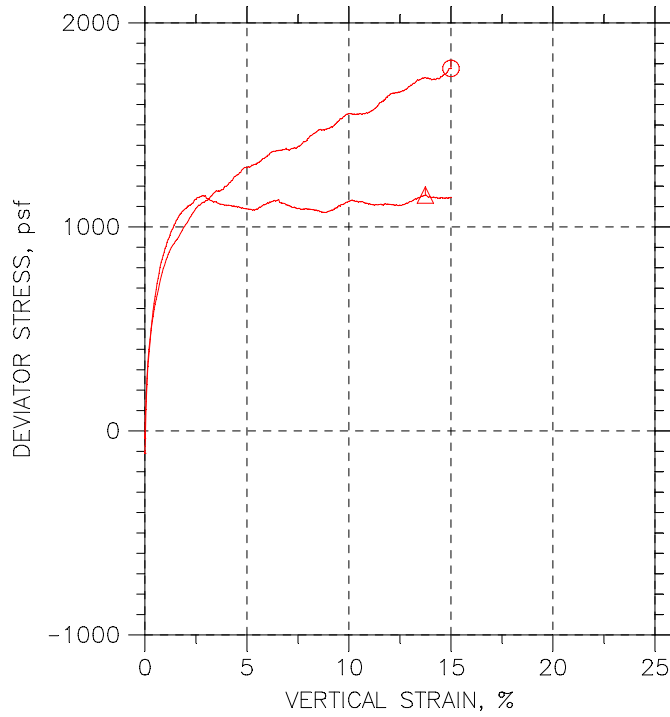
Symbol	⊙	Δ		
Sample No.	T-2	T-2		
Test No.	1	2		
Depth	9'0"-9'6" 8.5' - 9.0'			
Initial	Diameter, in	2.86	2.86	
	Height, in	5.608	5.63	
	Water Content, %	20.5	28.8	
	Dry Density, pcf	100.	90.87	
	Saturation, %	81.2	91.4	
Before Shear	Void Ratio	0.679	0.848	
	Water Content, %	31.1	30.5	
	Dry Density, pcf	91.49	92.21	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.836	0.821	
	Back Press., psf	9217	7777	
	Ver. Eff. Cons. Stress, psf	1138	2279	
	Shear Strength, psf	888.5	578.	
	Strain at Failure, %	15	13.7	
	Strain Rate, %/min	0.01	0.01	
	B-Value	0.95	0.96	
	Measured Specific Gravity	2.69	2.69	
	Liquid Limit	23	23	
	Plastic Limit	19	19	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-9				
	Sample Type: Undisturbed				
	Description: Brown Sandy Silty CLAY (CL-ML)				
	Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

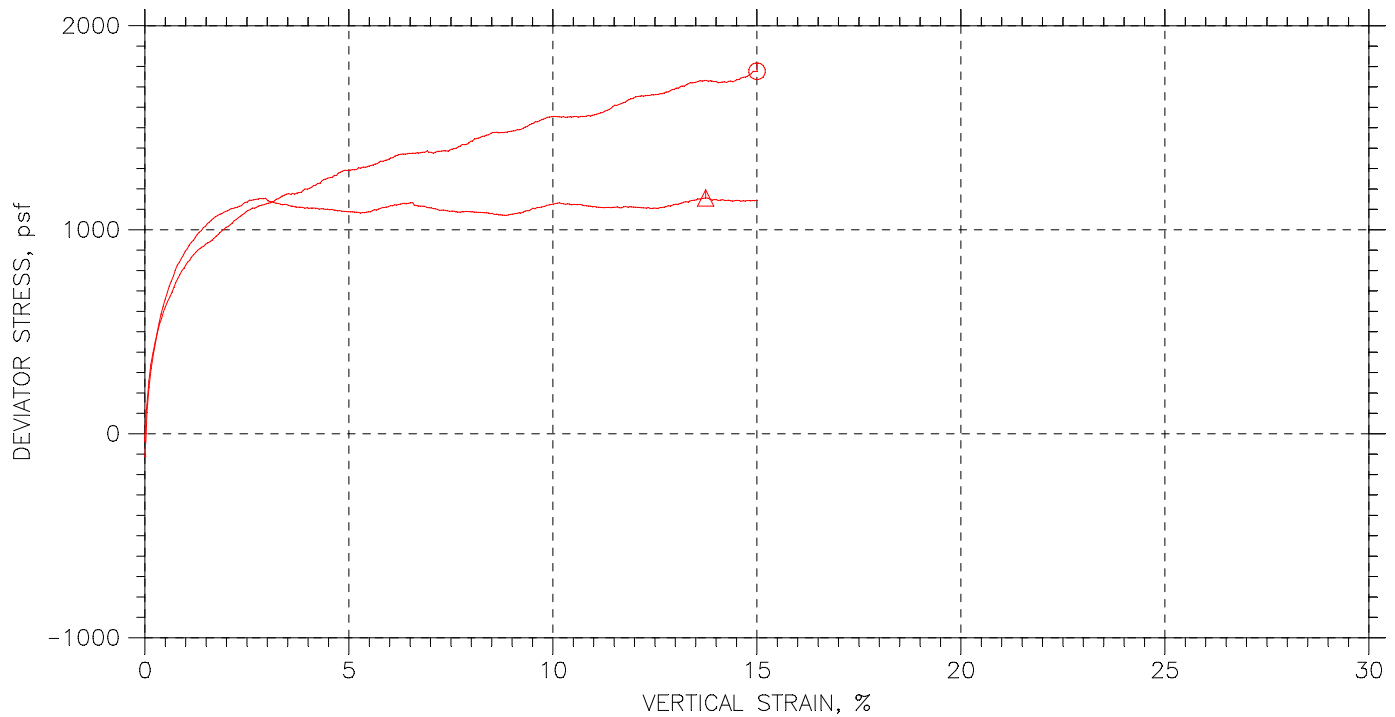
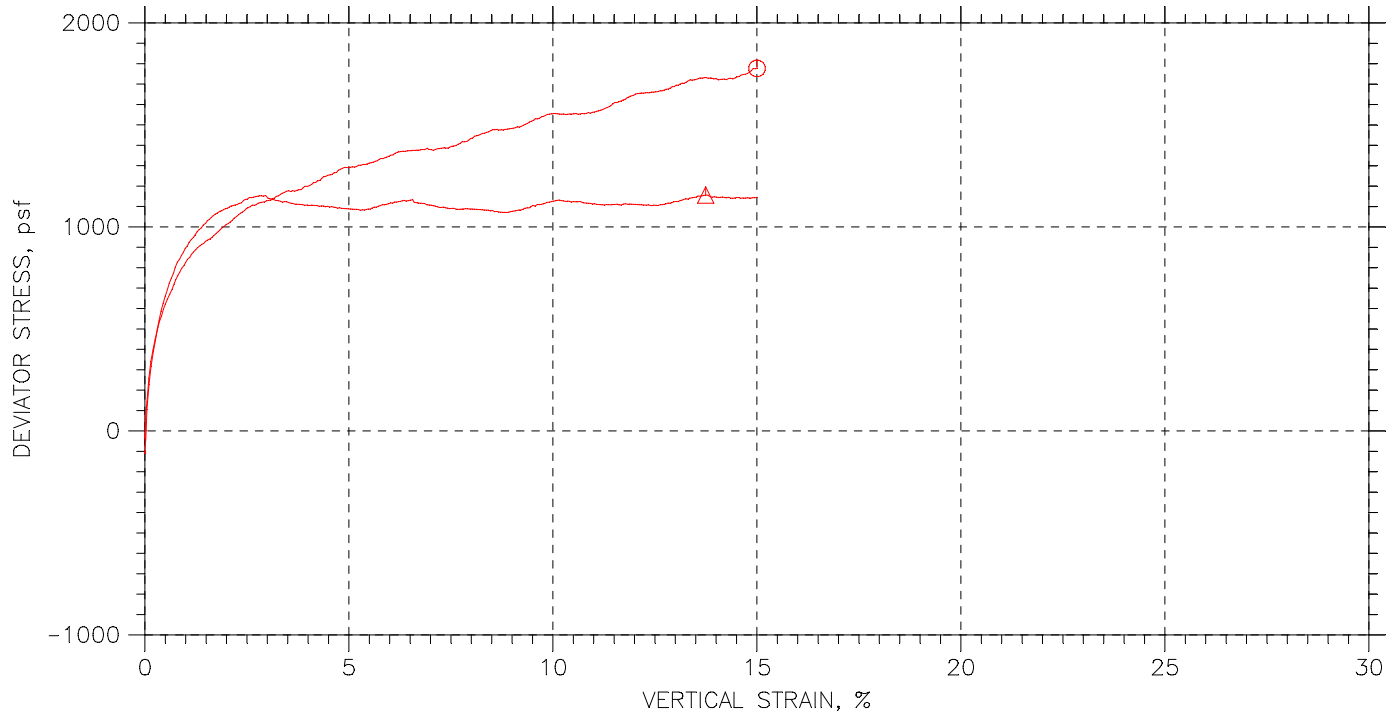


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
○	T-2	1	9'0"-9'6"	Jason	06/01/2015	Bert		CU TRIAXIAL GZ-9 8'0" - 10'0"
△	T-2	2	8.5' - 9.0'	Jason	06/08/2015	Bert		CU TRIAXIAL GZ-9 8'0" - 10'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-9	Sample Type: Undisturbed	
Description: Brown Sandy Silty CLAY (CL-ML)		
Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767

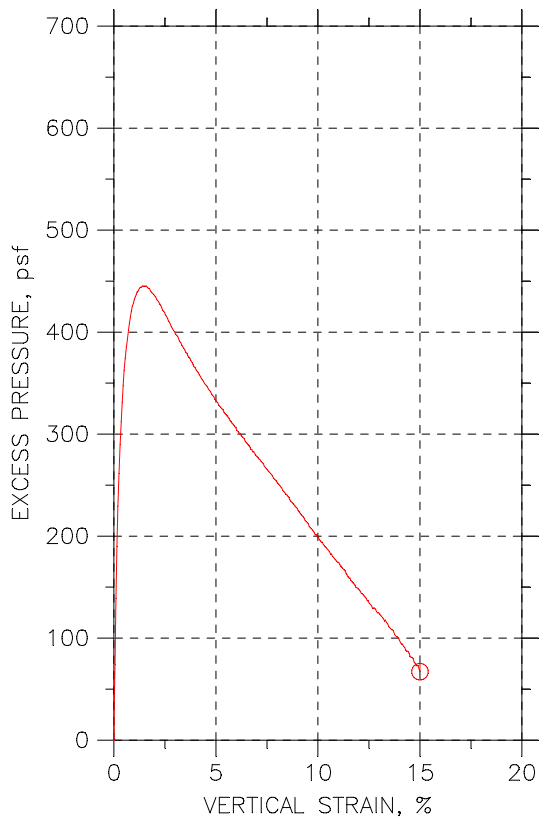
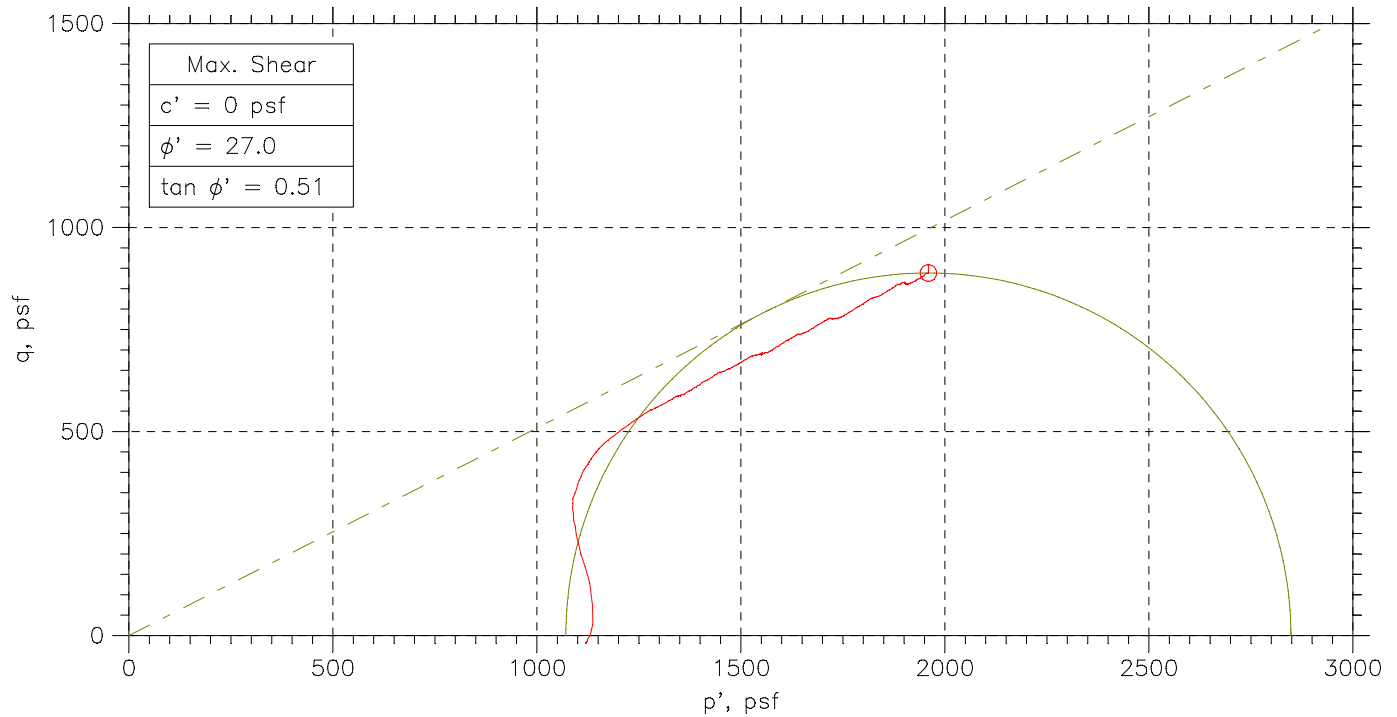


	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊙	T-2	1	9'0"-9'6"	Jason	06/01/2015	Bert		CU TRIAXIAL GZ-9 8'0" - 10'0"
Δ	T-2	2	8.5' - 9.0'	Jason	06/08/2015	Bert		CU TRIAXIAL GZ-9 8'0" - 10'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-9	Sample Type: Undisturbed	
Description: Brown Sandy Silty CLAY (CL-ML)		
Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF		

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	Ⓢ			
Sample No.	T-2			
Test No.	1			
Depth	9'0"-9'6"			
Initial	Diameter, in	2.86		
	Height, in	5.608		
	Water Content, %	20.5		
	Dry Density, pcf	100.		
	Saturation, %	81.2		
Before Shear	Void Ratio	0.679		
	Water Content, %	31.1		
	Dry Density, pcf	91.49		
	Saturation*, %	100.0		
	Void Ratio	0.836		
	Back Press., psf	9217		
	Ver. Eff. Cons. Stress, psf	1138		
	Shear Strength, psf	888.5		
	Strain at Failure, %	15		
	Strain Rate, %/min	0.01		
	B-Value	0.95		
	Measured Specific Gravity	2.69		
	Liquid Limit	23		
	Plastic Limit	19		

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-9				
	Sample Type: Undisturbed				
	Description: Brown Sandy Silty CLAY (CL-ML)				
	Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-2
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/01/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 9'0"-9'6"
Elevation:

Soil Description: Brown Sandy Silty CLAY (CL-ML)
Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF

Specimen Height: 5.61 in
Specimen Area: 6.42 in²
Specimen Volume: 590.38 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 23

Plastic Limit: 19

Measured Specific Gravity: 2.69

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	19	---	0	0
Wt. Container + Wet Soil, gm	31.57	---	---	506.63
Wt. Container + Dry Soil, gm	27.97	---	---	388.15
Wt. Container, gm	10.39	---	---	6.73
Wt. Wet Soil, gm	21.18	1139.9	1240	499.9
Wt. Dry Soil, gm	17.58	946.13	946.13	381.42
Wt. Water, gm	3.6	193.75	293.9	118.48
Water Content, %	20.48	20.48	31.06	31.06
Void Ratio	---	0.68	0.84	---
Degree of Saturation, %	---	81.18	100.00	---
Dry Unit Weight, pcf	---	100.05	91.486	---

Initial

Height: 5.608 in
Area: 6.4242 in²
Volume: 590.38 cc

Moisture: 20.48 %
Void Ratio: 0.68
Dry Unit Weight: 100.05 pcf
Saturation: 81.18 %

End of Initialization

Time: 10.174 min
Total Vertical Stress: 720.85 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 146.2 psf
Effective Horizontal Stress: 144.76 psf

Height Change: -0.0019058 in
Area Change: 0 in²
Volume Change: -0.60189 cc
Water Change: -3.4994 cc
Correction: 0 cc

Moisture: 20.85 %
Void Ratio: 0.68
Dry Unit Weight: 99.944 pcf
Saturation: 82.44 %

End of Consolidation/A

Time: 10.174 min
Total Vertical Stress: 720.85 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 574.66 psf
Effective Vertical Stress: 146.2 psf
Effective Horizontal Stress: 144.76 psf

Height Change: -0.0019058 in
Area Change: 0 in²
Volume Change: -0.60189 cc
Water Change: -3.4994 cc
Correction: 0 cc

Moisture: 20.85 %
Void Ratio: 0.68
Dry Unit Weight: 99.944 pcf
Saturation: 82.44 %

End of Saturation

Time: 36.077 min
Total Vertical Stress: 9386.4 psf
Total Horizontal Stress: 9391.4 psf
Pore Pressure: 9202.7 psf
Effective Vertical Stress: 183.68 psf
Effective Horizontal Stress: 188.64 psf

Height Change: 0.0014293 in
Area Change: 0 in²
Volume Change: 0.45142 cc
Water Change: -40.73 cc
Correction: 0 cc

Moisture: 24.78 %
Void Ratio: 0.68
Dry Unit Weight: 100.12 pcf
Saturation: 98.43 %

End of Consolidation/B

Time: 156.53 min
Total Vertical Stress: 10316 psf
Total Horizontal Stress: 10355 psf
Pore Pressure: 9216.9 psf
Effective Vertical Stress: 1099.5 psf
Effective Horizontal Stress: 1138.1 psf

Height Change: 0.024489 in
Area Change: -0.6319 in²
Volume Change: -55.239 cc
Water Change: -16.859 cc
Correction: -83.29 cc

Moisture: 31.06 %
Void Ratio: 0.84
Dry Unit Weight: 91.486 pcf
Saturation: 100.00 %

End of Shear

Time: 1660.1 min
Total Vertical Stress: 12015 psf
Total Horizontal Stress: 10354 psf
Pore Pressure: 9282.8 psf
Effective Vertical Stress: 2732.1 psf
Effective Horizontal Stress: 1070.9 psf

Height Change: 0.86208 in
Area Change: -1.8772 in²
Volume Change: -55.239 cc
Water Change: -16.859 cc
Correction: -83.29 cc

Moisture: 31.06 %
Void Ratio: 0.84
Dry Unit Weight: 91.486 pcf
Saturation: 100.00 %

At Failure

Time: 1660.1 min
Total Vertical Stress: 12131 psf
Total Horizontal Stress: 10354 psf
Pore Pressure: 9282.8 psf
Effective Vertical Stress: 2848 psf
Effective Horizontal Stress: 1070.9 psf

Height Change: 0.86208 in
Area Change: -1.837 in²
Volume Change: -55.239 cc
Water Change: -16.859 cc
Correction: 0 cc

Moisture: 31.06 %
Void Ratio: 0.84
Dry Unit Weight: 91.486 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-2
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/01/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 9'0"-9'6"
Elevation:

Soil Description: Brown Sandy Silty CLAY (CL-ML)

Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF

Specimen Height: 5.58 in
Specimen Area: 7.06 in²
Specimen Volume: 645.62 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 23

Plastic Limit: 19

Measured Specific Gravity: 2.69

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.6367	-0.037217	-38.537	9215.7	10354	10315
2	0.012417	0	0	6.6367	-0.037217	-38.537	9215.7	10354	10315
3	0.02075	0	0	6.6367	0.098029	-35.603	9216.9	10354	10318
4	0.054083	0	0	6.6367	0.23327	-32.668	9216.9	10354	10321
5	0.10408	0	0	6.6367	0.50188	-26.84	9218	10355	10328
6	0.20407	0	0	6.6367	0.9095	-17.995	9220.4	10354	10336
7	0.50403	0.0034132	0	6.6369	1.8543	2.2103	9225.1	10355	10357
8	1.004	0.0068265	0	6.6371	2.9382	25.431	9233.4	10354	10379
9	2.0039	0.011946	0	6.6375	4.424	57.222	9246.3	10355	10412
10	5.0037	0.049492	0	6.64	8.6185	144.92	9289.9	10354	10499
11	10.003	0.098984	0	6.6432	14.026	257.8	9354.6	10355	10613
12	15.003	0.14506	0	6.6463	17.951	338.71	9405.3	10354	10692
13	20.002	0.19797	0	6.6498	20.926	398.38	9445.3	10354	10752
14	25.002	0.25087	0	6.6534	23.494	449.17	9477.1	10355	10804
15	30.001	0.30548	0	6.657	25.793	493.93	9505.4	10355	10849
16	35.001	0.35498	0	6.6603	27.959	536.22	9527.7	10354	10890
17	40.001	0.40788	0	6.6639	29.445	563.45	9546.6	10355	10918
18	45	0.45396	0	6.6669	31.205	597.21	9563.1	10354	10951
19	50.004	0.50174	0	6.6701	32.555	621.93	9578.4	10355	10977
20	55.003	0.55294	0	6.6736	33.908	646.35	9590.2	10355	11001
21	60.003	0.60926	0	6.6774	35.262	670.3	9600.8	10354	11024
22	65.003	0.66558	0	6.6811	36.613	694.13	9609	10355	11049
23	70.002	0.71166	0	6.6842	37.965	718.94	9617.2	10355	11074
24	75.002	0.75774	0	6.6873	39.184	740.85	9624.3	10354	11095
25	80.001	0.80211	0	6.6903	40.266	759.94	9630.2	10354	11114
26	85.001	0.85331	0	6.6938	41.346	778.33	9636.1	10355	11133
27	90	0.9028	0	6.6971	42.43	796.93	9640.8	10354	11151
28	95.004	0.95912	0	6.7009	43.377	811.91	9644.3	10354	11166
29	100	0.99837	0	6.7036	44.186	825.55	9647.9	10355	11180
30	105	1.0462	0	6.7068	45.133	841.31	9650.2	10355	11196
31	110	1.0991	0	6.7104	45.809	850.75	9652.6	10355	11206
32	115	1.1366	0	6.713	46.621	864.56	9654.9	10355	11219
33	120	1.1929	0	6.7168	47.434	876.58	9656.1	10354	11230
34	125	1.2441	0	6.7203	48.244	889	9658.5	10355	11244
35	130	1.2919	0	6.7235	48.92	898.87	9659.6	10355	11254
36	135	1.3499	0	6.7275	49.596	907.74	9659.6	10355	11263
37	140	1.396	0	6.7306	50.137	914.85	9660.8	10355	11270
38	145	1.4421	0	6.7338	50.543	919.06	9660.8	10355	11274
39	150	1.4848	0	6.7367	51.219	929.38	9660.8	10355	11284
40	155	1.5394	0	6.7404	51.76	935.63	9660.8	10355	11291
41	160	1.594	0	6.7442	52.166	941.03	9660.8	10355	11296
42	165	1.6469	0	6.7478	52.572	949.09	9659.6	10355	11304
43	170	1.6895	0	6.7507	52.979	957.3	9658.5	10354	11311
44	175	1.7425	0	6.7544	53.518	968.19	9658.5	10355	11323
45	180	1.7954	0	6.758	53.924	976.22	9656.1	10355	11331
46	185	1.8346	0	6.7607	54.33	984.4	9654.9	10355	11339
47	190	1.8875	0	6.7643	54.871	995.29	9653.7	10355	11350
48	195	1.949	0	6.7686	55.277	1003.2	9652.6	10355	11358
49	200	1.9882	0	6.7713	55.682	1011.4	9651.4	10355	11366
50	205	2.0428	0	6.7751	55.953	1016.4	9650.2	10355	11371
51	210	2.0923	0	6.7785	56.358	1024.5	9647.9	10355	11379
52	215	2.1418	0	6.7819	56.764	1032.5	9646.7	10355	11387
53	220	2.1862	0	6.785	57.305	1043.4	9645.5	10355	11398
54	225	2.2459	0	6.7891	57.711	1051.3	9643.1	10355	11406
55	230	2.2937	0	6.7925	58.117	1059.3	9642	10355	11414
56	235	2.3432	0	6.7959	58.522	1067.2	9639.6	10355	11422
57	240	2.3841	0	6.7988	58.795	1072.5	9637.3	10354	11426
58	245	2.4405	0	6.8027	59.199	1080.3	9636.1	10355	11435
59	250	2.4814	0	6.8055	59.604	1088.4	9634.9	10355	11443
60	255	2.5224	0	6.8084	59.875	1093.6	9632.5	10355	11448
61	260	2.5787	0	6.8123	60.145	1098.6	9631.4	10355	11453
62	265	2.6299	0	6.8159	60.551	1106.5	9629	10355	11461
63	270	2.676	0	6.8192	60.551	1105.9	9626.7	10355	11461
64	275	2.7221	0	6.8224	60.686	1108.1	9625.5	10355	11463
65	280	2.7767	0	6.8262	61.092	1115.9	9623.1	10355	11471
66	285	2.8176	0	6.8291	61.229	1118.3	9620.8	10354	11472
67	290	2.8637	0	6.8323	61.363	1120.5	9619.6	10355	11475
68	295	2.9217	0	6.8364	61.5	1122.6	9617.2	10354	11476
69	300	2.9797	0	6.8405	61.768	1127.5	9616.1	10355	11482
70	305	3.0207	0	6.8434	61.904	1129.8	9613.7	10355	11485
71	310	3.0839	0	6.8478	62.041	1131.8	9612.5	10354	11486
72	315	3.1299	0	6.8511	62.309	1136.8	9611.4	10355	11492
73	320	3.1777	0	6.8545	62.58	1141.9	9609	10355	11497
74	325	3.2204	0	6.8575	62.986	1149.8	9606.6	10355	11505
75	330	3.2733	0	6.8613	63.121	1151.9	9605.5	10355	11507
76	335	3.3262	0	6.865	63.527	1159.7	9603.1	10355	11515
77	340	3.3654	0	6.8678	63.797	1164.9	9601.9	10355	11520
78	345	3.4235	0	6.8719	64.068	1169.7	9599.6	10355	11525
79	350	3.473	0	6.8755	64.338	1174.7	9598.4	10355	11530
80	355	3.519	0	6.8787	64.473	1176.9	9596	10355	11532

81	360	3.5788	0	6.883	64.338	1173.2	9594.9	10355	11528
82	365	3.6197	0	6.8859	64.608	1178.3	9592.5	10355	11533
83	370	3.6692	0	6.8895	64.473	1174.8	9591.3	10355	11530
84	375	3.7272	0	6.8936	64.744	1179.6	9590.2	10355	11535
85	380	3.7733	0	6.8969	64.879	1181.8	9587.8	10355	11537
86	385	3.8382	0	6.9016	65.014	1183.7	9585.4	10355	11539
87	390	3.874	0	6.9041	65.42	1191.7	9584.3	10355	11547
88	395	3.9201	0	6.9075	65.826	1199.5	9581.9	10355	11554
89	400	3.9849	0	6.9121	65.826	1198.5	9580.7	10355	11553
90	405	4.0396	0	6.916	66.096	1203.4	9578.4	10355	11558
91	410	4.0873	0	6.9195	66.367	1208.3	9577.2	10355	11563
92	415	4.13	0	6.9226	66.772	1216.2	9576	10355	11571
93	420	4.188	0	6.9268	66.908	1218.1	9573.7	10355	11573
94	425	4.2358	0	6.9302	67.315	1225.9	9572.5	10354	11580
95	430	4.2904	0	6.9342	67.449	1227.9	9570.1	10355	11583
96	435	4.3365	0	6.9375	67.992	1238.5	9569	10354	11592
97	440	4.3826	0	6.9409	68.395	1246.2	9567.8	10355	11601
98	445	4.4355	0	6.9447	68.531	1248.2	9565.4	10355	11603
99	450	4.4816	0	6.9481	68.801	1253.1	9564.3	10355	11608
100	455	4.5379	0	6.9522	68.936	1255.1	9563.1	10355	11610
101	460	4.5891	0	6.9559	69.072	1257.1	9561.9	10355	11612
102	465	4.6352	0	6.9592	69.479	1264.9	9559.5	10354	11619
103	470	4.6983	0	6.9639	69.613	1266.7	9558.4	10355	11622
104	475	4.7376	0	6.9667	70.155	1277.3	9557.2	10354	11631
105	480	4.7922	0	6.9707	70.424	1282	9554.8	10355	11637
106	485	4.8383	0	6.9741	70.696	1286.9	9553.7	10354	11641
107	490	4.8929	0	6.9781	70.965	1291.6	9552.5	10355	11647
108	495	4.9458	0	6.982	70.965	1290.8	9550.1	10355	11646
109	500	4.9936	0	6.9855	70.965	1290.1	9548.9	10355	11645
110	505	5.0311	0	6.9883	71.1	1292.3	9547.8	10355	11647
111	510	5.0857	0	6.9923	71.236	1294.2	9546.6	10355	11649
112	515	5.1352	0	6.9959	71.237	1293.5	9544.2	10354	11647
113	520	5.1881	0	6.9998	71.371	1295.4	9543.1	10355	11650
114	525	5.2376	0	7.0035	71.777	1303	9541.9	10355	11658
115	530	5.2922	0	7.0075	71.777	1302.2	9540.7	10355	11657
116	535	5.3468	0	7.0116	72.047	1306.9	9539.5	10355	11662
117	540	5.398	0	7.0154	72.047	1306.1	9537.2	10355	11661
118	545	5.4441	0	7.0188	72.182	1308.1	9536	10355	11663
119	550	5.4953	0	7.0226	72.453	1312.9	9534.8	10355	11668
120	555	5.5431	0	7.0261	72.588	1314.9	9533.6	10355	11670
121	560	5.5909	0	7.0297	72.723	1316.9	9532.5	10355	11672
122	565	5.6404	0	7.0334	72.994	1321.7	9531.3	10355	11677
123	570	5.695	0	7.0375	73.129	1323.6	9528.9	10355	11678
124	575	5.7393	0	7.0408	73.535	1331.2	9527.7	10355	11686
125	580	5.7837	0	7.0441	73.805	1336	9526.6	10355	11691
126	585	5.84	0	7.0483	73.805	1335.1	9525.4	10355	11690
127	590	5.8844	0	7.0516	74.076	1339.9	9524.2	10355	11695
128	595	5.9288	0	7.0549	74.211	1341.9	9523	10355	11697
129	600	5.9834	0	7.059	74.481	1346.6	9521.9	10355	11701
130	605	6.0243	0	7.0621	74.754	1351.5	9519.5	10354	11705
131	610	6.0807	0	7.0664	74.887	1353.3	9518.3	10355	11708
132	615	6.1267	0	7.0698	75.293	1360.8	9517.1	10355	11716
133	620	6.1831	0	7.0741	75.563	1365.4	9516	10355	11720
134	625	6.224	0	7.0772	75.699	1367.5	9514.8	10355	11722
135	630	6.2718	0	7.0808	75.834	1369.4	9513.6	10355	11724
136	635	6.323	0	7.0846	75.969	1371.3	9512.4	10355	11726
137	640	6.3793	0	7.0889	75.969	1370.4	9511.3	10355	11725
138	645	6.4305	0	7.0928	76.104	1372.3	9508.9	10355	11727
139	650	6.4783	0	7.0964	76.24	1374.3	9507.7	10355	11729
140	655	6.5261	0	7.1	76.24	1373.5	9506.5	10355	11728
141	660	6.5688	0	7.1033	76.375	1375.5	9505.4	10355	11730
142	665	6.62	0	7.1072	76.375	1374.7	9504.2	10355	11730
143	670	6.6694	0	7.1109	76.51	1376.6	9503	10355	11731
144	675	6.7138	0	7.1143	76.51	1375.8	9500.7	10355	11731
145	680	6.7599	0	7.1178	76.645	1377.8	9500.7	10355	11733
146	685	6.8094	0	7.1216	76.781	1379.7	9498.3	10355	11735
147	690	6.8572	0	7.1253	76.781	1378.9	9498.3	10355	11734
148	695	6.9203	0	7.1301	77.186	1386.1	9496	10355	11741
149	700	6.9527	0	7.1326	76.916	1380.1	9494.8	10355	11735
150	705	7.0176	0	7.1376	76.916	1379	9493.6	10355	11734
151	710	7.0654	0	7.1412	76.781	1375.5	9492.4	10355	11730
152	715	7.12	0	7.1454	77.051	1380	9491.2	10355	11735
153	720	7.1831	0	7.1503	77.322	1384.4	9490.1	10355	11739
154	725	7.2139	0	7.1527	77.323	1383.9	9488.9	10354	11738
155	730	7.2702	0	7.157	77.459	1385.7	9487.7	10354	11739
156	735	7.3282	0	7.1615	77.594	1387.4	9486.5	10354	11741
157	740	7.3726	0	7.1649	77.592	1386.6	9484.2	10355	11742
158	745	7.4255	0	7.169	77.592	1385.8	9483	10355	11741
159	750	7.4664	0	7.1722	77.864	1390.5	9481.8	10354	11744
160	755	7.5228	0	7.1765	78.133	1395	9480.6	10355	11750
161	760	7.5705	0	7.1803	78.268	1396.9	9479.5	10355	11752
162	765	7.6234	0	7.1844	78.404	1398.7	9478.3	10355	11754
163	770	7.6781	0	7.1886	78.809	1405.9	9477.1	10355	11761
164	775	7.731	0	7.1927	79.08	1410.4	9475.9	10355	11765
165	780	7.7736	0	7.1961	79.486	1417.8	9474.8	10355	11773
166	785	7.8248	0	7.2001	79.486	1416.9	9472.4	10355	11772
167	790	7.888	0	7.205	79.621	1418.5	9471.2	10355	11773
168	795	7.9409	0	7.2091	80.028	1425.7	9470	10354	11779
169	800	7.9818	0	7.2123	80.432	1433.1	9468.9	10355	11788
170	805	8.0279	0	7.216	80.568	1435	9467.7	10355	11790
171	810	8.0808	0	7.2201	81.108	1444.9	9466.5	10355	11800
172	815	8.1303	0	7.224	81.244	1446.7	9465.3	10355	11802
173	820	8.1696	0	7.2271	81.379	1448.7	9464.2	10355	11804
174	825	8.2225	0	7.2313	81.649	1453.1	9463	10355	11808
175	830	8.2703	0	7.235	81.92	1457.7	9460.6	10355	11813
176	835	8.3283	0	7.2396	82.055	1459.3	9459.4	10355	11814
177	840	8.3727	0	7.2431	82.326	1463.9	9458.3	10355	11819
178	845	8.4221	0	7.247	82.461	1465.7	9457.1	10355	11821
179	850	8.4819	0	7.2518	82.867	1472.7	9455.9	10355	11828
180	855	8.528	0	7.2554	83.137	1477.2	9454.7	10355	11832

181	860	8.5757	0	7.2592	83.137	1476.4	9453.6	10355	11831
182	865	8.6286	0	7.2634	83.272	1478.1	9451.2	10355	11833
183	870	8.6747	0	7.2671	83.137	1474.6	9450	10355	11830
184	875	8.7276	0	7.2713	83.272	1476.3	9448.8	10355	11831
185	880	8.7771	0	7.2752	83.272	1475.4	9447.7	10355	11830
186	885	8.8215	0	7.2788	83.408	1477.3	9446.5	10355	11832
187	890	8.8761	0	7.2831	83.543	1479	9445.3	10355	11834
188	895	8.9256	0	7.2871	83.68	1480.8	9444.1	10354	11835
189	900	8.9836	0	7.2917	83.813	1482.4	9443	10355	11837
190	905	9.0314	0	7.2956	83.949	1484.2	9440.6	10355	11839
191	910	9.0775	0	7.2993	84.084	1486	9439.4	10355	11841
192	915	9.1253	0	7.3031	84.354	1490.5	9438.3	10355	11845
193	920	9.1696	0	7.3067	84.354	1489.7	9437.1	10355	11845
194	925	9.214	0	7.3102	84.49	1491.5	9435.9	10355	11846
195	930	9.2772	0	7.3153	84.895	1498.3	9434.7	10355	11853
196	935	9.3181	0	7.3186	85.166	1502.9	9433.5	10355	11858
197	940	9.3744	0	7.3232	85.436	1507.2	9431.2	10355	11862
198	945	9.4256	0	7.3273	85.842	1514.2	9430	10355	11869
199	950	9.4768	0	7.3315	86.113	1518.6	9428.8	10355	11873
200	955	9.5314	0	7.3359	86.383	1522.9	9427.7	10355	11878
201	960	9.569	0	7.3389	86.789	1530.1	9425.3	10355	11885
202	965	9.6219	0	7.3432	86.789	1529.1	9424.1	10355	11884
203	970	9.6748	0	7.3475	87.059	1533.4	9422.9	10355	11888
204	975	9.7294	0	7.352	87.465	1540.3	9421.8	10355	11895
205	980	9.7721	0	7.3555	87.6	1542.2	9420.6	10355	11897
206	985	9.8182	0	7.3592	87.871	1546.6	9419.4	10355	11902
207	990	9.8608	0	7.3627	88.141	1551.1	9417.1	10355	11906
208	995	9.9154	0	7.3672	88.277	1552.7	9417.1	10355	11908
209	1000	9.9717	0	7.3718	88.412	1554.2	9414.7	10355	11909
210	1005	10.021	0	7.3758	88.547	1555.9	9414.7	10355	11911
211	1010	10.069	0	7.3797	88.547	1555	9412.3	10355	11910
212	1015	10.115	0	7.3835	88.547	1554.1	9411.2	10355	11909
213	1020	10.154	0	7.3867	88.547	1553.4	9410	10355	11908
214	1025	10.204	0	7.3908	88.547	1552.4	9410	10355	11907
215	1030	10.262	0	7.3956	88.682	1553.9	9407.6	10355	11909
216	1035	10.315	0	7.4	88.547	1550.3	9406.5	10355	11905
217	1040	10.354	0	7.4032	88.682	1552.2	9405.3	10355	11907
218	1045	10.417	0	7.4084	88.818	1553.6	9404.1	10355	11908
219	1050	10.46	0	7.4119	88.818	1552.8	9402.9	10355	11908
220	1055	10.514	0	7.4165	88.953	1554.3	9401.7	10355	11909
221	1060	10.566	0	7.4207	89.088	1556	9400.6	10355	11911
222	1065	10.615	0	7.4248	88.953	1552.4	9398.2	10355	11907
223	1070	10.668	0	7.4292	89.088	1554	9398.2	10355	11909
224	1075	10.714	0	7.4331	89.223	1555.7	9395.9	10355	11911
225	1080	10.772	0	7.4379	89.223	1554.6	9394.7	10355	11910
226	1085	10.813	0	7.4413	89.359	1556.4	9393.5	10355	11911
227	1090	10.869	0	7.446	89.629	1560.6	9392.3	10355	11915
228	1095	10.919	0	7.4501	89.494	1557	9391.1	10355	11912
229	1100	10.96	0	7.4536	89.764	1561.4	9390	10355	11916
230	1105	11.016	0	7.4583	89.899	1562.9	9390	10355	11918
231	1110	11.076	0	7.4633	90.17	1567	9387.6	10355	11922
232	1115	11.117	0	7.4667	90.305	1568.8	9386.4	10355	11924
233	1120	11.175	0	7.4716	90.576	1572.9	9385.3	10355	11928
234	1125	11.218	0	7.4752	90.711	1574.6	9384.1	10355	11930
235	1130	11.274	0	7.48	91.117	1581.3	9382.9	10355	11936
236	1135	11.332	0	7.4848	91.387	1585.4	9381.7	10355	11940
237	1140	11.38	0	7.4889	91.658	1589.6	9379.4	10355	11945
238	1145	11.417	0	7.4921	91.928	1594.1	9378.2	10355	11949
239	1150	11.47	0	7.4965	92.469	1603.4	9375.8	10355	11958
240	1155	11.518	0	7.5006	92.875	1610.3	9374.7	10355	11965
241	1160	11.564	0	7.5045	92.875	1609.3	9374.7	10355	11964
242	1165	11.615	0	7.5088	93.145	1613.5	9372.3	10355	11968
243	1170	11.67	0	7.5135	93.416	1617.6	9371.1	10355	11972
244	1175	11.716	0	7.5174	93.686	1621.8	9370	10355	11977
245	1180	11.776	0	7.5225	93.957	1625.8	9368.8	10355	11981
246	1185	11.818	0	7.5261	94.363	1632.7	9367.6	10355	11988
247	1190	11.863	0	7.5299	94.633	1636.9	9365.2	10355	11992
248	1195	11.907	0	7.5337	94.904	1641.2	9365.2	10355	11996
249	1200	11.974	0	7.5394	95.174	1645	9364.1	10355	12000
250	1205	12.028	0	7.5441	95.58	1651.6	9362.9	10355	12007
251	1210	12.074	0	7.548	95.715	1653.2	9361.7	10355	12008
252	1215	12.132	0	7.553	95.85	1654.6	9359.4	10355	12010
253	1220	12.168	0	7.5561	95.986	1656.4	9359.4	10355	12011
254	1225	12.223	0	7.5608	95.986	1655.3	9358.2	10355	12010
255	1230	12.267	0	7.5646	96.121	1657	9357	10355	12012
256	1235	12.32	0	7.5692	96.256	1658.4	9355.8	10355	12013
257	1240	12.366	0	7.5732	96.256	1657.5	9354.6	10355	12012
258	1245	12.421	0	7.5779	96.527	1661.5	9352.3	10355	12016
259	1250	12.462	0	7.5814	96.527	1660.6	9352.3	10355	12016
260	1255	12.518	0	7.5863	96.662	1662	9349.9	10355	12017
261	1260	12.574	0	7.5912	96.797	1663.4	9348.8	10355	12018
262	1265	12.629	0	7.596	97.068	1667.4	9347.6	10355	12022
263	1270	12.673	0	7.5998	97.069	1666.5	9345.2	10354	12020
264	1275	12.725	0	7.6043	97.338	1670.5	9345.2	10355	12025
265	1280	12.772	0	7.6084	97.609	1674.6	9345.2	10355	12029
266	1285	12.829	0	7.6134	97.744	1675.9	9344	10355	12031
267	1290	12.871	0	7.6171	98.014	1680.1	9341.7	10355	12035
268	1295	12.922	0	7.6216	98.42	1686.7	9340.5	10355	12042
269	1300	12.977	0	7.6264	98.555	1688.1	9340.5	10355	12043
270	1305	13.023	0	7.6304	98.959	1694.7	9339.3	10356	12051
271	1310	13.071	0	7.6346	98.961	1693.8	9338.2	10355	12049
272	1315	13.117	0	7.6386	99.365	1700.4	9337	10356	12056
273	1320	13.165	0	7.6428	99.637	1704.5	9335.8	10355	12059
274	1325	13.211	0	7.6469	99.637	1703.5	9334.6	10355	12058
275	1330	13.271	0	7.6522	100.04	1709.8	9332.3	10355	12065
276	1335	13.306	0	7.6553	100.31	1714.1	9333.4	10355	12069
277	1340	13.364	0	7.6605	100.72	1720.5	9331.1	10355	12075
278	1345	13.407	0	7.6642	100.72	1719.6	9329.9	10355	12074
279	1350	13.463	0	7.6692	100.86	1720.9	9327.6	10354	12075
280	1355	13.499	0	7.6724	100.99	1722.6	9326.4	10355	12078

281	1360	13.556	0	7.6774	101.26	1726.5	9325.2	10355	12081
282	1365	13.607	0	7.6819	101.53	1730.4	9324	10355	12085
283	1370	13.655	0	7.6862	101.53	1729.4	9324	10355	12084
284	1375	13.702	0	7.6904	101.67	1730.8	9322.8	10355	12086
285	1380	13.754	0	7.695	101.8	1732.2	9319.3	10355	12087
286	1385	13.805	0	7.6996	101.67	1728.6	9318.1	10355	12084
287	1390	13.856	0	7.7042	101.8	1730	9317	10355	12085
288	1395	13.894	0	7.7075	101.8	1729.2	9317	10355	12084
289	1400	13.945	0	7.7121	101.67	1725.5	9315.8	10355	12080
290	1405	13.996	0	7.7167	101.8	1726.9	9313.4	10355	12082
291	1410	14.054	0	7.7219	101.53	1720.6	9311.1	10355	12075
292	1415	14.1	0	7.726	101.67	1722.1	9309.9	10355	12077
293	1420	14.143	0	7.7299	101.8	1723.7	9309.9	10355	12079
294	1425	14.202	0	7.7353	101.94	1724.9	9307.5	10355	12080
295	1430	14.254	0	7.7399	101.8	1721.2	9306.4	10355	12076
296	1435	14.303	0	7.7444	102.21	1727.7	9304	10355	12083
297	1440	14.359	0	7.7495	102.34	1728.9	9302.8	10355	12084
298	1445	14.411	0	7.7541	102.21	1725.3	9302.8	10355	12080
299	1450	14.476	0	7.76	102.61	1731.4	9300.5	10355	12086
300	1455	14.508	0	7.7629	102.88	1735.7	9298.1	10355	12091
301	1460	14.564	0	7.768	103.02	1736.9	9296.9	10355	12092
302	1465	14.609	0	7.7721	103.42	1743.4	9296.9	10355	12098
303	1470	14.667	0	7.7773	103.69	1747.1	9295.8	10355	12102
304	1475	14.716	0	7.7819	103.83	1748.5	9292.2	10355	12103
305	1480	14.769	0	7.7867	104.1	1752.3	9291.1	10355	12107
306	1485	14.815	0	7.7909	104.51	1758.8	9288.7	10355	12114
307	1490	14.863	0	7.7953	104.91	1765.2	9288.7	10355	12120
308	1495	14.911	0	7.7997	105.59	1776.6	9288.7	10355	12132
309	1500	14.964	0	7.8045	105.59	1775.4	9285.2	10354	12129
310	1503.6	15.001	0	7.808	105.73	1777.1	9282.8	10354	12131

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-2
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/01/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 9'0"-9'6"
Elevation:

Soil Description: Brown Sandy Silty CLAY (CL-ML)

Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 1140 PSF

Specimen Height: 5.58 in
Specimen Area: 7.06 in²
Specimen Volume: 645.62 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 23

Plastic Limit: 19

Measured Specific Gravity: 2.69

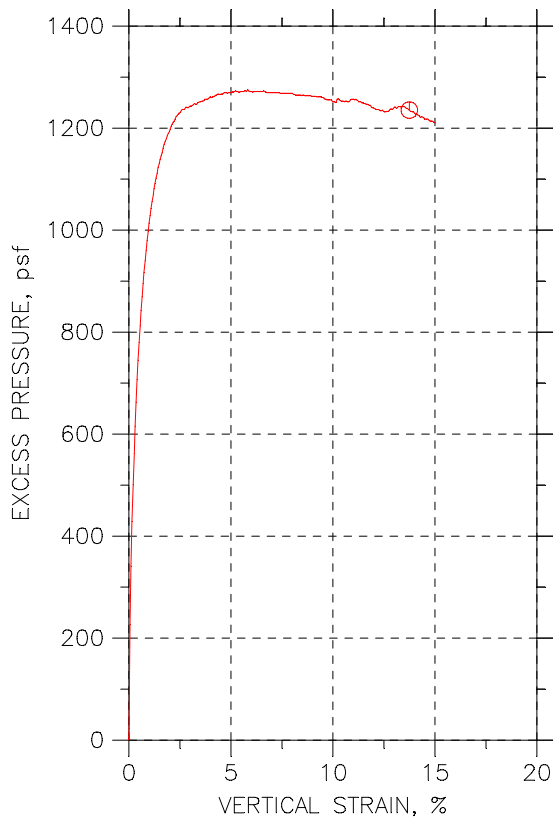
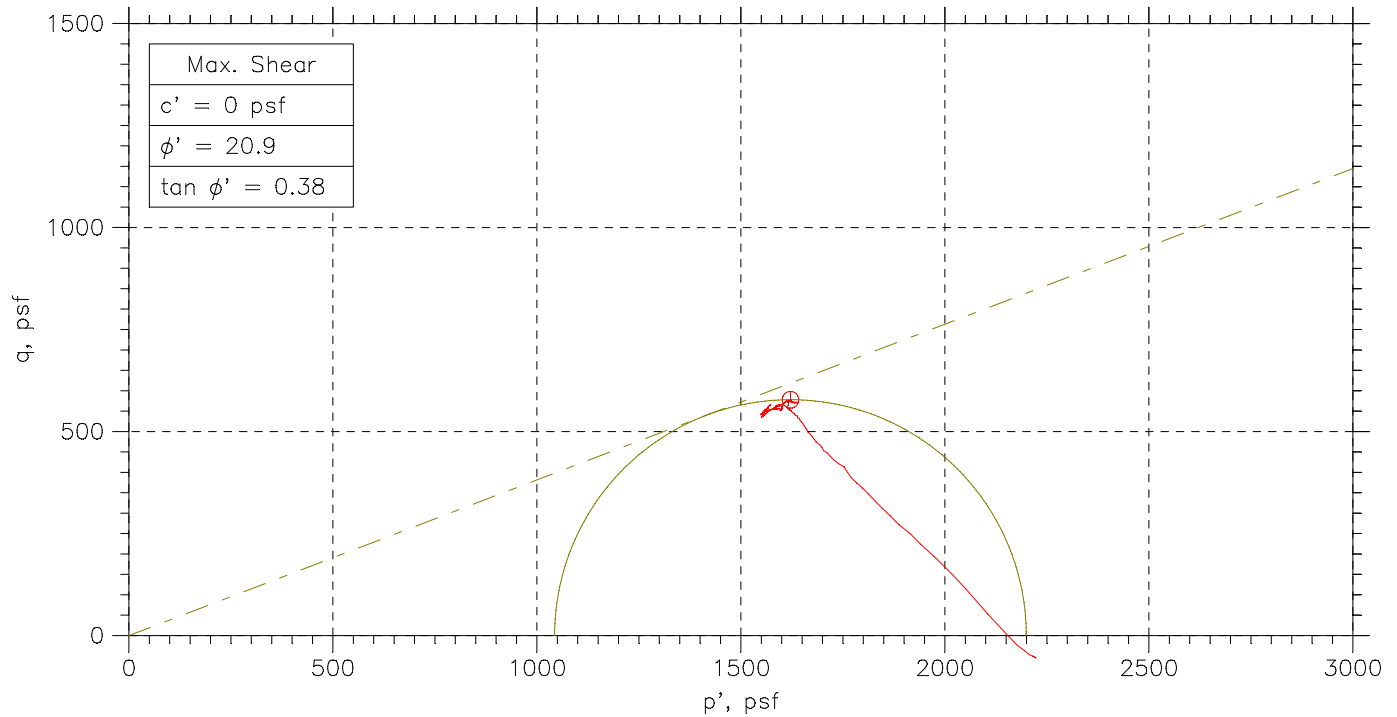
	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	10315	10354	0	0.000	1099.5	1138.1	1.035	1118.8	-19.269
2	0.00	10315	10354	0	0.000	1099.5	1138.1	1.035	1118.8	-19.269
3	0.00	10318	10354	1.1776	0.401	1101.3	1136.9	1.032	1119.1	-17.801
4	0.00	10321	10354	1.1776	0.201	1104.2	1136.9	1.030	1120.5	-16.334
5	0.00	10328	10355	2.3551	0.101	1110	1136.9	1.024	1123.5	-13.42
6	0.00	10336	10354	4.7103	0.229	1115.3	1133.3	1.016	1124.3	-8.9977
7	0.00	10357	10355	9.4206	0.202	1132	1129.8	1.002	1130.9	1.1051
8	0.01	10379	10354	17.664	0.276	1145.8	1120.4	1.023	1133.1	12.715
9	0.01	10412	10355	30.617	0.307	1165.8	1108.6	1.052	1137.2	28.611
10	0.05	10499	10354	74.187	0.404	1208.8	1063.9	1.136	1136.3	72.461
11	0.10	10613	10355	138.95	0.465	1258.1	1000.3	1.258	1129.2	128.9
12	0.15	10692	10354	189.59	0.503	1287.2	948.47	1.357	1117.8	169.35
13	0.20	10752	10354	229.63	0.526	1306.8	908.43	1.439	1107.6	199.19
14	0.25	10804	10355	261.42	0.534	1327	877.81	1.512	1102.4	224.58
15	0.31	10849	10355	289.68	0.542	1343.5	849.55	1.581	1096.5	246.96
16	0.35	10890	10354	312.06	0.543	1362.2	826	1.649	1094.1	268.11
17	0.41	10918	10355	330.9	0.548	1371.8	808.34	1.697	1090.1	281.73
18	0.45	10951	10354	347.38	0.546	1387.9	790.67	1.755	1089.3	298.61
19	0.50	10977	10355	362.69	0.547	1398.5	776.54	1.801	1087.5	310.97
20	0.55	11001	10355	374.47	0.545	1411.1	764.77	1.845	1087.9	323.18
21	0.61	11024	10354	385.07	0.543	1423.3	752.99	1.890	1088.1	335.15
22	0.67	11049	10355	393.31	0.535	1440.1	745.92	1.931	1093	347.07
23	0.71	11074	10355	401.55	0.529	1456.6	737.68	1.975	1097.2	359.47
24	0.76	11095	10354	408.62	0.524	1470.3	729.44	2.016	1099.9	370.42
25	0.80	11114	10354	414.51	0.519	1483.5	723.55	2.050	1103.5	379.97
26	0.85	11133	10355	420.39	0.513	1497.2	718.84	2.083	1108	389.16
27	0.90	11151	10354	425.1	0.509	1509.9	712.95	2.118	1111.4	398.46
28	0.96	11166	10354	428.64	0.504	1521.3	709.42	2.144	1115.4	405.95
29	1.00	11180	10355	432.17	0.499	1532.6	707.06	2.168	1119.8	412.78
30	1.05	11196	10355	434.52	0.493	1546	704.71	2.194	1125.4	420.66
31	1.10	11206	10355	436.88	0.490	1553.1	702.35	2.211	1127.7	425.38
32	1.14	11219	10355	439.23	0.485	1564.6	700	2.235	1132.3	432.28
33	1.19	11230	10354	440.41	0.481	1574.2	697.64	2.256	1135.9	438.29
34	1.24	11244	10355	442.77	0.476	1585.5	696.47	2.276	1141	444.5
35	1.29	11254	10355	443.95	0.472	1594.2	695.29	2.293	1144.7	449.44
36	1.35	11263	10355	443.95	0.468	1603	695.29	2.306	1149.2	453.87
37	1.40	11270	10355	445.12	0.466	1609	694.11	2.318	1151.5	457.43
38	1.44	11274	10355	445.12	0.464	1613.2	694.11	2.324	1153.6	459.53
39	1.48	11284	10355	445.12	0.459	1623.5	694.11	2.339	1158.8	464.69
40	1.54	11291	10355	445.12	0.456	1629.7	694.11	2.348	1161.9	467.82
41	1.59	11296	10355	445.12	0.453	1635.1	694.11	2.356	1164.6	470.52
42	1.65	11304	10355	443.95	0.448	1644.4	695.29	2.365	1169.8	474.55
43	1.69	11311	10354	442.77	0.445	1652.6	695.29	2.377	1173.9	478.65
44	1.74	11323	10355	442.77	0.439	1664.7	696.47	2.390	1180.6	484.09
45	1.80	11331	10355	440.41	0.433	1675	698.82	2.397	1186.9	488.11
46	1.83	11339	10355	439.23	0.428	1684.4	700	2.406	1192.2	492.2
47	1.89	11350	10355	438.06	0.423	1696.5	701.18	2.419	1198.8	497.65
48	1.95	11358	10355	436.88	0.418	1705.5	702.35	2.428	1204	501.6
49	1.99	11366	10355	435.7	0.414	1714.9	703.53	2.438	1209.2	505.68
50	2.04	11371	10355	434.52	0.411	1721.2	704.71	2.442	1212.9	508.22
51	2.09	11379	10355	432.17	0.405	1731.5	707.06	2.449	1219.3	512.23
52	2.14	11387	10355	430.99	0.401	1740.7	708.24	2.458	1224.5	516.23
53	2.19	11398	10355	429.81	0.396	1752.8	709.42	2.471	1231.1	521.7
54	2.25	11406	10355	427.46	0.391	1763	711.78	2.477	1237.4	525.63
55	2.29	11414	10355	426.28	0.387	1772.2	712.95	2.486	1242.6	529.64
56	2.34	11422	10355	423.93	0.382	1782.6	715.31	2.492	1248.9	533.62
57	2.38	11426	10354	421.57	0.379	1789	716.48	2.497	1252.7	536.25
58	2.44	11435	10355	420.39	0.375	1799.2	718.84	2.503	1259	540.16
59	2.48	11443	10355	419.22	0.371	1808.4	720.02	2.512	1264.2	544.19
60	2.52	11448	10355	416.86	0.367	1815.9	722.37	2.514	1269.2	546.79
61	2.58	11453	10355	415.68	0.365	1822.1	723.55	2.518	1272.8	549.28
62	2.63	11461	10355	413.33	0.360	1832.4	725.91	2.524	1279.1	553.23
63	2.68	11461	10355	410.97	0.358	1834.1	728.26	2.518	1281.2	552.93
64	2.72	11463	10355	409.8	0.356	1837.5	729.44	2.519	1283.5	554.05
65	2.78	11471	10355	407.44	0.352	1847.7	731.79	2.525	1289.8	557.97
66	2.82	11472	10354	405.09	0.350	1851.3	732.97	2.526	1292.1	559.15
67	2.86	11475	10355	403.91	0.347	1855.8	735.33	2.524	1295.6	560.25
68	2.92	11476	10354	401.55	0.346	1859.1	736.5	2.524	1297.8	561.31
69	2.98	11482	10355	400.37	0.342	1866.3	738.86	2.526	1302.6	563.75
70	3.02	11485	10355	398.02	0.340	1871	741.21	2.524	1306.1	564.89
71	3.08	11486	10354	396.84	0.339	1873	741.21	2.527	1307.1	565.91
72	3.13	11492	10355	395.66	0.336	1880.4	743.57	2.529	1312	568.42
73	3.18	11497	10355	393.31	0.332	1887.8	745.92	2.531	1316.9	570.94
74	3.22	11505	10355	390.95	0.328	1898.1	748.28	2.537	1323.2	574.91
75	3.27	11507	10355	389.78	0.326	1901.4	749.46	2.537	1325.4	575.97
76	3.33	11515	10355	387.42	0.322	1911.5	751.81	2.543	1331.7	579.86
77	3.37	11520	10355	386.24	0.320	1917.8	752.99	2.547	1335.4	582.43
78	3.42	11525	10355	383.89	0.317	1925.1	755.35	2.549	1340.2	584.86
79	3.47	11530	10355	382.71	0.314	1931.2	756.52	2.553	1343.9	587.35

80	3.52	11532	10355	380.36	0.312	1935.8	758.88	2.551	1347.3	588.44
81	3.58	11528	10355	379.18	0.312	1933.3	760.06	2.544	1346.7	586.61
82	3.62	11533	10355	376.82	0.309	1940.7	762.41	2.546	1351.6	589.15
83	3.67	11530	10355	375.65	0.309	1938.4	763.59	2.539	1351	587.39
84	3.73	11535	10355	374.47	0.306	1944.4	764.77	2.542	1354.6	589.81
85	3.77	11537	10355	372.11	0.304	1948.9	767.12	2.541	1358	590.9
86	3.84	11539	10355	369.76	0.302	1953.2	769.48	2.538	1361.3	591.86
87	3.87	11547	10355	368.58	0.299	1962.3	770.65	2.546	1366.5	595.83
88	3.92	11554	10355	366.23	0.295	1972.5	773.01	2.552	1372.7	599.74
89	3.98	11553	10355	365.05	0.294	1972.7	774.19	2.548	1373.5	599.27
90	4.04	11558	10355	362.69	0.291	1979.9	776.54	2.550	1378.2	601.7
91	4.09	11563	10355	361.52	0.289	1986.1	777.72	2.554	1381.9	604.17
92	4.13	11571	10355	360.34	0.286	1995.1	778.9	2.561	1387	608.08
93	4.19	11573	10355	357.98	0.284	1999.4	781.25	2.559	1390.3	609.07
94	4.24	11580	10354	356.8	0.282	2007.2	781.25	2.569	1394.2	612.96
95	4.29	11583	10355	354.45	0.279	2012.7	784.78	2.565	1398.7	613.94
96	4.34	11592	10354	353.27	0.277	2023.3	784.78	2.578	1404	619.24
97	4.38	11601	10355	352.09	0.273	2033.3	787.14	2.583	1410.2	623.09
98	4.44	11603	10355	349.74	0.271	2037.7	789.49	2.581	1413.6	624.1
99	4.48	11608	10355	348.56	0.269	2043.8	790.67	2.585	1417.2	626.56
100	4.54	11610	10355	347.38	0.268	2046.9	791.85	2.585	1419.4	627.54
101	4.59	11612	10355	346.21	0.266	2050.1	793.03	2.585	1421.6	628.56
102	4.64	11619	10354	343.85	0.264	2059.1	794.2	2.593	1426.6	632.43
103	4.70	11622	10355	342.67	0.262	2063.2	796.56	2.590	1429.9	633.33
104	4.74	11631	10354	341.5	0.260	2073.8	796.56	2.604	1435.2	638.65
105	4.79	11637	10355	339.14	0.256	2082.1	800.09	2.602	1441.1	641
106	4.84	11641	10354	337.96	0.255	2087	800.09	2.608	1443.6	643.46
107	4.89	11647	10355	336.79	0.252	2094.1	802.45	2.610	1448.3	645.82
108	4.95	11646	10355	334.43	0.251	2095.6	804.8	2.604	1450.2	645.41
109	4.99	11645	10355	333.25	0.250	2096.1	805.98	2.601	1451	645.04
110	5.03	11647	10355	332.08	0.249	2099.5	807.16	2.601	1453.3	646.15
111	5.09	11649	10355	330.9	0.247	2102.6	808.34	2.601	1455.5	647.12
112	5.14	11647	10354	328.54	0.247	2103	809.51	2.598	1456.3	646.75
113	5.19	11650	10355	327.37	0.245	2107.3	811.87	2.596	1459.6	647.72
114	5.24	11658	10355	326.19	0.242	2116.1	813.05	2.603	1464.6	651.51
115	5.29	11657	10355	325.01	0.242	2116.4	814.22	2.599	1465.3	651.08
116	5.35	11662	10355	323.83	0.240	2122.3	815.4	2.603	1468.8	653.43
117	5.40	11661	10355	321.48	0.238	2123.8	817.76	2.597	1470.8	653.03
118	5.44	11663	10355	320.3	0.237	2127.1	818.93	2.597	1473	654.06
119	5.50	11668	10355	319.12	0.235	2133	820.11	2.601	1476.5	656.43
120	5.54	11670	10355	317.94	0.234	2136.2	821.29	2.601	1478.7	657.44
121	5.59	11672	10355	316.77	0.233	2139.4	822.47	2.601	1480.9	658.45
122	5.64	11677	10355	315.59	0.231	2145.3	823.64	2.605	1484.5	660.83
123	5.69	11678	10355	313.23	0.229	2149.6	826	2.602	1487.8	661.78
124	5.74	11686	10355	312.06	0.227	2158.3	827.18	2.609	1492.8	665.58
125	5.78	11691	10355	310.88	0.225	2164.3	828.35	2.613	1496.3	667.99
126	5.84	11690	10355	309.7	0.225	2164.6	829.53	2.609	1497.1	667.54
127	5.88	11695	10355	308.52	0.223	2170.6	830.71	2.613	1500.7	669.94
128	5.93	11697	10355	307.35	0.222	2173.8	831.89	2.613	1502.9	670.97
129	5.98	11701	10355	306.17	0.220	2179.6	833.07	2.616	1506.4	673.29
130	6.02	11705	10354	303.81	0.219	2185.7	834.24	2.620	1510	675.73
131	6.08	11708	10355	302.64	0.217	2189.9	836.6	2.618	1513.2	676.64
132	6.13	11716	10355	301.46	0.215	2198.6	837.78	2.624	1518.2	680.39
133	6.18	11720	10355	300.28	0.213	2204.3	838.95	2.627	1521.6	682.69
134	6.22	11722	10355	299.1	0.212	2207.6	840.13	2.628	1523.9	683.73
135	6.27	11724	10355	297.93	0.211	2210.7	841.31	2.628	1526	684.71
136	6.32	11726	10355	296.75	0.210	2213.8	842.49	2.628	1528.1	685.66
137	6.38	11725	10355	295.57	0.209	2214.1	843.66	2.624	1528.9	685.2
138	6.43	11727	10355	293.22	0.207	2218.3	846.02	2.622	1532.2	686.15
139	6.48	11729	10355	292.04	0.206	2221.4	847.2	2.622	1534.3	687.13
140	6.53	11728	10355	290.86	0.205	2221.8	848.37	2.619	1535.1	686.73
141	6.57	11730	10355	289.68	0.204	2225.1	849.55	2.619	1537.3	687.75
142	6.62	11730	10355	288.51	0.203	2225.4	850.73	2.616	1538.1	687.33
143	6.67	11731	10355	287.33	0.202	2228.5	851.91	2.616	1540.2	688.28
144	6.71	11731	10355	284.97	0.201	2230.1	854.26	2.611	1542.2	687.92
145	6.76	11733	10355	284.97	0.200	2232.1	854.26	2.613	1543.2	688.9
146	6.81	11735	10355	282.62	0.198	2236.3	856.62	2.611	1546.5	689.86
147	6.86	11734	10355	282.62	0.199	2235.5	856.62	2.610	1546.1	689.46
148	6.92	11741	10355	280.26	0.196	2245	858.97	2.614	1552	693.03
149	6.95	11735	10355	279.08	0.196	2240.2	860.15	2.604	1550.2	690.03
150	7.02	11734	10355	277.91	0.195	2240.3	861.33	2.601	1550.8	689.49
151	7.07	11730	10355	276.73	0.195	2238	862.5	2.595	1550.2	687.73
152	7.12	11735	10355	275.55	0.193	2243.7	863.68	2.598	1553.7	690
153	7.18	11739	10355	274.37	0.192	2249.2	864.86	2.601	1557.1	692.19
154	7.21	11738	10354	273.2	0.192	2248.8	864.86	2.600	1556.8	691.95
155	7.27	11739	10354	272.02	0.191	2251.7	866.04	2.600	1558.9	692.84
156	7.33	11741	10354	270.84	0.190	2254.6	867.21	2.600	1560.9	693.71
157	7.37	11742	10355	268.49	0.188	2257.4	870.75	2.592	1564.1	693.32
158	7.43	11741	10355	267.31	0.187	2257.7	871.93	2.589	1564.8	692.88
159	7.47	11744	10354	266.13	0.186	2262.5	871.92	2.595	1567.2	695.27
160	7.52	11750	10355	264.95	0.184	2269.2	874.28	2.596	1571.8	697.48
161	7.57	11752	10355	263.78	0.183	2272.3	875.46	2.596	1573.9	698.44
162	7.62	11754	10355	262.6	0.182	2275.3	876.64	2.596	1576	699.34
163	7.68	11761	10355	261.42	0.180	2283.7	877.81	2.602	1580.8	702.94
164	7.73	11765	10355	260.24	0.179	2289.4	878.99	2.605	1584.2	705.2
165	7.77	11773	10355	259.07	0.177	2297.9	880.17	2.611	1589.1	708.89
166	7.82	11772	10355	256.71	0.176	2299.4	882.52	2.606	1591	708.45
167	7.89	11773	10355	255.53	0.175	2302.2	883.7	2.605	1593	709.26
168	7.94	11779	10354	254.36	0.174	2309.4	883.7	2.613	1596.6	712.87
169	7.98	11788	10355	253.18	0.171	2319.1	886.06	2.617	1602.6	716.55
170	8.03	11790	10355	252	0.170	2322.2	887.23	2.617	1604.7	717.49
171	8.08	11800	10355	250.82	0.168	2333.3	888.41	2.626	1610.8	722.43
172	8.13	11802	10355	249.65	0.167	2336.3	889.59	2.626	1612.9	723.34
173	8.17	11804	10355	248.47	0.166	2339.4	890.77	2.626	1615.1	724.34
174	8.22	11808	10355	247.29	0.165	2345.1	891.94	2.629	1618.5	726.57
175	8.27	11813	10355	244.94	0.163	2352	894.3	2.630	1623.1	728.83
176	8.33	11814	10355	243.76	0.162	2354.8	895.48	2.630	1625.1	729.66
177	8.37	11819	10355	242.58	0.161	2360.6	896.65	2.633	1628.6	731.96
178	8.42	11821	10355	241.4	0.160	2363.5	897.83	2.633	1630.7	732.86
179	8.48	11828	10355	240.22	0.158	2371.7	899.01	2.638	1635.4	736.35

180	8.53	11832	10355	239.05	0.157	2377.4	900.19	2.641	1638.8	738.62
181	8.58	11831	10355	237.87	0.156	2377.7	901.36	2.638	1639.6	738.19
182	8.63	11833	10355	235.51	0.155	2381.8	903.72	2.636	1642.8	739.06
183	8.67	11830	10355	234.34	0.154	2379.5	904.9	2.630	1642.2	737.3
184	8.73	11831	10355	233.16	0.153	2382.4	906.07	2.629	1644.2	738.16
185	8.78	11830	10355	231.98	0.152	2382.7	907.25	2.626	1645	737.71
186	8.82	11832	10355	230.8	0.151	2385.7	908.43	2.626	1647.1	738.65
187	8.88	11834	10355	229.63	0.151	2388.6	909.61	2.626	1649.1	739.49
188	8.93	11835	10354	228.45	0.150	2390.4	909.61	2.628	1650	740.4
189	8.98	11837	10355	227.27	0.149	2394.3	911.96	2.625	1653.2	741.19
190	9.03	11839	10355	224.92	0.147	2398.5	914.32	2.623	1656.4	742.09
191	9.08	11841	10355	223.74	0.146	2401.5	915.5	2.623	1658.5	743
192	9.13	11845	10355	222.56	0.145	2407.1	916.67	2.626	1661.9	745.24
193	9.17	11845	10355	221.38	0.144	2407.5	917.85	2.623	1662.7	744.83
194	9.21	11846	10355	220.21	0.143	2410.5	919.03	2.623	1664.8	745.76
195	9.28	11853	10355	219.03	0.142	2418.5	920.21	2.628	1669.4	749.17
196	9.32	11858	10355	217.85	0.141	2424.3	921.38	2.631	1672.8	751.45
197	9.37	11862	10355	215.5	0.139	2430.9	923.74	2.632	1677.3	753.59
198	9.43	11869	10355	214.32	0.137	2439.1	924.92	2.637	1682	757.11
199	9.48	11873	10355	213.14	0.136	2444.7	926.09	2.640	1685.4	759.28
200	9.53	11878	10355	211.96	0.135	2450.1	927.27	2.642	1688.7	761.43
201	9.57	11885	10355	209.61	0.133	2459.7	929.63	2.646	1694.7	765.06
202	9.62	11884	10355	208.43	0.132	2459.9	930.8	2.643	1695.4	764.56
203	9.67	11888	10355	207.25	0.131	2465.4	931.98	2.645	1698.7	766.71
204	9.73	11895	10355	206.08	0.130	2473.5	933.16	2.651	1703.3	770.17
205	9.77	11897	10355	204.9	0.129	2476.5	934.34	2.651	1705.4	771.09
206	9.82	11902	10355	203.72	0.128	2482.1	935.51	2.653	1708.8	773.3
207	9.86	11906	10355	201.37	0.126	2488.9	937.87	2.654	1713.4	775.54
208	9.92	11908	10355	201.37	0.126	2490.5	937.87	2.656	1714.2	776.34
209	9.97	11909	10355	199.01	0.124	2494.5	940.22	2.653	1717.3	777.12
210	10.02	11911	10355	199.01	0.124	2496.2	940.22	2.655	1718.2	777.96
211	10.07	11910	10355	196.65	0.123	2497.6	942.58	2.650	1720.1	777.5
212	10.12	11909	10355	195.48	0.122	2497.9	943.76	2.647	1720.8	777.06
213	10.15	11908	10355	194.3	0.121	2498.3	944.93	2.644	1721.6	776.68
214	10.20	11907	10355	194.3	0.121	2497.4	944.93	2.643	1721.1	776.21
215	10.26	11909	10355	191.94	0.120	2501.2	947.29	2.640	1724.3	776.97
216	10.31	11905	10355	190.77	0.119	2498.8	948.47	2.635	1723.6	775.14
217	10.35	11907	10355	189.59	0.118	2501.8	949.64	2.634	1725.7	776.08
218	10.42	11908	10355	188.41	0.118	2504.4	950.82	2.634	1727.6	776.79
219	10.46	11908	10355	187.23	0.117	2504.8	952	2.631	1728.4	776.38
220	10.51	11909	10355	186.06	0.116	2507.5	953.18	2.631	1730.3	777.16
221	10.57	11911	10355	184.88	0.115	2510.3	954.36	2.630	1732.3	777.98
222	10.62	11907	10355	182.52	0.114	2509.1	956.71	2.623	1732.9	776.19
223	10.67	11909	10355	182.52	0.114	2510.7	956.71	2.624	1733.7	776.99
224	10.71	11911	10355	180.17	0.112	2514.8	959.07	2.622	1736.9	777.86
225	10.77	11910	10355	178.99	0.112	2514.8	960.24	2.619	1737.5	777.3
226	10.81	11911	10355	177.81	0.111	2517.8	961.42	2.619	1739.6	778.21
227	10.87	11915	10355	176.64	0.110	2523.2	962.6	2.621	1742.9	780.28
228	10.92	11912	10355	175.46	0.109	2520.8	963.78	2.615	1742.3	778.49
229	10.96	11916	10355	174.28	0.108	2526.4	964.95	2.618	1745.7	780.7
230	11.02	11918	10355	174.28	0.108	2527.9	964.95	2.620	1746.4	781.46
231	11.08	11922	10355	171.93	0.106	2534.3	967.31	2.620	1750.8	783.49
232	11.12	11924	10355	170.75	0.105	2537.3	968.49	2.620	1752.9	784.39
233	11.17	11928	10355	169.57	0.105	2542.5	969.66	2.622	1756.1	786.43
234	11.22	11930	10355	168.39	0.104	2545.5	970.84	2.622	1758.2	787.31
235	11.27	11936	10355	167.22	0.102	2553.3	972.02	2.627	1762.7	790.66
236	11.33	11940	10355	166.04	0.102	2558.6	973.2	2.629	1765.9	792.69
237	11.38	11945	10355	163.68	0.100	2565.2	975.55	2.629	1770.4	794.82
238	11.42	11949	10355	162.51	0.099	2570.8	976.73	2.632	1773.8	797.05
239	11.47	11958	10355	160.15	0.097	2582.5	979.08	2.638	1780.8	801.71
240	11.52	11965	10355	158.97	0.096	2590.5	980.26	2.643	1785.4	805.13
241	11.56	11964	10355	158.97	0.096	2589.6	980.26	2.642	1784.9	804.67
242	11.62	11968	10355	156.62	0.094	2596.1	982.62	2.642	1789.4	806.74
243	11.67	11972	10355	155.44	0.093	2601.4	983.79	2.644	1792.6	808.78
244	11.72	11977	10355	154.26	0.092	2606.8	984.97	2.647	1795.9	810.91
245	11.78	11981	10355	153.08	0.091	2611.9	986.15	2.649	1799	812.89
246	11.82	11988	10355	151.91	0.090	2620	987.33	2.654	1803.7	816.34
247	11.86	11992	10355	149.55	0.089	2626.6	989.68	2.654	1808.2	818.47
248	11.91	11996	10355	149.55	0.088	2630.9	989.68	2.658	1810.3	820.6
249	11.97	12000	10355	148.37	0.087	2635.9	990.86	2.660	1813.4	822.5
250	12.03	12007	10355	147.2	0.086	2643.6	992.04	2.665	1817.8	825.8
251	12.07	12008	10355	146.02	0.086	2646.4	993.22	2.665	1819.8	826.62
252	12.13	12010	10355	143.66	0.084	2650.2	995.57	2.662	1822.9	827.3
253	12.17	12011	10355	143.66	0.084	2652	995.57	2.664	1823.8	828.22
254	12.22	12010	10355	142.49	0.083	2652	996.75	2.661	1824.4	827.65
255	12.27	12012	10355	141.31	0.083	2654.9	997.93	2.660	1826.4	828.48
256	12.32	12013	10355	140.13	0.082	2657.5	999.1	2.660	1828.3	829.21
257	12.37	12012	10355	138.95	0.081	2657.7	1000.3	2.657	1829	828.73
258	12.42	12016	10355	136.6	0.080	2664.1	1002.6	2.657	1833.4	830.73
259	12.46	12016	10355	136.6	0.080	2663.2	1002.6	2.656	1832.9	830.3
260	12.52	12017	10355	134.24	0.078	2667	1005	2.654	1836	830.99
261	12.57	12018	10355	133.07	0.077	2669.5	1006.2	2.653	1837.9	831.69
262	12.63	12022	10355	131.89	0.077	2674.7	1007.3	2.655	1841	833.68
263	12.67	12020	10354	129.53	0.076	2675	1008.5	2.652	1841.7	833.23
264	12.72	12025	10355	129.53	0.075	2680.2	1009.7	2.654	1844.9	835.23
265	12.77	12029	10355	129.53	0.075	2684.3	1009.7	2.658	1847	837.29
266	12.83	12031	10355	128.36	0.074	2686.8	1010.9	2.658	1848.8	837.97
267	12.87	12035	10355	126	0.073	2693.4	1013.2	2.658	1853.3	840.07
268	12.92	12042	10355	124.82	0.072	2701.1	1014.4	2.663	1857.8	843.36
269	12.98	12043	10355	124.82	0.072	2702.5	1014.4	2.664	1858.5	844.06
270	13.02	12051	10356	123.65	0.070	2711.5	1016.8	2.667	1864.1	847.37
271	13.07	12049	10355	122.47	0.070	2710.5	1016.8	2.666	1863.6	846.88
272	13.12	12056	10356	121.29	0.068	2719.5	1019.1	2.668	1869.3	850.19
273	13.16	12059	10355	120.11	0.068	2723.6	1019.1	2.673	1871.4	852.24
274	13.21	12058	10355	118.93	0.068	2723.8	1020.3	2.670	1872	851.74
275	13.27	12065	10355	116.58	0.066	2732.5	1022.7	2.672	1877.6	854.91
276	13.31	12069	10355	117.76	0.067	2735.6	1021.5	2.678	1878.5	857.07
277	13.36	12075	10355	115.4	0.065	2744.3	1023.8	2.680	1884.1	860.25
278	13.41	12074	10355	114.22	0.064	2744.6	1025	2.678	1884.8	859.79
279	13.46	12075	10354	111.87	0.064	2747.1	1026.2	2.677	1886.6	860.46

280	13.50	12078	10355	110.69	0.062	2751.2	1028.5	2.675	1889.9	861.32
281	13.56	12081	10355	109.51	0.061	2756.2	1029.7	2.677	1893	863.24
282	13.61	12085	10355	108.34	0.061	2761.3	1030.9	2.679	1896.1	865.21
283	13.65	12084	10355	108.34	0.061	2760.3	1030.9	2.678	1895.6	864.68
284	13.70	12086	10355	107.16	0.060	2762.9	1032.1	2.677	1897.5	865.42
285	13.75	12087	10355	103.63	0.058	2767.9	1035.6	2.673	1901.7	866.12
286	13.80	12084	10355	102.45	0.057	2765.4	1036.8	2.667	1901.1	864.29
287	13.86	12085	10355	101.27	0.057	2767.9	1038	2.667	1903	864.99
288	13.89	12084	10355	101.27	0.057	2767.1	1038	2.666	1902.5	864.58
289	13.94	12080	10355	100.09	0.056	2764.6	1039.1	2.661	1901.9	862.75
290	14.00	12082	10355	97.739	0.055	2768.4	1041.5	2.658	1904.9	863.45
291	14.05	12075	10355	95.383	0.054	2764.4	1043.9	2.648	1904.1	860.28
292	14.10	12077	10355	94.206	0.053	2767.1	1045	2.648	1906.1	861.04
293	14.14	12079	10355	94.206	0.053	2768.7	1045	2.649	1906.9	861.83
294	14.20	12080	10355	91.851	0.051	2772.2	1047.4	2.647	1909.8	862.43
295	14.25	12076	10355	90.673	0.051	2769.8	1048.6	2.641	1909.2	860.6
296	14.30	12083	10355	88.318	0.049	2778.6	1050.9	2.644	1914.7	863.83
297	14.36	12084	10355	87.14	0.049	2781	1052.1	2.643	1916.6	864.46
298	14.41	12080	10355	87.14	0.049	2777.4	1052.1	2.640	1914.7	862.63
299	14.48	12086	10355	84.785	0.047	2785.8	1054.4	2.642	1920.1	865.68
300	14.51	12091	10355	82.43	0.046	2792.5	1056.8	2.642	1924.6	867.83
301	14.56	12092	10355	81.253	0.045	2794.9	1058	2.642	1926.4	868.45
302	14.61	12098	10355	81.253	0.045	2801.4	1058	2.648	1929.7	871.72
303	14.67	12102	10355	80.075	0.044	2806.3	1059.2	2.650	1932.7	873.57
304	14.72	12103	10355	76.542	0.042	2811.2	1062.7	2.645	1937	874.26
305	14.77	12107	10355	75.365	0.041	2816.2	1063.9	2.647	1940	876.17
306	14.82	12114	10355	73.01	0.040	2825	1066.2	2.650	1945.6	879.4
307	14.86	12120	10355	73.01	0.040	2831.4	1066.2	2.656	1948.8	882.6
308	14.91	12132	10355	73.01	0.040	2842.8	1066.2	2.666	1954.5	888.3
309	14.96	12129	10354	69.477	0.038	2844	1068.6	2.661	1956.3	887.71
310	15.00	12131	10354	67.122	0.037	2848	1070.9	2.659	1959.5	888.53

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



Symbol	⊙			
Sample No.	T-2			
Test No.	2			
Depth	8.5' - 9.0'			
Initial	Diameter, in	2.86		
	Height, in	5.63		
	Water Content, %	28.8		
	Dry Density, pcf	90.87		
	Saturation, %	91.4		
Before Shear	Void Ratio	0.848		
	Water Content, %	30.5		
	Dry Density, pcf	92.21		
	Saturation*, %	100.0		
	Void Ratio	0.821		
	Back Press., psf	7777		
	Ver. Eff. Cons. Stress, psf	2279		
	Shear Strength, psf	578.		
	Strain at Failure, %	13.7		
	Strain Rate, %/min	0.01		
	B-Value	0.96		
	Measured Specific Gravity	2.69		
	Liquid Limit	23		
	Plastic Limit	19		

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-9				
	Sample Type: Undisturbed				
	Description: Brown Sandy Silty CLAY (CL-ML)				
	Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 2280 PSF				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-2
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/08/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 8.5' - 9.0'
Elevation:

Soil Description: Brown Sandy Silty CLAY (CL-ML)
Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 2280 PSF

Specimen Height: 5.63 in
Specimen Area: 6.42 in²
Specimen Volume: 592.70 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 23

Plastic Limit: 19

Measured Specific Gravity: 2.69

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	279	---	0	
Wt. Container + Wet Soil, gm	53.86	---	---	1114.3
Wt. Container + Dry Soil, gm	48.92	---	---	855.3
Wt. Container, gm	31.78	---	---	6.84
Wt. Wet Soil, gm	22.08	1111.3	1126	1107.5
Wt. Dry Soil, gm	17.14	862.69	862.69	848.46
Wt. Water, gm	4.94	248.64	263.35	259.01
Water Content, %	28.82	28.82	30.53	30.53
Void Ratio	---	0.85	0.82	---
Degree of Saturation, %	---	91.41	100.00	---
Dry Unit Weight, pcf	---	90.866	92.21	---

Initial

Height: 5.63 in
Area: 6.4242 in²
Volume: 592.7 cc

Moisture: 28.82 %
Void Ratio: 0.85
Dry Unit Weight: 90.866 pcf
Saturation: 91.41 %

End of Initialization

Time: 10.137 min
Total Vertical Stress: 718.21 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 575.83 psf
Effective Vertical Stress: 142.37 psf
Effective Horizontal Stress: 143.59 psf

Height Change: -0.00019058 in
Area Change: 0 in²
Volume Change: -0.060189 cc
Water Change: -6.1969 cc
Correction: 0 cc

Moisture: 29.54 %
Void Ratio: 0.85
Dry Unit Weight: 90.857 pcf
Saturation: 93.67 %

End of Consolidation/A

Time: 10.137 min
Total Vertical Stress: 718.21 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 575.83 psf
Effective Vertical Stress: 142.37 psf
Effective Horizontal Stress: 143.59 psf

Height Change: -0.00019058 in
Area Change: 0 in²
Volume Change: -0.060189 cc
Water Change: -6.1969 cc
Correction: 0 cc

Moisture: 29.54 %
Void Ratio: 0.85
Dry Unit Weight: 90.857 pcf
Saturation: 93.67 %

End of Saturation

Time: 31.591 min
Total Vertical Stress: 7926.2 psf
Total Horizontal Stress: 7930.1 psf
Pore Pressure: 7763.7 psf
Effective Vertical Stress: 162.47 psf
Effective Horizontal Stress: 166.38 psf

Height Change: 0.0032398 in
Area Change: 0 in²
Volume Change: 1.0232 cc
Water Change: -20.949 cc
Correction: 0 cc

Moisture: 31.25 %
Void Ratio: 0.84
Dry Unit Weight: 91.023 pcf
Saturation: 99.49 %

End of Consolidation/B

Time: 262.29 min
Total Vertical Stress: 9945.7 psf
Total Horizontal Stress: 10055 psf
Pore Pressure: 7776.7 psf
Effective Vertical Stress: 2169 psf
Effective Horizontal Stress: 2278.7 psf

Height Change: 0.069942 in
Area Change: 0.014 in²
Volume Change: 8.6387 cc
Water Change: 9.5783 cc
Correction: -24.292 cc

Moisture: 30.53 %
Void Ratio: 0.82
Dry Unit Weight: 92.21 pcf
Saturation: 100.00 %

End of Shear

Time: 1766.4 min
Total Vertical Stress: 11198 psf
Total Horizontal Stress: 10055 psf
Pore Pressure: 8987.2 psf
Effective Vertical Stress: 2210.4 psf
Effective Horizontal Stress: 1068.1 psf

Height Change: 0.90401 in
Area Change: -1.1173 in²
Volume Change: 8.6387 cc
Water Change: 9.5783 cc
Correction: -24.292 cc

Moisture: 30.53 %
Void Ratio: 0.82
Dry Unit Weight: 92.21 pcf
Saturation: 100.00 %

At Failure

Time: 1642.3 min
Total Vertical Stress: 11211 psf
Total Horizontal Stress: 10055 psf
Pore Pressure: 9012 psf
Effective Vertical Stress: 2199.4 psf
Effective Horizontal Stress: 1043.4 psf

Height Change: 0.83416 in
Area Change: -0.99552 in²
Volume Change: 8.6387 cc
Water Change: 9.5783 cc
Correction: 0 cc

Moisture: 30.53 %
Void Ratio: 0.82
Dry Unit Weight: 92.21 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-2
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/08/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 8.5' - 9.0'
Elevation:

Soil Description: Brown Sandy Silty CLAY (CL-ML)
Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 2280 PSF

Specimen Height: 5.56 in
Specimen Area: 6.41 in²
Specimen Volume: 584.06 cc
Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb
Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 23

Plastic Limit: 19

Measured Specific Gravity: 2.69

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.3999	-0.099735	-109.58	7776.7	10054	9944.6
2	0.012433	0	0	6.3999	-0.099735	-109.58	7777.9	10054	9944.6
3	0.020767	0.0017138	0	6.4	-0.10162	-109.77	7779	10055	9945.6
4	0.054083	0.0017138	0	6.4	0.17076	-103.64	7783.8	10054	9950.5
5	0.10408	0.0017138	0	6.4	0.30412	-100.64	7789.6	10055	9954.7
6	0.20408	0.0034276	0	6.4001	0.57461	-94.7	7800.2	10055	9960.7
7	0.50405	0.0085691	0	6.4005	1.5232	-73.797	7822.6	10054	9980.4
8	1.004	0.018852	0	6.4011	2.7385	-47.338	7854.4	10055	10008
9	2.0039	0.029135	0	6.4018	4.9025	0.45326	7901.5	10055	10056
10	5.0036	0.049701	0	6.4031	9.6361	105.13	8002.8	10055	10160
11	10.003	0.099401	0	6.4063	15.316	228.46	8118.2	10055	10284
12	15.003	0.15082	0	6.4096	19.509	318.09	8205.3	10055	10373
13	20.002	0.20737	0	6.4132	22.89	388.94	8277.2	10055	10444
14	25.002	0.26221	0	6.4168	25.73	447.71	8338.4	10055	10503
15	30.001	0.30506	0	6.4195	28.3	501.45	8392.6	10055	10557
16	35.001	0.3479	0	6.4223	30.329	543.01	8439.7	10055	10598
17	40.001	0.39418	0	6.4253	32.493	587.24	8483.2	10055	10643
18	45	0.44731	0	6.4287	34.386	624.73	8522.1	10055	10680
19	50.004	0.49701	0	6.4319	36.144	659.47	8556.2	10055	10715
20	55.003	0.55185	0	6.4354	37.903	693.69	8589.2	10055	10749
21	60.003	0.59469	0	6.4382	39.39	722.94	8618.7	10055	10778
22	65.003	0.64782	0	6.4417	40.743	748.17	8645.7	10055	10804
23	70.002	0.69924	0	6.445	42.095	773.53	8671.6	10055	10829
24	75.002	0.73865	0	6.4476	43.448	800	8694	10055	10855
25	80.001	0.79521	0	6.4512	44.8	827.2	8716.4	10055	10883
26	85.001	0.84834	0	6.4547	45.476	841.75	8736.4	10055	10897
27	90	0.89118	0	6.4575	46.288	859.4	8756.4	10055	10915
28	95.004	0.94945	0	6.4613	47.099	876.88	8774.1	10055	10932
29	100	0.98716	0	6.4637	47.911	894.56	8790.6	10055	10950
30	105	1.0386	0	6.4671	48.452	906.05	8805.9	10055	10961
31	110	1.0814	0	6.4699	49.263	923.65	8818.8	10055	10979
32	115	1.1363	0	6.4735	49.939	938.08	8833	10055	10993
33	120	1.1945	0	6.4773	50.48	949.45	8845.9	10055	11005
34	125	1.2288	0	6.4796	51.019	961.04	8857.7	10057	11018
35	130	1.2768	0	6.4827	51.698	975.56	8868.3	10055	11031
36	135	1.3282	0	6.4861	52.239	986.97	8878.9	10055	11042
37	140	1.383	0	6.4897	52.644	995.33	8888.3	10055	11051
38	145	1.4293	0	6.4927	53.321	1009.8	8898.9	10055	11065
39	150	1.4893	0	6.4967	53.724	1018	8907.2	10057	11075
40	155	1.527	0	6.4992	54.267	1029.6	8915.4	10055	11085
41	160	1.5853	0	6.503	54.673	1037.9	8922.5	10055	11093
42	165	1.6264	0	6.5057	55.081	1046.4	8928.4	10054	11101
43	170	1.6727	0	6.5088	55.484	1054.7	8937.8	10055	11110
44	175	1.7258	0	6.5123	55.888	1063	8944.8	10057	11120
45	180	1.7772	0	6.5157	56.161	1068.4	8950.7	10055	11124
46	185	1.8372	0	6.5197	56.566	1076.6	8955.4	10055	11132
47	190	1.8835	0	6.5228	56.702	1079	8961.3	10055	11134
48	195	1.9263	0	6.5256	56.972	1084.4	8966	10055	11140
49	200	1.9812	0	6.5293	57.243	1089.7	8969.6	10055	11145
50	205	2.024	0	6.5321	57.378	1092.1	8974.3	10055	11147
51	210	2.0703	0	6.5352	57.648	1097.4	8980.2	10055	11153
52	215	2.1114	0	6.538	57.919	1102.9	8983.7	10055	11158
53	220	2.1697	0	6.5419	58.054	1105.1	8988.4	10055	11160
54	225	2.2074	0	6.5444	58.189	1107.6	8989.6	10055	11163
55	230	2.2622	0	6.5481	58.325	1109.8	8994.3	10055	11165
56	235	2.3102	0	6.5513	58.595	1115.1	8999	10055	11171
57	240	2.3633	0	6.5548	58.73	1117.4	9001.4	10055	11173
58	245	2.4148	0	6.5583	59.271	1128.6	9003.7	10055	11184
59	250	2.4525	0	6.5608	59.542	1134.1	9006.1	10055	11189
60	255	2.5124	0	6.5649	59.677	1136.2	9007.3	10055	11192
61	260	2.5604	0	6.5681	60.083	1144.5	9010.8	10055	11200
62	265	2.6119	0	6.5716	60.083	1143.8	9013.1	10055	11199
63	270	2.6616	0	6.5749	60.218	1146.1	9013.1	10055	11201
64	275	2.713	0	6.5784	60.355	1148.4	9013.1	10054	11203
65	280	2.7712	0	6.5823	60.489	1150.5	9016.7	10055	11206
66	285	2.8072	0	6.5848	60.624	1153	9017.9	10055	11208
67	290	2.8552	0	6.588	60.624	1152.3	9016.7	10055	11208
68	295	2.9066	0	6.5915	60.624	1151.6	9016.7	10055	11207
69	300	2.9615	0	6.5952	60.759	1153.8	9019	10055	11209
70	305	3.0129	0	6.5987	60.218	1141.3	9020.2	10055	11197
71	310	3.0609	0	6.602	60.083	1137.7	9020.2	10055	11193
72	315	3.1157	0	6.6057	60.083	1137	9021.4	10055	11192
73	320	3.1586	0	6.6087	59.948	1133.4	9022.6	10055	11189
74	325	3.2151	0	6.6125	59.812	1129.7	9024.9	10055	11185
75	330	3.2717	0	6.6164	59.812	1129	9023.7	10055	11184
76	335	3.3197	0	6.6197	59.677	1125.4	9023.7	10055	11181
77	340	3.3694	0	6.6231	59.542	1121.8	9026.1	10055	11177
78	345	3.4156	0	6.6263	59.677	1124.1	9027.3	10055	11179
79	350	3.4773	0	6.6305	59.677	1123.3	9028.5	10055	11179
80	355	3.5133	0	6.633	59.542	1119.8	9028.5	10055	11175

81	360	3.5784	0	6.6374	59.407	1116	9029.6	10055	11171
82	365	3.6196	0	6.6403	59.407	1115.5	9029.6	10055	11171
83	370	3.6796	0	6.6444	59.271	1111.7	9030.8	10055	11167
84	375	3.719	0	6.6471	59.271	1111.2	9033.2	10055	11167
85	380	3.779	0	6.6513	59.271	1110.4	9033.2	10055	11166
86	385	3.8218	0	6.6542	59.271	1109.9	9033.2	10055	11165
87	390	3.8681	0	6.6574	59.271	1109.2	9033.2	10055	11165
88	395	3.9212	0	6.6611	59.136	1105.6	9035.5	10055	11161
89	400	3.9795	0	6.6652	59.271	1107.7	9037.9	10055	11163
90	405	4.0172	0	6.6678	59.136	1104.3	9036.7	10055	11160
91	410	4.0737	0	6.6717	59.271	1106.5	9036.7	10055	11162
92	415	4.1149	0	6.6746	59.271	1105.9	9037.9	10055	11161
93	420	4.1783	0	6.679	59.271	1105.1	9039.1	10055	11160
94	425	4.2228	0	6.6821	59.271	1104.5	9040.2	10055	11160
95	430	4.2708	0	6.6855	59.136	1101	9041.4	10055	11156
96	435	4.3274	0	6.6894	59.271	1103.1	9042.6	10055	11158
97	440	4.3719	0	6.6925	59.271	1102.5	9043.8	10055	11158
98	445	4.4251	0	6.6962	59.138	1098.9	9042.6	10054	11153
99	450	4.4782	0	6.7	59.271	1101.1	9042.6	10055	11156
100	455	4.5279	0	6.7035	59.136	1097.5	9043.8	10055	11153
101	460	4.5793	0	6.7071	59.271	1099.7	9043.8	10055	11155
102	465	4.6324	0	6.7108	59.136	1096.1	9044.9	10055	11152
103	470	4.6753	0	6.7138	59.136	1095.6	9046.1	10055	11151
104	475	4.7301	0	6.7177	59.001	1091.9	9046.1	10055	11147
105	480	4.7661	0	6.7202	59.136	1094.4	9046.1	10055	11150
106	485	4.8192	0	6.724	59.001	1090.8	9044.9	10055	11146
107	490	4.8775	0	6.7281	58.999	1089.9	9046.1	10057	11146
108	495	4.9272	0	6.7316	59.001	1089.3	9046.1	10055	11145
109	500	4.9889	0	6.736	59.001	1088.5	9046.1	10055	11144
110	505	5.0472	0	6.7401	59.001	1087.7	9047.3	10055	11143
111	510	5.0849	0	6.7428	59.001	1087.2	9048.5	10055	11143
112	515	5.1346	0	6.7463	59.001	1086.6	9047.3	10055	11142
113	520	5.1843	0	6.7499	59.001	1085.9	9048.5	10055	11141
114	525	5.234	0	6.7534	59.001	1085.3	9049.7	10055	11141
115	530	5.2785	0	6.7566	58.866	1081.8	9048.5	10055	11137
116	535	5.3334	0	6.7605	59.001	1083.9	9048.5	10055	11139
117	540	5.3797	0	6.7638	59.001	1083.3	9047.3	10055	11139
118	545	5.4242	0	6.767	59.136	1085.6	9047.3	10055	11141
119	550	5.4791	0	6.7709	59.271	1087.8	9048.5	10055	11143
120	555	5.5236	0	6.7741	59.271	1087.2	9048.5	10055	11143
121	560	5.5682	0	6.7773	59.542	1092.3	9048.5	10055	11148
122	565	5.6179	0	6.7809	59.812	1097.4	9048.5	10055	11153
123	570	5.6693	0	6.7846	59.812	1096.7	9049.7	10055	11152
124	575	5.7276	0	6.7888	60.083	1101.6	9049.7	10055	11157
125	580	5.7653	0	6.7915	60.22	1104	9048.5	10054	11158
126	585	5.8253	0	6.7958	60.487	1108.9	9052	10057	11165
127	590	5.8647	0	6.7986	60.489	1108.4	9049.7	10055	11164
128	595	5.9127	0	6.8021	60.624	1110.6	9048.5	10055	11166
129	600	5.9624	0	6.8057	60.759	1112.8	9048.5	10055	11168
130	605	6.0223	0	6.8101	61.03	1117.7	9048.5	10055	11173
131	610	6.0738	0	6.8138	61.03	1117	9047.3	10055	11172
132	615	6.1183	0	6.817	61.3	1122.1	9048.5	10055	11177
133	620	6.1663	0	6.8205	61.3	1121.4	9048.5	10055	11177
134	625	6.2177	0	6.8242	61.435	1123.6	9048.5	10055	11179
135	630	6.2708	0	6.8281	61.571	1125.7	9048.5	10055	11181
136	635	6.312	0	6.8311	61.706	1128	9048.5	10055	11183
137	640	6.3617	0	6.8347	61.841	1130.1	9048.5	10055	11185
138	645	6.3994	0	6.8375	61.706	1126.7	9048.5	10055	11182
139	650	6.4542	0	6.8415	61.841	1128.8	9048.5	10055	11184
140	655	6.5022	0	6.845	61.976	1131	9048.5	10055	11186
141	660	6.5622	0	6.8494	62.112	1133	9048.5	10055	11188
142	665	6.5999	0	6.8522	61.571	1121.1	9049.7	10055	11176
143	670	6.6719	0	6.8575	61.435	1117.3	9048.5	10055	11173
144	675	6.7079	0	6.8601	61.435	1116.8	9047.3	10055	11172
145	680	6.7627	0	6.8641	61.435	1116	9046.1	10055	11171
146	685	6.8244	0	6.8687	61.435	1115.2	9046.1	10055	11171
147	690	6.857	0	6.8711	61.435	1114.7	9046.1	10055	11170
148	695	6.9118	0	6.8751	61.165	1108.3	9046.1	10055	11164
149	700	6.9684	0	6.8793	61.165	1107.5	9046.1	10055	11163
150	705	7.0146	0	6.8827	61.165	1106.9	9046.1	10055	11162
151	710	7.0678	0	6.8867	61.03	1103.3	9046.1	10055	11159
152	715	7.1089	0	6.8897	61.03	1102.8	9046.1	10055	11158
153	720	7.1637	0	6.8938	60.894	1099.2	9046.1	10055	11155
154	725	7.2134	0	6.8975	60.759	1095.7	9046.1	10055	11151
155	730	7.2666	0	6.9014	60.759	1095	9046.1	10055	11150
156	735	7.3197	0	6.9054	60.894	1097	9046.1	10055	11152
157	740	7.3711	0	6.9092	60.757	1093.5	9046.1	10057	11150
158	745	7.4157	0	6.9125	60.759	1092.9	9044.9	10055	11148
159	750	7.4654	0	6.9163	60.624	1089.4	9044.9	10055	11145
160	755	7.5288	0	6.921	60.759	1091.4	9044.9	10055	11147
161	760	7.5819	0	6.925	60.759	1090.6	9044.9	10055	11146
162	765	7.623	0	6.9281	60.624	1087.3	9044.9	10055	11143
163	770	7.6693	0	6.9315	60.624	1086.6	9044.9	10055	11142
164	775	7.7224	0	6.9355	60.624	1085.9	9044.9	10055	11141
165	780	7.7704	0	6.9391	60.759	1088.1	9044.9	10055	11143
166	785	7.8133	0	6.9424	60.759	1087.5	9044.9	10055	11143
167	790	7.8613	0	6.946	60.894	1089.6	9044.9	10055	11145
168	795	7.9127	0	6.9498	60.894	1088.9	9044.9	10055	11144
169	800	7.9675	0	6.954	60.894	1088.2	9044.9	10055	11144
170	805	8.0155	0	6.9576	60.894	1087.5	9044.9	10055	11143
171	810	8.0652	0	6.9614	60.894	1086.8	9042.6	10055	11142
172	815	8.1235	0	6.9658	60.894	1086	9042.6	10055	11141
173	820	8.1715	0	6.9694	60.894	1085.4	9041.4	10055	11141
174	825	8.2177	0	6.9729	60.894	1084.7	9041.4	10055	11140
175	830	8.2743	0	6.9772	60.894	1084	9041.4	10055	11139
176	835	8.3137	0	6.9802	60.894	1083.4	9041.4	10055	11139
177	840	8.3703	0	6.9846	60.894	1082.7	9041.4	10055	11138
178	845	8.42	0	6.9883	60.894	1082	9041.4	10055	11137
179	850	8.4662	0	6.9919	60.759	1078.6	9040.2	10055	11134
180	855	8.5211	0	6.9961	60.894	1080.6	9041.4	10055	11136

181	860	8.5691	0	6.9997	60.624	1074.4	9041.4	10055	11130
182	865	8.6256	0	7.0041	60.759	1076.4	9040.2	10055	11132
183	870	8.6753	0	7.0079	60.624	1072.9	9040.2	10055	11128
184	875	8.7233	0	7.0116	60.624	1072.3	9040.2	10055	11128
185	880	8.7696	0	7.0151	60.624	1071.6	9040.2	10055	11127
186	885	8.8141	0	7.0186	60.624	1071	9040.2	10055	11126
187	890	8.8587	0	7.022	60.624	1070.4	9040.2	10055	11126
188	895	8.9187	0	7.0266	60.757	1072.3	9040.2	10057	11129
189	900	8.9564	0	7.0295	60.894	1074.6	9039.1	10055	11130
190	905	9.0164	0	7.0342	61.03	1076.6	9039.1	10055	11132
191	910	9.0695	0	7.0383	61.165	1078.6	9039.1	10055	11134
192	915	9.1226	0	7.0424	61.3	1080.6	9039.1	10055	11136
193	920	9.1672	0	7.0458	61.435	1082.8	9039.1	10055	11138
194	925	9.2117	0	7.0493	61.435	1082.2	9037.9	10055	11138
195	930	9.27	0	7.0538	61.706	1086.9	9037.9	10055	11142
196	935	9.318	0	7.0576	61.976	1091.7	9037.9	10055	11147
197	940	9.3746	0	7.062	62.112	1093.7	9037.9	10055	11149
198	945	9.4174	0	7.0653	62.112	1093.1	9037.9	10055	11148
199	950	9.4585	0	7.0685	62.382	1098.1	9036.7	10055	11153
200	955	9.5082	0	7.0724	62.788	1105.6	9036.7	10055	11161
201	960	9.5614	0	7.0765	62.653	1102.1	9035.5	10055	11157
202	965	9.6162	0	7.0808	63.058	1109.6	9033.2	10055	11165
203	970	9.6642	0	7.0846	63.058	1108.9	9033.2	10055	11164
204	975	9.7173	0	7.0888	63.194	1110.9	9032	10055	11166
205	980	9.7619	0	7.0923	63.329	1113	9032	10055	11168
206	985	9.803	0	7.0955	63.464	1115.2	9032	10055	11171
207	990	9.851	0	7.0993	63.734	1120	9032	10055	11175
208	995	9.911	0	7.104	63.868	1121.8	9032	10057	11178
209	1000	9.9641	0	7.1082	64.005	1123.8	9029.6	10055	11179
210	1005	10.004	0	7.1113	64.14	1126	9028.5	10055	11181
211	1010	10.064	0	7.1161	64.275	1127.9	9028.5	10055	11183
212	1015	10.105	0	7.1193	64.411	1130	9027.3	10055	11185
213	1020	10.159	0	7.1237	64.546	1132	9027.3	10055	11187
214	1025	10.206	0	7.1273	64.411	1128.5	9033.2	10055	11184
215	1030	10.257	0	7.1314	64.409	1127.8	9034.3	10057	11184
216	1035	10.309	0	7.1355	64.275	1124.3	9032	10055	11180
217	1040	10.357	0	7.1393	64.411	1126.4	9030.8	10055	11182
218	1045	10.411	0	7.1437	64.411	1125.6	9029.6	10055	11181
219	1050	10.451	0	7.1468	64.275	1122.3	9029.6	10055	11178
220	1055	10.509	0	7.1515	64.411	1124.2	9029.6	10055	11180
221	1060	10.562	0	7.1557	64.413	1123.4	9028.5	10054	11178
222	1065	10.605	0	7.1592	64.411	1122.8	9029.6	10055	11178
223	1070	10.66	0	7.1636	64.546	1124.7	9029.6	10055	11180
224	1075	10.715	0	7.168	64.411	1121.2	9028.5	10055	11177
225	1080	10.758	0	7.1714	64.275	1117.8	9028.5	10055	11173
226	1085	10.821	0	7.1765	64.275	1116.9	9029.6	10055	11172
227	1090	10.864	0	7.1799	64.275	1116.3	9032	10055	11172
228	1095	10.92	0	7.1845	64.274	1115.4	9033.2	10057	11172
229	1100	10.979	0	7.1892	64.14	1111.9	9033.2	10055	11167
230	1105	11.022	0	7.1927	64.275	1114	9033.2	10055	11169
231	1110	11.071	0	7.1967	64.14	1110.6	9032	10055	11166
232	1115	11.123	0	7.2009	64.138	1109.8	9033.2	10057	11166
233	1120	11.162	0	7.2041	64.14	1109.3	9032	10055	11165
234	1125	11.217	0	7.2085	64.14	1108.5	9030.8	10055	11164
235	1130	11.27	0	7.2128	64.142	1107.8	9028.5	10054	11162
236	1135	11.318	0	7.2167	64.275	1109.7	9028.5	10055	11165
237	1140	11.363	0	7.2203	64.275	1109.1	9028.5	10055	11164
238	1145	11.426	0	7.2255	64.275	1108.2	9026.1	10055	11164
239	1150	11.472	0	7.2293	64.411	1110.2	9026.1	10055	11166
240	1155	11.507	0	7.2321	64.411	1109.7	9024.9	10055	11165
241	1160	11.575	0	7.2377	64.546	1111.4	9024.9	10055	11167
242	1165	11.623	0	7.2416	64.411	1108	9023.7	10055	11163
243	1170	11.674	0	7.2458	64.411	1107.3	9023.7	10055	11163
244	1175	11.729	0	7.2503	64.681	1111.8	9022.6	10055	11167
245	1180	11.779	0	7.2544	64.816	1113.8	9021.4	10055	11169
246	1185	11.839	0	7.2594	64.679	1110.2	9021.4	10057	11167
247	1190	11.884	0	7.263	64.816	1112.3	9017.9	10055	11168
248	1195	11.92	0	7.266	64.816	1111.8	9016.7	10055	11167
249	1200	11.976	0	7.2707	64.815	1110.9	9016.7	10057	11167
250	1205	12.016	0	7.2739	64.815	1110.3	9015.5	10057	11167
251	1210	12.082	0	7.2795	64.816	1109.4	9014.3	10055	11165
252	1215	12.127	0	7.2832	64.816	1108.7	9013.1	10055	11164
253	1220	12.178	0	7.2874	64.816	1108	9013.1	10055	11163
254	1225	12.223	0	7.2911	64.815	1107.3	9013.1	10057	11164
255	1230	12.286	0	7.2964	64.816	1106.4	9012	10055	11162
256	1235	12.338	0	7.3007	64.952	1108.3	9010.8	10055	11164
257	1240	12.382	0	7.3044	64.816	1105	9010.8	10055	11160
258	1245	12.432	0	7.3085	64.816	1104.3	9012	10055	11160
259	1250	12.473	0	7.312	64.952	1106.3	9009.6	10055	11162
260	1255	12.526	0	7.3164	64.952	1105.6	9008.4	10055	11161
261	1260	12.576	0	7.3206	64.952	1104.8	9008.4	10055	11160
262	1265	12.636	0	7.3256	65.222	1109.3	9009.6	10055	11165
263	1270	12.679	0	7.3292	65.222	1108.7	9009.6	10055	11164
264	1275	12.727	0	7.3332	65.357	1110.6	9009.6	10055	11166
265	1280	12.768	0	7.3367	65.493	1112.7	9012	10055	11168
266	1285	12.821	0	7.3411	65.761	1117.1	9014.3	10057	11174
267	1290	12.869	0	7.3452	65.763	1116.5	9014.3	10055	11172
268	1295	12.914	0	7.3489	65.9	1118.5	9013.1	10054	11173
269	1300	12.965	0	7.3533	66.169	1123	9015.5	10055	11178
270	1305	13.015	0	7.3575	66.304	1124.9	9017.9	10055	11180
271	1310	13.064	0	7.3617	66.304	1124.2	9017.9	10055	11180
272	1315	13.112	0	7.3658	66.575	1128.7	9015.5	10055	11184
273	1320	13.16	0	7.3698	66.71	1130.7	9016.7	10055	11186
274	1325	13.207	0	7.3738	66.98	1135.2	9019	10055	11191
275	1330	13.258	0	7.3781	67.116	1137.1	9019	10055	11192
276	1335	13.308	0	7.3824	67.118	1136.4	9019	10054	11191
277	1340	13.356	0	7.3864	67.386	1140.9	9016.7	10055	11196
278	1345	13.405	0	7.3907	67.519	1142.7	9019	10057	11199
279	1350	13.464	0	7.3957	67.657	1144.5	9019	10055	11200
280	1355	13.515	0	7.4001	67.79	1146.3	9019	10057	11203

281	1360	13.551	0	7.4031	68.062	1151.1	9016.7	10055	11206
282	1365	13.606	0	7.4078	68.06	1150.2	9015.5	10057	11207
283	1370	13.651	0	7.4117	68.196	1152.2	9015.5	10057	11209
284	1375	13.697	0	7.4156	68.333	1154.1	9013.1	10055	11209
285	1380	13.745	0	7.4198	68.468	1156	9012	10055	11211
286	1385	13.8	0	7.4245	68.468	1155.2	9009.6	10055	11211
287	1390	13.851	0	7.4289	68.198	1149.1	9009.6	10055	11204
288	1395	13.896	0	7.4328	68.062	1145.8	9008.4	10055	11201
289	1400	13.954	0	7.4378	68.198	1147.5	9008.4	10055	11203
290	1405	14.004	0	7.4421	68.199	1146.8	9006.1	10054	11201
291	1410	14.06	0	7.447	68.062	1143.3	9003.7	10055	11199
292	1415	14.106	0	7.451	68.198	1145.2	9003.7	10055	11201
293	1420	14.158	0	7.4555	68.333	1147	9002.5	10055	11202
294	1425	14.218	0	7.4607	68.198	1143.5	9001.4	10055	11199
295	1430	14.255	0	7.464	68.198	1142.9	8999	10055	11198
296	1435	14.307	0	7.4684	68.333	1144.7	8997.8	10055	11200
297	1440	14.36	0	7.4731	68.198	1141.3	8999	10055	11197
298	1445	14.411	0	7.4776	68.198	1140.5	8997.8	10055	11196
299	1450	14.463	0	7.482	68.333	1142.3	8996.7	10055	11198
300	1455	14.507	0	7.4859	68.468	1144.3	8994.3	10055	11200
301	1460	14.562	0	7.4908	68.468	1143.4	8994.3	10055	11199
302	1465	14.6	0	7.4941	68.333	1140.2	8994.3	10055	11196
303	1470	14.657	0	7.499	68.466	1141.9	8994.3	10057	11198
304	1475	14.708	0	7.5035	68.468	1141.2	8991.9	10055	11197
305	1480	14.761	0	7.5082	68.603	1142.9	8990.8	10055	11198
306	1485	14.809	0	7.5125	68.603	1142.2	8990.8	10055	11198
307	1490	14.85	0	7.5161	68.603	1141.6	8990.8	10055	11197
308	1495	14.896	0	7.5202	68.739	1143.4	8989.6	10055	11199
309	1500	14.946	0	7.5246	68.739	1142.7	8988.4	10055	11198
310	1504.1	15.001	0	7.5294	68.874	1144.4	8987.2	10055	11200

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-2
Test No.: 2

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/08/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 8.5' - 9.0'
Elevation:

Soil Description: Brown Sandy Silty CLAY (CL-ML)

Remarks: 16667-0 VRE Alexandria GZ-9 8'0" - 10'0" - CU Triaxial - 2280 PSF

Specimen Height: 5.56 in
Specimen Area: 6.41 in²
Specimen Volume: 584.06 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 23

Plastic Limit: 19

Measured Specific Gravity: 2.69

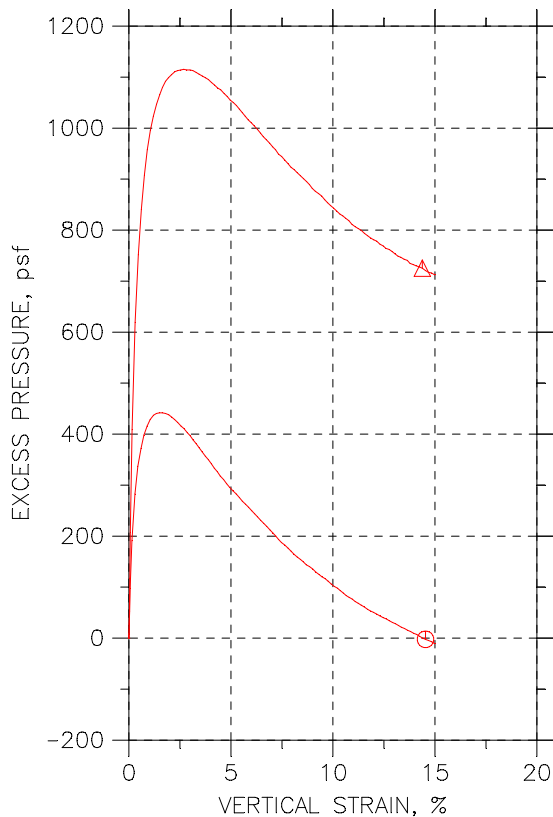
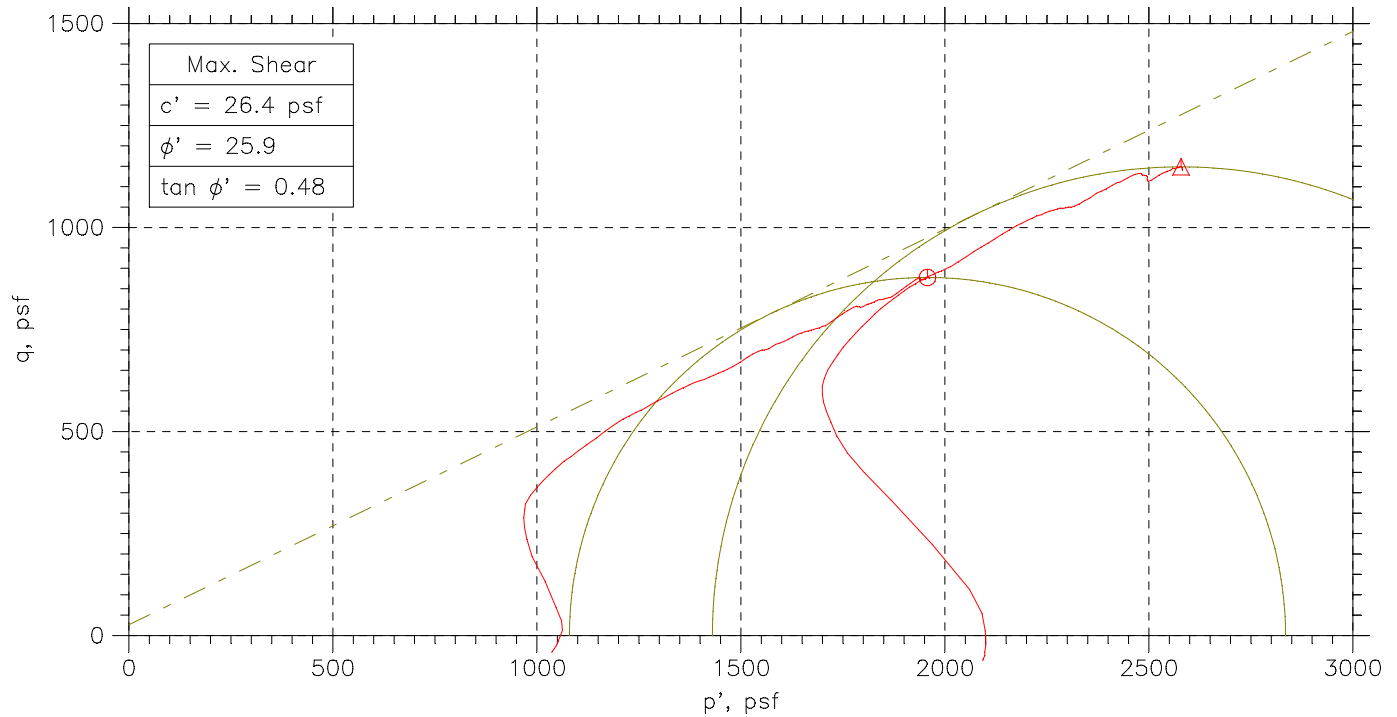
	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	9944.6	10054	0	0.000	2167.9	2277.5	1.051	2222.7	-54.79
2	0.00	9944.6	10054	1.1776	0.000	2166.7	2276.3	1.051	2221.5	-54.79
3	0.00	9945.6	10055	2.3551	0.000	2166.5	2276.3	1.051	2221.4	-54.884
4	0.00	9950.5	10054	7.0654	1.190	2166.8	2270.4	1.048	2218.6	-51.82
5	0.00	9954.7	10055	12.953	1.317	2165.1	2265.7	1.046	2215.4	-50.32
6	0.00	9960.7	10055	23.551	1.503	2160.4	2255.1	1.044	2207.8	-47.35
7	0.01	9980.4	10054	45.925	1.283	2157.8	2231.6	1.034	2194.7	-36.899
8	0.02	10008	10055	77.72	1.230	2153.6	2200.9	1.022	2177.3	-23.669
9	0.03	10056	10055	124.82	1.124	2154.3	2153.8	1.000	2154.1	0.22663
10	0.05	10160	10055	226.09	1.048	2157.7	2052.6	1.051	2105.1	52.565
11	0.10	10284	10055	341.5	1.007	2165.6	1937.2	1.118	2051.4	114.23
12	0.15	10373	10055	428.64	0.999	2168.1	1850	1.172	2009.1	159.05
13	0.21	10444	10055	500.47	1.002	2167.1	1778.2	1.219	1972.7	194.47
14	0.26	10503	10055	561.7	1.006	2164.7	1717	1.261	1940.8	223.86
15	0.31	10557	10055	615.87	1.006	2164.2	1662.8	1.302	1913.5	250.73
16	0.35	10598	10055	662.97	1.014	2158.7	1615.7	1.336	1887.2	271.5
17	0.39	10643	10055	706.54	1.012	2159.4	1572.1	1.374	1865.7	293.62
18	0.45	10680	10055	745.4	1.013	2158	1533.3	1.407	1845.6	312.37
19	0.50	10715	10055	779.55	1.012	2158.6	1499.1	1.440	1828.8	329.74
20	0.55	10749	10055	812.53	1.010	2159.8	1466.1	1.473	1813	346.84
21	0.59	10778	10055	841.96	1.010	2159.6	1436.7	1.503	1798.2	361.47
22	0.65	10804	10055	869.05	1.012	2157.8	1409.6	1.531	1783.7	374.08
23	0.70	10829	10055	894.96	1.012	2157.2	1383.7	1.559	1770.5	386.76
24	0.74	10855	10055	917.33	1.007	2161.3	1361.3	1.588	1761.3	400
25	0.80	10883	10055	939.7	1.002	2166.2	1339	1.618	1752.6	413.6
26	0.85	10897	10055	959.72	1.008	2160.7	1318.9	1.638	1739.8	420.87
27	0.89	10915	10055	979.74	1.010	2158.3	1298.9	1.662	1728.6	429.7
28	0.95	10932	10055	997.4	1.010	2158.1	1281.3	1.684	1719.7	438.44
29	0.99	10950	10055	1013.9	1.009	2159.3	1264.8	1.707	1712.1	447.28
30	1.04	10961	10055	1029.2	1.012	2155.5	1249.5	1.725	1702.5	453.03
31	1.08	10979	10055	1042.2	1.007	2160.2	1236.5	1.747	1698.3	461.82
32	1.14	10993	10055	1056.3	1.007	2160.5	1222.4	1.767	1691.4	469.04
33	1.19	11005	10055	1069.2	1.009	2158.9	1209.4	1.785	1684.2	474.73
34	1.23	11018	10057	1081	1.007	2159.9	1198.8	1.802	1679.4	480.52
35	1.28	11031	10055	1091.6	1.005	2162.6	1187.1	1.822	1674.8	487.78
36	1.33	11042	10055	1102.2	1.004	2163.4	1176.5	1.839	1669.9	493.48
37	1.38	11051	10055	1111.6	1.005	2162.4	1167	1.853	1664.7	497.66
38	1.43	11065	10055	1122.2	1.002	2166.2	1156.4	1.873	1661.3	504.89
39	1.49	11075	10057	1130.5	1.000	2167.4	1149.4	1.886	1658.4	509
40	1.53	11085	10055	1138.7	0.999	2169.5	1140	1.903	1654.7	514.79
41	1.59	11093	10055	1145.8	0.998	2170.7	1132.9	1.916	1651.8	518.93
42	1.63	11101	10054	1151.7	0.996	2172.2	1125.8	1.929	1649	523.19
43	1.67	11110	10055	1161.1	0.996	2172.3	1117.6	1.944	1644.9	527.37
44	1.73	11120	10057	1168.2	0.994	2174.7	1111.7	1.956	1643.2	531.5
45	1.78	11124	10055	1174	0.996	2173	1104.6	1.967	1638.8	534.19
46	1.84	11132	10055	1178.8	0.993	2176.5	1099.9	1.979	1638.2	538.29
47	1.88	11134	10055	1184.6	0.996	2173	1094	1.986	1633.5	539.49
48	1.93	11140	10055	1189.3	0.995	2173.7	1089.3	1.995	1631.5	542.2
49	1.98	11145	10055	1192.9	0.994	2175.4	1085.8	2.004	1630.6	544.83
50	2.02	11147	10055	1197.6	0.996	2173.2	1081.1	2.010	1627.1	546.04
51	2.07	11153	10055	1203.5	0.996	2172.6	1075.2	2.021	1623.9	548.72
52	2.11	11158	10055	1207	0.995	2174.5	1071.7	2.029	1623.1	551.44
53	2.17	11160	10055	1211.7	0.997	2172	1066.9	2.036	1619.5	552.55
54	2.21	11163	10055	1212.9	0.996	2173.3	1065.8	2.039	1619.6	553.79
55	2.26	11165	10055	1217.6	0.998	2170.9	1061.1	2.046	1616	554.92
56	2.31	11171	10055	1222.3	0.997	2171.5	1056.3	2.056	1613.9	557.57
57	2.36	11173	10055	1224.7	0.997	2171.4	1054	2.060	1612.7	558.71
58	2.41	11184	10055	1227	0.990	2180.3	1051.6	2.073	1615.9	564.31
59	2.45	11189	10055	1229.4	0.988	2183.3	1049.3	2.081	1616.3	567.03
60	2.51	11192	10055	1230.6	0.987	2184.3	1048.1	2.084	1616.2	568.11
61	2.56	11200	10055	1234.1	0.983	2189	1044.6	2.096	1616.8	572.23
62	2.61	11199	10055	1236.5	0.986	2186	1042.2	2.097	1614.1	571.88
63	2.66	11201	10055	1236.5	0.984	2188.3	1042.2	2.100	1615.2	573.03
64	2.71	11203	10054	1236.5	0.983	2189.4	1041	2.103	1615.2	574.18
65	2.77	11206	10055	1240	0.983	2189.2	1038.7	2.108	1613.9	575.25
66	2.81	11208	10055	1241.2	0.982	2190.5	1037.5	2.111	1614	576.48
67	2.86	11208	10055	1240	0.982	2191	1038.7	2.109	1614.8	576.15
68	2.91	11207	10055	1240	0.982	2190.3	1038.7	2.109	1614.5	575.8
69	2.96	11209	10055	1242.3	0.982	2190.1	1036.3	2.113	1613.2	576.9
70	3.01	11197	10055	1243.5	0.993	2176.4	1035.1	2.103	1605.8	570.65
71	3.06	11193	10055	1243.5	0.996	2172.8	1035.1	2.099	1604	568.85
72	3.12	11192	10055	1244.7	0.998	2170.9	1034	2.100	1602.5	568.48
73	3.16	11189	10055	1245.9	1.001	2166.2	1032.8	2.097	1599.5	566.72
74	3.22	11185	10055	1248.2	1.006	2160.2	1030.4	2.096	1595.3	564.86
75	3.27	11184	10055	1247.1	1.006	2160.6	1031.6	2.094	1596.1	564.48
76	3.32	11181	10055	1247.1	1.009	2157	1031.6	2.091	1594.3	562.69
77	3.37	11177	10055	1249.4	1.014	2151	1029.3	2.090	1590.1	560.88
78	3.42	11179	10055	1250.6	1.013	2152.2	1028.1	2.093	1590.1	562.04
79	3.48	11179	10055	1251.8	1.014	2150.2	1026.9	2.094	1588.5	561.63

80	3.51	11175	10055	1251.8	1.017	2146.7	1026.9	2.090	1586.8	559.92
81	3.58	11171	10055	1252.9	1.021	2141.8	1025.7	2.088	1583.7	558.02
82	3.62	11171	10055	1252.9	1.022	2141.2	1025.7	2.088	1583.5	557.74
83	3.68	11167	10055	1254.1	1.026	2136.3	1024.6	2.085	1580.4	555.87
84	3.72	11167	10055	1256.5	1.028	2133.4	1022.2	2.087	1577.8	555.61
85	3.78	11166	10055	1256.5	1.029	2132.6	1022.2	2.086	1577.4	555.21
86	3.82	11165	10055	1256.5	1.029	2132	1022.2	2.086	1577.1	554.93
87	3.87	11165	10055	1256.5	1.030	2131.4	1022.2	2.085	1576.8	554.62
88	3.92	11161	10055	1258.8	1.035	2125.4	1019.8	2.084	1572.6	552.8
89	3.98	11163	10055	1261.2	1.035	2125.2	1017.5	2.089	1571.4	553.87
90	4.02	11160	10055	1260	1.037	2123	1018.7	2.084	1570.8	552.16
91	4.07	11162	10055	1260	1.035	2125.2	1018.7	2.086	1571.9	553.25
92	4.11	11161	10055	1261.2	1.037	2123.4	1017.5	2.087	1570.5	552.97
93	4.18	11160	10055	1262.4	1.038	2121.4	1016.3	2.087	1568.9	552.55
94	4.22	11160	10055	1263.5	1.040	2119.6	1015.1	2.088	1567.4	552.25
95	4.27	11156	10055	1264.7	1.044	2114.9	1014	2.086	1564.4	550.48
96	4.33	11158	10055	1265.9	1.043	2115.9	1012.8	2.089	1564.3	551.55
97	4.37	11158	10055	1267.1	1.044	2114.1	1011.6	2.090	1562.9	551.26
98	4.43	11153	10054	1265.9	1.047	2110.5	1011.6	2.086	1561.1	549.47
99	4.48	11156	10055	1265.9	1.045	2113.9	1012.8	2.087	1563.3	550.55
100	4.53	11153	10055	1267.1	1.049	2109.1	1011.6	2.085	1560.4	548.77
101	4.58	11155	10055	1267.1	1.047	2111.3	1011.6	2.087	1561.5	549.87
102	4.63	11152	10055	1268.2	1.051	2106.6	1010.4	2.085	1558.5	548.07
103	4.68	11151	10055	1269.4	1.052	2104.8	1009.2	2.086	1557	547.78
104	4.73	11147	10055	1269.4	1.056	2101.2	1009.2	2.082	1555.2	545.97
105	4.77	11150	10055	1269.4	1.053	2103.6	1009.2	2.084	1556.4	547.18
106	4.82	11146	10055	1268.2	1.056	2101.2	1010.4	2.080	1555.8	545.38
107	4.88	11146	10057	1269.4	1.056	2100.4	1010.4	2.079	1555.4	544.97
108	4.93	11145	10055	1269.4	1.058	2098.6	1009.2	2.079	1553.9	544.66
109	4.99	11144	10055	1269.4	1.059	2097.7	1009.2	2.079	1553.5	544.25
110	5.05	11143	10055	1270.6	1.060	2095.8	1008.1	2.079	1551.9	543.87
111	5.08	11143	10055	1271.8	1.062	2094.1	1006.9	2.080	1550.5	543.62
112	5.13	11142	10055	1270.6	1.061	2094.6	1008.1	2.078	1551.4	543.29
113	5.18	11141	10055	1271.8	1.063	2092.8	1006.9	2.078	1549.8	542.96
114	5.23	11141	10055	1273	1.064	2091	1005.7	2.079	1548.3	542.63
115	5.28	11137	10055	1271.8	1.067	2088.7	1006.9	2.074	1547.8	540.89
116	5.33	11139	10055	1271.8	1.065	2090.8	1006.9	2.077	1548.9	541.97
117	5.38	11139	10055	1270.6	1.064	2091.4	1008.1	2.075	1549.7	541.66
118	5.42	11141	10055	1270.6	1.062	2093.7	1008.1	2.077	1550.9	542.8
119	5.48	11143	10055	1271.8	1.061	2094.6	1006.9	2.080	1550.8	543.88
120	5.52	11143	10055	1271.8	1.062	2094	1006.9	2.080	1550.5	543.58
121	5.57	11148	10055	1271.8	1.057	2099.2	1006.9	2.085	1553	546.15
122	5.62	11153	10055	1271.8	1.053	2104.3	1006.9	2.090	1555.6	548.69
123	5.67	11152	10055	1273	1.054	2102.4	1005.7	2.090	1554.1	548.35
124	5.73	11157	10055	1273	1.050	2107.4	1005.7	2.095	1556.5	550.82
125	5.77	11158	10054	1271.8	1.048	2109.8	1005.7	2.098	1557.7	552.02
126	5.83	11165	10057	1275.3	1.045	2113.4	1004.5	2.104	1559	554.44
127	5.86	11164	10055	1273	1.044	2114.1	1005.7	2.102	1559.9	554.19
128	5.91	11166	10055	1271.8	1.041	2117.5	1006.9	2.103	1562.2	555.3
129	5.96	11168	10055	1271.8	1.039	2119.7	1006.9	2.105	1563.3	556.39
130	6.02	11173	10055	1271.8	1.035	2124.6	1006.9	2.110	1565.7	558.84
131	6.07	11172	10055	1270.6	1.035	2125	1008.1	2.108	1566.6	558.49
132	6.12	11177	10055	1271.8	1.032	2129	1006.9	2.114	1567.9	561.04
133	6.17	11177	10055	1271.8	1.032	2128.3	1006.9	2.114	1567.6	560.71
134	6.22	11179	10055	1271.8	1.030	2130.4	1006.9	2.116	1568.7	561.78
135	6.27	11181	10055	1271.8	1.029	2132.6	1006.9	2.118	1569.7	562.84
136	6.31	11183	10055	1271.8	1.027	2134.8	1006.9	2.120	1570.9	563.98
137	6.36	11185	10055	1271.8	1.025	2137	1006.9	2.122	1571.9	565.06
138	6.40	11182	10055	1271.8	1.028	2133.6	1006.9	2.119	1570.3	563.37
139	6.45	11184	10055	1271.8	1.026	2135.7	1006.9	2.121	1571.3	564.42
140	6.50	11186	10055	1271.8	1.024	2137.9	1006.9	2.123	1572.4	565.5
141	6.56	11188	10055	1271.8	1.023	2139.9	1006.9	2.125	1573.4	566.51
142	6.60	11176	10055	1273	1.033	2126.8	1005.7	2.115	1566.3	560.56
143	6.67	11173	10055	1271.8	1.036	2124.2	1006.9	2.110	1565.5	558.64
144	6.71	11172	10055	1270.6	1.035	2124.9	1008.1	2.108	1566.5	558.39
145	6.76	11171	10055	1269.4	1.035	2125.3	1009.2	2.106	1567.3	558.01
146	6.82	11171	10055	1269.4	1.036	2124.4	1009.2	2.105	1566.8	557.59
147	6.86	11170	10055	1269.4	1.036	2124	1009.2	2.105	1566.6	557.36
148	6.91	11164	10055	1269.4	1.041	2117.5	1009.2	2.098	1563.4	554.15
149	6.97	11163	10055	1269.4	1.042	2116.8	1009.2	2.097	1563	553.76
150	7.01	11162	10055	1269.4	1.043	2116.1	1009.2	2.097	1562.7	553.44
151	7.07	11159	10055	1269.4	1.046	2112.6	1009.2	2.093	1560.9	551.66
152	7.11	11158	10055	1269.4	1.046	2112	1009.2	2.093	1560.6	551.38
153	7.16	11155	10055	1269.4	1.049	2108.4	1009.2	2.089	1558.8	549.59
154	7.21	11151	10055	1269.4	1.052	2104.9	1009.2	2.086	1557.1	547.84
155	7.27	11150	10055	1269.4	1.053	2104.2	1009.2	2.085	1556.7	547.48
156	7.32	11152	10055	1269.4	1.051	2106.3	1009.2	2.087	1557.8	548.52
157	7.37	11150	10057	1269.4	1.053	2103.9	1010.4	2.082	1557.2	546.74
158	7.42	11148	10055	1268.2	1.054	2103.3	1010.4	2.082	1556.9	546.46
159	7.47	11145	10055	1268.2	1.057	2099.8	1010.4	2.078	1555.1	544.71
160	7.53	11147	10055	1268.2	1.055	2101.8	1010.4	2.080	1556.1	545.68
161	7.58	11146	10055	1268.2	1.056	2101.1	1010.4	2.079	1555.7	545.32
162	7.62	11143	10055	1268.2	1.059	2097.7	1010.4	2.076	1554.1	543.63
163	7.67	11142	10055	1268.2	1.059	2097.1	1010.4	2.075	1553.7	543.32
164	7.72	11141	10055	1268.2	1.060	2096.3	1010.4	2.075	1553.4	542.96
165	7.77	11143	10055	1268.2	1.058	2098.5	1010.4	2.077	1554.5	544.03
166	7.81	11143	10055	1268.2	1.058	2097.9	1010.4	2.076	1554.2	543.74
167	7.86	11145	10055	1268.2	1.057	2100	1010.4	2.078	1555.2	544.81
168	7.91	11144	10055	1268.2	1.057	2099.3	1010.4	2.078	1554.9	544.46
169	7.97	11144	10055	1268.2	1.058	2098.6	1010.4	2.077	1554.5	544.09
170	8.02	11143	10055	1268.2	1.058	2097.9	1010.4	2.076	1554.2	543.76
171	8.07	11142	10055	1265.9	1.057	2099.6	1012.8	2.073	1556.2	543.42
172	8.12	11141	10055	1265.9	1.058	2098.8	1012.8	2.072	1555.8	543.02
173	8.17	11141	10055	1264.7	1.057	2099.3	1014	2.070	1556.6	542.69
174	8.22	11140	10055	1264.7	1.058	2098.7	1014	2.070	1556.3	542.37
175	8.27	11139	10055	1264.7	1.059	2097.9	1014	2.069	1555.9	541.98
176	8.31	11139	10055	1264.7	1.059	2097.4	1014	2.069	1555.7	541.71
177	8.37	11138	10055	1264.7	1.060	2096.6	1014	2.068	1555.3	541.33
178	8.42	11137	10055	1264.7	1.060	2095.9	1014	2.067	1554.9	540.99
179	8.47	11134	10055	1263.5	1.062	2093.7	1015.1	2.062	1554.4	539.28

180	8.52	11136	10055	1264.7	1.062	2094.5	1014	2.066	1554.2	540.29
181	8.57	11130	10055	1264.7	1.067	2088.3	1014	2.060	1551.1	537.18
182	8.63	11132	10055	1263.5	1.064	2091.5	1015.1	2.060	1553.3	538.19
183	8.68	11128	10055	1263.5	1.068	2088	1015.1	2.057	1551.6	536.46
184	8.72	11128	10055	1263.5	1.068	2087.4	1015.1	2.056	1551.3	536.13
185	8.77	11127	10055	1263.5	1.069	2086.8	1015.1	2.056	1550.9	535.81
186	8.81	11126	10055	1263.5	1.069	2086.2	1015.1	2.055	1550.6	535.51
187	8.86	11126	10055	1263.5	1.070	2085.5	1015.1	2.054	1550.3	535.21
188	8.92	11129	10057	1263.5	1.067	2088.6	1016.3	2.055	1552.5	536.16
189	8.96	11130	10055	1262.4	1.065	2090.9	1016.3	2.057	1553.6	537.31
190	9.02	11132	10055	1262.4	1.063	2092.9	1016.3	2.059	1554.6	538.28
191	9.07	11134	10055	1262.4	1.061	2094.9	1016.3	2.061	1555.6	539.3
192	9.12	11136	10055	1262.4	1.060	2096.9	1016.3	2.063	1556.6	540.32
193	9.17	11138	10055	1262.4	1.058	2099.1	1016.3	2.065	1557.7	541.4
194	9.21	11138	10055	1261.2	1.057	2099.7	1017.5	2.064	1558.6	541.09
195	9.27	11142	10055	1261.2	1.053	2104.4	1017.5	2.068	1560.9	543.45
196	9.32	11147	10055	1261.2	1.049	2109.2	1017.5	2.073	1563.4	545.87
197	9.37	11149	10055	1261.2	1.047	2111.2	1017.5	2.075	1564.3	546.86
198	9.42	11148	10055	1261.2	1.048	2110.6	1017.5	2.074	1564	546.56
199	9.46	11153	10055	1260	1.042	2116.7	1018.7	2.078	1567.7	549.03
200	9.51	11161	10055	1260	1.036	2124.3	1018.7	2.085	1571.5	552.81
201	9.56	11157	10055	1258.8	1.038	2122	1019.8	2.081	1570.9	551.06
202	9.62	11165	10055	1256.5	1.030	2131.8	1022.2	2.085	1577	554.79
203	9.66	11164	10055	1256.5	1.030	2131.1	1022.2	2.085	1576.7	554.45
204	9.72	11166	10055	1255.3	1.028	2134.3	1023.4	2.086	1578.8	555.45
205	9.76	11168	10055	1255.3	1.026	2136.4	1023.4	2.088	1579.9	556.51
206	9.80	11171	10055	1255.3	1.024	2138.5	1023.4	2.090	1581	557.59
207	9.85	11175	10055	1255.3	1.020	2143.3	1023.4	2.094	1583.4	559.99
208	9.91	11178	10057	1255.3	1.017	2146.4	1024.6	2.095	1585.5	560.91
209	9.96	11179	10055	1252.9	1.015	2149.6	1025.7	2.096	1587.6	561.92
210	10.00	11181	10055	1251.8	1.012	2152.9	1026.9	2.096	1589.9	563
211	10.06	11183	10055	1251.8	1.011	2154.8	1026.9	2.098	1590.8	563.94
212	10.10	11185	10055	1250.6	1.008	2158.1	1028.1	2.099	1593.1	565.01
213	10.16	11187	10055	1250.6	1.006	2160	1028.1	2.101	1594.1	565.98
214	10.21	11184	10055	1256.5	1.014	2150.7	1022.2	2.104	1586.5	564.27
215	10.26	11184	10057	1257.6	1.015	2150	1022.2	2.103	1586.1	563.88
216	10.31	11180	10055	1255.3	1.016	2147.7	1023.4	2.099	1585.5	562.16
217	10.36	11182	10055	1254.1	1.014	2150.9	1024.6	2.099	1587.7	563.18
218	10.41	11181	10055	1252.9	1.013	2151.3	1025.7	2.097	1588.5	562.78
219	10.45	11178	10055	1252.9	1.016	2148	1025.7	2.094	1586.9	561.14
220	10.51	11180	10055	1252.9	1.015	2149.9	1025.7	2.096	1587.8	562.08
221	10.56	11178	10054	1251.8	1.015	2149.1	1025.7	2.095	1587.4	561.71
222	10.61	11178	10055	1252.9	1.016	2148.5	1025.7	2.095	1587.1	561.38
223	10.66	11180	10055	1252.9	1.014	2150.4	1025.7	2.096	1588.1	562.34
224	10.71	11177	10055	1251.8	1.016	2148.1	1026.9	2.092	1587.5	560.59
225	10.76	11173	10055	1251.8	1.019	2144.7	1026.9	2.089	1585.8	558.92
226	10.82	11172	10055	1252.9	1.021	2142.6	1025.7	2.089	1584.2	558.46
227	10.86	11172	10055	1255.3	1.023	2139.7	1023.4	2.091	1581.5	558.15
228	10.92	11172	10057	1256.5	1.024	2138.8	1023.4	2.090	1581.1	557.72
229	10.98	11167	10055	1256.5	1.028	2134.1	1022.2	2.088	1578.2	555.96
230	11.02	11169	10055	1256.5	1.026	2136.2	1022.2	2.090	1579.2	557.01
231	11.07	11166	10055	1255.3	1.028	2134	1023.4	2.085	1578.7	555.3
232	11.12	11166	10057	1256.5	1.028	2133.2	1023.4	2.084	1578.3	554.91
233	11.16	11165	10055	1255.3	1.029	2132.7	1023.4	2.084	1578	554.64
234	11.22	11164	10055	1254.1	1.029	2133	1024.6	2.082	1578.8	554.25
235	11.27	11162	10054	1251.8	1.028	2133.5	1025.7	2.080	1579.6	553.88
236	11.32	11165	10055	1251.8	1.026	2136.6	1026.9	2.081	1581.8	554.87
237	11.36	11164	10055	1251.8	1.026	2136	1026.9	2.080	1581.5	554.54
238	11.43	11164	10055	1249.4	1.025	2137.4	1029.3	2.077	1583.3	554.08
239	11.47	11166	10055	1249.4	1.023	2139.5	1029.3	2.079	1584.4	555.1
240	11.51	11165	10055	1248.2	1.023	2140.1	1030.4	2.077	1585.3	554.85
241	11.58	11167	10055	1248.2	1.021	2141.8	1030.4	2.079	1586.1	555.7
242	11.62	11163	10055	1247.1	1.023	2139.6	1031.6	2.074	1585.6	554
243	11.67	11163	10055	1247.1	1.024	2138.9	1031.6	2.073	1585.2	553.63
244	11.73	11167	10055	1245.9	1.019	2144.6	1032.8	2.077	1588.7	555.92
245	11.78	11169	10055	1244.7	1.016	2147.8	1034	2.077	1590.9	556.9
246	11.84	11167	10057	1244.7	1.018	2145.4	1035.2	2.073	1590.3	555.1
247	11.88	11168	10055	1241.2	1.015	2149.8	1037.5	2.072	1593.6	556.14
248	11.92	11167	10055	1240	1.014	2150.4	1038.7	2.070	1594.6	555.88
249	11.98	11167	10057	1240	1.014	2150.8	1039.9	2.068	1595.3	555.45
250	12.02	11167	10057	1238.8	1.014	2151.4	1041	2.067	1596.2	555.16
251	12.08	11165	10055	1237.6	1.014	2150.4	1041	2.066	1595.7	554.69
252	12.13	11164	10055	1236.5	1.014	2150.9	1042.2	2.064	1596.6	554.36
253	12.18	11163	10055	1236.5	1.015	2150.2	1042.2	2.063	1596.2	553.99
254	12.22	11164	10057	1236.5	1.014	2150.7	1043.4	2.061	1597	553.65
255	12.29	11162	10055	1235.3	1.015	2149.8	1043.4	2.060	1596.6	553.2
256	12.34	11164	10055	1234.1	1.012	2152.9	1044.6	2.061	1598.7	554.16
257	12.38	11160	10055	1234.1	1.015	2149.6	1044.6	2.058	1597.1	552.5
258	12.43	11160	10055	1235.3	1.017	2147.7	1043.4	2.058	1595.5	552.14
259	12.47	11162	10055	1232.9	1.013	2152.1	1045.7	2.058	1598.9	553.17
260	12.53	11161	10055	1231.7	1.013	2152.5	1046.9	2.056	1599.7	552.78
261	12.58	11160	10055	1231.7	1.013	2151.8	1046.9	2.055	1599.3	552.42
262	12.64	11165	10055	1232.9	1.011	2155	1045.7	2.061	1600.4	554.64
263	12.68	11164	10055	1232.9	1.011	2154.4	1045.7	2.060	1600.1	554.33
264	12.73	11166	10055	1232.9	1.009	2156.4	1045.7	2.062	1601	555.3
265	12.77	11168	10055	1235.3	1.010	2156	1043.4	2.066	1599.7	556.33
266	12.82	11174	10057	1237.6	1.007	2159.4	1042.2	2.072	1600.8	558.57
267	12.87	11172	10055	1237.6	1.008	2157.5	1041	2.072	1599.3	558.23
268	12.91	11173	10054	1236.5	1.007	2159.5	1041	2.074	1600.3	559.25
269	12.96	11178	10055	1238.8	1.004	2162.9	1039.9	2.080	1601.4	561.5
270	13.01	11180	10055	1241.2	1.004	2162.4	1037.5	2.084	1600	562.45
271	13.06	11180	10055	1241.2	1.005	2161.7	1037.5	2.084	1599.6	562.08
272	13.11	11184	10055	1238.8	0.999	2168.6	1039.9	2.085	1604.2	564.36
273	13.16	11186	10055	1240	0.999	2169.3	1038.7	2.089	1604	565.33
274	13.21	11191	10055	1242.3	0.997	2171.6	1036.3	2.095	1603.9	567.62
275	13.26	11192	10055	1242.3	0.996	2173.4	1036.3	2.097	1604.9	568.55
276	13.31	11191	10054	1242.3	0.997	2171.5	1035.1	2.098	1603.3	568.2
277	13.36	11196	10055	1240	0.991	2179.6	1038.7	2.098	1609.1	570.45
278	13.41	11199	10057	1242.3	0.990	2180.3	1037.5	2.101	1608.9	571.37
279	13.46	11200	10055	1242.3	0.990	2180.9	1036.3	2.104	1608.6	572.27

280	13.52	11203	10057	1242.3	0.987	2183.9	1037.5	2.105	1610.7	573.17
281	13.55	11206	10055	1240	0.983	2189.8	1038.7	2.108	1614.2	575.55
282	13.61	11207	10057	1238.8	0.981	2191.3	1041	2.105	1616.1	575.11
283	13.65	11209	10057	1238.8	0.980	2193.2	1041	2.107	1617.1	576.08
284	13.70	11209	10055	1236.5	0.978	2196.3	1042.2	2.107	1619.3	577.06
285	13.74	11211	10055	1235.3	0.975	2199.4	1043.4	2.108	1621.4	578
286	13.80	11211	10055	1232.9	0.974	2200.9	1045.7	2.105	1623.3	577.58
287	13.85	11204	10055	1232.9	0.979	2194.9	1045.7	2.099	1620.3	574.56
288	13.90	11201	10055	1231.7	0.980	2192.7	1046.9	2.094	1619.8	572.91
289	13.95	11203	10055	1231.7	0.979	2194.5	1046.9	2.096	1620.7	573.77
290	14.00	11201	10054	1229.4	0.978	2194.9	1048.1	2.094	1621.5	573.41
291	14.06	11199	10055	1227	0.978	2194.9	1051.6	2.087	1623.3	571.65
292	14.11	11201	10055	1227	0.977	2196.8	1051.6	2.089	1624.2	572.6
293	14.16	11202	10055	1225.9	0.975	2199.8	1052.8	2.089	1626.3	573.51
294	14.22	11199	10055	1224.7	0.976	2197.5	1054	2.085	1625.7	571.75
295	14.26	11198	10055	1222.3	0.975	2199.3	1056.3	2.082	1627.8	571.46
296	14.31	11200	10055	1221.1	0.973	2202.3	1057.5	2.082	1629.9	572.37
297	14.36	11197	10055	1222.3	0.976	2197.7	1056.3	2.080	1627	570.66
298	14.41	11196	10055	1221.1	0.976	2198	1057.5	2.078	1627.8	570.26
299	14.46	11198	10055	1220	0.974	2201	1058.7	2.079	1629.9	571.17
300	14.51	11200	10055	1217.6	0.970	2205.3	1061.1	2.078	1633.2	572.13
301	14.56	11199	10055	1217.6	0.971	2204.5	1061.1	2.078	1632.8	571.71
302	14.60	11196	10055	1217.6	0.973	2201.3	1061.1	2.075	1631.2	570.12
303	14.66	11198	10057	1217.6	0.971	2204.2	1062.2	2.075	1633.2	570.96
304	14.71	11197	10055	1215.3	0.971	2204.6	1063.4	2.073	1634	570.58
305	14.76	11198	10055	1214.1	0.968	2207.5	1064.6	2.074	1636.1	571.47
306	14.81	11198	10055	1214.1	0.969	2206.8	1064.6	2.073	1635.7	571.1
307	14.85	11197	10055	1214.1	0.969	2206.2	1064.6	2.072	1635.4	570.78
308	14.90	11199	10055	1212.9	0.967	2209.2	1065.8	2.073	1637.5	571.72
309	14.95	11198	10055	1211.7	0.967	2209.6	1066.9	2.071	1638.3	571.34
310	15.00	11200	10055	1210.5	0.964	2212.5	1068.1	2.071	1640.3	572.21

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



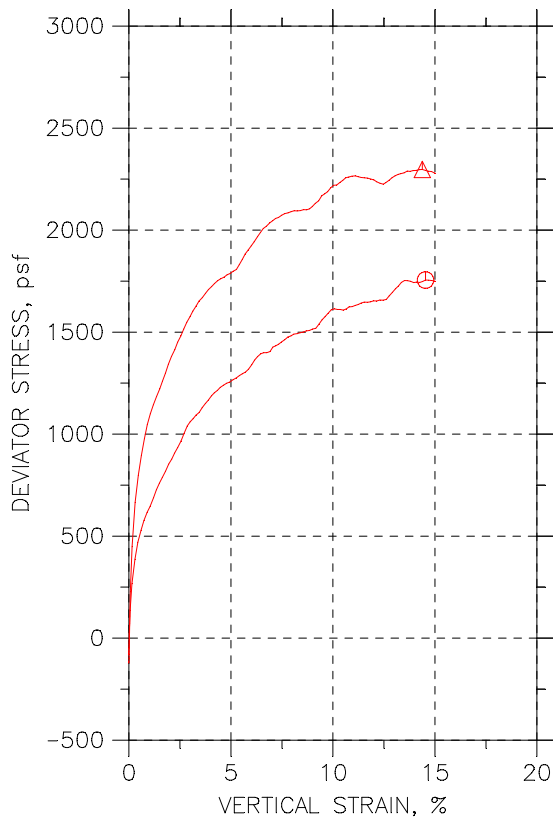
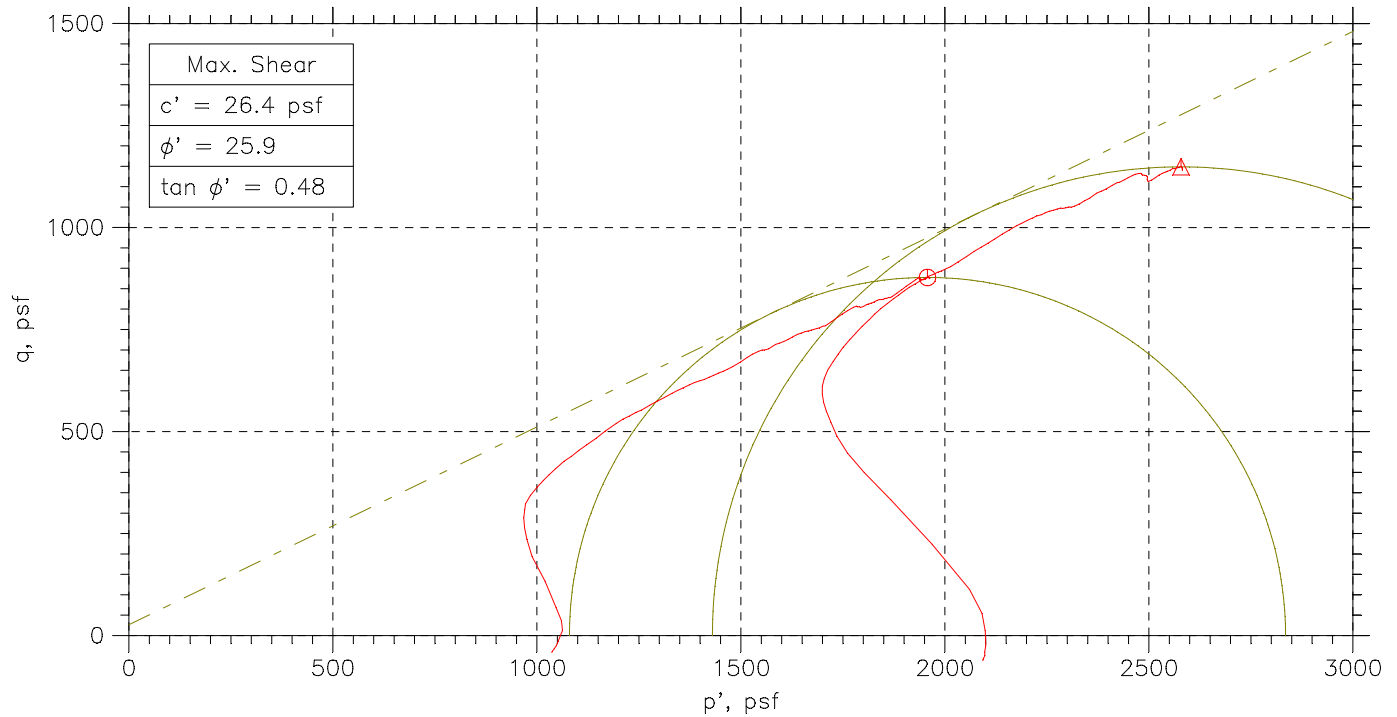
Symbol	⊖	Δ		
Sample No.	T-4			
Test No.	1	1		
Depth	18.2'-18.9'	18.9'-19.4'		
Initial	Diameter, in	2.843	2.85	
	Height, in	5.685	5.721	
	Water Content, %	26.3	23.5	
	Dry Density, pcf	99.44	99.6	
	Saturation, %	102.3	91.6	
Before Shear	Void Ratio	0.694	0.692	
	Water Content, %	24.6	22.8	
	Dry Density, pcf	101.3	104.3	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.664	0.615	
	Back Press., psf	10410	12090	
	Ver. Eff. Cons. Stress, psf	1077	2154	
	Shear Strength, psf	877.5	1149	
	Strain at Failure, %	14.5	14.4	
	Strain Rate, %/min	0.03	0.03	
	B-Value	0.94	0.91	
	Measured Specific Gravity	2.7	2.7	
	Liquid Limit	27	27	
	Plastic Limit	17	17	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-9				
	Sample Type: Undisturbed				
	Description: Yellowish Brown Lean CLAY (CL)				
	Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



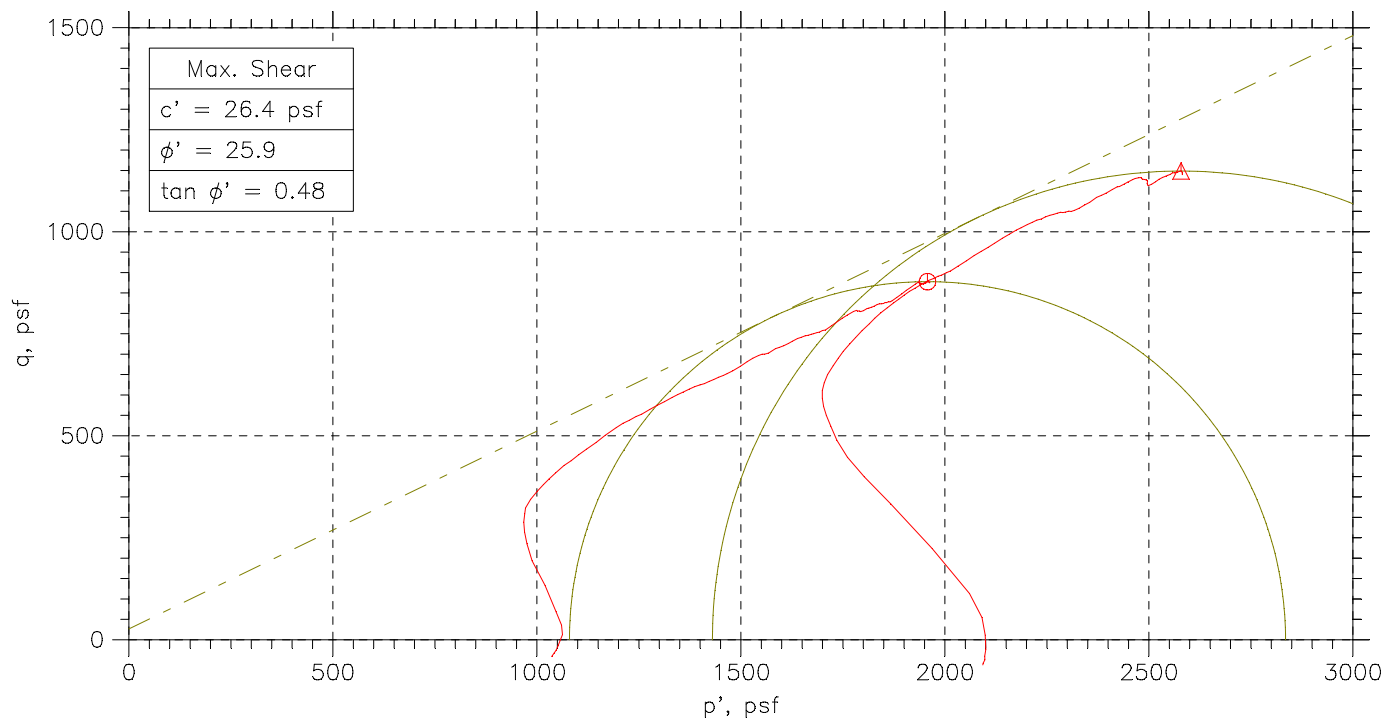
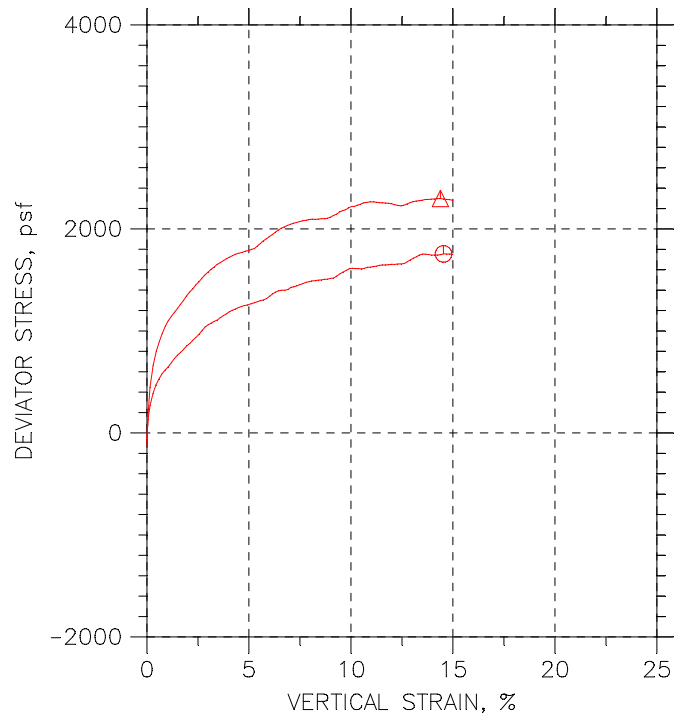
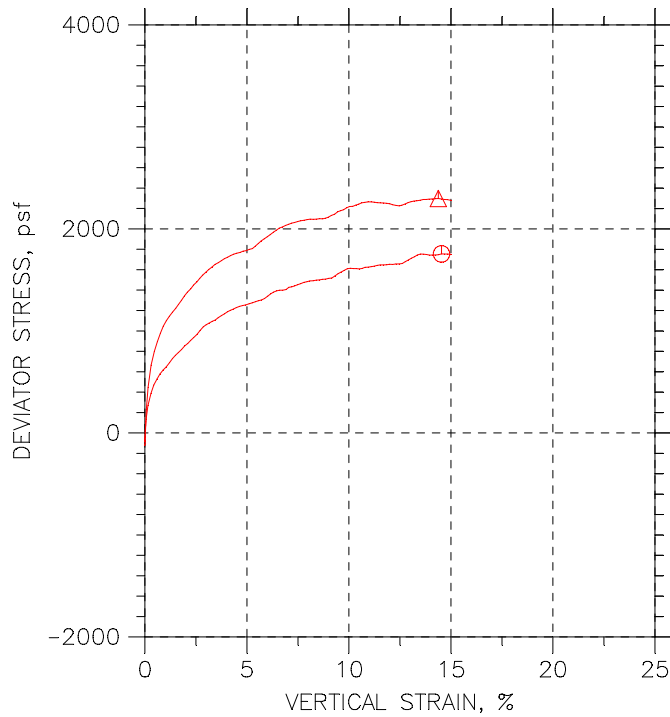
Symbol	⊕	△		
Sample No.	T-4			
Test No.	1	1		
Depth	18.2'-18.9'	18.9'-19.4'		
Initial	Diameter, in	2.843	2.85	
	Height, in	5.685	5.721	
	Water Content, %	26.3	23.5	
	Dry Density, pcf	99.44	99.6	
	Saturation, %	102.3	91.6	
Before Shear	Void Ratio	0.694	0.692	
	Water Content, %	24.6	22.8	
	Dry Density, pcf	101.3	104.3	
	Saturation*, %	100.0	100.0	
	Void Ratio	0.664	0.615	
	Back Press., psf	10410	12090	
	Ver. Eff. Cons. Stress, psf	1077	2154	
	Shear Strength, psf	877.5	1149	
	Strain at Failure, %	14.5	14.4	
	Strain Rate, %/min	0.03	0.03	
	B-Value	0.94	0.91	
	Measured Specific Gravity	2.7	2.7	
	Liquid Limit	27	27	
	Plastic Limit	17	17	

	Project: VRE Alexandria				
	Location: Alexandria, VA				
	Project No.: 16679-0				
	Boring No.: GZ-9				
	Sample Type: Undisturbed				
	Description: Yellowish Brown Lean CLAY (CL)				
	Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial				

Phase calculations based on start of test.

* Saturation is set to 100% for phase calculations

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊖	T-4	1	18.2'-18.9'	Jason	06/17/2015	Bert		CU TRIAXIAL GZ-9 18'0" - 20'0"
Δ		1	18.9'-19.4'	Jason	06/10/2015	Bert		CU TRIAXIAL GZ-9 18'0" - 20'0"



Project: VRE Alexandria

Location: Alexandria, VA

Project No.: 16679-0

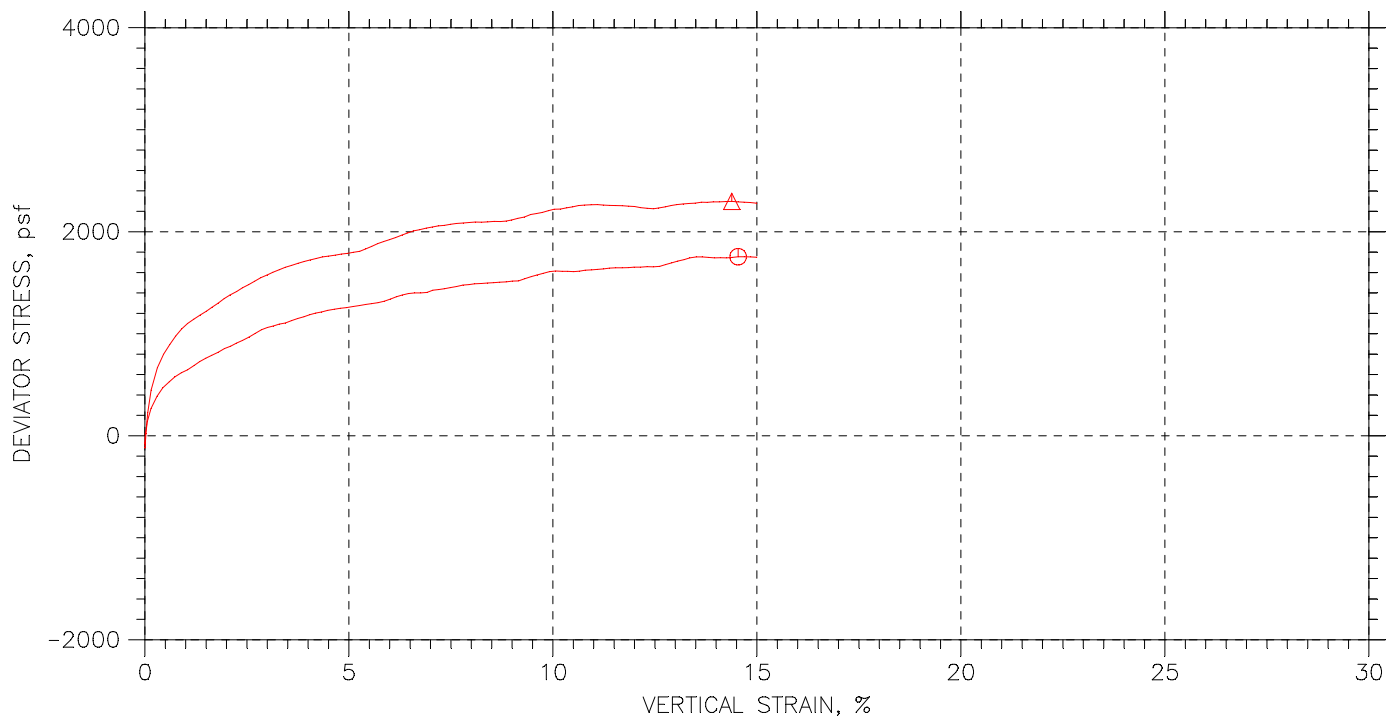
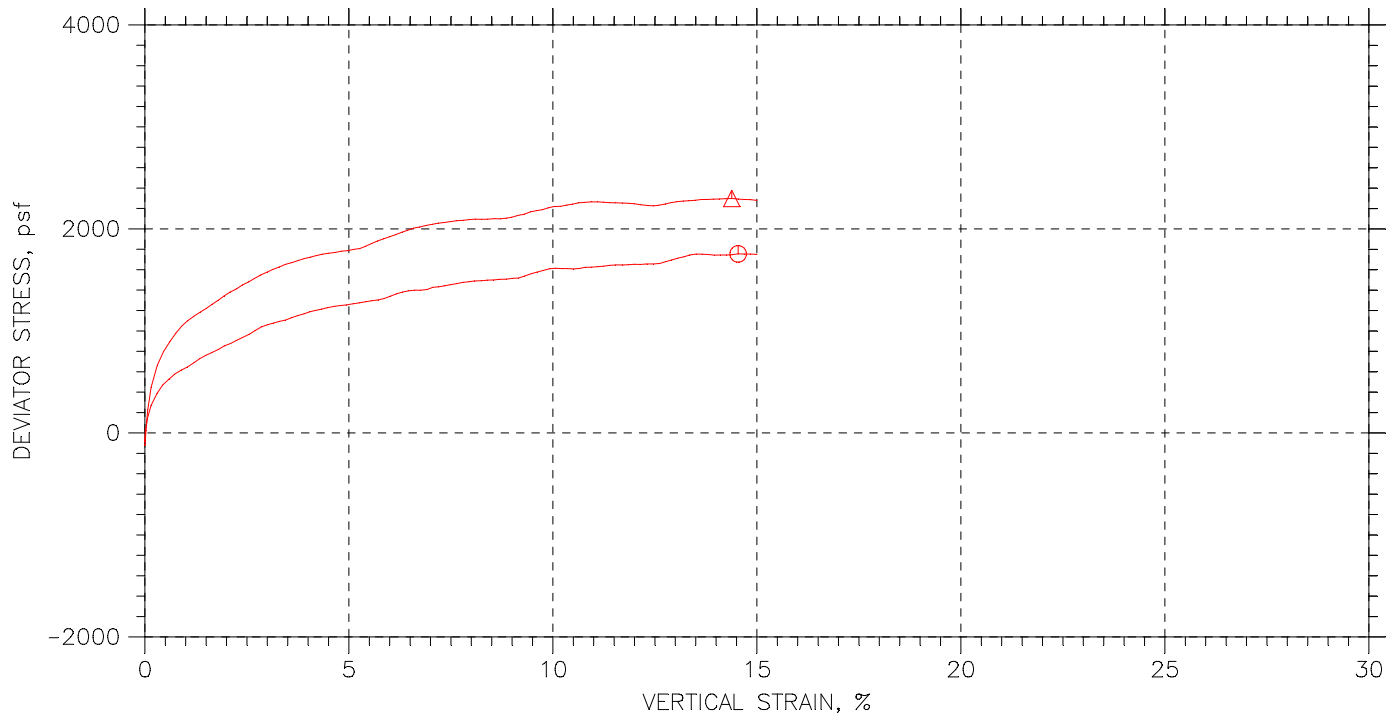
Boring No.: GZ-9

Sample Type: Undisturbed

Description: Yellowish Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

CONSOLIDATED UNDRAINED TRIAXIAL TEST by ASTM D4767



	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
⊖	T-4	1	18.2'-18.9'	Jason	06/17/2015	Bert		CU TRIAXIAL GZ-9 18'0" - 20'0"
Δ		1	18.9'-19.4'	Jason	06/10/2015	Bert		CU TRIAXIAL GZ-9 18'0" - 20'0"



Project: VRE Alexandria	Location: Alexandria, VA	Project No.: 16679-0
Boring No.: GZ-9	Sample Type: Undisturbed	
Description: Yellowish Brown Lean CLAY (CL)		
Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial		

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-4
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/17/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 18.2'-18.9'
Elevation:

Soil Description: Yellowish Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

Specimen Height: 5.68 in
Specimen Area: 6.35 in²
Specimen Volume: 591.39 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 17

Measured Specific Gravity: 2.70

	Before Test Trimmings	Before Test Specimen	After Test Specimen	After Test Trimmings
Container ID	279	---	0	0
Wt. Container + Wet Soil, gm	93.39	---	---	1200
Wt. Container + Dry Soil, gm	80.55	---	---	964.52
Wt. Container, gm	31.77	---	---	6.74
Wt. Wet Soil, gm	61.62	1190	1173.6	1193.3
Wt. Dry Soil, gm	48.78	942.04	942.04	957.78
Wt. Water, gm	12.84	247.96	231.6	235.47
Water Content, %	26.32	26.32	24.58	24.58
Void Ratio	---	0.69	0.66	---
Degree of Saturation, %	---	102.31	100.00	---
Dry Unit Weight, pcf	---	99.442	101.29	---

Initial

Height: 5.685 in
Area: 6.3481 in²
Volume: 591.39 cc

Moisture: 26.32 %
Void Ratio: 0.69
Dry Unit Weight: 99.442 pcf
Saturation: 102.31 %

End of Initialization

Time: 10.183 min
Total Vertical Stress: 713.41 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 575.83 psf
Effective Vertical Stress: 137.57 psf
Effective Horizontal Stress: 143.59 psf

Height Change: 0.002954 in
Area Change: 0 in²
Volume Change: 0.92187 cc
Water Change: -7.6101 cc
Correction: 14.136 cc

Height: 5.682 in
Area: 6.3481 in²
Volume: 590.47 cc

Moisture: 25.63 %
Void Ratio: 0.69
Dry Unit Weight: 99.598 pcf
Saturation: 100.00 %

End of Consolidation/A

Time: 10.183 min
Total Vertical Stress: 713.41 psf
Total Horizontal Stress: 719.42 psf
Pore Pressure: 575.83 psf
Effective Vertical Stress: 137.57 psf
Effective Horizontal Stress: 143.59 psf

Height Change: 0.002954 in
Area Change: 0 in²
Volume Change: 0.92187 cc
Water Change: -7.6101 cc
Correction: 14.136 cc

Height: 5.682 in
Area: 6.3481 in²
Volume: 590.47 cc

Moisture: 25.63 %
Void Ratio: 0.69
Dry Unit Weight: 99.598 pcf
Saturation: 100.00 %

End of Saturation

Time: 36.503 min
Total Vertical Stress: 10629 psf
Total Horizontal Stress: 10672 psf
Pore Pressure: 10413 psf
Effective Vertical Stress: 215.97 psf
Effective Horizontal Stress: 258.89 psf

Height Change: 0.032208 in
Area Change: 0 in²
Volume Change: 10.051 cc
Water Change: -54.395 cc
Correction: 70.051 cc

Height: 5.6528 in
Area: 6.3481 in²
Volume: 581.34 cc

Moisture: 24.66 %
Void Ratio: 0.67
Dry Unit Weight: 101.16 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 179.61 min
Total Vertical Stress: 11408 psf
Total Horizontal Stress: 11491 psf
Pore Pressure: 10413 psf
Effective Vertical Stress: 994.54 psf
Effective Horizontal Stress: 1077.4 psf

Height Change: 0.053076 in
Area Change: 0.056778 in²
Volume Change: 10.761 cc
Water Change: -23.957 cc
Correction: 40.322 cc

Height: 5.6319 in
Area: 6.2913 in²
Volume: 580.63 cc

Moisture: 24.58 %
Void Ratio: 0.66
Dry Unit Weight: 101.29 pcf
Saturation: 100.00 %

End of Shear

Time: 679.86 min
Total Vertical Stress: 13355 psf
Total Horizontal Stress: 11491 psf
Pore Pressure: 10403 psf
Effective Vertical Stress: 2952.5 psf
Effective Horizontal Stress: 1088 psf

Height Change: 0.89791 in
Area Change: -1.0535 in²
Volume Change: 10.761 cc
Water Change: -23.957 cc
Correction: 40.322 cc

Height: 4.7871 in
Area: 7.4016 in²
Volume: 580.63 cc

Moisture: 24.58 %
Void Ratio: 0.66
Dry Unit Weight: 101.29 pcf
Saturation: 100.00 %

At Failure

Time: 664.61 min
Total Vertical Stress: 13246 psf
Total Horizontal Stress: 11491 psf
Pore Pressure: 10411 psf
Effective Vertical Stress: 2834.8 psf
Effective Horizontal Stress: 1079.7 psf

Height Change: 0.87189 in
Area Change: -1.4537 in²
Volume Change: 10.761 cc
Water Change: -23.957 cc
Correction: 0 cc

Height: 4.8131 in
Area: 7.8018 in²
Volume: 580.63 cc

Moisture: 24.58 %
Void Ratio: 0.66
Dry Unit Weight: 101.29 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-4
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/17/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 18.2'-18.9'
Elevation:

Soil Description: Yellowish Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

Specimen Height: 5.63 in
Specimen Area: 6.29 in²
Specimen Volume: 580.63 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 17

Measured Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.6675	-0.094931	-82.715	10413	11491	11408
2	0.012267	0	0	6.6675	0.040315	-79.794	10413	11491	11411
3	0.0206	0	0	6.6675	0.17556	-76.873	10414	11491	11414
4	0.053933	0	0	6.6675	0.71654	-65.189	10416	11491	11425
5	0.10393	0.0016919	0	6.6676	1.3928	-50.729	10418	11491	11440
6	0.20392	0.0033839	0	6.6677	2.3414	-30.388	10423	11489	11459
7	0.5039	0.011844	0	6.6683	4.9111	24.375	10439	11489	11514
8	1.0038	0.038915	0	6.6701	7.2084	71.625	10466	11491	11562
9	2.0038	0.057526	0	6.6713	10.321	137.19	10511	11489	11627
10	5.0035	0.14889	0	6.6774	16.676	266.2	10604	11491	11757
11	10.003	0.29778	0	6.6874	22.897	386.89	10696	11491	11878
12	15.003	0.43991	0	6.697	27.36	469.99	10750	11491	11961
13	20.002	0.59387	0	6.7073	30.741	528.49	10785	11491	12019
14	25.002	0.73261	0	6.7167	33.581	576.58	10811	11491	12067
15	30.001	0.89504	0	6.7277	36.151	616.5	10829	11491	12107
16	35.001	1.0405	0	6.7376	38.18	646.27	10842	11491	12137
17	40	1.203	0	6.7487	40.344	688.03	10850	11491	12179
18	45	1.3451	0	6.7584	42.237	727.14	10854	11491	12218
19	50.004	1.4923	0	6.7685	43.86	760.32	10855	11491	12251
20	55.003	1.6395	0	6.7786	45.212	787.66	10855	11491	12278
21	60.003	1.7935	0	6.7893	46.7	817.71	10854	11491	12308
22	65.002	1.9474	0	6.7999	48.458	853.39	10851	11491	12344
23	70.002	2.1014	0	6.8106	49.674	877.47	10847	11492	12369
24	75.002	2.2418	0	6.8204	51.163	907.42	10842	11491	12398
25	80.001	2.3924	0	6.8309	52.516	934.26	10836	11491	12425
26	85.001	2.5515	0	6.8421	54.139	966.62	10829	11491	12457
27	90	2.6987	0	6.8524	55.897	1001.8	10824	11491	12493
28	95.004	2.8594	0	6.8638	57.79	1039.6	10816	11491	12530
29	100	3.0049	0	6.8741	58.872	1060.5	10810	11491	12551
30	105	3.1453	0	6.884	59.684	1075.7	10802	11491	12566
31	110	3.2925	0	6.8945	60.631	1093.5	10795	11491	12584
32	115	3.4414	0	6.9051	61.307	1105.7	10787	11491	12596
33	120	3.5937	0	6.916	62.524	1129	10778	11491	12620
34	125	3.7443	0	6.9269	63.606	1149.5	10770	11491	12640
35	130	3.8982	0	6.938	64.551	1167	10763	11492	12659
36	135	4.0421	0	6.9484	65.633	1187.4	10755	11492	12679
37	140	4.1859	0	6.9588	66.446	1202.2	10747	11491	12693
38	145	4.3331	0	6.9695	67.122	1214	10739	11491	12705
39	150	4.4803	0	6.9802	67.934	1228.7	10731	11491	12719
40	155	4.6427	0	6.9921	68.61	1240.2	10724	11491	12731
41	160	4.7899	0	7.0029	69.151	1249.1	10716	11491	12740
42	165	4.9371	0	7.0138	69.555	1255.2	10709	11492	12747
43	170	5.1029	0	7.026	70.233	1266.6	10702	11491	12757
44	175	5.2569	0	7.0374	70.772	1275.3	10696	11492	12767
45	180	5.4159	0	7.0493	71.45	1286.8	10689	11491	12777
46	185	5.5563	0	7.0598	71.991	1295.6	10682	11491	12786
47	190	5.712	0	7.0714	72.534	1304.3	10676	11489	12794
48	195	5.866	0	7.083	73.344	1318.3	10670	11491	12809
49	200	6.0233	0	7.0948	74.559	1340.5	10663	11492	12832
50	205	6.1621	0	7.1053	75.778	1363	10657	11491	12854
51	210	6.3076	0	7.1164	76.725	1379.7	10651	11491	12870
52	215	6.4582	0	7.1278	77.536	1393.6	10644	11491	12884
53	220	6.6121	0	7.1396	77.942	1399.2	10638	11491	12890
54	225	6.761	0	7.151	78.077	1399.4	10632	11491	12890
55	230	6.9133	0	7.1627	78.483	1405	10625	11491	12896
56	235	7.0571	0	7.1738	79.7	1427	10619	11491	12918
57	240	7.2009	0	7.1849	80.106	1432.7	10613	11491	12923
58	245	7.338	0	7.1955	80.647	1441.1	10606	11491	12932
59	250	7.4818	0	7.2067	81.323	1452.2	10601	11491	12943
60	255	7.6391	0	7.219	81.999	1462.9	10596	11491	12954
61	260	7.7965	0	7.2313	82.811	1476.3	10590	11491	12967
62	265	7.9437	0	7.2428	83.217	1481.7	10584	11491	12972
63	270	8.0824	0	7.2538	83.758	1489.9	10578	11491	12981
64	275	8.2499	0	7.267	84.028	1492.3	10572	11491	12983
65	280	8.4022	0	7.2791	84.432	1497.5	10568	11492	12989
66	285	8.5494	0	7.2908	84.704	1500.2	10563	11491	12991
67	290	8.6966	0	7.3026	85.11	1505.5	10557	11491	12996
68	295	8.8539	0	7.3152	85.379	1507.9	10553	11492	13000
69	300	9.0113	0	7.3278	85.922	1515.7	10549	11491	13006
70	305	9.1568	0	7.3396	86.192	1518.3	10543	11491	13009
71	310	9.3125	0	7.3522	87.409	1539.2	10538	11491	13030
72	315	9.4681	0	7.3648	88.626	1560.1	10533	11491	13051
73	320	9.6119	0	7.3765	89.573	1575.8	10530	11491	13066
74	325	9.7574	0	7.3884	90.52	1591.4	10525	11491	13082
75	330	9.9165	0	7.4015	91.602	1609.4	10519	11491	13100
76	335	10.065	0	7.4137	92.008	1614.3	10515	11491	13105
77	340	10.226	0	7.427	92.008	1611.1	10511	11491	13102
78	345	10.36	0	7.4381	92.141	1611	10506	11492	13103
79	350	10.507	0	7.4503	92.143	1608.1	10502	11491	13099
80	355	10.652	0	7.4624	92.549	1613.1	10497	11491	13104

81	360	10.793	0	7.4742	93.225	1623.3	10493	11491	13114
82	365	10.947	0	7.4871	93.495	1625.4	10490	11491	13116
83	370	11.087	0	7.4989	93.901	1630.4	10485	11491	13121
84	375	11.238	0	7.5117	94.307	1635.1	10482	11491	13126
85	380	11.388	0	7.5244	94.848	1642.4	10478	11491	13133
86	385	11.539	0	7.5372	95.253	1647	10475	11491	13138
87	390	11.696	0	7.5507	95.389	1646.4	10470	11491	13137
88	395	11.85	0	7.5638	95.657	1648.3	10466	11492	13140
89	400	11.989	0	7.5758	96.065	1653.2	10464	11491	13144
90	405	12.145	0	7.5892	96.2	1652.5	10460	11491	13143
91	410	12.304	0	7.603	96.606	1656.9	10457	11491	13148
92	415	12.463	0	7.6168	96.741	1656.2	10453	11491	13147
93	420	12.62	0	7.6305	97.147	1660.5	10451	11491	13151
94	425	12.761	0	7.6428	98.229	1678	10447	11491	13169
95	430	12.913	0	7.6561	99.311	1695.1	10444	11491	13186
96	435	13.063	0	7.6694	100.39	1712.2	10442	11491	13203
97	440	13.214	0	7.6827	101.34	1726.6	10438	11491	13217
98	445	13.356	0	7.6953	102.42	1743.8	10434	11491	13234
99	450	13.512	0	7.7091	103.1	1753	10432	11491	13244
100	455	13.657	0	7.7221	103.23	1752.3	10429	11491	13243
101	460	13.81	0	7.7358	103.23	1748.9	10426	11491	13240
102	465	13.96	0	7.7493	103.1	1743	10423	11492	13235
103	470	14.104	0	7.7623	103.37	1744.8	10420	11491	13235
104	475	14.258	0	7.7762	103.5	1743.8	10417	11492	13236
105	480	14.398	0	7.789	103.91	1748.2	10413	11492	13240
106	485	14.539	0	7.8018	104.45	1755.1	10411	11491	13246
107	490	14.689	0	7.8156	104.58	1754.1	10409	11492	13246
108	495	14.849	0	7.8302	104.72	1753.1	10406	11491	13244
109	500	14.989	0	7.8431	104.72	1749.9	10403	11491	13241
110	500.25	15.001	0	7.8442	104.72	1749.6	10403	11491	13240

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.: T-4
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/17/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 18.2'-18.9'
Elevation:

Soil Description: Yellowish Brown Lean CLAY (CL)
Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

Specimen Height: 5.63 in
Specimen Area: 6.29 in²
Specimen Volume: 580.63 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 17

Measured Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	11408	11491	0	0.000	994.67	1077.4	1.083	1036	-41.357
2	0.00	11411	11491	0	0.000	997.59	1077.4	1.080	1037.5	-39.897
3	0.00	11414	11491	1.1776	0.202	999.33	1076.2	1.077	1037.8	-38.436
4	0.00	11425	11491	2.3551	0.134	1009.8	1075	1.065	1042.4	-32.594
5	0.00	11440	11491	4.7103	0.147	1021.9	1072.7	1.050	1047.3	-25.365
6	0.00	11459	11489	9.4206	0.203	1036.4	1066.8	1.029	1051.6	-15.194
7	0.01	11514	11489	25.907	0.253	1074.7	1050.3	1.023	1062.5	12.187
8	0.04	11562	11491	52.991	0.343	1096	1024.4	1.070	1060.2	35.813
9	0.06	11627	11489	97.739	0.450	1115.7	978.46	1.140	1047.1	68.594
10	0.15	11757	11491	190.77	0.547	1152.8	886.61	1.300	1019.7	133.1
11	0.30	11878	11491	282.62	0.602	1181.6	794.76	1.487	988.21	193.44
12	0.44	11961	11491	336.79	0.609	1210.6	740.6	1.635	975.59	234.99
13	0.59	12019	11491	372.11	0.609	1233.8	705.27	1.749	969.51	264.24
14	0.73	12067	11491	398.02	0.604	1255.9	679.36	1.849	967.65	288.29
15	0.90	12107	11491	415.68	0.594	1278.2	661.7	1.932	969.95	308.25
16	1.04	12137	11491	428.64	0.588	1295	648.74	1.996	971.88	323.14
17	1.20	12179	11491	436.88	0.567	1328.5	640.5	2.074	984.52	344.02
18	1.35	12218	11491	440.41	0.544	1364.1	636.97	2.142	1000.5	363.57
19	1.49	12251	11491	441.59	0.524	1396.1	635.79	2.196	1016	380.16
20	1.64	12278	11491	441.59	0.507	1423.4	635.79	2.239	1029.6	393.83
21	1.79	12308	11491	440.41	0.489	1454.7	636.97	2.284	1045.8	408.85
22	1.95	12344	11491	438.06	0.468	1492.7	639.32	2.335	1066	426.69
23	2.10	12369	11492	433.35	0.450	1522.7	645.21	2.360	1084	438.74
24	2.24	12398	11491	428.64	0.433	1556.2	648.74	2.399	1102.5	453.71
25	2.39	12425	11491	422.75	0.416	1588.9	654.63	2.427	1121.8	467.13
26	2.55	12457	11491	415.68	0.396	1628.3	661.7	2.461	1145	483.31
27	2.70	12493	11491	410.97	0.379	1668.3	666.41	2.503	1167.3	500.92
28	2.86	12530	11491	402.73	0.359	1714.3	674.65	2.541	1194.5	519.81
29	3.00	12551	11491	396.84	0.347	1741	680.54	2.558	1210.8	530.24
30	3.15	12566	11491	388.6	0.335	1764.4	688.78	2.562	1226.6	537.83
31	3.29	12584	11491	381.53	0.324	1789.4	695.85	2.572	1242.6	546.77
32	3.44	12596	11491	373.29	0.314	1809.8	704.09	2.570	1256.9	552.85
33	3.59	12620	11491	365.05	0.301	1841.4	712.33	2.585	1276.8	564.51
34	3.74	12640	11491	356.8	0.290	1870.1	720.58	2.595	1295.3	574.74
35	3.90	12659	11492	349.74	0.279	1895.8	728.82	2.601	1312.3	583.49
36	4.04	12679	11492	341.5	0.268	1924.5	737.06	2.611	1330.8	593.7
37	4.19	12693	11491	333.25	0.259	1946.3	744.13	2.616	1345.2	601.09
38	4.33	12705	11491	326.19	0.252	1965.2	751.19	2.616	1358.2	607.02
39	4.48	12719	11491	317.94	0.242	1988.1	759.44	2.618	1373.8	614.33
40	4.64	12731	11491	310.88	0.235	2006.7	766.5	2.618	1386.6	620.1
41	4.79	12740	11491	302.64	0.227	2023.9	774.75	2.612	1399.3	624.57
42	4.94	12747	11492	295.57	0.220	2038.2	782.99	2.603	1410.6	627.62
43	5.10	12757	11491	288.51	0.214	2055.5	788.88	2.606	1422.2	633.32
44	5.26	12767	11492	282.62	0.207	2071.3	795.94	2.602	1433.6	637.67
45	5.42	12777	11491	275.55	0.201	2088.6	801.83	2.605	1445.2	643.38
46	5.56	12786	11491	268.49	0.195	2104.5	808.89	2.602	1456.7	647.81
47	5.71	12794	11489	262.6	0.190	2117.9	813.6	2.603	1465.7	652.13
48	5.87	12809	11491	256.71	0.183	2139	820.67	2.606	1479.8	659.15
49	6.02	12832	11492	249.65	0.175	2169.4	828.92	2.617	1499.2	670.24
50	6.16	12854	11491	243.76	0.169	2196.6	833.62	2.635	1515.1	681.48
51	6.31	12870	11491	237.87	0.163	2219.2	839.51	2.643	1529.4	689.86
52	6.46	12884	11491	230.8	0.156	2240.2	846.58	2.646	1543.4	696.81
53	6.61	12890	11491	224.92	0.152	2251.7	852.46	2.641	1552.1	699.62
54	6.76	12890	11491	219.03	0.148	2257.8	858.35	2.630	1558.1	699.72
55	6.91	12896	11491	211.96	0.142	2270.5	865.42	2.624	1567.9	702.52
56	7.06	12918	11491	206.08	0.136	2298.3	871.31	2.638	1584.8	713.52
57	7.20	12923	11491	200.19	0.132	2309.9	877.19	2.633	1593.5	716.35
58	7.34	12932	11491	193.12	0.127	2325.4	884.26	2.630	1604.8	720.57
59	7.48	12943	11491	187.23	0.122	2342.3	890.15	2.631	1616.2	726.08
60	7.64	12954	11491	182.52	0.118	2357.7	894.86	2.635	1626.3	731.44
61	7.80	12967	11491	176.64	0.113	2377	900.75	2.639	1638.9	738.13
62	7.94	12972	11491	170.75	0.109	2388.3	906.63	2.634	1647.5	740.84
63	8.08	12981	11491	164.86	0.105	2402.5	912.52	2.633	1657.5	744.97
64	8.25	12983	11491	158.97	0.101	2410.7	918.41	2.625	1664.5	746.13
65	8.40	12989	11492	154.26	0.097	2421.8	924.3	2.620	1673	748.74
66	8.55	12991	11491	149.55	0.094	2428	927.83	2.617	1677.9	750.09
67	8.70	12996	11491	143.66	0.090	2439.2	933.72	2.612	1686.5	752.75
68	8.85	13000	11492	140.13	0.087	2446.3	938.43	2.607	1692.4	753.94
69	9.01	13006	11491	135.42	0.085	2457.6	941.96	2.609	1699.8	757.83
70	9.16	13009	11491	129.53	0.081	2466.1	947.85	2.602	1707	759.13
71	9.31	13030	11491	124.82	0.077	2491.8	952.56	2.616	1722.2	769.6
72	9.47	13051	11491	120.11	0.073	2517.3	957.27	2.630	1737.3	780.03
73	9.61	13066	11491	116.58	0.070	2536.6	960.8	2.640	1748.7	787.9
74	9.76	13082	11491	111.87	0.067	2556.9	965.51	2.648	1761.2	795.71
75	9.92	13100	11491	105.98	0.063	2580.8	971.4	2.657	1776.1	804.68
76	10.07	13105	11491	101.27	0.060	2590.4	976.11	2.654	1783.3	807.15
77	10.23	13102	11491	97.739	0.058	2590.8	979.64	2.645	1785.2	805.56
78	10.36	13103	11492	93.028	0.054	2596.6	985.53	2.635	1791.1	805.52
79	10.51	13099	11491	88.318	0.052	2597.2	989.06	2.626	1793.1	804.07

80	10.65	13104	11491	83.608	0.049	2606.9	993.77	2.623	1800.3	806.54
81	10.79	13114	11491	80.075	0.047	2620.6	997.31	2.628	1809	811.65
82	10.95	13116	11491	76.542	0.045	2626.2	1000.8	2.624	1813.5	812.7
83	11.09	13121	11491	71.832	0.042	2635.9	1005.5	2.621	1820.7	815.18
84	11.24	13126	11491	68.299	0.040	2644.2	1009.1	2.620	1826.6	817.54
85	11.39	13133	11491	64.767	0.038	2655	1012.6	2.622	1833.8	821.18
86	11.54	13138	11491	61.234	0.035	2663.2	1016.1	2.621	1839.7	823.52
87	11.70	13137	11491	56.524	0.033	2667.2	1020.9	2.613	1844	823.19
88	11.85	13140	11492	52.991	0.030	2673.9	1025.6	2.607	1849.7	824.16
89	11.99	13144	11491	50.636	0.029	2679.9	1026.7	2.610	1853.3	826.6
90	12.14	13143	11491	47.103	0.027	2682.8	1030.3	2.604	1856.5	826.27
91	12.30	13148	11491	43.57	0.025	2690.7	1033.8	2.603	1862.3	828.46
92	12.46	13147	11491	40.037	0.023	2693.5	1037.3	2.597	1865.4	828.08
93	12.62	13151	11491	37.682	0.022	2700.2	1039.7	2.597	1870	830.26
94	12.76	13169	11491	34.15	0.019	2721.2	1043.2	2.608	1882.2	838.98
95	12.91	13186	11491	30.617	0.017	2741.8	1046.8	2.619	1894.3	847.54
96	13.06	13203	11491	28.262	0.016	2761.3	1049.1	2.632	1905.2	856.08
97	13.21	13217	11491	24.729	0.014	2779.3	1052.7	2.640	1916	863.32
98	13.36	13234	11491	21.196	0.012	2800	1056.2	2.651	1928.1	871.89
99	13.51	13244	11491	18.841	0.010	2811.5	1058.5	2.656	1935	876.49
100	13.66	13243	11491	15.308	0.008	2814.3	1062.1	2.650	1938.2	876.13
101	13.81	13240	11491	12.953	0.007	2813.3	1064.4	2.643	1938.9	874.43
102	13.96	13235	11492	9.4206	0.005	2812.1	1069.1	2.630	1940.6	871.48
103	14.10	13235	11491	7.0654	0.004	2815.1	1070.3	2.630	1942.7	872.4
104	14.26	13236	11492	3.5327	0.001	2818.9	1075	2.622	1946.9	871.92
105	14.40	13240	11492	0	-0.001	2826.8	1078.6	2.621	1952.7	874.1
106	14.54	13246	11491	-2.3551	-0.001	2834.8	1079.7	2.625	1957.3	877.53
107	14.69	13246	11492	-4.7103	-0.003	2837.4	1083.3	2.619	1960.3	877.06
108	14.85	13244	11491	-7.0654	-0.004	2837.5	1084.4	2.617	1961	876.53
109	14.99	13241	11491	-10.598	-0.006	2837.9	1088	2.608	1962.9	874.94
110	15.00	13240	11491	-10.598	-0.006	2837.6	1088	2.608	1962.8	874.81

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.:
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/10/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 18.9'-19.4'
Elevation:

Soil Description: Yellowish Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

Specimen Height: 5.72 in
Specimen Area: 6.38 in²
Specimen Volume: 598.07 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 17

Measured Specific Gravity: 2.70

	Before Test Trimming	Before Test Specimen	After Test Specimen	After Test Trimming
Container ID	279	---	0	0
Wt. Container + Wet Soil, gm	78.09	---	---	1201.4
Wt. Container + Dry Soil, gm	69.28	---	---	981.41
Wt. Container, gm	31.77	---	---	15.86
Wt. Wet Soil, gm	46.32	1178.2	1171.5	1185.5
Wt. Dry Soil, gm	37.51	954.14	954.14	965.55
Wt. Water, gm	8.81	224.1	217.36	219.96
Water Content, %	23.49	23.49	22.78	22.78
Void Ratio	---	0.69	0.61	---
Degree of Saturation, %	---	91.64	100.00	---
Dry Unit Weight, pcf	---	99.595	104.34	---

Initial

Height: 5.721 in
Area: 6.3794 in²
Volume: 598.07 cc

Moisture: 23.49 %
Void Ratio: 0.69
Dry Unit Weight: 99.595 pcf
Saturation: 91.64 %

End of Initialization

Time: 10.153 min
Total Vertical Stress: 715.9 psf
Total Horizontal Stress: 718.24 psf
Pore Pressure: 578.19 psf
Effective Vertical Stress: 137.72 psf
Effective Horizontal Stress: 140.05 psf

Height Change: 0.00057173 in
Area Change: 0 in²
Volume Change: 0.17931 cc
Water Change: 1.6722 cc
Correction: 0 cc

Moisture: 23.31 %
Void Ratio: 0.69
Dry Unit Weight: 99.625 pcf
Saturation: 91.02 %

End of Consolidation/A

Time: 10.153 min
Total Vertical Stress: 715.9 psf
Total Horizontal Stress: 718.24 psf
Pore Pressure: 578.19 psf
Effective Vertical Stress: 137.72 psf
Effective Horizontal Stress: 140.05 psf

Height Change: 0.00057173 in
Area Change: 0 in²
Volume Change: 0.17931 cc
Water Change: 1.6722 cc
Correction: 0 cc

Moisture: 23.31 %
Void Ratio: 0.69
Dry Unit Weight: 99.625 pcf
Saturation: 91.02 %

End of Saturation

Time: 43.452 min
Total Vertical Stress: 12248 psf
Total Horizontal Stress: 12276 psf
Pore Pressure: 12037 psf
Effective Vertical Stress: 210.77 psf
Effective Horizontal Stress: 238.97 psf

Height Change: 0.014675 in
Area Change: 0 in²
Volume Change: 4.6022 cc
Water Change: -49.174 cc
Correction: 33.322 cc

Moisture: 25.15 %
Void Ratio: 0.68
Dry Unit Weight: 100.37 pcf
Saturation: 100.00 %

End of Consolidation/B

Time: 188.99 min
Total Vertical Stress: 14129 psf
Total Horizontal Stress: 14249 psf
Pore Pressure: 12095 psf
Effective Vertical Stress: 2034.3 psf
Effective Horizontal Stress: 2154.4 psf

Height Change: 0.078899 in
Area Change: 0.20491 in²
Volume Change: 27.194 cc
Water Change: 15.963 cc
Correction: -9.2241 cc

Moisture: 22.78 %
Void Ratio: 0.61
Dry Unit Weight: 104.34 pcf
Saturation: 100.00 %

End of Shear

Time: 689.56 min
Total Vertical Stress: 16578 psf
Total Horizontal Stress: 14250 psf
Pore Pressure: 12808 psf
Effective Vertical Stress: 3769.7 psf
Effective Horizontal Stress: 1441.9 psf

Height Change: 0.92526 in
Area Change: -0.88476 in²
Volume Change: 27.194 cc
Water Change: 15.963 cc
Correction: -9.2241 cc

Moisture: 22.78 %
Void Ratio: 0.61
Dry Unit Weight: 104.34 pcf
Saturation: 100.00 %

At Failure

Time: 668.99 min
Total Vertical Stress: 16549 psf
Total Horizontal Stress: 14252 psf
Pore Pressure: 12821 psf
Effective Vertical Stress: 3727.5 psf
Effective Horizontal Stress: 1430.2 psf

Height Change: 0.89048 in
Area Change: -0.97434 in²
Volume Change: 27.194 cc
Water Change: 15.963 cc
Correction: 0 cc

Moisture: 22.78 %
Void Ratio: 0.61
Dry Unit Weight: 104.34 pcf
Saturation: 100.00 %

TRIAXIAL TEST

Project: VRE Alexandria
Boring No.: GZ-9
Sample No.:
Test No.: 1

Location: Alexandria, VA
Tested By: Jason
Test Date: 06/10/2015
Sample Type: Undisturbed

Project No.: 16679-0
Checked By: Bert
Depth: 18.9'-19.4'
Elevation:

Soil Description: Yellowish Brown Lean CLAY (CL)

Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

Specimen Height: 5.64 in
Specimen Area: 6.17 in²
Specimen Volume: 570.88 cc

Piston Area: 0.23 in²
Piston Friction: 0.00 lb
Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
Membrane Correction: 1.65 lb/in
Correction Type: Uniform

Liquid Limit: 27

Plastic Limit: 17

Measured Specific Gravity: 2.70

	Time min	Vertical Strain %	Volumetric Strain %	Corrected Area in ²	Deviator Load lb	Deviator Stress psf	Pore Pressure psf	Horizontal Stress psf	Vertical Stress psf
1	0	0	0	6.296	-0.17498	-123.16	12096	14250	14127
2	0.0123	0	0	6.296	0.097398	-116.93	12097	14249	14132
3	0.020617	0.0016889	0	6.2961	0.23264	-113.98	12098	14249	14135
4	0.05395	0.0033778	0	6.2962	0.90511	-98.743	12104	14252	14153
5	0.10395	0.0067556	0	6.2964	1.7185	-80.43	12113	14250	14170
6	0.20395	0.013511	0	6.2968	3.2081	-46.943	12125	14249	14202
7	0.50392	0.027022	0	6.2977	6.3187	23.023	12162	14249	14272
8	1.0039	0.042222	0	6.2986	10.104	108.24	12214	14250	14359
9	2.0038	0.069245	0	6.3003	15.378	226.43	12303	14250	14477
10	5.0035	0.15369	0	6.3056	25.388	447.54	12505	14249	14697
11	10.003	0.304	0	6.3152	35.53	665.11	12715	14250	14916
12	15.003	0.45769	0	6.3249	42.022	798.56	12847	14250	15049
13	20.002	0.60969	0	6.3346	46.891	894.83	12937	14250	15145
14	25.002	0.75493	0	6.3438	50.678	977.54	13004	14250	15228
15	30.001	0.90018	0	6.3531	53.788	1046.4	13053	14250	15297
16	35.001	1.0471	0	6.3626	56.223	1099.6	13091	14250	15350
17	40	1.2008	0	6.3725	58.251	1143.5	13119	14250	15394
18	45.004	1.3562	0	6.3825	60.145	1184.2	13143	14250	15435
19	50.004	1.5082	0	6.3924	61.903	1221.7	13162	14250	15472
20	55.003	1.6416	0	6.401	63.661	1259.3	13176	14250	15510
21	60.003	1.797	0	6.4112	65.555	1299.6	13188	14250	15550
22	65.002	1.9388	0	6.4204	67.585	1343	13195	14249	15592
23	70.002	2.0858	0	6.4301	69.343	1380.1	13201	14249	15629
24	75.002	2.2496	0	6.4408	70.964	1413.8	13206	14250	15664
25	80.001	2.3915	0	6.4502	72.723	1450.7	13209	14250	15701
26	85.001	2.5435	0	6.4603	74.21	1481.4	13210	14250	15732
27	90	2.6904	0	6.47	75.833	1515	13211	14250	15765
28	95.004	2.8373	0	6.4798	77.456	1548.5	13210	14250	15799
29	100	2.9961	0	6.4904	78.809	1575.7	13210	14250	15826
30	105	3.138	0	6.4999	80.161	1603.1	13209	14250	15854
31	110	3.295	0	6.5105	81.378	1627.1	13205	14250	15878
32	115	3.4369	0	6.52	82.596	1651.4	13202	14250	15902
33	120	3.5957	0	6.5308	83.542	1669.3	13198	14250	15920
34	125	3.751	0	6.5413	84.624	1690.1	13195	14250	15941
35	130	3.8963	0	6.5512	85.571	1708.1	13191	14250	15959
36	135	4.0517	0	6.5618	86.382	1722.9	13185	14250	15973
37	140	4.1952	0	6.5716	87.194	1737.8	13181	14250	15988
38	145	4.3506	0	6.5823	88.005	1752.5	13175	14250	16003
39	150	4.5009	0	6.5927	88.546	1761.3	13171	14250	16012
40	155	4.6664	0	6.6041	89.087	1769.7	13164	14250	16020
41	160	4.8167	0	6.6146	89.764	1781.4	13158	14250	16032
42	165	4.9637	0	6.6248	90.171	1787.2	13151	14249	16036
43	170	5.114	0	6.6353	90.846	1798.7	13146	14250	16049
44	175	5.266	0	6.6459	91.387	1807.3	13141	14250	16058
45	180	5.4095	0	6.656	92.604	1830.6	13133	14250	16081
46	185	5.5598	0	6.6666	93.956	1856.7	13126	14250	16107
47	190	5.7034	0	6.6768	95.311	1882.8	13119	14249	16132
48	195	5.8503	0	6.6872	96.393	1902.9	13112	14249	16152
49	200	5.9956	0	6.6975	97.473	1922.9	13106	14250	16173
50	205	6.1425	0	6.708	98.555	1942.9	13101	14250	16193
51	210	6.3029	0	6.7195	99.907	1968.2	13093	14250	16219
52	215	6.4431	0	6.7295	100.99	1988.2	13086	14250	16239
53	220	6.5884	0	6.74	102.07	2007.9	13079	14250	16258
54	225	6.7319	0	6.7504	102.75	2019	13073	14250	16269
55	230	6.8974	0	6.7624	103.69	2035.3	13066	14250	16286
56	235	7.0477	0	6.7733	104.37	2046.1	13059	14250	16297
57	240	7.1913	0	6.7838	105.05	2057	13053	14250	16307
58	245	7.3349	0	6.7943	105.45	2062.2	13045	14250	16313
59	250	7.4919	0	6.8058	106.13	2072.7	13040	14250	16323
60	255	7.6355	0	6.8164	106.67	2080.6	13033	14250	16331
61	260	7.8044	0	6.8289	107.08	2085.1	13026	14250	16335
62	265	7.9429	0	6.8392	107.48	2090.3	13019	14249	16339
63	270	8.0965	0	6.8506	107.89	2095	13015	14250	16345
64	275	8.2519	0	6.8622	108.02	2094	13009	14250	16344
65	280	8.4022	0	6.8735	108.29	2095.9	13003	14250	16346
66	285	8.5593	0	6.8853	108.7	2100.5	12997	14250	16351
67	290	8.7113	0	6.8968	108.83	2099.6	12991	14250	16350
68	295	8.8549	0	6.9076	109.24	2104.5	12985	14250	16355
69	300	8.99	0	6.9179	109.92	2115.2	12978	14249	16364
70	305	9.1386	0	6.9292	110.86	2131.1	12972	14249	16380
71	310	9.2974	0	6.9413	111.67	2143.9	12967	14250	16394
72	315	9.4527	0	6.9532	113.03	2167.9	12963	14250	16418
73	320	9.5946	0	6.9641	113.7	2178.3	12956	14250	16429
74	325	9.7415	0	6.9755	114.38	2188.4	12950	14250	16439
75	330	9.8902	0	6.987	115.46	2206.8	12944	14250	16457
76	335	10.032	0	6.998	116.27	2219.7	12939	14252	16471
77	340	10.184	0	7.0098	116.54	2221.3	12933	14250	16472
78	345	10.341	0	7.0221	117.35	2233.7	12927	14250	16484
79	350	10.486	0	7.0335	118.03	2243.7	12924	14250	16494
80	355	10.628	0	7.0447	118.84	2256.4	12919	14252	16508

81	360	10.779	0	7.0565	119.25	2260.6	12914	14250	16511
82	365	10.934	0	7.0689	119.65	2264.7	12907	14250	16515
83	370	11.093	0	7.0815	119.92	2265.8	12903	14250	16516
84	375	11.236	0	7.0929	119.92	2261.9	12899	14250	16512
85	380	11.388	0	7.1051	119.92	2257.7	12896	14250	16508
86	385	11.54	0	7.1173	120.06	2256.3	12890	14250	16507
87	390	11.702	0	7.1304	120.19	2254.6	12885	14250	16505
88	395	11.856	0	7.1428	120.19	2250.3	12880	14250	16501
89	400	12.003	0	7.1547	120.19	2246.3	12877	14250	16497
90	405	12.15	0	7.1667	119.92	2236.8	12874	14252	16488
91	410	12.304	0	7.1793	119.79	2229.9	12869	14250	16480
92	415	12.466	0	7.1926	119.79	2225.4	12865	14250	16476
93	420	12.594	0	7.2031	120.33	2232.7	12860	14250	16483
94	425	12.756	0	7.2165	121.14	2244.4	12858	14252	16496
95	430	12.895	0	7.228	121.95	2256.8	12854	14250	16507
96	435	13.04	0	7.2401	122.63	2266.2	12850	14250	16517
97	440	13.19	0	7.2526	123.17	2272.7	12845	14250	16523
98	445	13.334	0	7.2646	123.58	2276.7	12843	14250	16527
99	450	13.486	0	7.2774	123.98	2280.5	12839	14250	16531
100	455	13.641	0	7.2905	124.66	2289.4	12837	14250	16540
101	460	13.781	0	7.3023	124.79	2288.1	12831	14250	16538
102	465	13.927	0	7.3146	125.2	2291.9	12828	14250	16542
103	470	14.077	0	7.3274	125.47	2292.9	12826	14250	16543
104	475	14.236	0	7.341	125.87	2296.3	12824	14250	16547
105	480	14.384	0	7.3537	126.14	2297.3	12821	14252	16549
106	485	14.536	0	7.3668	126.14	2292.9	12817	14252	16545
107	490	14.683	0	7.3795	126.14	2288.7	12813	14250	16539
108	495	14.834	0	7.3925	126.28	2287	12812	14250	16537
109	500	14.982	0	7.4055	126.14	2280.1	12808	14250	16531
110	500.57	15.001	0	7.4071	126.14	2279.6	12808	14250	16530

TRIAXIAL TEST

Project: VRE Alexandria
 Boring No.: GZ-9
 Sample No.:
 Test No.: 1

Location: Alexandria, VA
 Tested By: Jason
 Test Date: 06/10/2015
 Sample Type: Undisturbed

Project No.: 16679-0
 Checked By: Bert
 Depth: 18.9'-19.4'
 Elevation:

Soil Description: Yellowish Brown Lean CLAY (CL)
 Remarks: 16667-0 VRE Alexandria GZ-9 18'0" - 20'0" - CU Triaxial

Specimen Height: 5.64 in
 Specimen Area: 6.17 in²
 Specimen Volume: 570.88 cc

Piston Area: 0.23 in²
 Piston Friction: 0.00 lb
 Piston Weight: 0.00 lb

Filter Strip Correction: 172.80 psf
 Membrane Correction: 1.65 lb/in
 Correction Type: Uniform

Liquid Limit: 27 Plastic Limit: 17 Measured Specific Gravity: 2.70

	Vertical Strain %	Total Vertical Stress psf	Total Horizontal Stress psf	Excess Pore Pressure psf	A Parameter	Effective Vertical Stress psf	Effective Horizontal Stress psf	Stress Ratio	Effective p psf	q psf
1	0.00	14127	14250	0	0.000	2031.2	2154.4	1.061	2092.8	-61.579
2	0.00	14132	14249	1.1776	0.378	2035.1	2152	1.057	2093.5	-58.464
3	0.00	14135	14249	2.3551	0.385	2036.9	2150.8	1.056	2093.8	-56.989
4	0.00	14153	14252	8.243	0.289	2048.6	2147.3	1.048	2097.9	-49.371
5	0.01	14170	14250	16.486	0.386	2057.5	2137.9	1.039	2097.7	-40.215
6	0.01	14202	14249	29.439	0.402	2076.8	2123.8	1.023	2100.3	-23.471
7	0.03	14272	14249	65.944	0.459	2110.3	2087.2	1.011	2098.8	11.512
8	0.04	14359	14250	117.76	0.509	2144.9	2036.6	1.053	2090.7	54.12
9	0.07	14477	14250	207.25	0.593	2173.5	1947.1	1.116	2060.3	113.22
10	0.15	14697	14249	408.62	0.718	2192.1	1744.6	1.257	1968.3	223.77
11	0.30	14916	14250	619.4	0.786	2200.1	1535	1.433	1867.5	332.55
12	0.46	15049	14250	751.29	0.815	2201.6	1403.1	1.569	1802.4	399.28
13	0.61	15145	14250	840.79	0.826	2208.4	1313.6	1.681	1761	447.41
14	0.75	15228	14250	907.91	0.825	2224	1246.5	1.784	1735.2	488.77
15	0.90	15297	14250	957.37	0.819	2243.4	1197	1.874	1720.2	523.18
16	1.05	15350	14250	995.05	0.814	2259	1159.3	1.949	1709.1	549.82
17	1.20	15394	14250	1023.3	0.808	2274.6	1131.1	2.011	1702.8	571.76
18	1.36	15435	14250	1046.9	0.801	2291.7	1107.5	2.069	1699.6	592.08
19	1.51	15472	14250	1065.7	0.792	2310.3	1088.7	2.122	1699.5	610.84
20	1.64	15510	14250	1079.8	0.781	2333.9	1074.5	2.172	1704.2	629.67
21	1.80	15550	14250	1091.6	0.767	2362.4	1062.8	2.223	1712.6	649.81
22	1.94	15592	14249	1098.7	0.750	2397.5	1054.5	2.274	1726	671.51
23	2.09	15629	14249	1104.6	0.736	2428.8	1048.6	2.316	1738.7	690.06
24	2.25	15664	14250	1110.5	0.723	2457.7	1043.9	2.354	1750.8	706.89
25	2.39	15701	14250	1112.8	0.707	2492.3	1041.6	2.393	1766.9	725.36
26	2.54	15732	14250	1114	0.694	2521.7	1040.4	2.424	1781.1	740.68
27	2.69	15765	14250	1115.2	0.681	2554.2	1039.2	2.458	1796.7	757.49
28	2.84	15799	14250	1114	0.666	2588.9	1040.4	2.488	1814.6	774.25
29	3.00	15826	14250	1114	0.656	2616.1	1040.4	2.515	1828.2	787.85
30	3.14	15854	14250	1112.8	0.645	2644.7	1041.6	2.539	1843.1	801.55
31	3.30	15878	14250	1109.3	0.634	2672.2	1045.1	2.557	1858.7	813.57
32	3.44	15902	14250	1105.7	0.623	2700	1048.6	2.575	1874.3	825.69
33	3.60	15920	14250	1102.2	0.615	2721.4	1052.2	2.587	1886.8	834.63
34	3.75	15941	14250	1098.7	0.606	2745.8	1055.7	2.601	1900.7	845.06
35	3.90	15959	14250	1095.1	0.598	2767.3	1059.2	2.613	1913.3	854.05
36	4.05	15973	14250	1089.3	0.590	2788	1065.1	2.618	1926.6	861.44
37	4.20	15988	14250	1084.5	0.583	2807.6	1069.8	2.624	1938.7	868.91
38	4.35	16003	14250	1078.7	0.575	2828.2	1075.7	2.629	1951.9	876.24
39	4.50	16012	14250	1075.1	0.571	2840.5	1079.2	2.632	1959.9	880.63
40	4.67	16020	14250	1068.1	0.564	2856	1086.3	2.629	1971.2	884.85
41	4.82	16032	14250	1062.2	0.558	2873.6	1092.2	2.631	1982.9	890.68
42	4.96	16036	14249	1055.1	0.553	2885.3	1098.1	2.628	1991.7	893.61
43	5.11	16049	14250	1050.4	0.547	2902.7	1104	2.629	2003.3	899.37
44	5.27	16058	14250	1044.5	0.541	2917.2	1109.9	2.628	2013.5	903.65
45	5.41	16081	14250	1037.4	0.531	2947.6	1116.9	2.639	2032.2	915.32
46	5.56	16107	14250	1030.4	0.520	2980.7	1124	2.652	2052.3	928.34
47	5.70	16132	14249	1023.3	0.511	3012.7	1129.9	2.666	2071.3	941.4
48	5.85	16152	14249	1016.2	0.502	3039.8	1136.9	2.674	2088.4	951.45
49	6.00	16173	14250	1010.4	0.494	3066.9	1144	2.681	2105.5	961.46
50	6.14	16193	14250	1004.5	0.486	3092.8	1149.9	2.690	2121.3	971.43
51	6.30	16219	14250	997.4	0.477	3125.2	1157	2.701	2141.1	984.12
52	6.44	16239	14250	990.34	0.469	3152.2	1164	2.708	2158.1	994.09
53	6.59	16258	14250	983.27	0.461	3179	1171.1	2.715	2175.1	1004
54	6.73	16269	14250	977.39	0.456	3196	1177	2.715	2186.5	1009.5
55	6.90	16286	14250	970.32	0.450	3219.3	1184	2.719	2201.7	1017.6
56	7.05	16297	14250	963.25	0.444	3237.2	1191.1	2.718	2214.2	1023
57	7.19	16307	14250	957.37	0.439	3254	1197	2.718	2225.5	1028.5
58	7.33	16313	14250	949.12	0.434	3267.4	1205.2	2.711	2236.3	1031.1
59	7.49	16323	14250	944.41	0.430	3282.7	1210	2.713	2246.3	1036.3
60	7.64	16331	14250	937.35	0.425	3297.7	1217	2.710	2257.3	1040.3
61	7.80	16335	14250	930.28	0.421	3309.2	1224.1	2.703	2266.6	1042.5
62	7.94	16339	14249	923.22	0.418	3320.2	1230	2.699	2275.1	1045.1
63	8.10	16345	14250	918.51	0.414	3330.8	1235.9	2.695	2283.4	1047.5
64	8.25	16344	14250	912.62	0.412	3335.7	1241.8	2.686	2288.7	1047
65	8.40	16346	14250	906.73	0.409	3343.6	1247.6	2.680	2295.6	1048
66	8.56	16351	14250	900.84	0.405	3354.1	1253.5	2.676	2303.8	1050.3
67	8.71	16350	14250	894.96	0.403	3359	1259.4	2.667	2309.2	1049.8
68	8.85	16355	14250	889.07	0.399	3369.8	1265.3	2.663	2317.5	1052.2
69	8.99	16364	14249	882	0.395	3386.4	1271.2	2.664	2328.8	1057.6
70	9.14	16380	14249	876.11	0.389	3408.2	1277.1	2.669	2342.6	1065.6
71	9.30	16394	14250	871.4	0.384	3426.9	1283	2.671	2354.9	1072
72	9.45	16418	14250	866.69	0.378	3455.6	1287.7	2.684	2371.6	1084
73	9.59	16429	14250	859.63	0.374	3473	1294.7	2.682	2383.9	1089.1
74	9.74	16439	14250	853.74	0.369	3489	1300.6	2.683	2394.8	1094.2
75	9.89	16457	14250	847.85	0.364	3513.3	1306.5	2.689	2409.9	1103.4
76	10.03	16471	14252	843.14	0.359	3532.1	1312.4	2.691	2422.3	1109.9
77	10.18	16472	14250	837.25	0.357	3538.4	1317.1	2.686	2427.8	1110.6
78	10.34	16484	14250	831.37	0.353	3556.7	1323	2.688	2439.9	1116.9
79	10.49	16494	14250	827.83	0.350	3570.2	1326.5	2.691	2448.4	1121.8

80	10.63	16508	14252	823.12	0.345	3588.8	1332.4	2.693	2460.6	1128.2
81	10.78	16511	14250	818.41	0.343	3596.6	1336	2.692	2466.3	1130.3
82	10.93	16515	14250	811.35	0.340	3607.7	1343	2.686	2475.3	1132.3
83	11.09	16516	14250	806.64	0.338	3613.5	1347.7	2.681	2480.6	1132.9
84	11.24	16512	14250	803.11	0.337	3613.1	1351.3	2.674	2482.2	1130.9
85	11.39	16508	14250	799.57	0.336	3612.5	1354.8	2.666	2483.7	1128.9
86	11.54	16507	14250	793.68	0.334	3617	1360.7	2.658	2488.8	1128.1
87	11.70	16505	14250	788.97	0.332	3619.9	1365.4	2.651	2492.7	1127.3
88	11.86	16501	14250	784.26	0.330	3620.4	1370.1	2.642	2495.3	1125.2
89	12.00	16497	14250	780.73	0.329	3619.9	1373.6	2.635	2496.8	1123.1
90	12.15	16488	14252	778.38	0.329	3613.9	1377.2	2.624	2495.6	1118.4
91	12.30	16480	14250	772.49	0.328	3611.8	1381.9	2.614	2496.8	1114.9
92	12.47	16476	14250	768.96	0.327	3610.9	1385.4	2.606	2498.1	1112.7
93	12.59	16483	14250	764.25	0.324	3622.9	1390.1	2.606	2506.5	1116.4
94	12.76	16496	14252	761.89	0.321	3638.1	1393.7	2.610	2515.9	1122.2
95	12.89	16507	14250	758.36	0.319	3652.8	1396	2.617	2524.4	1128.4
96	13.04	16517	14250	753.65	0.315	3666.9	1400.7	2.618	2533.8	1133.1
97	13.19	16523	14250	748.94	0.313	3678.2	1405.4	2.617	2541.8	1136.4
98	13.33	16527	14250	746.58	0.311	3684.5	1407.8	2.617	2546.1	1138.4
99	13.49	16531	14250	743.05	0.309	3691.8	1411.3	2.616	2551.5	1140.2
100	13.64	16540	14250	740.69	0.307	3703.1	1413.7	2.619	2558.4	1144.7
101	13.78	16538	14250	734.81	0.305	3707.6	1419.6	2.612	2563.6	1144
102	13.93	16542	14250	732.45	0.303	3713.8	1421.9	2.612	2567.9	1146
103	14.08	16543	14250	730.1	0.302	3717.2	1424.3	2.610	2570.7	1146.5
104	14.24	16547	14250	727.74	0.301	3723	1426.6	2.610	2574.8	1148.2
105	14.38	16549	14252	725.39	0.299	3727.5	1430.2	2.606	2578.8	1148.7
106	14.54	16545	14252	720.67	0.298	3727.8	1434.9	2.598	2581.3	1146.5
107	14.68	16539	14250	717.14	0.297	3726	1437.2	2.592	2581.6	1144.4
108	14.83	16537	14250	715.96	0.297	3725.4	1438.4	2.590	2581.9	1143.5
109	14.98	16531	14250	712.43	0.296	3722	1441.9	2.581	2582	1140.1
110	15.00	16530	14250	712.43	0.297	3721.5	1441.9	2.581	2581.7	1139.8

Report Number: **153616**HP ENVIRONMENTAL
INCORPORATED

Page 1 of 3

Certificate of Laboratory AnalysisGeoConcepts Engineering, Inc.
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: **VRE Alexandria Station**

4. Client Sample No: **GZ-7 (13-15')** HPE Sample No.: 153616-04
 Sample Matrix: Soil Date Collected: 04/19/15
 Sample Location:

Test(s) Requested: **Soil Corrosion Potential Profile**
 Analysis Method(s): Various Date Analyzed: 05/20/15

<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Reporting Limit</u>	<u>Qualifier</u>
Resistivity - ASTM G187	6900	ohm-cm	N/A	
Redox Potential - Electrode	+ 196	mV	N/A	
pH - CA643	5.2	pH	N/A	
Chloride (Water Soluble) - CA422	33	mg/Kg	2.5	
Sulfate (Water Soluble) - CA417	36	mg/Kg	5.0	
Sulfide (Water Soluble) EPA 376.2	< 1.2	mg/Kg	1.2	U
Moisture (Percent)	20	%	N/A	

5. Client Sample No: **GZ-8 (15-17')** HPE Sample No.: 153616-05
 Sample Matrix: Soil Date Collected: 04/19/15
 Sample Location:

Test(s) Requested: **Soil Corrosion Potential Profile**
 Analysis Method(s): Various Date Analyzed: 05/20/15

<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Reporting Limit</u>	<u>Qualifier</u>
Resistivity - ASTM G187	4600	ohm-cm	N/A	
Redox Potential - Electrode	+ 331	mV	N/A	
pH - CA643	4.0	pH	N/A	
Chloride (Water Soluble) - CA422	45	mg/Kg	2.5	
Sulfate (Water Soluble) - CA417	< 5.0	mg/Kg	5.0	U
Sulfide (Water Soluble) EPA 376.2	< 1.2	mg/Kg	1.2	U
Moisture (Percent)	24	%	N/A	

Analyte Qualifier Codes

U = Analyte was not detected



Report Number: **153616**

HP ENVIRONMENTAL
INCORPORATED

Page 2 of 3

Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc.
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: **VRE Alexandria Station**

6. Client Sample No: **GZ-9 (10-12')** HPE Sample No.: 153616-06
Sample Matrix: Soil Date Collected: 04/11/15
Sample Location:

Test(s) Requested: **Soil Corrosion Potential Profile**
Analysis Method(s): Various

Date Analyzed: 05/20/15

<u>Analyte</u>	<u>Result</u>	<u>Units</u>	<u>Reporting Limit</u>	<u>Qualifier</u>
Resistivity - ASTM G187	11000	ohm-cm	N/A	
Redox Potential - Electrode	+ 165	mV	N/A	
pH - CA643	4.9	pH	N/A	
Chloride (Water Soluble) - CA422	< 2.5	mg/Kg	2.5	U
Sulfate (Water Soluble) - CA417	9.7	mg/Kg	5.0	
Sulfide (Water Soluble) EPA 376.2	< 1.2	mg/Kg	1.2	U
Moisture (Percent)	22	%	N/A	

JP

05/26/15

Approved by

Date

Analyte Qualifier Codes

U = Analyte was not detected

Environmental Sample Chain-of-Custody Record

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME: <u>Routine</u>		COC Reference: ###														
Address: 19955 Highland Vista Dr., Suite 170 Ashburn, VA 20147		Emergency P.O./Job Number: 12170		Tests Requested														
Contact: Josh April-japril@geoconcepts-eng.com		SITE: VRE Alexandria Station Pedestrian Tunnel																
Phone: (703) 726-8030		Sampled by:																
Fax: (703) 726-8032																		
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-DRO (VELAP)	TPH GRO (VELAP)	Priority Pollutant Metals (13)	VOCs	PCBs	pH	Chloride	Sulfides	Resistivity	Redox Potential	Natural Moisture Content	Sulfates
1. GZ-7 (13-15')	4/19/2015		Grab	S	None	1 jar	X	X	X	X	X							
2. GZ-8 (13-15')	4/19/2015		Grab	S	None	1 jar	X	X	X	X	X							
3. GZ-9 (14-16')	4/11/2015		Grab	S	None	1 jar	X	X	X	X	X							
4. GZ-7 (13-15')	4/19/2015		Grab	S	None	1 ziploc						X	X	X	X	X	X	
5. GZ-8 (15-17')	4/19/2015		Grab	S	None	1 ziploc						X	X	X	X	X	X	
6. GZ-9 (10-12')	4/11/2015		Grab	S	None	1 ziploc						X	X	X	X	X	X	
7.																		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		

Received Condition:	Relinquished By:	Date/Time	Received By:	Date/Time
Mode of Shipment:	Relinquished By:	Date/Time	Received By Labor:	Date/Time
HPE Report Number:				

on ice 40C
hand delivered
153616

5/19/15
4:56 PM

K-T GeoServices, Inc.

219 N. Iowa St., Unit J
Gunnison CO 81230 USA

www.ktgeo.com
970-641-1235

June 26, 2015

Josh April
Project Geologist
GeoConcepts Engineering, Inc.
19955 Highland Vista Drive, Suite 170
Ashburn, Virginia 20147
(703) 726-8030
JApril@GeoConcepts-Eng.Com

Project No.: 12170
Project Name: VRE Alexandria Station
Subject: X-ray Diffraction Analysis
K-T File No.: Z15175

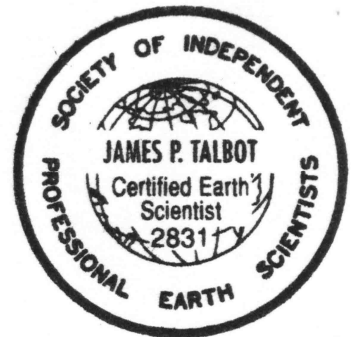
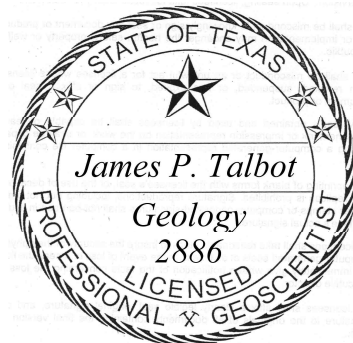
Dear Josh,

This report presents the results of bulk (whole rock) and clay X-ray diffraction (XRD) analysis performed on 3 samples.

Enclosed find the tabular XRD data (weight percentage), the X-ray diffraction traces and a detailed description of sample preparation and analytical procedures. For your convenience, I have sent a copy of this report via e-mail.

Unused portions of the samples will be returned upon request. If you have any questions concerning these results or if you need anything else please contact me at (970) 641-1235. Thank you for using K-T GeoServices for your analytical needs and I look forward to working with you again in the future.

Sincerely,



James P. Talbot, P.G.

NOTICE: The results and interpretations presented in this report are based on materials and information supplied by the client and represent the judgment of K-T GeoServices, Inc. This report is intended for the client's exclusive and confidential use, and any user of this report agrees that K-T GeoServices, Inc. and its employees assume no responsibility and make no warranties or representation as to the utility of this report for any reason. K-T GeoServices, Inc. and its employees shall not be liable for any loss or damage, regardless of cause, resulting from the use of any information contained herein.

X-ray Diffraction Data (Weight Percent)

Location	GZ-7	GZ-8	GZ-9
Depth	13.0-15.0	9.0-11.0	14.0-16.0
Whole Rock Mineralogy (Weight Percent)			
Quartz	79.7	58.9	62.7
K-Feldspar	3.5	1	2
Plagioclase	2.5	0	5.6
Siderite	0.8	0	0
Goethite	0.8	3.6	0
R0 M-L I/S (90%S)*	1.3	27.8	6.2
R1 M-L C/S (20%S)**	0	0	2.3
Illite&Mica	8.8	2.7	17.8
Kaolinite	2	4.8	2.5
Chlorite	0.6	1.2	0.9
TOTAL	100	100	100

*R0 M-L I/S (90%S) - R0 Ordered Mixed-Layer Illite/Smectite with 90% Smectite Layers

**R1 M-L C/S (20%S) - R1 Ordered Mixed-Layer Chlorite/Smectite with 20% Smectite Layers

See pages 3 and 4 for mineral definitions.

See page 5 for a discussion of X-ray diffraction terminology and limitations.

Sample preparation and analytical procedures are on page 6.

X-ray diffraction traces are on page 7 - 12.

Mineral Definitions

Quartz

Quartz (SiO_2) is the most common rock-forming mineral.

K-Feldspar

K-Feldspar (KAlSi_3O_8) is a potassium bearing feldspar and can be Orthoclase, Microcline or Sanidine.

Plagioclase

Plagioclase is a mineral series ranging in composition from Albite ($\text{NaAlSi}_3\text{O}_8$) to Anorthite ($\text{CaAl}_2\text{Si}_2\text{O}_8$) and is one of the most common rock forming mineral groups.

Siderite

Siderite is a hexagonal carbonate mineral with the formula FeCO_3 .

Goethite

Goethite ($\text{FeO} \bullet \text{OH}$) is a common weathering product of iron-bearing minerals such as siderite, magnetite, pyrite, etc.

Mineral Definitions (continued)

Illite & Mica

Illite & Mica (muscovite) are common non-expanding (non-swelling) minerals. Illite is the fine-grained clay mineral analogue to muscovite. Illite and Mica are hydrated silicates containing potassium, silica and alumina.

Kaolinite

Kaolinite is a common non-expanding (non-swelling) clay mineral. It is a hydrous aluminum silicate with the general formula $\text{Al}_2(\text{Si}_2\text{O}_5)(\text{OH})_4$.

Chlorite

Chlorite is a common non-expanding (non-swelling) clay mineral. It is a hydrous aluminum silicate that often contains iron.

Mixed-Layer Illite/Smectite

A clay mineral group containing interlayered or interstratified Illite and Smectite. The mixed-layer clay type is identified by the minerals involved (Illite and Smectite in this case), the type of order or stacking along the Z axis (random or not ordered in this case), and the proportions of the minerals involved (10% Illite and 90% Smectite in this case).

Mixed-Layer Chlorite/Smectite

A clay mineral group containing interlayered or interstratified Chlorite and Smectite. The mixed-layer clay type is identified by the minerals involved (Chlorite and Smectite in this case), the type of order or stacking along the Z axis (R1 or ordered in this case), and the proportions of the minerals involved (80% Chlorite and 20% Smectite in this case).

Smectite (Montmorillonite)

A clay mineral group synonymous with the montmorillonite group. The smectite group is composed of expandable (swelling) clay minerals. The general formula for Smectite is $(\text{Na,Ca})(\text{Al,Mg})_6(\text{Si}_4\text{O}_{10})_3(\text{OH})_6 \cdot n \text{H}_2\text{O}$. Smectites are characterized by swelling in water and extreme colloidal behavior.

Reference for general mineral definitions: Dictionary of Geological Terms, American Geological Institute, 1976, Anchor Press/Doubleday, Garden City, New York.

K-T GeoServices, Inc.
Whole Rock XRD
Discussion of Terminology and Limitations

Weight percentage data from X-ray diffraction methods are considered semi-quantitative. There are many factors affecting the results.

XRD methods can quantify crystalline material only. Organic non-crystalline material in large concentrations can be detected but not quantified. Therefore, any organic and/or non-crystalline material is not included in the accompanying results.

Detection limits for XRD are on the order of one to five weight percent. The detection limits differ for each mineral species.

Mineral standards used to determine calibration factors are often different from the actual minerals analyzed. Minerals such as feldspars that undergo solid solution are especially problematic. Clay minerals are problematic for this same reason. Clay minerals also have a wide range of crystallinities (poorly crystallized to well crystallized) which may compound this problem.

With this method the data always sums to 100%. This means that the percentages reported for each mineral are dependent upon the percentages reported for the other minerals. If one mineral is underestimated the others will be overestimated. Also, if one or more minerals are present but not detected then the percentages of the minerals that are detected will be overestimated.

Any or all of the above factors may affect the estimated weight percentages.

Data are formatted as weight percent, but are actually calculated as weight fractions. Therefore, slight rounding errors may be observed in the formatted data.

K-T GeoServices, Inc.
Whole Rock and Clay Fraction XRD
Sample Preparation and Analytical Procedures

Sample Preparation

Samples submitted for whole rock and clay mineral XRD analyses are cleaned of obvious contaminants and disaggregated in a mortar and pestle. A split of each sample is then transferred to distilled water and pulverized using a McCrone micronizing mill. The resultant powder is dried, disaggregated, and packed into a metal sample holder to produce random whole-rock mounts. A separate split of each sample is dispersed in distilled water using a sonic probe. The suspensions are then size fractionated with a centrifuge to isolate clay-size (<4 micron equivalent spherical diameter) materials for a separate clay mount. The suspensions are then vacuum deposited on nylon membrane filters to produce oriented clay mineral mounts. The clay mineral mounts are attached to glass slides and exposed to ethylene glycol vapor for approximately 12 hours.

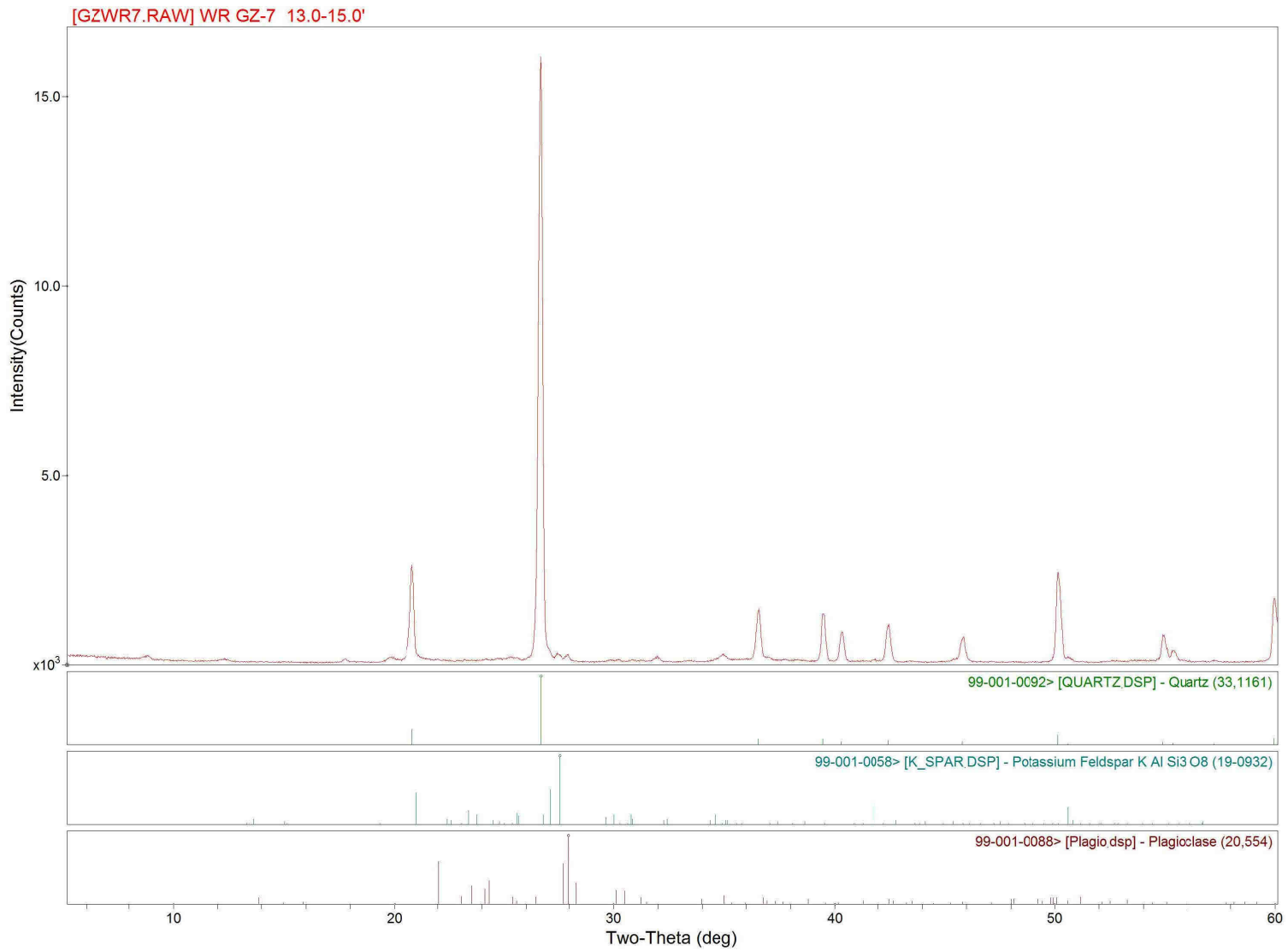
Analytical Procedures

X-ray Diffraction (XRD) analyses of the samples are performed using a Siemens D500 automated powder diffractometer equipped with a copper X-ray source (40kV, 30mA) and a scintillation X-ray detector. The whole rock samples are analyzed over an angular range of five to sixty degrees two theta at a scan rate of one degree per minute. The glycol solvated oriented clay mounts are analyzed over an angular range of two to thirty six degrees two theta at a scan rate of one degree per minute.

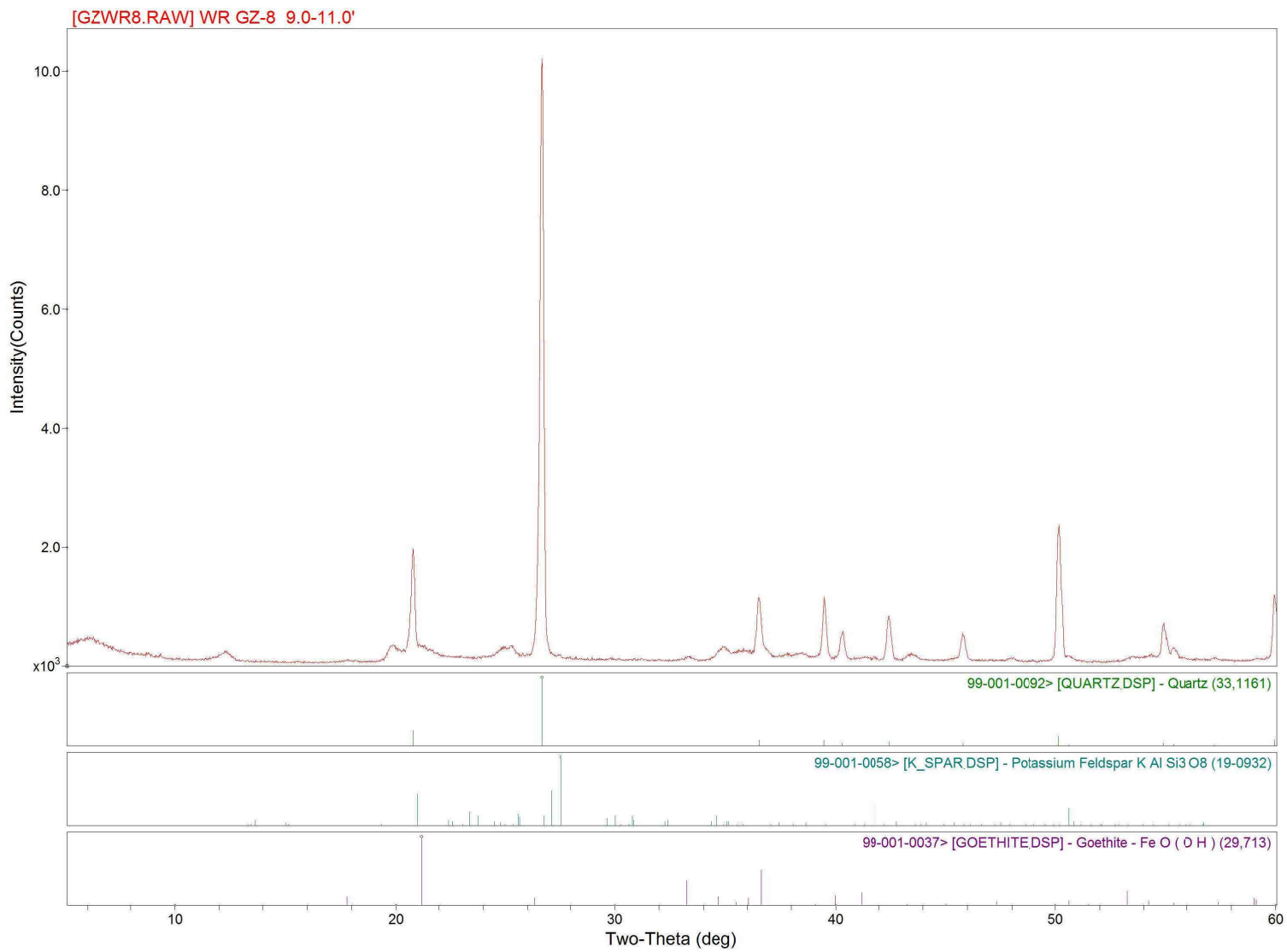
XRD patterns from air-dried and glycol-solvated clay-fraction samples are qualitatively analyzed to determine the types of clays present in the samples. Determinations of mixed-layer clay ordering and expandability are done by comparing experimental diffraction data from the glycol-solvated clay mounts with simulated one dimensional diffraction profiles generated using the program NEWMOD written by R. C. Reynolds.

Semiquantitative determinations of whole-rock mineral amounts are done using Jade Software (Materials Data, Inc.) with the Whole Pattern Fitting option. All quantitative data (including clay mineral amounts) come from the whole rock pattern. This is done by using Whole Pattern Fitting (WPF) and Rietveld refinement methods on the observed data. A diffraction model is fit to the measured pattern by non-linear least-square optimization in which certain parameters are varied to improve the fit of the model to the observed data. Modeling parameters include background, profile parameters, and lattice constants. For Rietveld refinement, a complete physics simulation is generally used in which crystal structures of the phases are required. Since the physics of scattering is well known, this method can be very exact and even allow adjustment of atomic coordinates, occupancies, and thermal parameters.

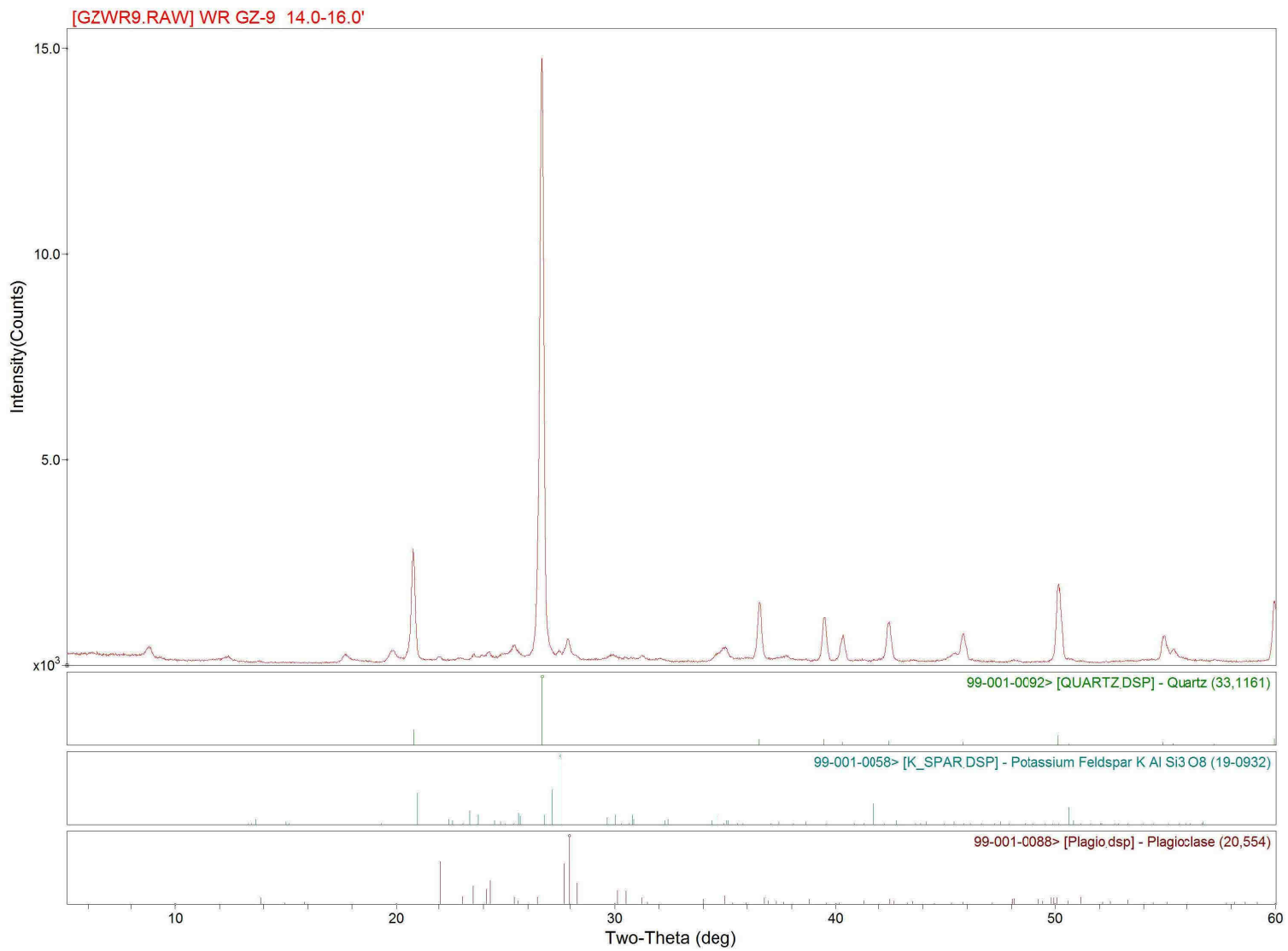
Whole Rock X-ray Diffraction Trace



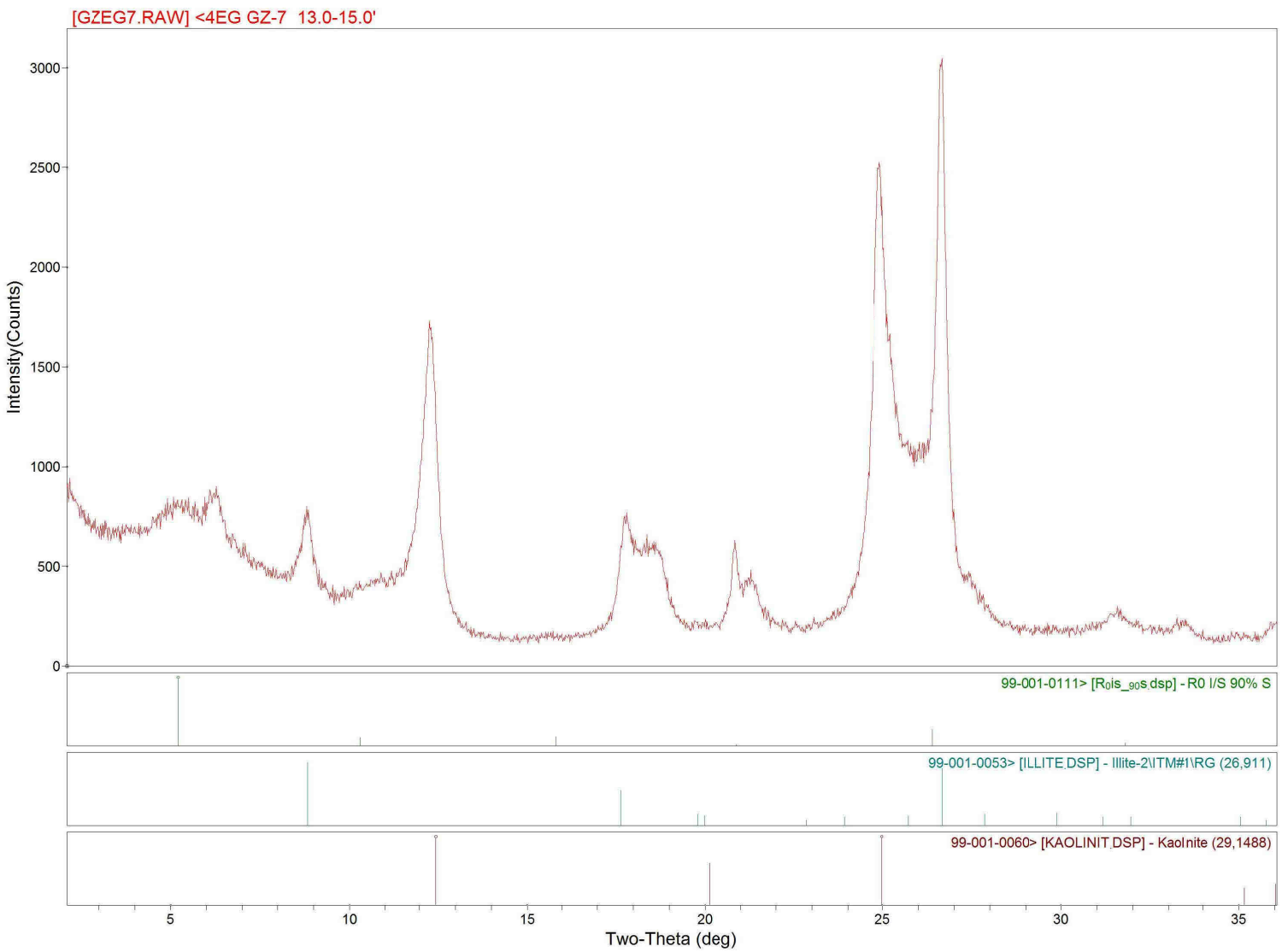
Whole Rock X-ray Diffraction Trace



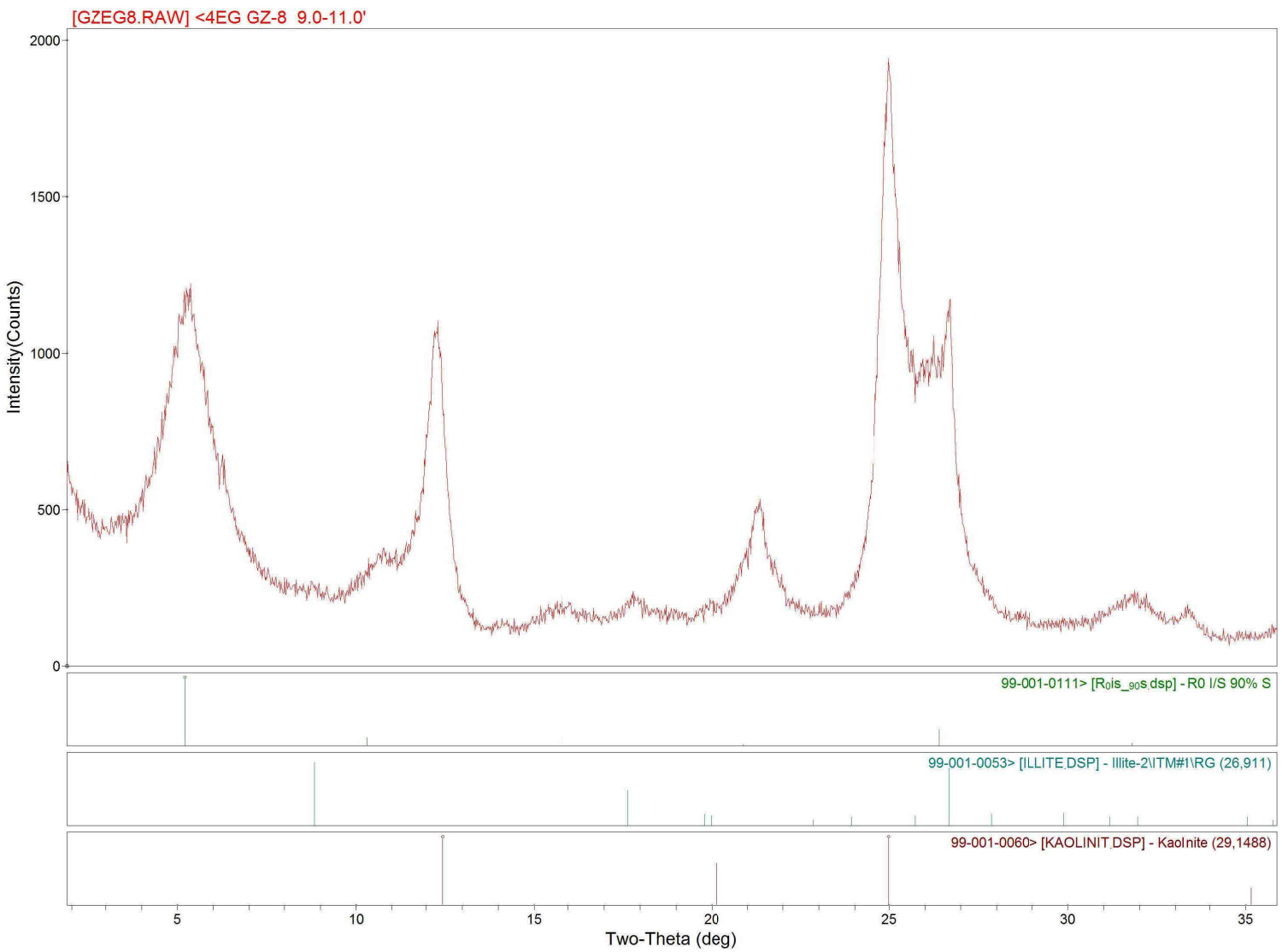
Whole Rock X-ray Diffraction Trace



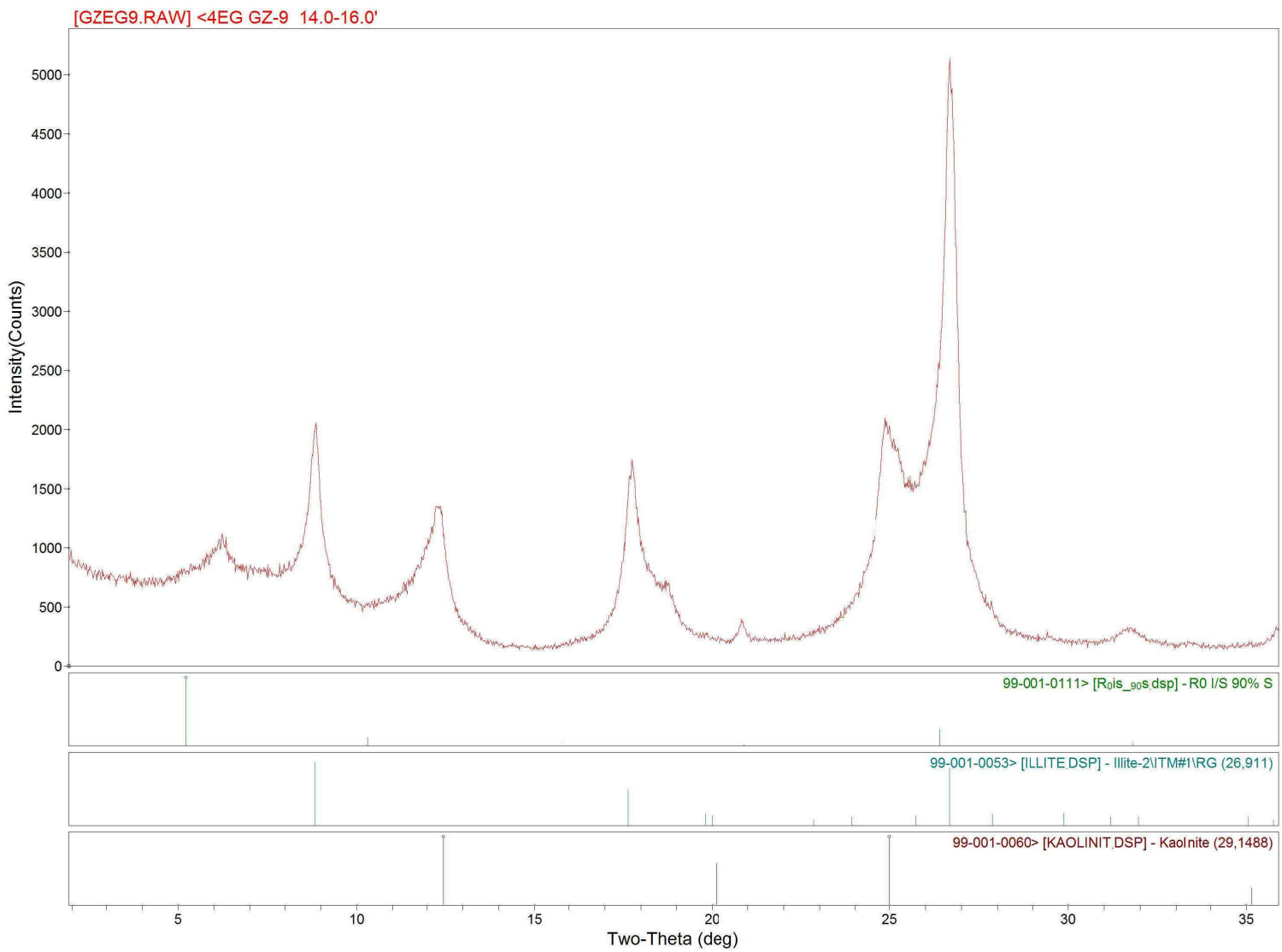
<4 Micron Ethylene Glycol Solvated X-ray Diffraction Trace



<4 Micron Ethylene Glycol Solvated X-ray Diffraction Trace



<4 Micron Ethylene Glycol Solvated X-ray Diffraction Trace





HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 1 of 9

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-7 (13-15)** Lab Sample No.: 153616-01
Sample Matrix: Soil Collection Date/Time: 04/19/15 00:00
Sample Description:

Volatile Organics - BTEX

Prep & Analysis Method: EPA 5030B EPA 8260C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Benzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:04	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:04	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:04	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:04	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:04	JP

TPH - Gasoline Range Organics

Prep & Analysis Method: EPA 5030B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-GRO	< 0.50	mg/Kg	0.50	1	U	A	05/21/15 08:00	05/21/15 09:43	JMP

TPH - Diesel Range Organics

Prep & Analysis Method: EPA 3550B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-DRO	< 10	mg/Kg	10	1	U	A	05/22/15 08:00	05/22/15 09:25	JMP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 2 of 9

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-8 (13-15)** Lab Sample No.: 153616-02
Sample Matrix: Soil Collection Date/Time: 04/19/15 00:00
Sample Description:

Volatile Organics - BTEX

Prep & Analysis Method: EPA 5030B EPA 8260C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Benzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:32	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:32	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:32	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:32	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 18:32	JP

TPH - Gasoline Range Organics

Prep & Analysis Method: EPA 5030B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-GRO	< 0.50	mg/Kg	0.50	1	U	A	05/21/15 08:00	05/21/15 10:15	JMP

TPH - Diesel Range Organics

Prep & Analysis Method: EPA 3550B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-DRO	< 10	mg/Kg	10	1	U	A	05/22/15 08:00	05/22/15 10:41	JMP



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Certificate of Laboratory Analysis

Page 3 of 9

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-9 (14-16)** Lab Sample No.: 153616-03
Sample Matrix: Soil Collection Date/Time: 04/11/15 00:00
Sample Description:

Volatile Organics - BTEX

Prep & Analysis Method: EPA 5030B EPA 8260C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Benzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 19:01	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 19:01	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 19:01	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 19:01	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15 14:00	05/21/15 19:01	JP

TPH - Gasoline Range Organics

Prep & Analysis Method: EPA 5030B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-GRO	< 0.50	mg/Kg	0.50	1	U	A	05/21/15 08:00	05/21/15 10:47	JMP

TPH - Diesel Range Organics

Prep & Analysis Method: EPA 3550B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-DRO	< 10	mg/Kg	10	1	U	A	05/22/15 08:00	05/22/15 11:07	JMP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 4 of 9

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Analyte Qualifier Codes

U = Analyte was not detected

Notes:

Samples received outside analysis holding time

Soil Results are reported on a wet weight basis (as received) unless stated as "dry".

The laboratory results reflect the measurement of the sample received only and may not be completely representative of the sampled site.

The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.

Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.

The chain-of-custody is a part of the entire analytical report.

Residual sample(s) will be disposed of in three months unless otherwise notified.

Certifications:

VELAP Certification No.: 3937; Laboratory ID: 460249

Virginia Drinking Water Certification No.: 3092; Laboratory ID: 00156

Maryland Drinking Water Certification No.: 319

Laboratory Report Approved by:

J Pfaff

05/26/15

Laboratory Director, Chemistry

Date



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - BTEX

Client: GeoConcepts Engineering, Inc.
Report: 153616
Method: EPA 8260C

Water Prep Batch No.
Soil Prep Batch No.: PVS025
Initial Calibration ID: 20515

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	Benzene	T		53	50	105.5	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	Toluene	T		54	50	107.1	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	Ethylbenzene	T		55	50	110.7	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	m,p-Xylene	T		112	100	112.1	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	o-Xylene	T		56	50	111.0	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	1,2-Dichloroethane-d4	S		52	50	103.5	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	Toluene-d8	S		51	50	102.4	80	120		
V00020- CC		CC	A25727.D	05/21/15 12:12	JP	4-Bromofluorobenzene	S		53	50	106.2	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	Benzene	T		51	50	101.8	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	Toluene	T		51	50	101.3	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	Ethylbenzene	T		52	50	104.6	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	m,p-Xylene	T		107	100	107.3	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	o-Xylene	T		53	50	106.1	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	1,2-Dichloroethane-d4	S		48	50	97.0	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	Toluene-d8	S		49	50	98.8	80	120		
V00020- CC		CC	A25736.D	05/21/15 16:38	JP	4-Bromofluorobenzene	S		53	50	105.3	80	120		
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	Benzene	T	Soil							
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	Toluene	T	Soil							
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	Ethylbenzene	T	Soil							
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	m,p-Xylene	T	Soil							
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	o-Xylene	T	Soil							
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	1,2-Dichloroethane-d4	S	Soil	51	50	102.2	70	130		
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	Toluene-d8	S	Soil	49	50	98.6	70	130		
PVS025- MB	PVS025	MB	A25737.D	05/21/15 17:07	JP	4-Bromofluorobenzene	S	Soil	47	50	94.7	70	130		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	Benzene	T	Soil	47	50	93.7	70	125		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	Toluene	T	Soil	46	50	92.9	70	125		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	Ethylbenzene	T	Soil	46	50	92.2	70	125		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	m,p-Xylene	T	Soil	91	100	91.1	70	125		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	o-Xylene	T	Soil	47	50	93.0	70	125		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	1,2-Dichloroethane-d4	S	Soil	49	50	97.2	70	130		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	Toluene-d8	S	Soil	50	50	100.1	70	130		
PVS025- BS	PVS025	BS	A25738.D	05/21/15 17:35	JP	4-Bromofluorobenzene	S	Soil	47	50	94.2	70	130		
153616- 01	PVS025	SAM	A25739.D	05/21/15 18:04	JP	1,2-Dichloroethane-d4	S	Soil	44	50	88.3	70	130		
153616- 01	PVS025	SAM	A25739.D	05/21/15 18:04	JP	Toluene-d8	S	Soil	51	50	101.8	70	130		
153616- 01	PVS025	SAM	A25739.D	05/21/15 18:04	JP	4-Bromofluorobenzene	S	Soil	45	50	90.5	70	130		
153616- 02	PVS025	SAM	A25740.D	05/21/15 18:32	JP	1,2-Dichloroethane-d4	S	Soil	51	50	101.7	70	130		
153616- 02	PVS025	SAM	A25740.D	05/21/15 18:32	JP	Toluene-d8	S	Soil	51	50	102.0	70	130		
153616- 02	PVS025	SAM	A25740.D	05/21/15 18:32	JP	4-Bromofluorobenzene	S	Soil	46	50	92.5	70	130		
153616- 03	PVS025	SAM	A25741.D	05/21/15 19:01	JP	1,2-Dichloroethane-d4	S	Soil	53	50	105.1	70	130		
153616- 03	PVS025	SAM	A25741.D	05/21/15 19:01	JP	Toluene-d8	S	Soil	50	50	100.2	70	130		
153616- 03	PVS025	SAM	A25741.D	05/21/15 19:01	JP	4-Bromofluorobenzene	S	Soil	46	50	92.9	70	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	Benzene	T	Soil	48	50	96.5	65	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	Toluene	T	Soil	49	50	98.4	65	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	Ethylbenzene	T	Soil	47	50	94.2	65	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	m,p-Xylene	T	Soil	94	100	94.4	65	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	o-Xylene	T	Soil	47	50	94.8	65	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	1,2-Dichloroethane-d4	S	Soil	49	50	97.1	60	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	Toluene-d8	S	Soil	49	50	98.4	60	130		
153616- 03MS	PVS025	MS	A25742.D	05/21/15 19:29	JP	4-Bromofluorobenzene	S	Soil	47	50	94.2	60	130		
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	Benzene	T	Soil	50	50	100.8	65	130	8.1	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	Toluene	T	Soil	50	50	100.6	65	130	4.2	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	Ethylbenzene	T	Soil	48	50	96.8	65	130	1.7	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	m,p-Xylene	T	Soil	96	100	96.3	65	130	69	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	o-Xylene	T	Soil	49	50	97.9	65	130	63	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	1,2-Dichloroethane-d4	S	Soil	50	50	100.2	60	130	5.6	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	Toluene-d8	S	Soil	51	50	101.2	60	130	4.1	25
153616- 03MSC	PVS025	MSD	A25743.D	05/21/15 19:58	JP	4-Bromofluorobenzene	S	Soil	49	50	98.5	60	130	0.1	25



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-GRO

Client: GeoConcepts Engineering, Inc.
Report: **153616**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PGS018
Initial Calibration ID: 101514

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Limit	Qualifier
G00017- CC		CC	GC113135.D	05/21/15 08:06	JMP	TPH-GRO	T		973	1000	97.3	80	120			
G00017- CC		CC	GC113135.D	05/21/15 08:06	JMP	4-Bromofluorobenzene	S		90	100	89.8	80	120			
PGS018- MB	PGS018	MB	GC113136.D	05/21/15 08:38	JMP	TPH-GRO	T	Soil								
PGS018- MB	PGS018	MB	GC113136.D	05/21/15 08:38	JMP	4-Bromofluorobenzene	S	Soil	78	100	78.3	60	140			
PGS018- BS	PGS018	BS	GC113137.D	05/21/15 09:10	JMP	TPH-GRO	T	Soil	924	1000	92.4	70	130			
PGS018- BS	PGS018	BS	GC113137.D	05/21/15 09:10	JMP	4-Bromofluorobenzene	S	Soil	102	100	101.5	70	130			
153616- 01	PGS018	SAM	GC113138.D	05/21/15 09:43	JMP	4-Bromofluorobenzene	S	Soil	87	100	87.1	60	140			
153616- 02	PGS018	SAM	GC113139.D	05/21/15 10:15	JMP	4-Bromofluorobenzene	S	Soil	80	100	80.3	60	140			
153616- 03	PGS018	SAM	GC113140.D	05/21/15 10:47	JMP	4-Bromofluorobenzene	S	Soil	77	100	77.3	60	140			
153616- 03MS	PGS018	MS	GC113141.D	05/21/15 11:19	JMP	TPH-GRO	T	Soil	787	1000	78.7	70	130			
153616- 03MS	PGS018	MS	GC113141.D	05/21/15 11:19	JMP	4-Bromofluorobenzene	S	Soil	72	100	71.8	60	130			
153616- 03MSE	PGS018	MSD	GC113142.D	05/21/15 11:51	JMP	TPH-GRO	T	Soil	817	1000	81.7	60	130	3.7	25	
153616- 03MSE	PGS018	MSD	GC113142.D	05/21/15 11:51	JMP	4-Bromofluorobenzene	S	Soil	73	100	73.3	60	130	2.1	25	
G00017- CC		CC	GC113145.D	05/21/15 13:28	JMP	TPH-GRO	T		1037	1000	103.7	80	120			
G00017- CC		CC	GC113145.D	05/21/15 13:28	JMP	4-Bromofluorobenzene	S		96	100	96.1	80	120			



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-DRO

Client: GeoConcepts Engineering, Inc.
Report: **153616**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PDS048
Initial Calibration ID: 10715

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
D00023- CC		CC	GC28469.D	05/22/15 08:04	JMP	TPH-DRO	T		1818	2000	90.9	80	120		
D00023- CC		CC	GC28469.D	05/22/15 08:04	JMP	o-Terphenyl	S		108	100	107.9	75	130		
PDS048- MB	PDS048	MB	GC28470.D	05/22/15 08:34	JMP	TPH-DRO	T	Soil							
PDS048- MB	PDS048	MB	GC28470.D	05/22/15 08:34	JMP	o-Terphenyl	S	Soil	92	100	91.5	60	140		
PDS048- BS	PDS048	BS	GC28471.D	05/22/15 09:00	JMP	TPH-DRO	T	Soil	1297	2000	64.9	50	100		
PDS048- BS	PDS048	BS	GC28471.D	05/22/15 09:00	JMP	o-Terphenyl	S	Soil	91	100	91.1	65	120		
153616- 01	PDS048	SAM	GC28472.D	05/22/15 09:25	JMP	o-Terphenyl	S	Soil	97	100	97.1	60	140		
153616- 01MS	PDS048	MS	GC28473.D	05/22/15 09:50	JMP	TPH-DRO	T	Soil	1398	2000	69.9	50	120		
153616- 01MS	PDS048	MS	GC28473.D	05/22/15 09:50	JMP	o-Terphenyl	S	Soil	96	100	95.8	65	120		
153616- 01MSE	PDS048	MSD	GC28474.D	05/22/15 10:16	JMP	TPH-DRO	T	Soil	1219	2000	61.0	50	120	14	25
153616- 01MSE	PDS048	MSD	GC28474.D	05/22/15 10:16	JMP	o-Terphenyl	S	Soil	87	100	86.6	65	120	10	25
153616- 02	PDS048	SAM	GC28475.D	05/22/15 10:41	JMP	o-Terphenyl	S	Soil	88	100	87.9	60	140		
153616- 03	PDS048	SAM	GC28476.D	05/22/15 11:07	JMP	o-Terphenyl	S	Soil	93	100	92.6	60	140		
D00023- CC		CC	GC28477.D	05/22/15 11:32	JMP	TPH-DRO	T		1745	2000	87.3	80	120		
D00023- CC		CC	GC28477.D	05/22/15 11:32	JMP	o-Terphenyl	S		101	100	101.1	75	130		
D00023- CC		CC	GC28482.D	05/22/15 13:45	JMP	TPH-DRO	T		1834	2000	91.7	80	120		
D00023- CC		CC	GC28482.D	05/22/15 13:45	JMP	o-Terphenyl	S		104	100	103.6	75	130		
D00023- CC		CC	GC28501.D	05/22/15 21:48	JMP	TPH-DRO	T		1929	2000	96.4	80	120		
D00023- CC		CC	GC28501.D	05/22/15 21:48	JMP	o-Terphenyl	S		104	100	103.7	75	130		

Sample Receipt and Inspection Form

HPE Report Number: 153616 Client: GeoConcepts Engineering, Inc.
 Received by: JS Date/Time: 05/19/15 04:56 Josh April
 Logged by: JP Date/Time: 05/20/15 12:00 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Shipment Mode: Drop-Off
 Turnaround Time: Standard PO No: 12170
 Project ID: VRE Alexandria Station

Contamination Control

Trip Blank(s) Submitted? N/A
 Field Blank(s) Submitted? N/A

Documentation

Test Request/COC Submitted? Yes
 Container Labels Agree with COC? Yes
 Custody Seals Present? No

Analyte Stabilization

Samples Acidified as Appropriate? N/A
 Thiosulfate Added as Appropriate? N/A
 Headspace Absent in VOA Vials? N/A
 Samples Received on Ice? Yes
 Sample Receipt Temp. (°C): 4

Comments

Number of Samples: 3

Summary of Samples Received

Sample #	HPE#	Cont.	Matrix	Collection	Container	Preservative	Storage	Test	Comments/TAT
				Date/Time			Location		
GZ-7 (13-15)	153616-	01 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	BTEX	
GZ-7 (13-15)	153616-	01 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	TPH-GRO	
GZ-7 (13-15)	153616-	01 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	TPH-DRO	
GZ-8 (13-15)	153616-	02 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	BTEX	
GZ-8 (13-15)	153616-	02 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	TPH-GRO	
GZ-8 (13-15)	153616-	02 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	TPH-DRO	
GZ-9 (14-16)	153616-	03 A	Soil	04/11/15 00:00	4 oz Jar	None	R2	BTEX	
GZ-9 (14-16)	153616-	03 A	Soil	04/11/15 00:00	4 oz Jar	None	R2	TPH-GRO	
GZ-9 (14-16)	153616-	03 A	Soil	04/11/15 00:00	4 oz Jar	None	R2	TPH-DRO	



HP ENVIRONMENTAL, INC.

10...t, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

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Environmental Sample Chain-of-Custody Record

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME: <u>Routing</u>		COC Reference: ###															
Address: 19955 Highland Vista Dr., Suite 170 Ashburn, VA 20147		Emergency Rush (24-48 hr)		Tests Requested															
Contact: Josh April: jApril@geoconcepts-eng.com		P.O./Job Number: 12170																	
Phone: (703) 726-8030		SITE: VRE Alexandria Station Pedestrian Tunnel																	
Fax: (703) 726-8032		Sampled by:																	
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-DRO (VELAP)	TPH GRO (VELAP)	Priority Pollutant Metals (13)	VOCs	PCBs	pH	Chloride	Sulfides	Resistivity	Redox Potential	Natural Moisture Content	Sulfates	
1. GZ-7 (13-15')	4/19/2015		Grab	S	None	1 jar	X	X	X	X	X								
2. GZ-8 (13-15')	4/19/2015		Grab	S	None	1 jar	X	X	X	X	X								
3. GZ-9 (14-16')	4/11/2015		Grab	S	None	1 jar	X	X	X	X	X								
4. GZ-7 (13-15')	4/19/2015		Grab	S	None	1 ziploc						X	X	X	X	X	X	X	
5. GZ-8 (15-17')	4/19/2015		Grab	S	None	1 ziploc						X	X	X	X	X	X	X	
6. GZ-9 (10-12')	4/11/2015		Grab	S	None	1 ziploc						X	X	X	X	X	X	X	
7.																			
8.																			
9.																			
10.																			
11.																			
12.																			
13.																			
14.																			
15.																			
Received Condition: <u>on ice 4°C</u>			Relinquished By: <u>Brenda J. Hoshoe</u>			Date/Time: <u>5/19/15 @ 4:56</u>			Received By: <u>Brenda Hoshoe</u>			Date/Time: <u>5/19/15 @ 4:56 PM</u>							
Mode of Shipment: <u>hand delivered</u>			Relinquished By: <u>Brenda J. Hoshoe</u>			Date/Time: <u>5/19/15 @ 4:56</u>			Received By: <u>Brenda Hoshoe</u>			Date/Time: <u>5/19/15 @ 4:56 PM</u>							
HPE Report Number: <u>155616</u>			Relinquished By: <u>Brenda J. Hoshoe</u>			Date/Time: <u>5/19/15 @ 4:56</u>			Received By: <u>Brenda Hoshoe</u>			Date/Time: <u>5/19/15 @ 4:56 PM</u>							



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153463**
Date Received: 04/20/15
Date Reported: 04/23/15
Project Location: VRE Alexandria Station
Pedestrian Tunnel

Client Sample No: **GZ-7 (19-21')** Lab Sample No.: 153463-01
Sample Matrix: Soil Collection Date/Time: 04/19/15 00:00
Sample Description:

Volatile Organics - BTEX

Prep & Analysis Method: EPA 5030B EPA 8260C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Benzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15 12:00	04/22/15 13:18	JP

TPH - Gasoline Range Organics

Prep & Analysis Method: EPA 5030B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-GRO	< 0.50	mg/Kg	0.50	1	U	A	04/21/15 08:30	04/21/15 10:23	JMP

TPH - Diesel Range Organics

Prep & Analysis Method: EPA 3550B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-DRO	< 10	mg/Kg	10	1	U	A	04/21/15 09:30	04/21/15 15:36	JMP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 2 of 7

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153463**
Date Received: 04/20/15
Date Reported: 04/23/15
Project Location: VRE Alexandria Station
Pedestrian Tunnel

Analyte Qualifier Codes

U = Analyte was not detected at or above reporting limit

Notes:

Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The laboratory results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Certifications:

VELAP Certification No.: 3937; Laboratory ID: 460249
Virginia Drinking Water Certification No.: 3092; Laboratory ID: 00156
Maryland Drinking Water Certification No.: 319

Laboratory Report Approved by:

J Pfaff

04/23/15

Laboratory Director, Chemistry

Date



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - BTEX

Client: GeoConcepts Engineering, Inc.
Report: 153463
Method: EPA 8260C

Water Prep Batch No.
Soil Prep Batch No.: PVS018
Initial Calibration ID: 8260

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	Benzene	T		49	50	97.2	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	Toluene	T		48	50	95.9	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	Ethylbenzene	T		50	50	99.8	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	m,p-Xylene	T		102	100	101.8	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	o-Xylene	T		50	50	99.6	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	Methyl-tert-butyl ether (MTBE)	T		42	50	83.4	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	Naphthalene	T		47	50	93.3	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	1,2-Dichloroethane-d4	S		48	50	96.0	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	Toluene-d8	S		47	50	94.7	80	120		
V00020- CC		CC	A25621.D	04/22/15 11:52	JP	4-Bromofluorobenzene	S		49	50	97.8	80	120		
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	Benzene	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	Toluene	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	Ethylbenzene	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	m,p-Xylene	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	o-Xylene	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	Methyl-tert-butyl ether (MTBE)	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	Naphthalene	T	Soil							
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	1,2-Dichloroethane-d4	S	Soil	48	50	96.6	70	130		
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	Toluene-d8	S	Soil	48	50	96.0	70	130		
PVS018- MB	PVS018	MB	A25622.D	04/22/15 12:21	JP	4-Bromofluorobenzene	S	Soil	46	50	91.4	70	130		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	Benzene	T	Soil	48	50	95.6	70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	Toluene	T	Soil	46	50	92.7	70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	Ethylbenzene	T	Soil	49	50	97.0	70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	m,p-Xylene	T	Soil	98	100	98.1	70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	o-Xylene	T	Soil	50	50	99.1	70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	Methyl-tert-butyl ether (MTBE)	T	Soil	42	50	84.0	70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	Naphthalene	T	Soil		50		70	125		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	1,2-Dichloroethane-d4	S	Soil	47	50	94.4	70	130		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	Toluene-d8	S	Soil	48	50	96.2	70	130		
PVS018- BS	PVS018	BS	A25623.D	04/22/15 12:49	JP	4-Bromofluorobenzene	S	Soil	49	50	98.0	70	130		
153463- 01	PVS018	SAM	A25624.D	04/22/15 13:18	JP	1,2-Dichloroethane-d4	S	Soil	44	50	88.3	70	130		
153463- 01	PVS018	SAM	A25624.D	04/22/15 13:18	JP	Toluene-d8	S	Soil	48	50	96.0	70	130		
153463- 01	PVS018	SAM	A25624.D	04/22/15 13:18	JP	4-Bromofluorobenzene	S	Soil	44	50	88.8	70	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	Benzene	T	Soil	47	50	94.2	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	Toluene	T	Soil	47	50	94.3	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	Ethylbenzene	T	Soil	47	50	94.5	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	m,p-Xylene	T	Soil	95	100	95.3	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	o-Xylene	T	Soil	47	50	94.0	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	Methyl-tert-butyl ether (MTBE)	T	Soil	34	50	69.0	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	Naphthalene	T	Soil	39	50	78.7	65	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	1,2-Dichloroethane-d4	S	Soil	44	50	87.8	60	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	Toluene-d8	S	Soil	47	50	93.4	60	130		
153463- 01MS	PVS018	MS	A25625.D	04/22/15 13:46	JP	4-Bromofluorobenzene	S	Soil	46	50	91.5	60	130		
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	Benzene	T	Soil	48	50	96.1	65	130	1.9	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	Toluene	T	Soil	48	50	95.5	65	130	1.0	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	Ethylbenzene	T	Soil	49	50	98.2	65	130	64	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	m,p-Xylene	T	Soil	99	100	99.2	65	130	71	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	o-Xylene	T	Soil	49	50	98.3	65	130	35	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	Methyl-tert-butyl ether (MTBE)	T	Soil	34	50	68.6	65	130	14	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	Naphthalene	T	Soil	38	50	75.9	65	130	15	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	1,2-Dichloroethane-d4	S	Soil	42	50	83.9	60	130	11	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	Toluene-d8	S	Soil	47	50	94.1	60	130	2.8	25
153463- 01MSC	PVS018	MSD	A25626.D	04/22/15 14:15	JP	4-Bromofluorobenzene	S	Soil	47	50	94.1	60	130	2.1	25



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-GRO

Client: GeoConcepts Engineering, Inc.
Report: **153463**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PGS013
Initial Calibration ID: 101514

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Limit	Qualifier
G00017- CC		CC	GC113009.D	04/21/15 08:46	JMP	TPH-GRO	T		983	1000	98.3	80	120			
G00017- CC		CC	GC113009.D	04/21/15 08:46	JMP	4-Bromofluorobenzene	S		92	100	91.8	80	120			
PGS013- MB	PGS013	MB	GC113010.D	04/21/15 09:18	JMP	TPH-GRO	T	Soil								
PGS013- MB	PGS013	MB	GC113010.D	04/21/15 09:18	JMP	4-Bromofluorobenzene	S	Soil	87	100	87.3	60	140			
PGS013- BS	PGS013	BS	GC113011.D	04/21/15 09:51	JMP	TPH-GRO	T	Soil	920	1000	92.0	70	130			
PGS013- BS	PGS013	BS	GC113011.D	04/21/15 09:51	JMP	4-Bromofluorobenzene	S	Soil	94	100	93.9	70	130			
153463- 01	PGS013	SAM	GC113012.D	04/21/15 10:23	JMP	4-Bromofluorobenzene	S	Soil	86	100	85.5	60	140			
153463- 01MS	PGS013	MS	GC113013.D	04/21/15 10:55	JMP	TPH-GRO	T	Soil	919	1000	91.9	70	130			
153463- 01MS	PGS013	MS	GC113013.D	04/21/15 10:55	JMP	4-Bromofluorobenzene	S	Soil	87	100	87.5	60	130			
153463- 01MSE	PGS013	MSD	GC113014.D	04/21/15 11:27	JMP	TPH-GRO	T	Soil	766	1000	76.6	60	130	18	25	
153463- 01MSE	PGS013	MSD	GC113014.D	04/21/15 11:27	JMP	4-Bromofluorobenzene	S	Soil	84	100	84.4	60	130	3.6	25	
G00017- CC		CC	GC113015.D	04/21/15 12:00	JMP	TPH-GRO	T		1045	1000	104.5	80	120			
G00017- CC		CC	GC113015.D	04/21/15 12:00	JMP	4-Bromofluorobenzene	S		97	100	96.7	80	120			



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-DRO

Client: GeoConcepts Engineering, Inc.
Report: **153463**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PDS040
Initial Calibration ID: 10715

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
D00023- CC		CC	GC28248.D	04/21/15 14:20	JMP	TPH-DRO	T		1859	2000	93.0	80	120		
D00023- CC		CC	GC28248.D	04/21/15 14:20	JMP	o-Terphenyl	S		107	100	106.5	75	130		
PDS040- MB	PDS040	MB	GC28249.D	04/21/15 14:45	JMP	TPH-DRO	T	Soil							
PDS040- MB	PDS040	MB	GC28249.D	04/21/15 14:45	JMP	o-Terphenyl	S	Soil	77	100	76.6	60	140		
PDS040- BS	PDS040	BS	GC28250.D	04/21/15 15:11	JMP	TPH-DRO	T	Soil	1732	2000	86.6	50	100		
PDS040- BS	PDS040	BS	GC28250.D	04/21/15 15:11	JMP	o-Terphenyl	S	Soil	101	100	100.5	65	120		
153463- 01	PDS040	SAM	GC28251.D	04/21/15 15:36	JMP	o-Terphenyl	S	Soil	103	100	103.2	60	140		
153463- 01MS	PDS040	MS	GC28252.D	04/21/15 16:01	JMP	TPH-DRO	T	Soil	1787	2000	89.3	50	120		
153463- 01MS	PDS040	MS	GC28252.D	04/21/15 16:01	JMP	o-Terphenyl	S	Soil	102	100	102.1	65	120		
153463- 01MSE	PDS040	MSD	GC28253.D	04/21/15 16:26	JMP	TPH-DRO	T	Soil	1435	2000	71.7	50	120	22	25
153463- 01MSE	PDS040	MSD	GC28253.D	04/21/15 16:26	JMP	o-Terphenyl	S	Soil	89	100	88.5	65	120	14	25
D00023- CC		CC	GC28254.D	04/21/15 16:52	JMP	TPH-DRO	T		2139	2000	106.9	80	120		
D00023- CC		CC	GC28254.D	04/21/15 16:52	JMP	o-Terphenyl	S		124	100	123.8	75	130		
D00023- CC		CC	GC28255.D	04/22/15 09:01	JMP	TPH-DRO	T		1929	2000	96.5	80	120		
D00023- CC		CC	GC28255.D	04/22/15 09:01	JMP	o-Terphenyl	S		109	100	109.4	75	130		
153472- 01	PDS040	SAM	GC28260.D	04/22/15 11:07	JMP	o-Terphenyl	S	Soil	86	100	85.5	60	140		
153472- 02	PDS040	SAM	GC28261.D	04/22/15 11:33	JMP	o-Terphenyl	S	Soil	85	100	84.8	60	140		
153472- 03	PDS040	SAM	GC28262.D	04/22/15 11:58	JMP	o-Terphenyl	S	Soil	107	100	106.5	60	140		
153472- 04	PDS040	SAM	GC28263.D	04/22/15 12:23	JMP	o-Terphenyl	S	Soil	78	100	78.2	60	140		
D00023- CC		CC	GC28264.D	04/22/15 12:48	JMP	TPH-DRO	T		1843	2000	92.1	80	120		
D00023- CC		CC	GC28264.D	04/22/15 12:48	JMP	o-Terphenyl	S		110	100	109.7	75	130		

Sample Receipt and Inspection Form

HPE Report Number: 153463 Client: GeoConcepts Engineering, Inc.
 Received by: JS Date/Time: 04/20/15 16:20 Josh April
 Logged by: JP Date/Time: 04/20/15 17:00 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Shipment Mode: Drop-Off
 Turnaround Time: Standard

PO No: 12170
 Project ID: VRE Alexandria Station
 Pedestrian Tunnel

Contamination Control

Trip Blank(s) Submitted? No
 Field Blank(s) Submitted? No

Documentation

Test Request/COC Submitted? Yes
 Container Labels Agree with COC? Yes
 Custody Seals Present? No

Analyte Stabilization

Samples Acidified as Appropriate? N/A
 Thiosulfate Added as Appropriate? N/A
 Headspace Absent in VOA Vials? N/A
 Samples Received on Ice? Yes
 Sample Receipt Temp. (°C): 4

Comments

Number of Samples: 1

Summary of Samples Received

Sample #	HPE#	Cont.	Matrix	Collection	Container	Preservative	Storage	Test	Comments
				Date/Time			Location		
GZ-7 (19-21')	153463-	01 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	BTEX/M/N	
GZ-7 (19-21')	153463-	01 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	TPH-GRO	
GZ-7 (19-21')	153463-	01 A	Soil	04/19/15 00:00	4 oz Jar	None	R2	TPH-DRO	



HP ENVIRONMENTAL, INC.

104 Liden St, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

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Environmental Sample Chain-of-Custody Record

COC Reference Number: 6000

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME:		Routine		Tests Requested									
Address:		Emergency		Rush (24-48hr)											
19955 Highland Vista Dr., Suite 170		P.O. Job Number:		12170											
Ashburn, VA 20147		SITE:		VRE Alexandria Station Pedestrian Tunnel											
Contact:		Sampled by:													
Josh Jazajazaj@geconcepts-eng.com															
Phone: (703) 726-8030															
Fax: (703) 726-8032															
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-DRO (VELAP)	TPH-GRO (VELAP)	Priority Pollutant Metals (13)	VOCs	PCBs	TCLP Metals	TOX	TPH 1664 (VELAP)	
1. GZ-7 (19-21')	4/19/2015	9M	Grab	S	None	1	X	X	X	X	X				
2. GZ-7 (Comp.)	4/19/2015	9M	Comp	S	None	1						X	X	X	
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															
Received Condition:			Relinquished By:			Date/Time			Received By:			Date/Time			
Mode of Shipment:			Relinquished By:			Date/Time			Received By Laboratory:			Date/Time			
HPE Report Number:			Relinquished By:			Date/Time			Received By Laboratory:			Date/Time			



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153518**
Date Received: 04/28/15
Date Reported: 05/01/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-8 (28-30')** Lab Sample No.: 153518-01
Sample Matrix: Soil Collection Date/Time: 04/25/15 09:00
Sample Description:

Volatile Organics - BTEX

Prep & Analysis Method: EPA 5030B EPA 8260C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Benzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15 12:00	04/29/15 14:03	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15 12:00	04/29/15 14:03	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15 12:00	04/29/15 14:03	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15 12:00	04/29/15 14:03	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15 12:00	04/29/15 14:03	JP

TPH - Gasoline Range Organics

Prep & Analysis Method: EPA 5030B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-GRO	< 0.50	mg/Kg	0.50	1	U	A	04/29/15 08:30	04/29/15 09:56	JMP

TPH - Diesel Range Organics

Prep & Analysis Method: EPA 3550B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-DRO	46	mg/Kg	10	1		A	04/29/15 08:30	04/29/15 09:35	JMP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153518**
Date Received: 04/28/15
Date Reported: 05/01/15
Project Location: VRE Alexandria Station

Analyte Qualifier Codes

U = Analyte was not detected at or above reporting limit

Notes:

Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The laboratory results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Certifications:

VELAP Certification No.: 3937; Laboratory ID: 460249
Virginia Drinking Water Certification No.: 3092; Laboratory ID: 00156
Maryland Drinking Water Certification No.: 319

Laboratory Report Approved by:

J Pfaff

05/01/15

Laboratory Director, Chemistry

Date



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - BTEX

Client: GeoConcepts Engineering, Inc.
 Report: **153518**
 Method: EPA 8260C

Water Prep Batch No.
 Soil Prep Batch No.: PVS019
 Initial Calibration ID: 8260

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	Benzene	T		48	50	96.3	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	Toluene	T		48	50	96.4	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	Ethylbenzene	T		49	50	97.8	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	m,p-Xylene	T		99	100	99.5	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	o-Xylene	T		49	50	99.0	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	1,2-Dichloroethane-d4	S		47	50	94.5	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	Toluene-d8	S		47	50	94.9	80	120		
V00020- CC		CC	A25668.D	04/29/15 12:38	JP	4-Bromofluorobenzene	S		49	50	97.7	80	120		
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	Benzene	T	Soil							
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	Toluene	T	Soil							
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	Ethylbenzene	T	Soil							
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	m,p-Xylene	T	Soil							
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	o-Xylene	T	Soil							
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	1,2-Dichloroethane-d4	S	Soil	49	50	97.2	70	130		
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	Toluene-d8	S	Soil	48	50	96.3	70	130		
PVS019- MB	PVS019	MB	A25669.D	04/29/15 13:06	JP	4-Bromofluorobenzene	S	Soil	47	50	93.1	70	130		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	Benzene	T	Soil	49	50	97.9	70	125		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	Toluene	T	Soil	48	50	95.1	70	125		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	Ethylbenzene	T	Soil	50	50	99.3	70	125		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	m,p-Xylene	T	Soil	101	100	101.5	70	125		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	o-Xylene	T	Soil	51	50	101.2	70	125		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	1,2-Dichloroethane-d4	S	Soil	47	50	93.4	70	130		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	Toluene-d8	S	Soil	48	50	95.6	70	130		
PVS019- BS	PVS019	BS	A25670.D	04/29/15 13:35	JP	4-Bromofluorobenzene	S	Soil	49	50	97.9	70	130		
153518- 01	PVS019	SAM	A25671.D	04/29/15 14:03	JP	1,2-Dichloroethane-d4	S	Soil	46	50	91.3	70	130		
153518- 01	PVS019	SAM	A25671.D	04/29/15 14:03	JP	Toluene-d8	S	Soil	48	50	96.5	70	130		
153518- 01	PVS019	SAM	A25671.D	04/29/15 14:03	JP	4-Bromofluorobenzene	S	Soil	45	50	90.8	70	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	Benzene	T	Soil	47	50	93.3	65	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	Toluene	T	Soil	47	50	93.6	65	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	Ethylbenzene	T	Soil	48	50	95.0	65	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	m,p-Xylene	T	Soil	95	100	94.7	65	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	o-Xylene	T	Soil	47	50	94.2	65	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	1,2-Dichloroethane-d4	S	Soil	42	50	84.0	60	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	Toluene-d8	S	Soil	46	50	92.5	60	130		
153518- 01MS	PVS019	MS	A25672.D	04/29/15 14:32	JP	4-Bromofluorobenzene	S	Soil	46	50	92.1	60	130		
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	Benzene	T	Soil	50	50	99.2	65	130	8.8	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	Toluene	T	Soil	50	50	100.0	65	130	7.0	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	Ethylbenzene	T	Soil	50	50	100.1	65	130	6.7	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	m,p-Xylene	T	Soil	102	100	101.5	65	130	72	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	o-Xylene	T	Soil	50	50	100.6	65	130	61	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	1,2-Dichloroethane-d4	S	Soil	46	50	91.4	60	130	3.1	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	Toluene-d8	S	Soil	49	50	97.6	60	130	15	25
153518- 01MSC	PVS019	MSD	A25673.D	04/29/15 15:01	JP	4-Bromofluorobenzene	S	Soil	49	50	98.3	60	130	6.1	25



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-GRO

Client: GeoConcepts Engineering, Inc.
Report: **153518**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PGS014
Initial Calibration ID: 101514

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Limit	Qualifier
G00017- CC		CC	GC113034.D	04/29/15 08:19	JMP	TPH-GRO	T		983	1000	98.3	80	120			
G00017- CC		CC	GC113034.D	04/29/15 08:19	JMP	4-Bromofluorobenzene	S		83	100	83.4	80	120			
PGS014- MB	PGS014	MB	GC113035.D	04/29/15 08:51	JMP	TPH-GRO	T	Soil								
PGS014- MB	PGS014	MB	GC113035.D	04/29/15 08:51	JMP	4-Bromofluorobenzene	S	Soil	87	100	87.4	60	140			
PGS014- BS	PGS014	BS	GC113036.D	04/29/15 09:24	JMP	TPH-GRO	T	Soil	894	1000	89.4	70	130			
PGS014- BS	PGS014	BS	GC113036.D	04/29/15 09:24	JMP	4-Bromofluorobenzene	S	Soil	94	100	93.8	70	130			
153518- 01	PGS014	SAM	GC113037.D	04/29/15 09:56	JMP	4-Bromofluorobenzene	S	Soil	83	100	82.8	60	140			
153518- 01MS	PGS014	MS	GC113038.D	04/29/15 10:28	JMP	TPH-GRO	T	Soil	906	1000	90.6	70	130			
153518- 01MS	PGS014	MS	GC113038.D	04/29/15 10:28	JMP	4-Bromofluorobenzene	S	Soil	85	100	85.4	60	130			
153518- 01MSE	PGS014	MSD	GC113039.D	04/29/15 11:01	JMP	TPH-GRO	T	Soil	857	1000	85.7	60	130	5.5	25	
153518- 01MSE	PGS014	MSD	GC113039.D	04/29/15 11:01	JMP	4-Bromofluorobenzene	S	Soil	95	100	94.6	60	130	10	25	
G00017- CC		CC	GC113041.D	04/29/15 12:06	JMP	TPH-GRO	T		986	1000	98.6	80	120			
G00017- CC		CC	GC113041.D	04/29/15 12:06	JMP	4-Bromofluorobenzene	S		91	100	90.5	80	120			



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-DRO

Client: GeoConcepts Engineering, Inc.
Report: **153518**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PDS042
Initial Calibration ID: 10715

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Limit	Qualifier
D00023- CC		CC	GC28315.D	04/29/15 08:10	JMP	TPH-DRO	T		2173	2000	108.7	80	120			
D00023- CC		CC	GC28315.D	04/29/15 08:10	JMP	o-Terphenyl	S		118	100	117.8	75	130			
PDS042- MB	PDS042	MB	GC28316.D	04/29/15 08:44	JMP	TPH-DRO	T	Soil								
PDS042- MB	PDS042	MB	GC28316.D	04/29/15 08:44	JMP	o-Terphenyl	S	Soil	85	100	84.7	60	140			
PDS042- BS	PDS042	BS	GC28317.D	04/29/15 09:10	JMP	TPH-DRO	T	Soil	1554	2000	77.7	50	100			
PDS042- BS	PDS042	BS	GC28317.D	04/29/15 09:10	JMP	o-Terphenyl	S	Soil	101	100	101.0	65	120			
153518- 01	PDS042	SAM	GC28318.D	04/29/15 09:35	JMP	o-Terphenyl	S	Soil	91	100	91.1	60	140			
153518- 01MS	PDS042	MS	GC28319.D	04/29/15 10:00	JMP	TPH-DRO	T	Soil	1485	2000	74.2	50	120			
153518- 01MS	PDS042	MS	GC28319.D	04/29/15 10:00	JMP	o-Terphenyl	S	Soil	98	100	97.6	65	120			
153518- 01MSE	PDS042	MSD	GC28320.D	04/29/15 10:25	JMP	TPH-DRO	T	Soil	1271	2000	63.5	50	120	16	25	
153518- 01MSE	PDS042	MSD	GC28320.D	04/29/15 10:25	JMP	o-Terphenyl	S	Soil	107	100	107.0	65	120	9.2	25	
D00023- CC		CC	GC28322.D	04/29/15 11:30	JMP	TPH-DRO	T		2020	2000	101.0	80	120			
D00023- CC		CC	GC28322.D	04/29/15 11:30	JMP	o-Terphenyl	S		115	100	115.1	75	130			
D00023- CC		CC	GC28325.D	04/29/15 13:56	JMP	TPH-DRO	T		1981	2000	99.1	80	120			
D00023- CC		CC	GC28325.D	04/29/15 13:56	JMP	o-Terphenyl	S		115	100	115.1	75	130			

Sample Receipt and Inspection Form

HPE Report Number: 153518 Client: GeoConcepts Engineering, Inc.
 Received by: JS Date/Time: 04/28/15 14:50 Josh April
 Logged by: JP Date/Time: 04/28/15 16:00 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Shipment Mode: Drop-Off
 Turnaround Time: Standard PO No: 12170
 Project ID: VRE Alexandria Station

Contamination Control

Trip Blank(s) Submitted? N/A
 Field Blank(s) Submitted? N/A

Documentation

Test Request/COC Submitted? Yes
 Container Labels Agree with COC? Yes
 Custody Seals Present? No

Analyte Stabilization

Samples Acidified as Appropriate? N/A
 Thiosulfate Added as Appropriate? N/A
 Headspace Absent in VOA Vials? N/A
 Samples Received on Ice? Yes
 Sample Receipt Temp. (°C): 4

Comments

Number of Samples: 1

Summary of Samples Received

Sample #	HPE#	Cont.	Matrix	Collection	Container	Preservative	Storage	Test	Comments
				Date/Time			Location		
GZ-8 (28-30')	153518-	01 A	Soil	04/25/15 09:00	4 oz Jar	None	R2	BTEX	
GZ-8 (28-30')	153518-	01 A	Soil	04/25/15 09:00	4 oz Jar	None	R2	TPH-GRO	
GZ-8 (28-30')	153518-	01 A	Soil	04/25/15 09:00	4 oz Jar	None	R2	TPH-DRO	



HP ENVIRONMENTAL, INC.

104 Elden St, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

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Environmental Sample Chain-of-Custody Record

COC Reference Number: 5000

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME: <u>Routine</u>		Tests Requested											
Address: 19955 Highland Vista Dr., Suite 170 Ashburn, VA 20147		Emergency Rush (24-48hr)													
Contact: Josh Aprill@geoconcepts-eng.com		F.O.J. Job Number: 12170													
Phone: (703) 728-8030		SITE: VRE Alexandria Station Pedestrian Tunnel													
Fax: (703) 728-8032		Sampled by: <u>LS</u>													
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-QRO (VELAP)	TPH-GRO (VELAP)	Priority Pollutant Metals (13)	VOCs	PCBs	TCLP Metals	TOX	TPH 1634 (VELAP)	
1. GZ-8 (28-30')	4/25/2015	<u>0900</u>	Grab	S	None	1	X	X	X	X	X				
2. GZ-8 (Comp.)	4/25/2015	<u>0900</u>	Comp	S	None	1						X	X	X	
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															
Received Condition: <u>cold</u>		Relinquished By:		Date/Time		Received By:		Date/Time							
Mode of Shipment: <u>hand delivered</u>		Relinquished By:		Date/Time		Received By Laboratory:		Date/Time							
HPE Report Number: <u>153518</u>		<u>Jimmy DeLoe</u>		<u>4/28/15 14:50</u>		<u>Jul 4-23-15 2:00</u>									

Josh Aprill@geoconcepts-eng.com



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 1 of 7

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153431**
Date Received: 04/16/15
Date Reported: 04/21/15
Project Location: VRE Alexandria Station
Pedestrian Tunnel

Client Sample No: **GZ-9 (6-10')** Lab Sample No.: 153431-01
Sample Matrix: Soil Collection Date/Time: 04/11/15 00:00
Sample Description:

Volatile Organics - BTEX

Prep & Analysis Method: EPA 5030B EPA 8260C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Benzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15 12:00	04/16/15 17:13	JP

TPH - Gasoline Range Organics

Prep & Analysis Method: EPA 5030B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-GRO	< 0.50	mg/Kg	0.50	1	U	A	04/17/15 09:00	04/17/15 11:27	JMP

TPH - Diesel Range Organics

Prep & Analysis Method: EPA 3550B EPA 8015C

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH-DRO	< 10	mg/Kg	10	1	U	A	04/16/15 12:00	04/16/15 13:19	JMP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 2 of 7

GeoConcepts Engineering, Inc.
Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153431**
Date Received: 04/16/15
Date Reported: 04/21/15
Project Location: VRE Alexandria Station
Pedestrian Tunnel

Analyte Qualifier Codes

U = Analyte was not detected at or above reporting limit

* = Outlier

Notes:

Soil Results are reported on a wet weight basis (as received) unless stated as "dry".

The laboratory results reflect the measurement of the sample received only and may not be completely representative of the sampled site.

The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.

Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.

The chain-of-custody is a part of the entire analytical report.

Residual sample(s) will be disposed of in three months unless otherwise notified.

Certifications:

VELAP Certification No.: 3937; Laboratory ID: 460249

Virginia Drinking Water Certification No.: 3092; Laboratory ID: 00156

Maryland Drinking Water Certification No.: 319

Laboratory Report Approved by:

J Pfaff

04/21/15

Laboratory Director, Chemistry

Date



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - BTEX

Client: GeoConcepts Engineering, Inc.
 Report: **153431**
 Method: EPA 8260C

Water Prep Batch No.
 Soil Prep Batch No.: PVS017
 Initial Calibration ID:

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	Benzene	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	Toluene	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	Ethylbenzene	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	m,p-Xylene	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	o-Xylene	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	Methyl-tert-butyl ether (MTBE)	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	Naphthalene	T	Soil							
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	1,2-Dichloroethane-d4	S	Soil	50	50	100.6	70	130		
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	Toluene-d8	S	Soil	49	50	97.5	70	130		
PVS017- MB	PVS017	MB	A25577.D	04/16/15 12:27	JP	4-Bromofluorobenzene	S	Soil	48	50	95.1	70	130		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	Benzene	T	Soil	48	50	95.0	70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	Toluene	T	Soil	48	50	96.3	70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	Ethylbenzene	T	Soil	50	50	99.3	70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	m,p-Xylene	T	Soil	101	100	100.5	70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	o-Xylene	T	Soil	50	50	100.9	70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	Methyl-tert-butyl ether (MTBE)	T	Soil	44	50	88.6	70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	Naphthalene	T	Soil		50		70	125		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	1,2-Dichloroethane-d4	S	Soil	49	50	98.0	70	130		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	Toluene-d8	S	Soil	49	50	97.7	70	130		
PVS017- BS	PVS017	BS	A25578.D	04/16/15 12:56	JP	4-Bromofluorobenzene	S	Soil	47	50	93.6	70	130		
153426- 04	PVS017	SAM	A25582.D	04/16/15 14:51	JP	1,2-Dichloroethane-d4	S	Soil	44	50	87.7	70	130		
153426- 04	PVS017	SAM	A25582.D	04/16/15 14:51	JP	Toluene-d8	S	Soil	48	50	96.4	70	130		
153426- 04	PVS017	SAM	A25582.D	04/16/15 14:51	JP	4-Bromofluorobenzene	S	Soil	45	50	90.7	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	Benzene	T	Soil	50	50	99.7	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	Toluene	T	Soil	50	50	100.6	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	Ethylbenzene	T	Soil	52	50	103.9	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	m,p-Xylene	T	Soil	105	100	105.4	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	o-Xylene	T	Soil	52	50	103.8	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	Methyl-tert-butyl ether (MTBE)	T	Soil	32	50	64.2	60	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	Naphthalene	T	Soil	37	50	74.7	70	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	1,2-Dichloroethane-d4	S	Soil	41	50	82.9	60	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	Toluene-d8	S	Soil	49	50	97.7	60	130		
153426- 04MS	PVS017	MS	A25583.D	04/16/15 15:19	JP	4-Bromofluorobenzene	S	Soil	50	50	99.7	60	130		
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	Benzene	T	Soil	46	50	92.2	70	130	8.7	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	Toluene	T	Soil	46	50	92.9	70	130	11	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	Ethylbenzene	T	Soil	48	50	95.3	70	130	75	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	m,p-Xylene	T	Soil	97	100	96.6	70	130	60	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	o-Xylene	T	Soil	48	50	95.2	70	130	39	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	Methyl-tert-butyl ether (MTBE)	T	Soil	31	50	62.1	60	130	18	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	Naphthalene	T	Soil	37	50	74.4	70	130	11	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	1,2-Dichloroethane-d4	S	Soil	41	50	81.4	60	130	18	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	Toluene-d8	S	Soil	46	50	91.2	60	130	8.9	25
153426- 04MSC	PVS017	MSD	A25584.D	04/16/15 15:48	JP	4-Bromofluorobenzene	S	Soil	47	50	93.6	60	130	1.5	25
153431- 01	PVS017	SAM	A25587.D	04/16/15 17:13	JP	1,2-Dichloroethane-d4	S	Soil	44	50	87.2	70	130		
153431- 01	PVS017	SAM	A25587.D	04/16/15 17:13	JP	Toluene-d8	S	Soil	48	50	95.7	70	130		
153431- 01	PVS017	SAM	A25587.D	04/16/15 17:13	JP	4-Bromofluorobenzene	S	Soil	41	50	81.7	70	130		



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-GRO

Client: GeoConcepts Engineering, Inc.
Report: **153431**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PGS012
Initial Calibration ID: 101514

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Limit	Qualifier
G00017- CC		CC	GC112996.D	04/17/15 08:13	JMP	TPH-GRO	T		882	1000	88.2	80	120			
G00017- CC		CC	GC112996.D	04/17/15 08:13	JMP	4-Bromofluorobenzene	S		88	100	88.5	80	120			
PGS012- MB	PGS012	MB	GC112997.D	04/17/15 08:46	JMP	TPH-GRO	T	Soil								
PGS012- MB	PGS012	MB	GC112997.D	04/17/15 08:46	JMP	4-Bromofluorobenzene	S	Soil	82	100	82.0	60	140			
PGS012- BS	PGS012	BS	GC112998.D	04/17/15 09:18	JMP	TPH-GRO	T	Soil	1043	1000	104.3	70	130			
PGS012- BS	PGS012	BS	GC112998.D	04/17/15 09:18	JMP	4-Bromofluorobenzene	S	Soil	99	100	98.9	70	130			
153430- 01	PGS012	SAM	GC113000.D	04/17/15 10:22	JMP	4-Bromofluorobenzene	S	Soil	84	100	84.2	60	140			
153431- 01	PGS012	SAM	GC113002.D	04/17/15 11:27	JMP	4-Bromofluorobenzene	S	Soil	79	100	79.1	60	140			
153435- 01	PGS012	SAM	GC113003.D	04/17/15 11:59	JMP	4-Bromofluorobenzene	S	Soil	76	100	75.9	60	140			
153435- 02	PGS012	SAM	GC113004.D	04/17/15 12:32	JMP	4-Bromofluorobenzene	S	Soil	71	100	71.2	60	140			
153435- 03	PGS012	SAM	GC113005.D	04/17/15 13:04	JMP	4-Bromofluorobenzene	S	Soil	78	100	78.3	60	140			
153435- 03MS	PGS012	MS	GC113006.D	04/17/15 13:37	JMP	TPH-GRO	T	Soil	904	1000	90.4	70	130			
153435- 03MS	PGS012	MS	GC113006.D	04/17/15 13:37	JMP	4-Bromofluorobenzene	S	Soil	91	100	91.4	60	130			
153435- 03MSE	PGS012	MSD	GC113007.D	04/17/15 14:09	JMP	TPH-GRO	T	Soil	794	1000	79.4	60	130	13	25	
153435- 03MSE	PGS012	MSD	GC113007.D	04/17/15 14:09	JMP	4-Bromofluorobenzene	S	Soil	79	100	79.0	60	130	15	25	
G00017- CC		CC	GC113008.D	04/17/15 14:41	JMP	TPH-GRO	T		954	1000	95.4	80	120			
G00017- CC		CC	GC113008.D	04/17/15 14:41	JMP	4-Bromofluorobenzene	S		94	100	94.0	80	120			



HP ENVIRONMENTAL INCORPORATED
Analytical Sequence & QC Data Summary - TPH-DRO

Client: GeoConcepts Engineering, Inc.
Report: **153431**
Method: EPA 8015C

Water Prep Batch No.
Soil Prep Batch No.: PDS037
Initial Calibration ID: 10715

Lab Sample	Prep Batch	Sample Type	Instrument File	Date/Time Analyzed	Analyst	Compound	Cmpd Type	Matrix	Sample Conc	Amt Added	Rec. %	Lower Limit	Upper Limit	% Diff	Qualifier
D00023- CC		CC	GC28186.D	04/16/15 08:43	JMP	TPH-DRO	T		2028	2000	101.4	80	130		
D00023- CC		CC	GC28186.D	04/16/15 08:43	JMP	o-Terphenyl	S		115	100	114.5	80	130		
PDS037- MB	PDS037	MB	GC28187.D	04/16/15 09:08	JMP	TPH-DRO	T	Soil							
PDS037- MB	PDS037	MB	GC28187.D	04/16/15 09:08	JMP	o-Terphenyl	S	Soil	85	100	84.7	60	140		
PDS037- BS	PDS037	BS	GC28188.D	04/16/15 09:33	JMP	TPH-DRO	T	Soil	1251	2000	62.5	50	100		
PDS037- BS	PDS037	BS	GC28188.D	04/16/15 09:33	JMP	o-Terphenyl	S	Soil	76	100	76.5	65	120		
153426- 01	PDS037	SAM	GC28190.D	04/16/15 10:23	JMP	o-Terphenyl	S	Soil	86	100	86.1	60	140		
153426- 02	PDS037	SAM	GC28191.D	04/16/15 10:48	JMP	o-Terphenyl	S	Soil	97	100	96.7	60	140		
153426- 03	PDS037	SAM	GC28192.D	04/16/15 11:13	JMP	o-Terphenyl	S	Soil	82	100	82.3	60	140		
153426- 04	PDS037	SAM	GC28193.D	04/16/15 11:38	JMP	o-Terphenyl	S	Soil	86	100	85.7	60	140		
153426- 04MS	PDS037	MS	GC28194.D	04/16/15 12:03	JMP	TPH-DRO	T	Soil	1341	2000	67.1	50	120		
153426- 04MS	PDS037	MS	GC28194.D	04/16/15 12:03	JMP	o-Terphenyl	S	Soil	85	100	85.0	65	120		
153426- 04MSE	PDS037	MSD	GC28195.D	04/16/15 12:28	JMP	TPH-DRO	T	Soil	1347	2000	67.3	50	120	0.4	25
153426- 04MSE	PDS037	MSD	GC28195.D	04/16/15 12:28	JMP	o-Terphenyl	S	Soil	83	100	83.2	65	120	2.1	25
153431- 01	PDS037	SAM	GC28197.D	04/16/15 13:19	JMP	o-Terphenyl	S	Soil	104	100	103.6	60	140		
D00023- CC		CC	GC28200.D	04/16/15 14:35	JMP	TPH-DRO	T		2223	2000	111.2	80	130		
D00023- CC		CC	GC28200.D	04/16/15 14:35	JMP	o-Terphenyl	S		131	100	130.6	80	130		*
153429- 01	PDS037	SAM				o-Terphenyl	S	Soil		100		60	140		

Sample Receipt and Inspection Form

HPE Report Number: 153431 Client: GeoConcepts Engineering, Inc.
 Received by: JS Date/Time: 04/16/15 11:30 Josh April
 Logged by: JP Date/Time: 04/16/15 14:00 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Shipment Mode: Drop-Off
 Turnaround Time: Standard

PO No: 12170
 Project ID: VRE Alexandria Station
 Pedestrian Tunnel

Contamination Control

Trip Blank(s) Submitted? No
 Field Blank(s) Submitted? No

Documentation

Test Request/COC Submitted? Yes
 Container Labels Agree with COC? Yes
 Custody Seals Present? No

Analyte Stabilization

Samples Acidified as Appropriate? N/A
 Thiosulfate Added as Appropriate? N/A
 Headspace Absent in VOA Vials? N/A
 Samples Received on Ice? Yes
 Sample Receipt Temp. (°C): 4

Comments

Number of Samples: 1

Summary of Samples Received

Sample #	HPE#	Cont.	Matrix	Collection	Container	Preservative	Storage	Test	Comments
				Date/Time			Location		
GZ-9 (6-10')	153431-	01 A	Soil	04/11/15 00:00	4 oz Jar	None	R2	BTEX/M/N	
GZ-9 (6-10')	153431-	01 A	Soil	04/11/15 00:00	4 oz Jar	None	R2	TPH-GRO	
GZ-9 (6-10')	153431-	01 A	Soil	04/11/15 00:00	4 oz Jar	None	R2	TPH-DRO	

**HP ENVIRONMENTAL, INC.**

104 Elden St, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

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Environmental Sample Chain-of-Custody Record

COC Reference Number: 5000

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME:		☒ Routine ☐ Rush (24-48hr)		Tests Requested								
Address: 19955 Highland Vista Dr., Suite 170 Ashburn, VA 20147		Emergency		P.O./Job Number: 12170		TPH-DRO	TPH GRO	Priority Pollutant Metals (13)	VOCs	PCBs	TCLP Metals	TOX	TPH 1664	
Contact: Josh April-japril@geoconcepts-eng.com		SITE: VRE Alexandria Station Pedestrian Tunnel		Sampled by:										
Phone: (703) 726-8030														
Fax: (703) 726-8032														
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles								
1. GZ-9 (8-10')	4/11/2015		Grab	S	None	1	X	X	X	X				
2. GZ-9 (Comp.)	4/11/2015		Comp	S	None	1					X	X	X	
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.														
Received Condition: iced 4C			Relinquished By: Habeem			Date/Time: 4-16-15 11:30			Received By: [Signature]			Date/Time: 4-16-15 11:30		
Mode of Shipment: hand delivered			Relinquished By:			Date/Time:			Received By Laboratory:			Date/Time:		
HPE Report Number: 153431														



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153616**
 Date Received: 05/19/15
 Date Reported: 05/26/15
 Project Location: VRE Alexandria Station

Client Sample No: **GZ-7 (13-15')**
 Sample Matrix: Soil
 Sample Description:

Lab Sample No.: 153616-01
 Collection Date/Time: 04/19/15 00:00

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Vinyl chloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromomethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Trichlorofluoromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Acetone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Methylene chloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
trans-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Butanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
cis-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloroform	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,1-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Carbon tetrachloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Benzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Trichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Dibromomethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromodichloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
cis-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Methyl-2-pentanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
trans-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,2-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Hexanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Tetrachloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Dibromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dibromoethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,1,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Styrene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromoform	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153616**
 Date Received: 05/19/15
 Date Reported: 05/26/15
 Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-7 (13-15')****Volatile Organic Compounds**

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Isopropylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,2,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,3-Trichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
n-Propylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3,5-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
tert-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,4-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
sec-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Isopropyltoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,4-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
n-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dibromo-3-chloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,4-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Hexachlorobutadiene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,3-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP

PCB's

Preparation & Analysis Method:

EPA 3550

EPA 8082

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Aroclor-1016	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1221	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1232	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1242	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1248	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1254	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1260	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP



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Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-7 (13-15')**

Priority Pollutant Metals

Preparation & Analysis Method:

EPA 3050

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Antimony	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Arsenic	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Beryllium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Cadmium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Chromium	12	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Copper	3.8	mg/Kg	5.0	1	J	A	05/20/15	05/21/15	JMP
Mercury	< 0.5	mg/Kg	0.5	1	U	A	05/20/15	05/21/15	JMP
Lead	5.5	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Nickel	3.6	mg/Kg	5.0	1	J	A	05/20/15	05/21/15	JMP
Selenium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Silver	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Thallium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Zinc	11	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153616**
 Date Received: 05/19/15
 Date Reported: 05/26/15
 Project Location: VRE Alexandria Station

Client Sample No: **GZ-8 (13-15')**
 Sample Matrix: Soil
 Sample Description:

Lab Sample No.: 153616-02
 Collection Date/Time: 04/19/15 00:00

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Vinyl chloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromomethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Trichlorofluoromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Acetone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Methylene chloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
trans-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Butanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
cis-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloroform	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,1-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Carbon tetrachloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Benzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Trichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Dibromomethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromodichloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
cis-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Methyl-2-pentanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
trans-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,2-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Hexanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Tetrachloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Dibromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dibromoethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,1,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Styrene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromoform	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153616**
 Date Received: 05/19/15
 Date Reported: 05/26/15
 Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-8 (13-15')****Volatile Organic Compounds**

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Isopropylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,2,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,3-Trichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
n-Propylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3,5-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
tert-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,4-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
sec-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Isopropyltoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,4-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
n-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dibromo-3-chloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,4-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Hexachlorobutadiene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,3-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP

PCB's

Preparation & Analysis Method:

EPA 3550

EPA 8082

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Aroclor-1016	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1221	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1232	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1242	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1248	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1254	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1260	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-8 (13-15')**

Priority Pollutant Metals

Preparation & Analysis Method:

EPA 3050

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Antimony	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Arsenic	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Beryllium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Cadmium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Chromium	11	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Copper	9.8	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Mercury	< 0.5	mg/Kg	0.5	1	U	A	05/20/15	05/21/15	JMP
Lead	5.7	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Nickel	9.0	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Selenium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Silver	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Thallium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Zinc	320	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153616**
 Date Received: 05/19/15
 Date Reported: 05/26/15
 Project Location: VRE Alexandria Station

Client Sample No: **GZ-9 (14-16')**
 Sample Matrix: Soil
 Sample Description:

Lab Sample No.: 153616-03
 Collection Date/Time: 04/11/15 00:00

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Vinyl chloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromomethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Trichlorofluoromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Acetone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Methylene chloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
trans-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Butanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
cis-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chloroform	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,1-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Carbon tetrachloride	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Benzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Trichloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Dibromomethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromodichloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
cis-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Methyl-2-pentanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
trans-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,2-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Hexanone	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Tetrachloroethene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Dibromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dibromoethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Chlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,1,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Styrene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromoform	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153616**
 Date Received: 05/19/15
 Date Reported: 05/26/15
 Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-9 (14-16')****Volatile Organic Compounds**

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Isopropylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Bromobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,1,2,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,3-Trichloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
n-Propylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
2-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3,5-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
tert-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,4-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
sec-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,3-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
4-Isopropyltoluene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,4-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
n-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2-Dibromo-3-chloropropane	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,4-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Hexachlorobutadiene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP
1,2,3-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	05/21/15	05/21/15	JP

PCB's

Preparation & Analysis Method:

EPA 3550

EPA 8082

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Aroclor-1016	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1221	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1232	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1242	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1248	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1254	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP
Aroclor-1260	< 80	ug/Kg	80	1	U	A	05/21/15	05/21/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-9 (14-16')**

Priority Pollutant Metals

Preparation & Analysis Method:

EPA 3050

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Antimony	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Arsenic	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Beryllium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Cadmium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Chromium	13	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Copper	11	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Mercury	< 0.5	mg/Kg	0.5	1	U	A	05/20/15	05/21/15	JMP
Lead	6.0	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Nickel	8.6	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP
Selenium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Silver	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Thallium	< 5.0	mg/Kg	5.0	1	U	A	05/20/15	05/21/15	JMP
Zinc	64	mg/Kg	5.0	1		A	05/20/15	05/21/15	JMP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 10 of 11

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153616**
Date Received: 05/19/15
Date Reported: 05/26/15
Project Location: VRE Alexandria Station

Analyte Qualifier Codes:

U = Analyte was not detected at or above reporting limit
J = Analyte detected below reporting limit (estimated value)

Notes:

Samples were received outside of holding time for VOC and PCB analysis
Report identifies container used for analysis: A - (4 oz soil jar)
Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The lab results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Laboratory Report Approved by:

J Pfaff

05/26/15

Laboratory Director, Chemistry

Date



HP ENVIRONMENTAL, INC.

10-
t, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

Page of 1

Environmental Sample Chain-of-Custody Record

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME: <u>Routing</u>		COC Reference: ###													
Address: 19955 Highland Vista Dr., Suite 170 Ashburn, VA 20147		Emergency P.O./Job Number: 12170		Tests Requested													
Contact: Josh April-japril@geoconcepts-eng.com		SITE: VRE Alexandria Station Pedestrian Tunnel		TPH-DRO (VELAP)	TPH GRO (VELAP)	Priority Pollutant Metals (13)	VOCs	PCBs	pH	Chloride	Sulfides	Resistivity	Redox Potential	Natural Moisture Content	Sulfates		
Phone: (703) 726-8030		Sampled by:															
Fax: (703) 726-8032																	
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles											
1. GZ-7 (13-15')	4/19/2015		Grab	S	None	1 jar	X	X	X	X	X						
2. GZ-8 (13-15')	4/19/2015		Grab	S	None	1 jar	X	X	X	X	X						
3. GZ-9 (14-16')	4/11/2015		Grab	S	None	1 jar	X	X	X	X	X						
4. GZ-7 (13-15')	4/19/2015		Grab	S	None	1 ziploc						X	X	X	X		
5. GZ-8 (15-17')	4/19/2015		Grab	S	None	1 ziploc						X	X	X	X		
6. GZ-9 (10-12')	4/11/2015		Grab	S	None	1 ziploc						X	X	X	X		
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	
14.																	
15.																	
Received Condition: <i>on ice 4°C</i>			Relinquished By:			Date/Time			Received By:			Date/Time					
Mode of Shipment: <i>hand delivered</i>			Relinquished By:			Date/Time			Received By Labor:			Date/Time					
HPE Report Number: <i>153616</i>			<i>Josh D. Moore</i>			<i>5/19 @ 4:56</i>			<i>Brenda Herrera</i>			<i>5/19/15 @ 4:56 pm</i>					



HP ENVIRONMENTAL INCORPORATED

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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153463**
 Date Received: 04/20/15
 Date Reported: 04/23/15
 Project Location: VRE Alexandria Station

Client Sample No: **GZ-7 (19-21')**
 Sample Matrix: Soil
 Sample Description:

Lab Sample No.: 153463-01
 Collection Date/Time: 04/19/15 00:00

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Chloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Vinyl chloride	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Bromomethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Chloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Trichlorofluoromethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Acetone	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Methylene chloride	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
trans-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
2-Butanone	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
2,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
cis-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Bromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Chloroform	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1,1-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Carbon tetrachloride	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Benzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Trichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Dibromomethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Bromodichloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
cis-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
4-Methyl-2-pentanone	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
trans-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1,2-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
2-Hexanone	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Tetrachloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,3-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Dibromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2-Dibromoethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Chlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1,1,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Styrene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Bromoform	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153463**
 Date Received: 04/20/15
 Date Reported: 04/23/15
 Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-7 (19-21')****Volatile Organic Compounds**

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Isopropylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Bromobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,1,2,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2,3-Trichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
n-Propylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
2-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
4-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,3,5-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
tert-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2,4-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
sec-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,3-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
4-Isopropyltoluene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,4-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
n-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2-Dibromo-3-chloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2,4-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Hexachlorobutadiene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP
1,2,3-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/22/15	04/22/15	JP

PCB's

Preparation & Analysis Method:

EPA 3550

EPA 8082

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Aroclor-1016	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP
Aroclor-1221	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP
Aroclor-1232	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP
Aroclor-1242	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP
Aroclor-1248	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP
Aroclor-1254	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP
Aroclor-1260	< 80	ug/Kg	80	1	U	A	04/20/15	04/21/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153463**
Date Received: 04/20/15
Date Reported: 04/23/15
Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-7 (19-21')**

Priority Pollutant Metals

Preparation & Analysis Method:

EPA 3050

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Antimony	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Arsenic	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Beryllium	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Cadmium	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Chromium	12	mg/Kg	5.0	1		A	04/21/15	04/22/15	JMP
Copper	11	mg/Kg	5.0	1		A	04/21/15	04/22/15	JMP
Mercury	< 0.5	mg/Kg	0.5	1	U	A	04/21/15	04/22/15	JMP
Lead	5.9	mg/Kg	5.0	1		A	04/21/15	04/22/15	JMP
Nickel	3.9	mg/Kg	5.0	1	J	A	04/21/15	04/22/15	JMP
Selenium	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Silver	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Thallium	< 5.0	mg/Kg	5.0	1	U	A	04/21/15	04/22/15	JMP
Zinc	15	mg/Kg	5.0	1		A	04/21/15	04/22/15	JMP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153463**
Date Received: 04/20/15
Date Reported: 04/23/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-7 (Comp.)**
Sample Matrix: Soil
Sample Description:

Lab Sample No.: 153463-02
Collection Date/Time: 04/19/15 00:00

TCLP Metals

Preparation & Analysis Method:

EPA 1311

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Arsenic	< 0.10	mg/L	0.10	1	U	A	04/21/15	04/22/15	JMP
Barium	0.39	mg/L	0.10	1		A	04/21/15	04/22/15	JMP
Cadmium	< 0.10	mg/L	0.10	1	U	A	04/21/15	04/22/15	JMP
Chromium	< 0.10	mg/L	0.10	1	U	A	04/21/15	04/22/15	JMP
Lead	< 0.10	mg/L	0.10	1	U	A	04/21/15	04/22/15	JMP
Mercury	< 0.02	mg/L	0.02	1	U	A	04/21/15	04/22/15	JMP
Selenium	< 0.10	mg/L	0.10	1	U	A	04/21/15	04/22/15	JMP
Silver	< 0.10	mg/L	0.10	1	U	A	04/21/15	04/22/15	JMP

TPH - Oil & Grease

Preparation & Analysis Method:

EPA 9071

EPA 9071

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - Oil & Grease	< 10	mg/Kg	10	1	U	A	04/23/15	04/23/15	JMP

TOX

Preparation & Analysis Method:

EPA 9023M

EPA 9023M

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TOX	< 10	mg/Kg	10	1	U	A	04/20/15	04/21/15	JP



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Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153463**
Date Received: 04/20/15
Date Reported: 04/23/15
Project Location: VRE Alexandria Station

Analyte Qualifier Codes:

U = Analyte was not detected at or above reporting limit
J = Analyte detected below reporting limit (estimated value)

Notes:

Report identifies container used for analysis: A - (4 oz soil jar)
Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The lab results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Laboratory Report Approved by:

J Pfaff

04/23/15

Laboratory Director, Chemistry

Date

**HP ENVIRONMENTAL, INC.**

104 Liden St, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

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Environmental Sample Chain-of-Custody Record

COC Reference Number: 6000

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME:		☐ Routine		Tests Requested									
Address:		☐ Emergency		☐ Rush (24-48hr)											
19955 Highland Vista Dr., Suite 170		P.O./Job Number:													
Ashburn, VA 20147		12170													
Contact:		SITE:													
Josh Bartlett @geoconcepts-eng.com		VRE Alexandria Station Pedestrian Tunnel													
Phone: (703) 726-8030		Sampled by:													
Fax: (703) 726-8032															
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-DRO (VELAP)	TPH GRO (VELAP)	Priority Pollutant Metals (13)	VOGs	PCBs	TCLP Metals	TOX	TPH 1664 (VELAP)	
1. GZ-7 (19-21')	4/19/2015	9M	Orsb	S	None	1	X	X	X	X	X				
2. GZ-7 (Comp.)	4/19/2015	9M	Comp	S	None	1						X	X	X	
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															
Received Condition:			Relinquished By:			Date/Time			Received By:			Date/Time			
Ice 4C															
Mode of Shipment:			Relinquished By:			Date/Time			Received By Laboratory:			Date/Time			
hand delivery															
HPE Report Number:			Relinquished By:			Date/Time			Received By Laboratory:			Date/Time			
153463						4/20/2015 4:20						4/20/15 4:20			



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153518**
 Date Received: 04/28/15
 Date Reported: 05/01/15
 Project Location: VRE Alexandria Station

Client Sample No: **GZ-8 (28-30')**
 Sample Matrix: Soil
 Sample Description:

Lab Sample No.: 153518-01
 Collection Date/Time: 04/25/15 09:00

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Chloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Vinyl chloride	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Bromomethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Chloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Trichlorofluoromethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Acetone	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Methylene chloride	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
trans-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
2-Butanone	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
2,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
cis-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Bromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Chloroform	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1,1-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Carbon tetrachloride	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Benzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Trichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Dibromomethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Bromodichloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
cis-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
4-Methyl-2-pentanone	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
trans-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1,2-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
2-Hexanone	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Tetrachloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,3-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Dibromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2-Dibromoethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Chlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1,1,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Styrene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Bromoform	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 2 of 6

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153518**
 Date Received: 04/28/15
 Date Reported: 05/01/15
 Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-8 (28-30')**

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Isopropylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Bromobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,1,2,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2,3-Trichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
n-Propylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
2-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
4-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,3,5-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
tert-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2,4-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
sec-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,3-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
4-Isopropyltoluene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,4-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
n-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2-Dibromo-3-chloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2,4-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Hexachlorobutadiene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP
1,2,3-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/29/15	04/29/15	JP

PCB's

Preparation & Analysis Method:

EPA 3550

EPA 8082

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Aroclor-1016	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP
Aroclor-1221	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP
Aroclor-1232	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP
Aroclor-1242	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP
Aroclor-1248	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP
Aroclor-1254	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP
Aroclor-1260	< 80	ug/Kg	80	1	U	A	04/29/15	04/29/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

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GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153518**
Date Received: 04/28/15
Date Reported: 05/01/15
Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-8 (28-30')**

Priority Pollutant Metals

Preparation & Analysis Method:

EPA 3050

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Antimony	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Arsenic	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Beryllium	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Cadmium	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Chromium	15	mg/Kg	5.0	1		A	04/29/15	04/30/15	JMP
Copper	15	mg/Kg	5.0	1		A	04/29/15	04/30/15	JMP
Mercury	< 0.5	mg/Kg	0.5	1	U	A	04/29/15	04/30/15	JMP
Lead	4.7	mg/Kg	5.0	1	J	A	04/29/15	04/30/15	JMP
Nickel	17	mg/Kg	5.0	1		A	04/29/15	04/30/15	JMP
Selenium	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Silver	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Thallium	< 5.0	mg/Kg	5.0	1	U	A	04/29/15	04/30/15	JMP
Zinc	22	mg/Kg	5.0	1		A	04/29/15	04/30/15	JMP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153518**
Date Received: 04/28/15
Date Reported: 05/01/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-8 (Comp.)**
Sample Matrix: Soil
Sample Description:

Lab Sample No.: 153518-02
Collection Date/Time: 04/25/15 09:00

TCLP Metals

Preparation & Analysis Method:

EPA 1311

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Arsenic	< 0.10	mg/L	0.10	1	U	A	04/29/15	04/30/15	JMP
Barium	0.43	mg/L	0.10	1		A	04/29/15	04/30/15	JMP
Cadmium	< 0.10	mg/L	0.10	1	U	A	04/29/15	04/30/15	JMP
Chromium	< 0.10	mg/L	0.10	1	U	A	04/29/15	04/30/15	JMP
Lead	< 0.10	mg/L	0.10	1	U	A	04/29/15	04/30/15	JMP
Mercury	< 0.02	mg/L	0.02	1	U	A	04/29/15	04/30/15	JMP
Selenium	< 0.10	mg/L	0.10	1	U	A	04/29/15	04/30/15	JMP
Silver	< 0.10	mg/L	0.10	1	U	A	04/29/15	04/30/15	JMP

TPH - Oil & Grease

Preparation & Analysis Method:

EPA 9071

EPA 9071

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - Oil & Grease	< 10	mg/Kg	10	1	U	A	04/29/15	04/29/15	JMP

TOX

Preparation & Analysis Method:

EPA 9023M

EPA 9023M

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TOX	< 10	mg/Kg	10	1	U	A	04/29/15	04/29/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 5 of 6

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153518**
Date Received: 04/28/15
Date Reported: 05/01/15
Project Location: VRE Alexandria Station

Analyte Qualifier Codes:

U = Analyte was not detected at or above reporting limit
J = Analyte detected below reporting limit (estimated value)

Notes:

Report identifies container used for analysis: A - (4 oz soil jar)
Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The lab results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Laboratory Report Approved by:

J Pfaff

05/01/15

Laboratory Director, Chemistry

Date

**HP ENVIRONMENTAL, INC.**

104 Elden St, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0023

Page 1 of 1

Environmental Sample Chain-of-Custody Record

CDC Reference Number: 5000

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME: Routine		Tests Requested											
Address: 19956 Highland Vista Dr., Suite 170 Ashburn, VA 20147		Emergency Rush (24-48hr)													
Contact: Josh April japr1@geoconcepts-eng.com Phone: (703) 728-8030 Fax: (703) 728-8032		P.O./Job Number: 12170													
		SITE: VRE Alexandra Station Pedestrian Tunnel													
		Sampled by: LB													
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-DRO (VELAP)	TPH GRO (VELAP)	Priority Pollutant Metals (13)	VOCs	PCBs	TCLP Metals	TOX	TPH 1634 (VELAP)	
1. GZ-8 (28-30')	4/25/2015	0900	Grab	S	None	1	X	X	X	X	X				
2. GZ-8 (Comp.)	4/25/2015	0900	Comp	S	None	1						X	X	X	
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
11.															
12.															
13.															
14.															
15.															
Received Condition: Cold			Relinquished By:			Date/Time	Received By:			Date/Time					
Mode of Shipment: hand delivered			Relinquished By: Jerry DeLoe			4/28/15 14:50	Received By Laboratory:			4/28/15 2:00					
HPE Report Number: 153518			Japr1@geoconcepts-eng.com												



HP ENVIRONMENTAL INCORPORATED

Page 1 of 6

Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153431**
 Date Received: 04/16/15
 Date Reported: 04/22/15
 Project Location: VRE Alexandria Station

Client Sample No: **GZ-9 (8-10')**
 Sample Matrix: Soil
 Sample Description:

Lab Sample No.: 153431-01
 Collection Date/Time: 04/11/15 00:00

Volatile Organic Compounds

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Dichlorodifluoromethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Chloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Vinyl chloride	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Bromomethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Chloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Trichlorofluoromethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Acetone	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Methylene chloride	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Methyl-tert-butyl ether (MTBE)	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
trans-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
2-Butanone	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
2,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
cis-1,2-Dichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Bromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Chloroform	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1,1-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Carbon tetrachloride	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Benzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2-Dichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Trichloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Dibromomethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Bromodichloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
cis-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
4-Methyl-2-pentanone	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Toluene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
trans-1,3-Dichloropropene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1,2-Trichloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
2-Hexanone	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Tetrachloroethene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,3-Dichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Dibromochloromethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2-Dibromoethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Chlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1,1,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Ethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
m,p-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
o-Xylene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Styrene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Bromoform	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP



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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
 Attn: Josh April
 19955 Highland Vista Dr.
 Suite 170
 Ashburn, VA 20147

Report Number: **153431**
 Date Received: 04/16/15
 Date Reported: 04/22/15
 Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-9 (8-10')****Volatile Organic Compounds**

Preparation & Analysis Method:

EPA 5030

EPA 8260

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Isopropylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Bromobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,1,2,2-Tetrachloroethane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2,3-Trichloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
n-Propylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
2-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
4-Chlorotoluene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,3,5-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
tert-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2,4-Trimethylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
sec-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,3-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
4-Isopropyltoluene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,4-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2-Dichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
n-Butylbenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2-Dibromo-3-chloropropane	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2,4-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Hexachlorobutadiene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
Naphthalene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP
1,2,3-Trichlorobenzene	< 5.0	ug/Kg	5.0	1	U	A	04/16/15	04/16/15	JP

PCB's

Preparation & Analysis Method:

EPA 3550

EPA 8082

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Aroclor-1016	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP
Aroclor-1221	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP
Aroclor-1232	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP
Aroclor-1242	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP
Aroclor-1248	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP
Aroclor-1254	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP
Aroclor-1260	< 80	ug/Kg	80	1	U	A	04/16/15	04/17/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 3 of 6

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153431**
Date Received: 04/16/15
Date Reported: 04/22/15
Project Location: VRE Alexandria Station

Sample Results Continued -----

Client Sample No: **GZ-9 (8-10')**

Priority Pollutant Metals

Preparation & Analysis Method:

EPA 3050

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Antimony	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Arsenic	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Beryllium	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Cadmium	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Chromium	12	mg/Kg	5.0	1		A	04/16/15	04/17/15	JMP
Copper	16	mg/Kg	5.0	1		A	04/16/15	04/17/15	JMP
Mercury	< 0.5	mg/Kg	0.5	1	U	A	04/10/15	04/17/15	JMP
Lead	13	mg/Kg	5.0	1		A	04/16/15	04/17/15	JMP
Nickel	6.0	mg/Kg	5.0	1		A	04/16/15	04/17/15	JMP
Selenium	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Silver	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Thallium	< 5.0	mg/Kg	5.0	1	U	A	04/16/15	04/17/15	JMP
Zinc	20	mg/Kg	5.0	1		A	04/16/15	04/17/15	JMP



HP ENVIRONMENTAL INCORPORATED

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Certificate of Laboratory Analysis

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153431**
Date Received: 04/16/15
Date Reported: 04/22/15
Project Location: VRE Alexandria Station

Client Sample No: **GZ-9 (Comp.)**
Sample Matrix: Soil
Sample Description:

Lab Sample No.: 153431-02
Collection Date/Time: 04/11/15 00:00

TCLP Metals

Preparation & Analysis Method:

EPA 1311

EPA 6010

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
Arsenic	< 0.10	mg/L	0.10	1	U	A	04/16/15	04/17/15	JMP
Barium	0.30	mg/L	0.10	1		A	04/16/15	04/17/15	JMP
Cadmium	< 0.10	mg/L	0.10	1	U	A	04/16/15	04/17/15	JMP
Chromium	< 0.10	mg/L	0.10	1	U	A	04/16/15	04/17/15	JMP
Lead	< 0.10	mg/L	0.10	1	U	A	04/16/15	04/17/15	JMP
Mercury	< 0.02	mg/L	0.02	1	U	A	04/16/15	04/17/15	JMP
Selenium	< 0.10	mg/L	0.10	1	U	A	04/16/15	04/17/15	JMP
Silver	< 0.10	mg/L	0.10	1	U	A	04/16/15	04/17/15	JMP

TPH - Oil & Grease

Preparation & Analysis Method:

EPA 9071

EPA 9071

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TPH - Oil & Grease	< 10	mg/Kg	10	1	U	A	04/16/15	04/16/15	JMP

TOX

Preparation & Analysis Method:

EPA 9023M

EPA 9023M

Analyte	Result	Units	Limit	Dilution	Qualifier	Cont.	Prep. Date	Analysis Date	Analyst
TOX	< 10	mg/Kg	10	1	U	A	04/16/15	04/16/15	JP



HP ENVIRONMENTAL INCORPORATED
Certificate of Laboratory Analysis

Page 5 of 6

GeoConcepts Engineering, Inc
Attn: Josh April
19955 Highland Vista Dr.
Suite 170
Ashburn, VA 20147

Report Number: **153431**
Date Received: 04/16/15
Date Reported: 04/22/15
Project Location: VRE Alexandria Station

Analyte Qualifier Codes:

U = Analyte was not detected at or above reporting limit

Notes:

Report identifies container used for analysis: A - (4 oz soil jar)
Soil Results are reported on a wet weight basis (as received) unless stated as "dry".
The lab results reflect the measurement of the sample received only and may not be completely representative of the sampled site.
The Client has the responsibility for assessing risk and appropriate data interpretation of the results contained herein.
Laboratory reports issued are intended for the exclusive use by the Client and shall not be reproduced except in its entirety.
The chain-of-custody is a part of the entire analytical report.
Residual sample(s) will be disposed of in three months unless otherwise notified.

Laboratory Report Approved by:

J Pfaff

04/22/15

Laboratory Director, Chemistry

Date

**HP ENVIRONMENTAL, INC.**

104 Elden St, Herndon, VA 20170 (703) 471-4200 Fax (703) 471-0020

Page 1 of 1

Environmental Sample Chain-of-Custody Record

COC Reference Number: 5000

Client: GeoConcepts Engineering, Inc.		TURN-AROUND TIME:		Routine ☒		Tests Requested											
Address:		Emergency		Rush (24-48hr)													
19955 Highland Vista Dr., Suite 170		P.O./Job Number:		12170													
Ashburn, VA 20147		SITE:		VRE Alexandria Station Pedestrian Tunnel													
Contact:		Sampled by:															
Josh April-japril@geoconcepts-eng.com																	
Phone: (703) 726-8030																	
Fax: (703) 726-8032																	
Sample ID	Sample Date	Sample Time	Comp/Grab	Matrix	Preserv. pH	# Bottles	TPH-DRO	TPH GRO	Priority Pollutant Metals (13)	VOCs	PCBs	TCLP Metals	TOX	TPH 1664			
1. GZ-9 (8-10')	4/11/2015		Grab	S	None	1	X	X	X	X	X						
2. GZ-9 (Comp.)	4/11/2015		Comp	S	None	1						X	X	X			
3.																	
4.																	
5.																	
6.																	
7.																	
8.																	
9.																	
10.																	
11.																	
12.																	
13.																	
14.																	
15.																	
Received Condition:			iced 4C			Relinquished By:			Date/Time			Received By:			Date/Time		
Mode of Shipment:			hand delivered			Relinquished By:			Date/Time			Received By Laboratory:			Date/Time		
HPE Report Number:			153431			Habe			4.16.15 11:30			CJP			4.16.15 11:30		

Analytical Report for
GeoConcepts Engineering, Inc.
Certificate of Analysis No.: 15042817

Project Manager: Josh April
Project Name : VRE Alexandria Station
Project Location: Alexandria, VA



May 5, 2015
Phase Separation Science, Inc.
6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

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PHASE SEPARATION SCIENCE, INC.



May 5, 2015

Josh April
GeoConcepts Engineering, Inc.
19955 Highland Vista Dr.
Ashburn, VA 20147

Reference: PSS Work Order(s) No: **15042817**
Project Name: VRE Alexandria Station
Project Location: Alexandria, VA

Dear Josh April :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **15042817**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on June 2, 2015. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Laboratory Manager



Sample Summary

Client Name: GeoConcepts Engineering, Inc.

Project Name: VRE Alexandria Station

Work Order Number(s): 15042817

The following samples were received under chain of custody by Phase Separation Science (PSS) on 04/28/2015 at 04:25 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
15042817-001	GZ-7	GROUND WATER	04/25/15 08:30

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the MDL.
- MDL This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15042817

GeoConcepts Engineering, Inc., Ashburn, VA

May 5, 2015

Project Name: VRE Alexandria Station

Project Location: Alexandria, VA

Sample ID: GZ-7	Date/Time Sampled: 04/25/2015 08:30	PSS Sample ID: 15042817-001
Matrix: GROUND WATER	Date/Time Received: 04/28/2015 16:25	

Inorganic Anions (2)		Analytical Method: EPA 300.0			Preparation Method: E300.0P			
	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Chloride	320	mg/L	50		10	04/29/15	04/30/15 15:54	1044
Sulfate	52	mg/L	5.0		1	04/29/15	04/29/15 19:26	1044
Total Metals (2)		Analytical Method: SW-846 6020 A			Preparation Method: 3010A			
	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Magnesium	45,000	ug/L	10,000		100	04/29/15	04/30/15 13:15	1033
Sodium	140,000	ug/L	10,000		100	04/29/15	04/30/15 13:15	1033
Total Petroleum Hydrocarbons - DRO		Analytical Method: SW-846 8015 C			Preparation Method: 3510C			
	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	0.12	mg/L	0.11		1	04/29/15	04/29/15 14:47	1055
Total Petroleum Hydrocarbons-GRO		Analytical Method: SW-846 8015C			Preparation Method: 5030B			
	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-GRO (Gasoline Range Organics)	ND	ug/L	100		1	04/30/15	04/30/15 14:57	1035

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15042817

GeoConcepts Engineering, Inc., Ashburn, VA

May 5, 2015

Project Name: VRE Alexandria Station

Project Location: Alexandria, VA

Sample ID: GZ-7	Date/Time Sampled: 04/25/2015 08:30	PSS Sample ID: 15042817-001
Matrix: GROUND WATER	Date/Time Received: 04/28/2015 16:25	

TCL Volatile Organic Compounds

Analytical Method: SW-846 8260 B

Preparation Method: 5030B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acetone	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Benzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Bromochloromethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Bromodichloromethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Bromoform	ND	ug/L	5.0		1	05/01/15	05/01/15 17:50	1011
Bromomethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
2-Butanone (MEK)	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Carbon Disulfide	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Carbon Tetrachloride	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Chlorobenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Chloroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Chloroform	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Chloromethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Cyclohexane	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
1,2-Dibromo-3-Chloropropane	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Dibromochloromethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,2-Dibromoethane (EDB)	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,2-Dichlorobenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,3-Dichlorobenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Dichlorodifluoromethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,4-Dichlorobenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,1-Dichloroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,2-Dichloroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,1-Dichloroethene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
cis-1,2-Dichloroethene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,2-Dichloropropane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
cis-1,3-Dichloropropene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
trans-1,3-Dichloropropene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
trans-1,2-Dichloroethene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Ethylbenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15042817

GeoConcepts Engineering, Inc., Ashburn, VA

May 5, 2015

Project Name: VRE Alexandria Station

Project Location: Alexandria, VA

Sample ID: GZ-7	Date/Time Sampled: 04/25/2015 08:30	PSS Sample ID: 15042817-001
Matrix: GROUND WATER	Date/Time Received: 04/28/2015 16:25	

TCL Volatile Organic Compounds

Analytical Method: SW-846 8260 B

Preparation Method: 5030B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2-Hexanone	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Isopropylbenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Methyl Acetate	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Methylcyclohexane	ND	ug/L	10		1	05/01/15	05/01/15 17:50	1011
Methylene Chloride	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
4-Methyl-2-Pentanone	ND	ug/L	5.0		1	05/01/15	05/01/15 17:50	1011
Methyl-t-butyl ether	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Naphthalene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Styrene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Tetrachloroethene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Toluene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,2,3-Trichlorobenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,2,4-Trichlorobenzene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,1,1-Trichloroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Trichloroethene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
1,1,2-Trichloroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Trichlorofluoromethane	ND	ug/L	5.0		1	05/01/15	05/01/15 17:50	1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
Vinyl Chloride	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011
m,p-Xylenes	ND	ug/L	2.0		1	05/01/15	05/01/15 17:50	1011
o-Xylene	ND	ug/L	1.0		1	05/01/15	05/01/15 17:50	1011



Case Narrative Summary

Client Name: GeoConcepts Engineering, Inc.

Project Name: VRE Alexandria Station

Work Order Number(s): 15042817

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

All sample receipt conditions were acceptable.

Analytical:

Total Petroleum Hydrocarbons-GRO

Batch: 122319

Surrogate exceedances identified; see surrogate summary form.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 15042817

Report Prepared For: GeoConcepts Engineering, Inc., Ashburn, VA

Project Name: VRE Alexandria Station

Project Manager: Josh April

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
EPA 300.0	GZ-7	Initial	15042817-001	1044	W	55223	122298	04/25/2015	04/29/2015 17:00	04/29/2015 19:26
	55223-1-BKS	BKS	55223-1-BKS	1044	W	55223	122298	-----	04/29/2015 16:00	04/29/2015 12:26
	55223-1-BLK	BLK	55223-1-BLK	1044	W	55223	122298	-----	04/29/2015 16:00	04/29/2015 12:03
	55223-1-BSD	BSD	55223-1-BSD	1044	W	55223	122298	-----	04/29/2015 16:00	04/29/2015 12:48
	Well S	MS	15042912-001 S	1044	W	55223	122298	04/29/2015	04/29/2015 16:00	04/29/2015 17:34
	55239-1-BKS	BKS	55239-1-BKS	1053	W	55239	122326	-----	04/30/2015 14:29	04/30/2015 13:17
	55239-1-BLK	BLK	55239-1-BLK	1053	W	55239	122326	-----	04/30/2015 14:29	04/30/2015 12:55
	55239-1-BSD	BSD	55239-1-BSD	1053	W	55239	122326	-----	04/30/2015 14:29	04/30/2015 13:40
	MW-15A S	MS	15043029-006 S	1053	W	55239	122326	04/30/2015	04/30/2015 16:27	04/30/2015 17:46
	GZ-7	Reanalysis	15042817-001	1044	W	55223	122326	04/25/2015	04/29/2015 17:00	04/30/2015 15:54
SW-846 6020 A	55211-1-BKS	BKS	55211-1-BKS	1033	W	55211	122269	-----	04/29/2015 08:00	04/29/2015 19:16
	55211-1-BLK	BLK	55211-1-BLK	1033	W	55211	122269	-----	04/29/2015 08:00	04/29/2015 19:10
	11412-B2-4/15 S	MS	15042709-002 S	1033	W	55211	122269	04/24/2015	04/29/2015 08:00	04/29/2015 19:28
	11412-B2-4/15 SD	MSD	15042709-002 SD	1033	W	55211	122269	04/24/2015	04/29/2015 08:00	04/29/2015 19:34
	GZ-7	Reanalysis	15042817-001	1033	W	55211	122314	04/25/2015	04/29/2015 08:00	04/30/2015 13:15
SW-846 8015 C	GZ-7	Initial	15042817-001	1055	W	55217	122257	04/25/2015	04/29/2015 10:59	04/29/2015 14:47
	55217-1-BKS	BKS	55217-1-BKS	1055	W	55217	122257	-----	04/29/2015 10:59	04/29/2015 12:10
	55217-1-BLK	BLK	55217-1-BLK	1055	W	55217	122257	-----	04/29/2015 10:59	04/29/2015 14:47
	55217-1-BSD	BSD	55217-1-BSD	1055	W	55217	122257	-----	04/29/2015 10:59	04/29/2015 12:41
SW-846 8015C	GZ-7	Initial	15042817-001	1035	W	55258	122319	04/25/2015	04/30/2015 11:58	04/30/2015 14:57
	55258-2-BKS	BKS	55258-2-BKS	1035	W	55258	122319	-----	04/30/2015 11:58	04/30/2015 15:49
	55258-2-BLK	BLK	55258-2-BLK	1035	W	55258	122319	-----	04/30/2015 11:58	04/30/2015 14:06
	GZ-7 S	MS	15042817-001 S	1035	W	55258	122319	04/25/2015	04/30/2015 11:58	05/01/2015 08:05
	GZ-7 SD	MSD	15042817-001 SD	1035	W	55258	122319	04/25/2015	04/30/2015 11:58	05/01/2015 08:30
SW-846 8260 B	GZ-7	Initial	15042817-001	1011	W	55266	122332	04/25/2015	05/01/2015 09:15	05/01/2015 17:50
	55266-1-BKS	BKS	55266-1-BKS	1011	W	55266	122332	-----	05/01/2015 09:15	05/01/2015 10:50
	55266-1-BLK	BLK	55266-1-BLK	1011	W	55266	122332	-----	05/01/2015 09:15	05/01/2015 11:59



Analytical Data Package Information Summary

Work Order(s): 15042817

Report Prepared For: GeoConcepts Engineering, Inc., Ashburn, VA

Project Name: VRE Alexandria Station

Project Manager: Josh April

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
SW-846 8260 B	GZ-7 S	MS	15042817-001 S	1011	W	55266	122332	04/25/2015	05/01/2015 09:15	05/01/2015 19:36
	GZ-7 SD	MSD	15042817-001 SD	1011	W	55266	122332	04/25/2015	05/01/2015 09:15	05/01/2015 20:11

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8015 C

Seq Number: 122257

PSS Sample ID: 15042817-001

Matrix: Ground Water

Prep Method: SW3510C

Date Prep: 04/29/2015

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	89		37-136	%	04/29/15 14:47

Analytical Method: SW-846 8015C

Seq Number: 122319

PSS Sample ID: 15042817-001

Matrix: Ground Water

Prep Method: SW5030B

Date Prep: 04/30/2015

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
a,a,a-Trifluorotoluene	65		65-111	%	04/30/15 14:57

Analytical Method: SW-846 8260 B

Seq Number: 122332

PSS Sample ID: 15042817-001

Matrix: Ground Water

Prep Method: SW5030B

Date Prep: 05/01/2015

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
4-Bromofluorobenzene	96		81-133	%	05/01/15 17:50
Dibromofluoromethane	105		84-110	%	05/01/15 17:50
Toluene-D8	102		94-109	%	05/01/15 17:50

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H = Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: EPA 300.0

Seq Number: 122298

MB Sample Id: 55223-1-BLK

Matrix: Water

LCS Sample Id: 55223-1-BKS

Prep Method: E300.0P

Date Prep: 04/29/15

LCSD Sample Id: 55223-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Sulfate	<5.000	50.00	48.15	96	49.06	98	90-110	2	20	mg/L	04/29/15 12:26	

Analytical Method: EPA 300.0

Seq Number: 122326

MB Sample Id: 55239-1-BLK

Matrix: Water

LCS Sample Id: 55239-1-BKS

Prep Method: E300.0P

Date Prep: 04/30/15

LCSD Sample Id: 55239-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.000	50.00	48.08	96	48.63	97	90-110	1	20	mg/L	04/30/15 13:17	

Analytical Method: SW-846 6020 A

Seq Number: 122269

MB Sample Id: 55211-1-BLK

Matrix: Water

LCS Sample Id: 55211-1-BKS

Prep Method: SW3010A

Date Prep: 04/29/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Magnesium	<100	400	400.8	100	80-120	ug/L	04/29/15 19:16	
Sodium	<100	400	451.1	113	80-120	ug/L	04/29/15 19:16	

Analytical Method: SW-846 8015 C

Seq Number: 122257

MB Sample Id: 55217-1-BLK

Matrix: Water

LCS Sample Id: 55217-1-BKS

Prep Method: SW3510C

Date Prep: 04/29/15

LCSD Sample Id: 55217-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-DRO (Diesel Range Organics)	<0.1000	1.000	1.023	102	1.021	102	61-119	0	20	mg/L	04/29/15 12:10	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date
o-Terphenyl	80		97		97		37-136	%	04/29/15 12:10

Analytical Method: SW-846 8015C

Seq Number: 122319

MB Sample Id: 55258-2-BLK

Matrix: Water

LCS Sample Id: 55258-2-BKS

Prep Method: SW5030B

Date Prep: 04/30/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
TPH-GRO (Gasoline Range Organic)	<100	5000	4631	93	61-138	ug/L	04/30/15 15:49	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	Limits	Units	Analysis Date
a,a,a-Trifluorotoluene	65		64	*	65-111	%	04/30/15 15:49

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8015C

Seq Number: 122319

Parent Sample Id: 15042817-001

Matrix: Ground Water

MS Sample Id: 15042817-001 S

Prep Method: SW5030B

Date Prep: 04/30/15

MSD Sample Id: 15042817-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-GRO (Gasoline Range Organic:	<100	5000	3726	75	3720	74	58-136	0	25	ug/L	05/01/15 08:05	
Surrogate			MS Result	MS Flag	MSD Result	MSD Flag	Limits			Units	Analysis Date	
a,a,a-Trifluorotoluene			68		69		65-111			%	05/01/15 08:05	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122332

MB Sample Id: 55266-1-BLK

Matrix: Water

LCS Sample Id: 55266-1-BKS

Prep Method: SW5030B

Date Prep: 05/01/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Acetone	<10.00	50.00	35.46	71	53-146	ug/L	05/01/15 10:50	
Benzene	<1.000	50.00	55.46	111	77-122	ug/L	05/01/15 10:50	
Bromochloromethane	<1.000	50.00	51.83	104	71-122	ug/L	05/01/15 10:50	
Bromodichloromethane	<1.000	50.00	55.78	112	76-122	ug/L	05/01/15 10:50	
Bromoform	<5.000	50.00	46.07	92	69-115	ug/L	05/01/15 10:50	
Bromomethane	<1.000	50.00	51.42	103	40-147	ug/L	05/01/15 10:50	
2-Butanone (MEK)	<10.00	50.00	38.56	77	56-133	ug/L	05/01/15 10:50	
Carbon Disulfide	<10.00	50.00	53.84	108	62-134	ug/L	05/01/15 10:50	
Carbon Tetrachloride	<1.000	50.00	53.25	107	74-127	ug/L	05/01/15 10:50	
Chlorobenzene	<1.000	50.00	52.40	105	76-116	ug/L	05/01/15 10:50	
Chloroethane	<1.000	50.00	46.82	94	59-132	ug/L	05/01/15 10:50	
Chloroform	<1.000	50.00	52.42	105	71-118	ug/L	05/01/15 10:50	
Chloromethane	<1.000	50.00	45.30	91	62-131	ug/L	05/01/15 10:50	
Cyclohexane	<10.00	50.00	51.33	103	46-150	ug/L	05/01/15 10:50	
1,2-Dibromo-3-Chloropropane	<10.00	50.00	39.88	80	59-135	ug/L	05/01/15 10:50	
Dibromochloromethane	<1.000	50.00	46.24	92	75-114	ug/L	05/01/15 10:50	
1,2-Dibromoethane (EDB)	<1.000	50.00	48.62	97	78-121	ug/L	05/01/15 10:50	
1,2-Dichlorobenzene	<1.000	50.00	52.33	105	80-122	ug/L	05/01/15 10:50	
1,3-Dichlorobenzene	<1.000	50.00	52.58	105	80-122	ug/L	05/01/15 10:50	
1,4-Dichlorobenzene	<1.000	50.00	51.95	104	77-118	ug/L	05/01/15 10:50	
Dichlorodifluoromethane	<1.000	50.00	55.29	111	54-139	ug/L	05/01/15 10:50	
1,1-Dichloroethane	<1.000	50.00	50.56	101	51-136	ug/L	05/01/15 10:50	
1,2-Dichloroethane	<1.000	50.00	51.26	103	64-130	ug/L	05/01/15 10:50	
1,1-Dichloroethene	<1.000	50.00	51.35	103	59-123	ug/L	05/01/15 10:50	
cis-1,2-Dichloroethene	<1.000	50.00	53.68	107	77-119	ug/L	05/01/15 10:50	
1,2-Dichloropropane	<1.000	50.00	50.92	102	75-125	ug/L	05/01/15 10:50	
cis-1,3-Dichloropropene	<1.000	50.00	52.74	105	74-123	ug/L	05/01/15 10:50	
trans-1,3-Dichloropropene	<1.000	50.00	53.47	107	73-116	ug/L	05/01/15 10:50	
trans-1,2-Dichloroethene	<1.000	50.00	53.53	107	58-134	ug/L	05/01/15 10:50	
Ethylbenzene	<1.000	50.00	52.92	106	79-122	ug/L	05/01/15 10:50	
2-Hexanone	<10.00	50.00	36.74	73	56-134	ug/L	05/01/15 10:50	
Isopropylbenzene	<1.000	50.00	53.03	106	80-128	ug/L	05/01/15 10:50	
Methyl Acetate	<10.00	50.00	38.87	78	47-145	ug/L	05/01/15 10:50	
Methylcyclohexane	<10.00	50.00	55.72	111	61-155	ug/L	05/01/15 10:50	
Methylene Chloride	<1.000	50.00	46.29	93	61-126	ug/L	05/01/15 10:50	
4-Methyl-2-Pentanone	<5.000	50.00	41.60	83	45-145	ug/L	05/01/15 10:50	
Methyl-t-butyl ether	<1.000	50.00	35.94	72	30-168	ug/L	05/01/15 10:50	
Naphthalene	<1.000	50.00	36.64	73	46-154	ug/L	05/01/15 10:50	
Styrene	<1.000	50.00	52.56	105	73-118	ug/L	05/01/15 10:50	
1,1,2,2-Tetrachloroethane	<1.000	50.00	46.04	92	71-126	ug/L	05/01/15 10:50	
Tetrachloroethene	<1.000	50.00	55.39	111	78-113	ug/L	05/01/15 10:50	
Toluene	<1.000	50.00	55.65	111	77-123	ug/L	05/01/15 10:50	
1,2,3-Trichlorobenzene	<1.000	50.00	45.94	92	66-140	ug/L	05/01/15 10:50	
1,2,4-Trichlorobenzene	<1.000	50.00	49.34	99	72-143	ug/L	05/01/15 10:50	
1,1,1-Trichloroethane	<1.000	50.00	54.03	108	66-133	ug/L	05/01/15 10:50	
1,1,2-Trichloroethane	<1.000	50.00	52.14	104	72-128	ug/L	05/01/15 10:50	
Trichloroethene	<1.000	50.00	54.74	109	72-127	ug/L	05/01/15 10:50	
Trichlorofluoromethane	<5.000	50.00	60.30	121	45-130	ug/L	05/01/15 10:50	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<1.000	50.00	52.55	105	56-126	ug/L	05/01/15 10:50	
Vinyl Chloride	<1.000	50.00	49.76	100	64-132	ug/L	05/01/15 10:50	
m,p-Xylenes	<2.000	100	106.4	106	78-119	ug/L	05/01/15 10:50	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122332

MB Sample Id: 55266-1-BLK

Matrix: Water

LCS Sample Id: 55266-1-BKS

Prep Method: SW5030B

Date Prep: 05/01/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
o-Xylene	<1.000	50.00	53.71	107	79-123	ug/L	05/01/15 10:50	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	Limits	Units	Analysis Date
4-Bromofluorobenzene	97		95		81-133	%	05/01/15 10:50
Dibromofluoromethane	103		103		84-110	%	05/01/15 10:50
Toluene-D8	100		103		94-109	%	05/01/15 10:50

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122332

Parent Sample Id: 15042817-001

Matrix: Ground Water

MS Sample Id: 15042817-001 S

Prep Method: SW5030B

Date Prep: 05/01/15

MSD Sample Id: 15042817-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Acetone	<10.00	50.00	55.43	111	54.45	109	41-161	2	25	ug/L	05/01/15 19:36	
Benzene	<1.000	50.00	57.15	114	56.62	113	75-132	1	25	ug/L	05/01/15 19:36	
Bromochloromethane	<1.000	50.00	53.14	106	52.18	104	67-130	2	25	ug/L	05/01/15 19:36	
Bromodichloromethane	<1.000	50.00	54.00	108	53.55	107	69-134	1	25	ug/L	05/01/15 19:36	
Bromoform	<5.000	50.00	47.82	96	46.68	93	65-115	2	25	ug/L	05/01/15 19:36	
Bromomethane	<1.000	50.00	51.45	103	53.98	108	29-154	5	25	ug/L	05/01/15 19:36	
2-Butanone (MEK)	<10.00	50.00	48.60	97	46.90	94	47-140	4	25	ug/L	05/01/15 19:36	
Carbon Disulfide	<10.00	50.00	52.28	105	51.99	104	59-146	1	25	ug/L	05/01/15 19:36	
Carbon Tetrachloride	<1.000	50.00	53.71	107	53.19	106	74-136	1	25	ug/L	05/01/15 19:36	
Chlorobenzene	<1.000	50.00	53.55	107	52.92	106	78-115	1	25	ug/L	05/01/15 19:36	
Chloroethane	<1.000	50.00	50.02	100	51.43	103	40-150	3	25	ug/L	05/01/15 19:36	
Chloroform	<1.000	50.00	52.49	105	51.63	103	67-130	2	25	ug/L	05/01/15 19:36	
Chloromethane	<1.000	50.00	46.16	92	46.28	93	59-144	0	25	ug/L	05/01/15 19:36	
Cyclohexane	<10.00	50.00	55.66	111	54.53	109	34-161	2	25	ug/L	05/01/15 19:36	
1,2-Dibromo-3-Chloropropane	<10.00	50.00	43.73	87	41.02	82	45-125	6	25	ug/L	05/01/15 19:36	
Dibromochloromethane	<1.000	50.00	47.49	95	46.46	93	73-114	2	25	ug/L	05/01/15 19:36	
1,2-Dibromoethane (EDB)	<1.000	50.00	51.09	102	49.42	99	72-126	3	25	ug/L	05/01/15 19:36	
1,2-Dichlorobenzene	<1.000	50.00	54.08	108	52.47	105	73-117	3	25	ug/L	05/01/15 19:36	
1,3-Dichlorobenzene	<1.000	50.00	53.04	106	52.62	105	73-117	1	25	ug/L	05/01/15 19:36	
1,4-Dichlorobenzene	<1.000	50.00	52.34	105	51.57	103	72-111	1	25	ug/L	05/01/15 19:36	
Dichlorodifluoromethane	<1.000	50.00	52.73	105	52.38	105	47-159	1	25	ug/L	05/01/15 19:36	
1,1-Dichloroethane	<1.000	50.00	52.28	105	51.92	104	44-152	1	25	ug/L	05/01/15 19:36	
1,2-Dichloroethane	<1.000	50.00	52.27	105	50.91	102	60-142	3	25	ug/L	05/01/15 19:36	
1,1-Dichloroethene	<1.000	50.00	54.93	110	53.23	106	50-136	3	25	ug/L	05/01/15 19:36	
cis-1,2-Dichloroethene	<1.000	50.00	55.08	110	54.73	109	76-127	1	25	ug/L	05/01/15 19:36	
1,2-Dichloropropane	<1.000	50.00	52.26	105	51.47	103	70-139	2	25	ug/L	05/01/15 19:36	
cis-1,3-Dichloropropene	<1.000	50.00	51.77	104	50.98	102	64-127	2	25	ug/L	05/01/15 19:36	
trans-1,3-Dichloropropene	<1.000	50.00	51.71	103	50.45	101	62-123	2	25	ug/L	05/01/15 19:36	
trans-1,2-Dichloroethene	<1.000	50.00	55.77	112	55.39	111	54-144	1	25	ug/L	05/01/15 19:36	
Ethylbenzene	<1.000	50.00	53.72	107	53.53	107	74-129	0	25	ug/L	05/01/15 19:36	
2-Hexanone	<10.00	50.00	44.03	88	42.03	84	50-130	5	25	ug/L	05/01/15 19:36	
Isopropylbenzene	<1.000	50.00	55.89	112	54.00	108	72-130	3	25	ug/L	05/01/15 19:36	
Methyl Acetate	<10.00	50.00	40.57	81	38.55	77	37-143	5	25	ug/L	05/01/15 19:36	
Methylcyclohexane	<10.00	50.00	57.49	115	57.40	115	55-148	0	25	ug/L	05/01/15 19:36	
Methylene Chloride	<1.000	50.00	47.07	94	45.96	92	56-137	2	25	ug/L	05/01/15 19:36	
4-Methyl-2-Pentanone	<5.000	50.00	47.22	94	41.48	83	44-133	13	25	ug/L	05/01/15 19:36	
Methyl-t-butyl ether	<1.000	50.00	41.09	82	39.72	79	22-182	3	25	ug/L	05/01/15 19:36	
Naphthalene	<1.000	50.00	41.46	83	38.34	77	7-137	8	25	ug/L	05/01/15 19:36	
Styrene	<1.000	50.00	54.19	108	53.01	106	67-121	2	25	ug/L	05/01/15 19:36	
1,1,2,2-Tetrachloroethane	<1.000	50.00	50.11	100	48.14	96	68-127	4	25	ug/L	05/01/15 19:36	
Tetrachloroethene	<1.000	50.00	53.40	107	52.67	105	69-126	1	25	ug/L	05/01/15 19:36	
Toluene	<1.000	50.00	55.21	110	54.55	109	74-132	1	25	ug/L	05/01/15 19:36	
1,2,3-Trichlorobenzene	<1.000	50.00	45.32	91	44.99	90	9-139	1	25	ug/L	05/01/15 19:36	
1,2,4-Trichlorobenzene	<1.000	50.00	49.08	98	48.29	97	31-135	2	25	ug/L	05/01/15 19:36	
1,1,1-Trichloroethane	<1.000	50.00	56.21	112	56.26	113	70-138	0	25	ug/L	05/01/15 19:36	
1,1,2-Trichloroethane	<1.000	50.00	51.71	103	50.11	100	65-143	3	25	ug/L	05/01/15 19:36	
Trichloroethene	<1.000	50.00	54.59	109	54.15	108	67-139	1	25	ug/L	05/01/15 19:36	
Trichlorofluoromethane	<5.000	50.00	60.15	120	59.77	120	37-147	1	25	ug/L	05/01/15 19:36	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<1.000	50.00	55.42	111	53.62	107	47-139	3	25	ug/L	05/01/15 19:36	
Vinyl Chloride	<1.000	50.00	53.90	108	54.38	109	60-146	1	25	ug/L	05/01/15 19:36	
m,p-Xylenes	<2.000	100	107	107	106.4	106	78-119	1	25	ug/L	05/01/15 19:36	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042817

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122332

Parent Sample Id: 15042817-001

Matrix: Ground Water

MS Sample Id: 15042817-001 S

Prep Method: SW5030B

Date Prep: 05/01/15

MSD Sample Id: 15042817-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
o-Xylene	<1.000	50.00	55.30	111	54.28	109	80-123	2	25	ug/L	05/01/15 19:36	

Surrogate

	MS Result	MS Flag	MSD Result	MSD Flag	Limits	Units	Analysis Date
4-Bromofluorobenzene	97		96		81-133	%	05/01/15 19:36
Dibromofluoromethane	103		101		84-110	%	05/01/15 19:36
Toluene-D8	100		100		94-109	%	05/01/15 19:36

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

[illegible]

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	15042817	Received By	Rachel Davis
Client Name	GeoConcepts Engineering, Inc.	Date Received	04/28/2015 04:25:00 PM
Project Name	VRE Alexandria Station	Delivered By	Client
Disposal Date	06/02/2015	Tracking No	Not Applicable
		Logged In By	Rachel Davis

Shipping Container(s)

No. of Coolers 1

		Ice	Present
Custody Seal(s) Intact?	N/A	Temp (deg C)	4
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	<u>LB</u>
Chain of Custody	Yes	MD DW Cert. No.	<u>N/A</u>

Sample Container

Appropriate for Specified Analysis?	Yes	Custody Seal(s) Intact?	Not Applicable
Intact?	Yes	Seal(s) Signed / Dated	Not Applicable
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 1

Total No. of Containers Received 12

Preservation

Metals	(pH<2)	Yes
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	Yes
Do VOA vials have zero headspace?		Yes
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By:

Rachel Davis

Rachel Davis

Date: 04/28/2015

PM Review and Approval:

NJ Jackson

Lynn Jackson

Date: 04/29/2015

6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

PHASE SEPARATION SCIENCE, INC.



04/29/2015

Josh April
GeoConcepts Engineering, Inc.
19955 Highland Vista Dr.
Ashburn, VA 20147

Please find the attached Confirmation of Sample Receipt for samples received by Phase Separation Science (PSS) on 04/28/2015. The samples have been logged in for a 5 Days turnaround with results due 05/05/2015. The following is our understanding of your project requirements as described on the enclosed chain of custody form. Reissuing final reports due to changes to any of the conditions listed in this confirmation of sample receipt may be subject to additional fees. To ensure that your needs are met, please take a moment to verify that:

1. The number and type of samples received are correct.
2. The Client Sample ID is correct.
3. The analytical methods specified are correct.
4. Due dates for analytical results are correct.
5. Address, phone and fax information are correct.

PSS reserves the right to return any unused samples, extracts or related solutions that have been identified as hazardous waste, are controlled substances under regulated protocols or have sample sizes exceeding standard analytical practices.

If there are any questions, please do not hesitate to contact the laboratory at (410) 747-8770 and reference laboratory identification number **15042817**



Phase Separation Science, Inc

Confirmation of Sample Receipt

The following samples were received on 04/28/2015 at 16:25 and will be analyzed as follows:

Work Order#: # 15042817

Client: GeoConcepts Engineering, Inc.

Lab PM: Simon Crisp

Project ID: N/A

Project Name: VRE Alexandria Station

Location: Alexandria, VA

Turnaround: 5 Days

Results Due: 05/05/2015 at 17:00

Report to: Josh April

EDD Type: PSS_EXCEL_CAS

Data Package: COA due 05/05/15

Regulation: No Flags

Sample Disposal Date: 06/02/2015

Client Sample ID	Lab ID	Method Name (Analysis) / Method	Mtx	Sampled
GZ-7	15042817-001	Inorganic Anions (2) / E300.0	Ground Water	04/25/15 08:30
GZ-7	15042817-001	On Hold / ON_HOLD	Ground Water	04/25/15 08:30
GZ-7	15042817-001	TCL Volatile Organic Compounds / SW8260B	Ground Water	04/25/15 08:30
GZ-7	15042817-001	Total Metals (2) / SW6020	Ground Water	04/25/15 08:30
GZ-7	15042817-001	Total Petroleum Hydrocarbons - DRO / SW8015DRO	Ground Water	04/25/15 08:30
GZ-7	15042817-001	Total Petroleum Hydrocarbons-GRO / SW8021B_SW8015	Ground Water	04/25/15 08:30

Special Instructions:

These samples are scheduled for disposal, without any further notice, on the date stated above. This includes any samples that were received with a request to be held, but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date, if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period. Each sample which is retained will incur a sample storage fee of \$5.00 per month.

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com

email: info@phaseonline.com

[illegible]

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	15042817	Received By	Rachel Davis
Client Name	GeoConcepts Engineering, Inc.	Date Received	04/28/2015 04:25:00 PM
Project Name	VRE Alexandria Station	Delivered By	Client
Disposal Date	06/02/2015	Tracking No	Not Applicable
		Logged In By	Rachel Davis

Shipping Container(s)

No. of Coolers 1

		Ice	Present
Custody Seal(s) Intact?	N/A	Temp (deg C)	4
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	<u>LB</u>
Chain of Custody	Yes	MD DW Cert. No.	<u>N/A</u>

Sample Container

Appropriate for Specified Analysis?	Yes	Custody Seal(s) Intact?	Not Applicable
Intact?	Yes	Seal(s) Signed / Dated	Not Applicable
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 1

Total No. of Containers Received 12

Preservation

Metals	(pH<2)	Yes
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	Yes
Do VOA vials have zero headspace?		Yes
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Samples Inspected/Checklist Completed By:

Rachel Davis

Rachel Davis

Date: 04/28/2015

PM Review and Approval:

NJ Jackson

Lynn Jackson

Date: 04/29/2015

Analytical Report for
GeoConcepts Engineering, Inc.
Certificate of Analysis No.: 15042020

Project Manager: Josh April
Project Name : VRE Alexandria Station
Project Location: Alexandria, VA



April 27, 2015
Phase Separation Science, Inc.
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PHASE SEPARATION SCIENCE, INC.



April 27, 2015

Josh April
GeoConcepts Engineering, Inc.
19955 Highland Vista Dr.
Ashburn, VA 20147

Reference: PSS Work Order(s) No: **15042020**
Project Name: VRE Alexandria Station
Project Location: Alexandria, VA

Dear Josh April :

This report includes the analytical results from the analyses performed on the samples received under the project name referenced above and identified with the Phase Separation Science (PSS) Work Order(s) numbered **15042020**.

All work reported herein has been performed in accordance with current NELAP standards, referenced methodologies, PSS Standard Operating Procedures and the PSS Quality Assurance Manual unless otherwise noted in the Case Narrative Summary. PSS is limited in liability to the actual cost of the sample analysis done.

PSS reserves the right to return any unused samples, extracts or related solutions. Otherwise, the samples are scheduled for disposal, without any further notice, on May 25, 2015. This includes any samples that were received with a request to be held but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period.

This report shall not be reproduced except in full, without the written approval of an authorized PSS representative. A copy of this report will be retained by PSS for at least 5 years, after which time it will be disposed of without further notice, unless prior arrangements have been made.

We thank you for selecting Phase Separation Science, Inc. to serve your analytical needs. If you have any questions concerning this report, do not hesitate to contact us at 410-747-8770 or info@phaseonline.com.

Sincerely,

Dan Prucnal

Laboratory Manager



Sample Summary

Client Name: GeoConcepts Engineering, Inc.

Project Name: VRE Alexandria Station

Work Order Number(s): 15042020

The following samples were received under chain of custody by Phase Separation Science (PSS) on 04/20/2015 at 03:45 pm

Lab Sample Id	Sample Id	Matrix	Date/Time Collected
15042020-001	GZ-9	GROUND WATER	04/19/15 09:45

Please reference the Chain of Custody and Sample Receipt Checklist for specific container counts and preservatives. Any sample conditions not in compliance with sample acceptance criteria are described in Case Narrative Summary.

Notes:

1. The presence of a common laboratory contaminant such as methylene chloride may be considered a possible laboratory artifact. Where observed, appropriate consideration of data should be taken.
2. Unless otherwise noted in the case narrative, results are reported on a dry weight basis with the exception of pH, flashpoint, moisture, and paint filter test.
3. Drinking water samples collected for the purpose of compliance with SDWA may not be suitable for their intended use unless collected by a certified sampler [COMAR 26.08.05.07.C.2].
4. The analyses of 1,2-dibromo-3-chloropropane (DBCP) and 1,2-dibromoethane (EDB) by EPA 524.2 and calcium, magnesium, sodium and iron by EPA 200.8 are not currently promulgated for use in testing to meet the Safe Drinking Water Act and as such cannot be used for compliance purposes. The listings of the current promulgated methods for testing in compliance with the Safe Drinking Water Act can be found in the 40 CFR part 141.1, for the primary drinking water contaminants, and part 141.3, for the secondary drinking water contaminants.
5. Sample prepared under EPA 3550C with concentrations greater than 20 mg/Kg should employ the microtip extraction procedure if required to meet data quality objectives.
6. The analysis of acrolein by EPA 624 must be analyzed within three days of sampling unless pH is adjusted to 4-5 units [40 CFR part 136.3(e)].
7. Method 180.1, The Determination of Turbidity by Nephelometry, recommends samples over 40 NTU be diluted until the turbidity falls below 40 units. Routine samples over 40 NTU may not be diluted as long as the data quality objectives are not affected.
8. Alkalinity results analyzed by EPA 310.2 that are reported by dilution are estimated and are not in compliance with method requirements.

Standard Flags/Abbreviations:

- B A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- C Results Pending Final Confirmation.
- E The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- Fail The result exceeds the regulatory level for Toxicity Characteristic (TCLP) as cited in 40 CFR 261.24 Table 1.
- J The target analyte was positively identified below the reporting limit but greater than the MDL.
- MDL This is the Laboratory Method Detection Limit which is equivalent to the Limit of Detection (LOD). The LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. This value will remain constant across multiple similar instrumentation and among different analysts. An LOD is analyte and matrix specific.
- ND Not Detected at or above the reporting limit.
- RL PSS Reporting Limit.
- U Not detected.

Certifications:

NELAP Certifications: PA 68-03330, VA 460156
State Certifications: MD 179, WV 303
Regulated Soil Permit: P330-12-00268
NSWC USCG Accepted Laboratory
LDBE MWAA LD1997-0041-2015

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15042020

GeoConcepts Engineering, Inc., Ashburn, VA

April 27, 2015

Project Name: VRE Alexandria Station

Project Location: Alexandria, VA

Sample ID: GZ-9	Date/Time Sampled: 04/19/2015 09:45	PSS Sample ID: 15042020-001
Matrix: GROUND WATER	Date/Time Received: 04/20/2015 15:45	

Inorganic Anions

Analytical Method: EPA 300.0

Preparation Method: E300.0P

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Chloride	180	mg/L	5.0		1	04/22/15	04/22/15 16:41	1044
Sulfate	20	mg/L	5.0		1	04/22/15	04/22/15 16:41	1044

Total Metals

Analytical Method: SW-846 6020 A

Preparation Method: 3010A

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Magnesium	55,000	ug/L	10,000		100	04/21/15	04/22/15 13:05	1034
Sodium	68,000	ug/L	10,000		100	04/21/15	04/22/15 13:05	1034

Total Petroleum Hydrocarbons - DRO

Analytical Method: SW-846 8015 C

Preparation Method: 3510C

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-DRO (Diesel Range Organics)	ND	mg/L	0.10		1	04/23/15	04/24/15 01:35	1055

Total Petroleum Hydrocarbons-GRO

Analytical Method: SW-846 8015C

Preparation Method: 5030B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
TPH-GRO (Gasoline Range Organics)	ND	ug/L	100		1	04/21/15	04/21/15 11:13	1035

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15042020

GeoConcepts Engineering, Inc., Ashburn, VA

April 27, 2015

Project Name: VRE Alexandria Station

Project Location: Alexandria, VA

Sample ID: GZ-9	Date/Time Sampled: 04/19/2015 09:45	PSS Sample ID: 15042020-001
Matrix: GROUND WATER	Date/Time Received: 04/20/2015 15:45	

TCL Volatile Organic Compounds

Analytical Method: SW-846 8260 B

Preparation Method: 5030B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
Acetone	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Benzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Bromochloromethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Bromodichloromethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Bromoform	ND	ug/L	5.0		1	04/22/15	04/22/15 12:20	1011
Bromomethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
2-Butanone (MEK)	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Carbon Disulfide	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Carbon Tetrachloride	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Chlorobenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Chloroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Chloroform	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Chloromethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Cyclohexane	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
1,2-Dibromo-3-Chloropropane	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Dibromochloromethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,2-Dibromoethane (EDB)	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,2-Dichlorobenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,3-Dichlorobenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Dichlorodifluoromethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,4-Dichlorobenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,1-Dichloroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,2-Dichloroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
cis-1,2-Dichloroethene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,1-Dichloroethene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,2-Dichloropropane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
cis-1,3-Dichloropropene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
trans-1,3-Dichloropropene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
trans-1,2-Dichloroethene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Ethylbenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011

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PHASE SEPARATION SCIENCE, INC.



CERTIFICATE OF ANALYSIS

No: 15042020

GeoConcepts Engineering, Inc., Ashburn, VA

April 27, 2015

Project Name: VRE Alexandria Station

Project Location: Alexandria, VA

Sample ID: GZ-9	Date/Time Sampled: 04/19/2015 09:45	PSS Sample ID: 15042020-001
Matrix: GROUND WATER	Date/Time Received: 04/20/2015 15:45	

TCL Volatile Organic Compounds

Analytical Method: SW-846 8260 B

Preparation Method: 5030B

	Result	Units	RL	Flag	Dil	Prepared	Analyzed	Analyst
2-Hexanone	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Isopropylbenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Methyl Acetate	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Methylcyclohexane	ND	ug/L	10		1	04/22/15	04/22/15 12:20	1011
Methylene Chloride	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
4-Methyl-2-Pentanone	ND	ug/L	5.0		1	04/22/15	04/22/15 12:20	1011
Methyl-t-butyl ether	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Naphthalene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Styrene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Tetrachloroethene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Toluene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,2,3-Trichlorobenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,2,4-Trichlorobenzene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,1,1-Trichloroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
1,1,2-Trichloroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Trichloroethene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Trichlorofluoromethane	ND	ug/L	5.0		1	04/22/15	04/22/15 12:20	1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
Vinyl Chloride	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011
m,p-Xylenes	ND	ug/L	2.0		1	04/22/15	04/22/15 12:20	1011
o-Xylene	ND	ug/L	1.0		1	04/22/15	04/22/15 12:20	1011



Case Narrative Summary

Client Name: GeoConcepts Engineering, Inc.

Project Name: VRE Alexandria Station

Work Order Number(s): 15042020

Any holding time exceedances, deviations from the method specifications, regulatory requirements or variations to the procedures outlined in the PSS Quality Assurance Manual are outlined below.

The analyses of chlorine, pH, dissolved oxygen, temperature and sulfite for drinking water and non-potable samples tested for compliance have a maximum holding time of 15 minutes. As such, all laboratory analyses for these analytes exceed holding times.

Matrix spike and matrix spike duplicate analyses may not be performed due to insufficient sample quantity. In these instances, a laboratory control sample and laboratory control sample duplicate are analyzed unless otherwise noted or specified in the method.

Sample Receipt:

Preserved metals container upon receipt with HNO₃.

Analytical:

Total Petroleum Hydrocarbons - DRO

Batch: 122124

The Method Blank extracted and analyzed with this batch showed a recovery for DRO above the reporting limit.

NELAP accreditation was held for all analyses performed unless noted below. See www.phaseonline.com for complete PSS scope of accreditation.



Analytical Data Package Information Summary

Work Order(s): 15042020

Report Prepared For: GeoConcepts Engineering, Inc., Ashburn, VA

Project Name: VRE Alexandria Station

Project Manager: Josh April

Method	Client Sample Id	Analysis Type	Lab Sample Id	Analyst	Mtx	Prep Batch	Analytical Batch	Sampled	Prepared	Analyzed
EPA 300.0	GZ-9	Initial	15042020-001	1044	W	55113	122080	04/19/2015	04/22/2015 17:09	04/22/2015 16:41
	55113-1-BKS	BKS	55113-1-BKS	1044	W	55113	122080	-----	04/22/2015 17:09	04/22/2015 15:34
	55113-1-BLK	BLK	55113-1-BLK	1044	W	55113	122080	-----	04/22/2015 17:09	04/22/2015 14:51
	55113-1-BSD	BSD	55113-1-BSD	1044	W	55113	122080	-----	04/22/2015 17:09	04/22/2015 15:56
	GZ-9 S	MS	15042020-001 S	1044	W	55113	122080	04/19/2015	04/22/2015 17:09	04/22/2015 17:03
	MW-1A S	MS	15042227-002 S	1044	W	55113	122080	04/21/2015	04/22/2015 17:09	04/23/2015 00:31
SW-846 6020 A	55080-1-BKS	BKS	55080-1-BKS	1034	W	55080	121994	-----	04/21/2015 08:44	04/21/2015 13:09
	55080-1-BLK	BLK	55080-1-BLK	1034	W	55080	121994	-----	04/21/2015 08:44	04/21/2015 13:03
	EB-041615 S	MS	15041710-014 S	1034	W	55080	121994	04/16/2015	04/21/2015 08:44	04/21/2015 13:21
	EB-041615 SD	MSD	15041710-014 SD	1034	W	55080	121994	04/16/2015	04/21/2015 08:44	04/21/2015 13:27
	GZ-9	Reanalysis	15042020-001	1034	W	55080	122045	04/19/2015	04/21/2015 08:44	04/22/2015 13:05
SW-846 8015 C	GZ-9	Initial	15042020-001	1055	W	55122	122124	04/19/2015	04/23/2015 11:44	04/24/2015 01:35
	55122-1-BKS	BKS	55122-1-BKS	1055	W	55122	122124	-----	04/23/2015 11:44	04/24/2015 00:02
	55122-1-BLK	BLK	55122-1-BLK	1055	W	55122	122124	-----	04/23/2015 11:44	04/23/2015 23:30
	55122-1-BSD	BSD	55122-1-BSD	1055	W	55122	122124	-----	04/23/2015 11:44	04/24/2015 00:33
SW-846 8015C	GZ-9	Initial	15042020-001	1035	W	55102	122009	04/19/2015	04/21/2015 08:32	04/21/2015 11:13
	55102-2-BKS	BKS	55102-2-BKS	1035	W	55102	122009	-----	04/21/2015 08:32	04/21/2015 10:21
	55102-2-BLK	BLK	55102-2-BLK	1035	W	55102	122009	-----	04/21/2015 08:32	04/21/2015 09:56
	GZ-9 S	MS	15042020-001 S	1035	W	55102	122009	04/19/2015	04/21/2015 08:32	04/21/2015 11:39
	GZ-9 SD	MSD	15042020-001 SD	1035	W	55102	122009	04/19/2015	04/21/2015 08:32	04/21/2015 12:05
SW-846 8260 B	GZ-9	Initial	15042020-001	1011	W	55118	122062	04/19/2015	04/22/2015 08:30	04/22/2015 12:20
	55118-1-BKS	BKS	55118-1-BKS	1011	W	55118	122062	-----	04/22/2015 08:30	04/22/2015 10:04
	55118-1-BLK	BLK	55118-1-BLK	1011	W	55118	122062	-----	04/22/2015 08:30	04/22/2015 11:14
	GZ-9 S	MS	15042020-001 S	1011	W	55118	122062	04/19/2015	04/22/2015 08:30	04/22/2015 13:33
	GZ-9 SD	MSD	15042020-001 SD	1011	W	55118	122062	04/19/2015	04/22/2015 08:30	04/22/2015 14:08

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8015 C

Seq Number: 122124

PSS Sample ID: 15042020-001

Matrix: Ground Water

Prep Method: SW3510C

Date Prep: 04/23/2015

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
o-Terphenyl	91		37-136	%	04/24/15 01:35

Analytical Method: SW-846 8015C

Seq Number: 122009

PSS Sample ID: 15042020-001

Matrix: Ground Water

Prep Method: SW5030B

Date Prep: 04/21/2015

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
a,a,a-Trifluorotoluene	76		65-111	%	04/21/15 11:13

Analytical Method: SW-846 8260 B

Seq Number: 122062

PSS Sample ID: 15042020-001

Matrix: Ground Water

Prep Method: SW5030B

Date Prep: 04/22/2015

Surrogate	%Rec	Flag	Limits	Units	Analysis Date
4-Bromofluorobenzene	97		81-133	%	04/22/15 12:20
Dibromofluoromethane	103		84-110	%	04/22/15 12:20
Toluene-D8	99		94-109	%	04/22/15 12:20

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: EPA 300.0

Seq Number: 122080

MB Sample Id: 55113-1-BLK

Matrix: Water

LCS Sample Id: 55113-1-BKS

Prep Method: E300.0P

Date Prep: 04/22/15

LCSD Sample Id: 55113-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Chloride	<5.000	50.00	47.53	95	47.87	96	90-110	1	20	mg/L	04/22/15 15:34	
Sulfate	<5.000	50.00	48.55	97	48.94	98	90-110	1	20	mg/L	04/22/15 15:34	

Analytical Method: EPA 300.0

Seq Number: 122080

Parent Sample Id: 15042020-001

Matrix: Ground Water

MS Sample Id: 15042020-001 S

Prep Method: E300.0P

Date Prep: 04/22/15

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	Limits	Units	Analysis Date	Flag
Chloride	175.1	50.00	226.2	102	66-126	mg/L	04/22/15 17:03	
Sulfate	20.36	50.00	71.39	102	72-123	mg/L	04/22/15 17:03	

Analytical Method: SW-846 6020 A

Seq Number: 121994

MB Sample Id: 55080-1-BLK

Matrix: Water

LCS Sample Id: 55080-1-BKS

Prep Method: SW3010A

Date Prep: 04/21/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Magnesium	<100	400	420.8	105	80-120	ug/L	04/21/15 13:09	
Sodium	<100	400	448.2	112	80-120	ug/L	04/21/15 13:09	

Analytical Method: SW-846 8015 C

Seq Number: 122124

MB Sample Id: 55122-1-BLK

Matrix: Water

LCS Sample Id: 55122-1-BKS

Prep Method: SW3510C

Date Prep: 04/23/15

LCSD Sample Id: 55122-1-BSD

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-DRO (Diesel Range Organics)	0.1075	1.000	1.129	113	1.159	116	61-119	3	20	mg/L	04/24/15 00:02	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	LCSD Result	LCSD Flag	Limits	Units	Analysis Date	Flag		
o-Terphenyl	87		82		86		37-136	%	04/24/15 00:02			

Analytical Method: SW-846 8015C

Seq Number: 122009

MB Sample Id: 55102-2-BLK

Matrix: Water

LCS Sample Id: 55102-2-BKS

Prep Method: SW5030B

Date Prep: 04/21/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
TPH-GRO (Gasoline Range Organic)	<100	5000	5997	120	61-138	ug/L	04/21/15 10:21	
Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	Limits	Units	Analysis Date	Flag
a,a,a-Trifluorotoluene	76		84		65-111	%	04/21/15 10:21	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8015C

Seq Number: 122009

Parent Sample Id: 15042020-001

Matrix: Ground Water

MS Sample Id: 15042020-001 S

Prep Method: SW5030B

Date Prep: 04/21/15

MSD Sample Id: 15042020-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
TPH-GRO (Gasoline Range Organic:	<100	5000	5724	114	4970	99	58-136	14	25	ug/L	04/21/15 11:39	
Surrogate			MS Result	MS Flag		MSD Result	MSD Flag	Limits		Units	Analysis Date	
a,a,a-Trifluorotoluene			83			83		65-111		%	04/21/15 11:39	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122062

MB Sample Id: 55118-1-BLK

Matrix: Water

LCS Sample Id: 55118-1-BKS

Prep Method: SW5030B

Date Prep: 04/22/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
Acetone	<10.00	50.00	33.72	67	53-146	ug/L	04/22/15 10:04	
Benzene	<1.000	50.00	56.90	114	77-122	ug/L	04/22/15 10:04	
Bromochloromethane	<1.000	50.00	55.61	111	71-122	ug/L	04/22/15 10:04	
Bromodichloromethane	<1.000	50.00	56.54	113	76-122	ug/L	04/22/15 10:04	
Bromoform	<5.000	50.00	50.61	101	69-115	ug/L	04/22/15 10:04	
Bromomethane	<1.000	50.00	46.54	93	40-147	ug/L	04/22/15 10:04	
2-Butanone (MEK)	<10.00	50.00	40.20	80	56-133	ug/L	04/22/15 10:04	
Carbon Disulfide	<10.00	50.00	55.36	111	62-134	ug/L	04/22/15 10:04	
Carbon Tetrachloride	<1.000	50.00	55.71	111	74-127	ug/L	04/22/15 10:04	
Chlorobenzene	<1.000	50.00	54.50	109	76-116	ug/L	04/22/15 10:04	
Chloroethane	<1.000	50.00	43.96	88	59-132	ug/L	04/22/15 10:04	
Chloroform	<1.000	50.00	54.09	108	71-118	ug/L	04/22/15 10:04	
Chloromethane	<1.000	50.00	40.15	80	62-131	ug/L	04/22/15 10:04	
Cyclohexane	<10.00	50.00	52.67	105	46-150	ug/L	04/22/15 10:04	
1,2-Dibromo-3-Chloropropane	<10.00	50.00	41.01	82	59-135	ug/L	04/22/15 10:04	
Dibromochloromethane	<1.000	50.00	49.32	99	75-114	ug/L	04/22/15 10:04	
1,2-Dibromoethane (EDB)	<1.000	50.00	51.56	103	78-121	ug/L	04/22/15 10:04	
1,2-Dichlorobenzene	<1.000	50.00	54.27	109	80-122	ug/L	04/22/15 10:04	
1,3-Dichlorobenzene	<1.000	50.00	54.11	108	80-122	ug/L	04/22/15 10:04	
1,4-Dichlorobenzene	<1.000	50.00	53.52	107	77-118	ug/L	04/22/15 10:04	
Dichlorodifluoromethane	<1.000	50.00	59.95	120	54-139	ug/L	04/22/15 10:04	
1,1-Dichloroethane	<1.000	50.00	52.03	104	51-136	ug/L	04/22/15 10:04	
1,2-Dichloroethane	<1.000	50.00	53.58	107	64-130	ug/L	04/22/15 10:04	
1,1-Dichloroethene	<1.000	50.00	46.89	94	59-123	ug/L	04/22/15 10:04	
cis-1,2-Dichloroethene	<1.000	50.00	56.36	113	77-119	ug/L	04/22/15 10:04	
1,2-Dichloropropane	<1.000	50.00	51.39	103	75-125	ug/L	04/22/15 10:04	
cis-1,3-Dichloropropene	<1.000	50.00	54.07	108	74-123	ug/L	04/22/15 10:04	
trans-1,3-Dichloropropene	<1.000	50.00	55.61	111	73-116	ug/L	04/22/15 10:04	
trans-1,2-Dichloroethene	<1.000	50.00	56.27	113	58-134	ug/L	04/22/15 10:04	
Ethylbenzene	<1.000	50.00	54.28	109	79-122	ug/L	04/22/15 10:04	
2-Hexanone	<10.00	50.00	37.43	75	56-134	ug/L	04/22/15 10:04	
Isopropylbenzene	<1.000	50.00	52.88	106	80-128	ug/L	04/22/15 10:04	
Methyl Acetate	<10.00	50.00	37.66	75	47-145	ug/L	04/22/15 10:04	
Methylcyclohexane	<10.00	50.00	58.40	117	61-155	ug/L	04/22/15 10:04	
Methylene Chloride	<1.000	50.00	47.59	95	61-126	ug/L	04/22/15 10:04	
4-Methyl-2-Pentanone	<5.000	50.00	42.98	86	45-145	ug/L	04/22/15 10:04	
Methyl-t-butyl ether	<1.000	50.00	50.59	101	30-168	ug/L	04/22/15 10:04	
Naphthalene	<1.000	50.00	42.36	85	46-154	ug/L	04/22/15 10:04	
Styrene	<1.000	50.00	56.04	112	73-118	ug/L	04/22/15 10:04	
1,1,2,2-Tetrachloroethane	<1.000	50.00	46.27	93	71-126	ug/L	04/22/15 10:04	
Tetrachloroethene	<1.000	50.00	57.98	116	78-113	ug/L	04/22/15 10:04	H
Toluene	<1.000	50.00	56.80	114	77-123	ug/L	04/22/15 10:04	
1,2,3-Trichlorobenzene	<1.000	50.00	50.60	101	66-140	ug/L	04/22/15 10:04	
1,2,4-Trichlorobenzene	<1.000	50.00	53.92	108	72-143	ug/L	04/22/15 10:04	
1,1,1-Trichloroethane	<1.000	50.00	57.87	116	66-133	ug/L	04/22/15 10:04	
1,1,2-Trichloroethane	<1.000	50.00	52.26	105	72-128	ug/L	04/22/15 10:04	
Trichloroethene	<1.000	50.00	56.52	113	72-127	ug/L	04/22/15 10:04	
Trichlorofluoromethane	<5.000	50.00	58.22	116	45-130	ug/L	04/22/15 10:04	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<1.000	50.00	49.48	99	56-126	ug/L	04/22/15 10:04	
Vinyl Chloride	<1.000	50.00	45.50	91	64-132	ug/L	04/22/15 10:04	
m,p-Xylenes	<2.000	100	110.3	110	78-119	ug/L	04/22/15 10:04	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122062

MB Sample Id: 55118-1-BLK

Matrix: Water

LCS Sample Id: 55118-1-BKS

Prep Method: SW5030B

Date Prep: 04/22/15

Parameter	MB Result	Spike Amount	LCS Result	LCS %Rec	Limits	Units	Analysis Date	Flag
o-Xylene	<1.000	50.00	56.52	113	79-123	ug/L	04/22/15 10:04	

Surrogate	MB %Rec	MB Flag	LCS Result	LCS Flag	Limits	Units	Analysis Date
4-Bromofluorobenzene	95		93		81-133	%	04/22/15 10:04
Dibromofluoromethane	104		105		84-110	%	04/22/15 10:04
Toluene-D8	102		101		94-109	%	04/22/15 10:04

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122062

Parent Sample Id: 15042020-001

Matrix: Ground Water

MS Sample Id: 15042020-001 S

Prep Method: SW5030B

Date Prep: 04/22/15

MSD Sample Id: 15042020-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
Acetone	<10.00	50.00	31.59	63	39.81	80	41-161	23	25	ug/L	04/22/15 13:33	
Benzene	<1.000	50.00	57.65	115	59.31	119	75-132	3	25	ug/L	04/22/15 13:33	
Bromochloromethane	<1.000	50.00	55.04	110	57.90	116	67-130	5	25	ug/L	04/22/15 13:33	
Bromodichloromethane	<1.000	50.00	56.85	114	58.84	118	69-134	3	25	ug/L	04/22/15 13:33	
Bromoform	<5.000	50.00	49.83	100	53.31	107	65-115	7	25	ug/L	04/22/15 13:33	
Bromomethane	<1.000	50.00	49.29	99	49.96	100	29-154	1	25	ug/L	04/22/15 13:33	
2-Butanone (MEK)	<10.00	50.00	37.35	75	46.65	93	47-140	22	25	ug/L	04/22/15 13:33	
Carbon Disulfide	<10.00	50.00	57.78	116	55.51	111	59-146	4	25	ug/L	04/22/15 13:33	
Carbon Tetrachloride	<1.000	50.00	56.74	113	58.34	117	74-136	3	25	ug/L	04/22/15 13:33	
Chlorobenzene	<1.000	50.00	54.56	109	56.55	113	78-115	4	25	ug/L	04/22/15 13:33	
Chloroethane	<1.000	50.00	45.87	92	46.90	94	40-150	2	25	ug/L	04/22/15 13:33	
Chloroform	<1.000	50.00	54.77	110	56.16	112	67-130	3	25	ug/L	04/22/15 13:33	
Chloromethane	<1.000	50.00	40.49	81	46.01	92	59-144	13	25	ug/L	04/22/15 13:33	
Cyclohexane	<10.00	50.00	53.18	106	54.00	108	34-161	2	25	ug/L	04/22/15 13:33	
1,2-Dibromo-3-Chloropropane	<10.00	50.00	38.57	77	45.99	92	45-125	18	25	ug/L	04/22/15 13:33	
Dibromochloromethane	<1.000	50.00	48.32	97	51.92	104	73-114	7	25	ug/L	04/22/15 13:33	
1,2-Dibromoethane (EDB)	<1.000	50.00	50.45	101	55.05	110	72-126	9	25	ug/L	04/22/15 13:33	
1,2-Dichlorobenzene	<1.000	50.00	53.55	107	57.57	115	73-117	7	25	ug/L	04/22/15 13:33	
1,3-Dichlorobenzene	<1.000	50.00	54.38	109	57.59	115	73-117	6	25	ug/L	04/22/15 13:33	
1,4-Dichlorobenzene	<1.000	50.00	53.79	108	57.12	114	72-111	6	25	ug/L	04/22/15 13:33	X
Dichlorodifluoromethane	<1.000	50.00	60.69	121	60.02	120	47-159	1	25	ug/L	04/22/15 13:33	
1,1-Dichloroethane	<1.000	50.00	53.20	106	54.18	108	44-152	2	25	ug/L	04/22/15 13:33	
1,2-Dichloroethane	<1.000	50.00	53.86	108	56.30	113	60-142	4	25	ug/L	04/22/15 13:33	
1,1-Dichloroethene	<1.000	50.00	50.16	100	49.31	99	50-136	2	25	ug/L	04/22/15 13:33	
cis-1,2-Dichloroethene	<1.000	50.00	56.38	113	58.02	116	76-127	3	25	ug/L	04/22/15 13:33	
1,2-Dichloropropane	<1.000	50.00	52.55	105	53.84	108	70-139	2	25	ug/L	04/22/15 13:33	
cis-1,3-Dichloropropene	<1.000	50.00	53.30	107	55.88	112	64-127	5	25	ug/L	04/22/15 13:33	
trans-1,3-Dichloropropene	<1.000	50.00	54.79	110	57.37	115	62-123	5	25	ug/L	04/22/15 13:33	
trans-1,2-Dichloroethene	<1.000	50.00	57.05	114	57.90	116	54-144	1	25	ug/L	04/22/15 13:33	
Ethylbenzene	<1.000	50.00	54.52	109	56.82	114	74-129	4	25	ug/L	04/22/15 13:33	
2-Hexanone	<10.00	50.00	34.93	70	43.18	86	50-130	21	25	ug/L	04/22/15 13:33	
Isopropylbenzene	<1.000	50.00	53.76	108	56.06	112	72-130	4	25	ug/L	04/22/15 13:33	
Methyl Acetate	<10.00	50.00	36.73	73	41.15	82	37-143	11	25	ug/L	04/22/15 13:33	
Methylcyclohexane	<10.00	50.00	57.53	115	59.04	118	55-148	3	25	ug/L	04/22/15 13:33	
Methylene Chloride	<1.000	50.00	49.49	99	47.92	96	56-137	3	25	ug/L	04/22/15 13:33	
4-Methyl-2-Pentanone	<5.000	50.00	39.43	79	48.96	98	44-133	22	25	ug/L	04/22/15 13:33	
Methyl-t-butyl ether	<1.000	50.00	47.30	95	52.49	105	22-182	10	25	ug/L	04/22/15 13:33	
Naphthalene	<1.000	50.00	38.60	77	46.26	93	7-137	18	25	ug/L	04/22/15 13:33	
Styrene	<1.000	50.00	57.05	114	57.37	115	67-121	1	25	ug/L	04/22/15 13:33	
1,1,2,2-Tetrachloroethane	<1.000	50.00	45.51	91	51.24	102	68-127	12	25	ug/L	04/22/15 13:33	
Tetrachloroethene	<1.000	50.00	57.90	116	59.09	118	69-126	2	25	ug/L	04/22/15 13:33	
Toluene	<1.000	50.00	57.09	114	58.29	117	74-132	2	25	ug/L	04/22/15 13:33	
1,2,3-Trichlorobenzene	<1.000	50.00	46.44	93	52.99	106	9-139	13	25	ug/L	04/22/15 13:33	
1,2,4-Trichlorobenzene	<1.000	50.00	49.90	100	55.59	111	31-135	11	25	ug/L	04/22/15 13:33	
1,1,1-Trichloroethane	<1.000	50.00	58.14	116	61.19	122	70-138	5	25	ug/L	04/22/15 13:33	
1,1,2-Trichloroethane	<1.000	50.00	52.79	106	54.66	109	65-143	3	25	ug/L	04/22/15 13:33	
Trichloroethene	<1.000	50.00	56.87	114	58.37	117	67-139	3	25	ug/L	04/22/15 13:33	
Trichlorofluoromethane	<5.000	50.00	61.30	123	60.88	122	37-147	1	25	ug/L	04/22/15 13:33	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<1.000	50.00	53.74	107	53.41	107	47-139	1	25	ug/L	04/22/15 13:33	
Vinyl Chloride	<1.000	50.00	47.48	95	50.53	101	60-146	6	25	ug/L	04/22/15 13:33	
m,p-Xylenes	<2.000	100	110.9	111	113.9	114	78-119	3	25	ug/L	04/22/15 13:33	

PHASE SEPARATION SCIENCE, INC.

QC Summary 15042020

GeoConcepts Engineering, Inc.
VRE Alexandria Station

Analytical Method: SW-846 8260 B

Seq Number: 122062

Parent Sample Id: 15042020-001

Matrix: Ground Water

MS Sample Id: 15042020-001 S

Prep Method: SW5030B

Date Prep: 04/22/15

MSD Sample Id: 15042020-001 SD

Parameter	Parent Result	Spike Amount	MS Result	MS %Rec	MSD Result	MSD %Rec	Limits	%RPD	RPD Limit	Units	Analysis Date	Flag
o-Xylene	<1.000	50.00	57.15	114	57.79	116	80-123	1	25	ug/L	04/22/15 13:33	

Surrogate

	MS Result	MS Flag	MSD Result	MSD Flag	Limits	Units	Analysis Date
4-Bromofluorobenzene	95		95		81-133	%	04/22/15 13:33
Dibromofluoromethane	106		104		84-110	%	04/22/15 13:33
Toluene-D8	101		99		94-109	%	04/22/15 13:33

F = RPD exceeded the laboratory control limits

X = Recovery of MS, MSD or both outside of QC Criteria

H= Recovery of BS,BSD or both exceeded the laboratory control limits

L = Recovery of BS,BSD or both below the laboratory control limits

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

1 CLIENT: GeoConcepts		OFFICE LOC. 18955 Highland Vista Dr., Suite 170, Ashburn, VA 20147		PSS Work Order #: 15042020		PAGE 1 OF 1									
PROJECT MGR: Josh April		PHONE NO.: 571.421.7839		Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil WL=Waste Liquid WS=Waste Solid W= Wipe											
EMAIL: jApril@geoconcepts-eng.com		FAX NO.:		No. CONTAINERS											
PROJECT NAME: VRE Alexandria Station		PROJECT NO.:		SAMPLE TYPE		HCL HCL									
SITE LOCATION: Alexandria, VA		P.O. NO.: 12170		C = COMP		TPH-DRO TPH-GRO VOCs Cl Na Mg SO4									
SAMPLERS: LB		DW CERT NO.:		G = GRAB		Preservative Used ←									
LAB NO.		SAMPLE IDENTIFICATION		DATE		TIME		MATRIX (See Codes)		Analysis/Method Required					
1		GZ-9		4-19-15		PM		GW		REMARKS ↓					
2		GZ-9		4-19-15		PM		GW		Please preserve Na/Mg upon arrival					
3		GZ-9		4-19-15		PM		GW							
4		GZ-9		4-19-15		PM		GW							
5		GZ-9		4-19-15		PM		GW							
Relinquished By: (1)		Date		Time		Received By:		Requested Turnaround Time		# of Coolers:					
Jenny Dfge		4/20/15		3:45pm		J. P. [Signature]		5-Day 3-Day 2-Day		Custody Seal: ABS					
Relinquished By: (2)		Date		Time		Received By:		Next Day Emergency Other		Data Deliverables Required:					
										Ice Present: PRES Temp: 40					
Relinquished By: (3)		Date		Time		Received By:				Shipping Carrier: CLIENT					
										Special Instructions:					
Relinquished By: (4)		Date		Time		Received By:									

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	15042020	Received By	Rachel Davis
Client Name	GeoConcepts Engineering, Inc.	Date Received	04/20/2015 03:45:00 PM
Project Name	VRE Alexandria Station	Delivered By	Client
Disposal Date	05/25/2015	Tracking No	Not Applicable
		Logged In By	Rachel Davis

Shipping Container(s)

No. of Coolers 1

		Ice	Present
Custody Seal(s) Intact?	N/A	Temp (deg C)	4
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	<u>LB</u>
Chain of Custody	Yes	MD DW Cert. No.	<u>N/A</u>

Sample Container

Appropriate for Specified Analysis?	Yes	Custody Seal(s) Intact?	Not Applicable
Intact?	Yes	Seal(s) Signed / Dated	Not Applicable
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 1

Total No. of Containers Received 11

Preservation

Metals	(pH<2)	No
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	Yes
Do VOA vials have zero headspace?		Yes
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A

Comments: (Any "No" response must be detailed in the comments section below.)

For any improper preservation conditions, list sample ID, preservative added (reagent ID number) below as well as documentation of any client notification as well as client instructions. Samples for pH, chlorine and dissolved oxygen should be analyzed as soon as possible, preferably in the field at the time of sampling. Samples which require thermal preservation shall be considered acceptable when received at a temperature above freezing to 6°C. Samples that are hand delivered on the day that they are collected may not meet these criteria but shall be considered acceptable if there is evidence that the chilling process has begun such as arrival on ice.

Preserved metals container upon receipt with HNO3.

Samples Inspected/Checklist Completed By:

Rachel Davis

Rachel Davis

Date: 04/20/2015

PM Review and Approval:

NJ Jackson

Lynn Jackson

Date: 04/21/2015

6630 Baltimore National Pike
Baltimore, MD 21228
Phone: (410) 747-8770
Fax: (410) 788-8723

PHASE SEPARATION SCIENCE, INC.



04/21/2015

Josh April
GeoConcepts Engineering, Inc.
19955 Highland Vista Dr.
Ashburn, VA 20147

Please find the attached Confirmation of Sample Receipt for samples received by Phase Separation Science (PSS) on 04/20/2015. The samples have been logged in for a 5 Days turnaround with results due 04/27/2015. The following is our understanding of your project requirements as described on the enclosed chain of custody form. Reissuing final reports due to changes to any of the conditions listed in this confirmation of sample receipt may be subject to additional fees. To ensure that your needs are met, please take a moment to verify that:

1. The number and type of samples received are correct.
2. The Client Sample ID is correct.
3. The analytical methods specified are correct.
4. Due dates for analytical results are correct.
5. Address, phone and fax information are correct.

PSS reserves the right to return any unused samples, extracts or related solutions that have been identified as hazardous waste, are controlled substances under regulated protocols or have sample sizes exceeding standard analytical practices.

If there are any questions, please do not hesitate to contact the laboratory at (410) 747-8770 and reference laboratory identification number **15042020**



Phase Separation Science, Inc

Confirmation of Sample Receipt

The following samples were received on 04/20/2015 at 15:45 and will be analyzed as follows:

Work Order#: # 15042020

Client: GeoConcepts Engineering, Inc.

Lab PM: Simon Crisp

Project ID: N/A

Project Name: VRE Alexandria Station

Location: Alexandria, VA

Turnaround: 5 Days

Results Due: 04/27/2015 at 17:00

Report to: Josh April

EDD Type: PSS_EXCEL_CAS

Data Package: COA due 04/27/15

Regulation: No Flags

Sample Disposal Date: 05/25/2015

Client Sample ID	Lab ID	Method Name (Analysis) / Method	Mtx	Sampled
GZ-9	15042020-001	Inorganic Anions / E300.0	Ground Water	04/19/15 09:45
GZ-9	15042020-001	TCL Volatile Organic Compounds / SW8260B	Ground Water	04/19/15 09:45
GZ-9	15042020-001	Total Metals / SW6020	Ground Water	04/19/15 09:45
GZ-9	15042020-001	Total Petroleum Hydrocarbons - DRO / SW8015DRO	Ground Water	04/19/15 09:45
GZ-9	15042020-001	Total Petroleum Hydrocarbons-GRO / SW8021B_SW8015	Ground Water	04/19/15 09:45

Analytical Method

E300.0

Matrix

WATER

Analytes of Interest

Chloride
Sulfate

SW6020

WATER

Magnesium
Sodium

Special Instructions:

Preserved metals container upon receipt with HNO₃.

These samples are scheduled for disposal, without any further notice, on the date stated above. This includes any samples that were received with a request to be held, but lacked a specific hold period. It is your responsibility to provide a written request defining a specific disposal date, if additional storage is required. Upon receipt, the request will be acknowledged by PSS, thus extending the storage period. Each sample which is retained will incur a sample storage fee of \$5.00 per month.

SAMPLE CHAIN OF CUSTODY/AGREEMENT FORM

PHASE SEPARATION SCIENCE, INC.

www.phaseonline.com
email: info@phaseonline.com

1 CLIENT: GeoConcepts		OFFICE LOC. 18955 Highland Vista Dr., Suite 170, Ashburn, VA 20147		PSS Work Order #: 15042020		PAGE 1 OF 1									
PROJECT MGR: Josh April		PHONE NO.: 571.421.7839		Matrix Codes: SW=Surface Wtr DW=Drinking Wtr GW=Ground Wtr WW=Waste Wtr O=Oil S=Soil WL=Waste Liquid WS=Waste Solid W= Wipe											
EMAIL: jApril@geoconcepts-eng.com		FAX NO.:		No. CONTAINERS											
PROJECT NAME: VRE Alexandria Station		PROJECT NO.:		SAMPLE TYPE		HCL HCL									
SITE LOCATION: Alexandria, VA		P.O. NO.: 12170		C = COMP		TPH-DRO TPH-GRO VOCs Cl Na Mg SO4									
SAMPLERS: LB		DW CERT NO.:		G = GRAB		Preservative Used ←									
LAB NO.		SAMPLE IDENTIFICATION		DATE		TIME		MATRIX (See Codes)		Analysis/Method Required					
1		GZ-9		4-19-15		0945 PM		GW		REMARKS ↓					
2		GZ-9		4-19-15		PM		GW		Please preserve Na/Mg upon arrival					
3		GZ-9		4-19-15		PM		GW							
4		GZ-9		4-19-15		PM		GW							
5		GZ-9		4-19-15		PM		GW							
Relinquished By: (1)		Date		Time		Received By:		Requested Turnaround Time		# of Coolers:					
Relinquished By: (2)		Date		Time		Received By:		5-Day 3-Day 2-Day Next Day Emergency Other		Custody Seal: ABS					
Relinquished By: (3)		Date		Time		Received By:		Data Deliverables Required:		Ice Present: PRES Temp: 40 Shipping Carrier: CLIENT					
Relinquished By: (4)		Date		Time		Received By:		Special Instructions:							

6630 Baltimore National Pike • Route 40 West • Baltimore, Maryland 21228 • (410) 747-8770 • (800) 932-9047 • Fax (410) 788-8723

The client (Client Name), by signing, or having client's agent sign, this "Sample Chain of Custody/Agreement Form", agrees to pay for the above requested services per the latest version of the Service Brochure or PSS-provided quotation including any and all attorney's or other reasonable fees if collection becomes necessary.



Phase Separation Science, Inc

Sample Receipt Checklist

Work Order #	15042020	Received By	Rachel Davis
Client Name	GeoConcepts Engineering, Inc.	Date Received	04/20/2015 03:45:00 PM
Project Name	VRE Alexandria Station	Delivered By	Client
Disposal Date	05/25/2015	Tracking No	Not Applicable
		Logged In By	Rachel Davis

Shipping Container(s)

No. of Coolers 1

		Ice	Present
Custody Seal(s) Intact?	N/A	Temp (deg C)	4
Seal(s) Signed / Dated?	N/A	Temp Blank Present	No

Documentation

COC agrees with sample labels?	Yes	Sampler Name	LB
Chain of Custody	Yes	MD DW Cert. No.	N/A

Sample Container

Appropriate for Specified Analysis?	Yes	Custody Seal(s) Intact?	Not Applicable
Intact?	Yes	Seal(s) Signed / Dated	Not Applicable
Labeled and Labels Legible?	Yes		

Total No. of Samples Received 1

Total No. of Containers Received 11

Preservation

Metals	(pH<2)	No
Cyanides	(pH>12)	N/A
Sulfide	(pH>9)	N/A
TOC, COD, Phenols	(pH<2)	N/A
TOX, TKN, NH3, Total Phos	(pH<2)	N/A
VOC, BTEX (VOA Vials Rcvd Preserved)	(pH<2)	Yes
Do VOA vials have zero headspace?		Yes
624 VOC (Rcvd at least one unpreserved VOA vial)		N/A

Comments: (Any "No" response must be detailed in the comments section below.)

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